

Product Name: CS/386 Turbo System

Date Available: October 1, 1991

Where Available: Worldwide

How To Order: Normal Ordering Channels

Model Number	Description
CS/386-400N	4MB CS/386 Turbo CPU
CS/386-800N	8MB CS/386 Turbo CPU
CS/386-1600N	16MB CS/386 Turbo CPU
CS/386-3200N	32MB CS/386 Turbo CPU
2236MXF	16-port Terminal I/O Controller
22C11-HS	High-Speed Printer/Disk Controller
2236MXF- CABLE	MXF 7 PORT OCTOPUS CABLE
MICROVP-TURBO	MICROVP To 4MB CS/386 Turbo CPU
CS-TURBO	CS To 4MB CS/386 Turbo CPU
CS-N-TURBO	CS-N+CS/386-N To 4MB CS/386 Turbo CPU
CS-D-TURBO	CS-D+CS/386-D To 4MB CS/386 Turbo CPU

NOTE: For Turbo models greater than 4MB, you must add one of the following at the same time you order a Turbo upgrade.

UJ-6059	4MB CS/386 TURBO to 8MB Turbo Memory
UJ-6060	4MB CS/386 TURBO to 16MB Turbo Memory
UJ-6061	4MB CS/386 TURBO to 32MB Turbo Memory

Subsequent Field Upgrades

UJ-6067	4MB To 8MB CS/386 Turbo CPU Memory Upgrade
UJ-6068	4MB To 16MB CS/386 Turbo CPU Memory Upgrade
UJ-6069	4MB To 32MB CS/386 Turbo CPU Memory Upgrade
UJ-6070	8MB To 16MB CS/386 Turbo CPU Memory Upgrade
UJ-6071	8MB To 16MB CS/386 Turbo CPU Memory Upgrade
UJ-6072	16MB To 32MB CS/386 Turbo CPU Memory Upgrade

CS/TURBO-CK-xx	Country Kit for all CS/386 Turbo models. Country codes (xx): AE, AG, AS, AU, AZ, BF, CA, CF, DA, FI, FL, GE, HK, IC, IT, NL, NO, PO, SF, SG, SI, SL, SP, SW, TU, UK, US, UV.
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Replaces: The CS/386-40N, CS/386-80N, CS/386-40D and CS/386-80D as these models, will be replaced by the new high-speed 4 and 8MB Turbo models, e.g., the CS/386-400N and CS/386-800N.

Discontinued/Obsolete Products:

Discontinued Prod. (model number)	Description	Replaced By (model number)	Effective Date
CS-10D	1MB VLSI CPU	CS/386-10D	10/1/91
CS-10N	1MB VLSI CPU	CS/386-10N	10/1/91
CS/386-40D	4MB 386 CPU	CS/386-400N	10/1/91
CS/386-40N	4MB 386 CPU	CS/386-400N	10/1/91
CS/386-80D	8MB 386 CPU	CS/386-800N	10/1/91
CS/386-80N	8MB 386 CPU	CS/386-800N	10/1/91

PRODUCT ABSTRACT

The CS/386 Turbo System will consist of a CS/386-N chassis with a new CPU board and a new Mother Board. The field upgrade kits come with a new CPU board and one of two new Mother Boards (one for MicroVP and CS chassis and one for CS-D/N and CS/386-D/N chassis). In order to take advantage of the new high-speed I/O channels, both new CPUs and field upgrades, require a 2236MXF 16-port I/O Controller and the 22C11-HS high-speed printer/disk I/O controller.

Highlights:

CS/386 CPU/Mother Board

- . 80386-33MHz Processor.
- . Control memory contains 256KB of 32-bit words.
- . 32-byte address and data memory bus.
- . 2200 I/O bus interface.
- . 4 to 32MB of RAM. Any combinations can be allocated to user memory or RAMdisk.
- . Up to 64 partitions of any memory size. Example, on a 32MB system, you can have up to a single 32MB partition or 64 500KB partitions.
- . Can handle 32-users/64-tasks, at the same level of performance that a CS/386 can handle 16/16.
- . Any number of partitions, of any size, can be a global partition.
- . Battery backed-up real-time clock.
- . CPU Board compatible with existing VLSI and CS/386 systems, e.g. existing VLSI and CS/386 CPUs can be field upgraded.
- . Mother Board is compatible with all existing VLSI and CS/386 controllers.
- . Software compatible with all other 2200 CPUs.

2236MXF

- . 80286 12MHz coprocessor.
- . 256K SRAM.
- . Supports 16 workstations per MXF, a maximum of 4 2236MXFs or a total of 4 MXEs and MXFs combined, per system.
- . 2 regular RS-232 ports and 2 concentrators that support 7 workstations per concentrator, through a 7-port octopus cable per concentrator.

22C11-HS

- . 80286 12MHz coprocessor.
- . 256K RAM.
- . Supports 1 disk port, 1 printer port and 1 multiplexing port (connection to a 2275MUX, 22C03-SCSI or the DPU of a CS-D or CS/386-D to allow these devices to work through and take advantage of the high-speed I/O channel).

CONFIGURATION INFORMATION

CS/386 Turbo Systems can either be sold as new CPUs or as field upgrades to existing VLSI or CS/386 systems. A new CPU is necessary if:

- . A new user of 2200 hardware.
- . A current user of a CPU that can not be field upgraded, e.g., a 2200, VP, SVP, LVP or MVP, e.g., a non-VLSI CPU.

Existing users of MICROVPs, CSs, CS-D/Ns or CS/386-D/Ns, e.g., VLSI or CS/386 CPUs, can field upgrade their CPU(s) to a CS/386 Turbo.

Customers ordering a CS/386-400N through CS/386-3200N, will receive a CS-N chassis with the new Turbo CPU and Mother Board. End-users ordering MICROVP-TURBO, CS-TURBO, CS-N-TURBO and CS-D-TURBO, will receive a CPU Board and the correct size Mother Board for their CPU.

Whether or not the end-user is ordering a new CPU or a upgrade kit, a 2236MXF and 22C11-HS must be ordered if they plan to take advantage of the new high-speed I/O. If the end-user just needs the faster CPU speed, current 2236MXEs and 22C11s will operate in 8-bit mode.

Required Components

The CS/386-400N through CS/386-3200N is only available as a new CPU in the N chassis. Therefore, a DS or equivalent storage is need for disk storage.

Optional Components

- . The 2236MXF has 2 regular RS-232 ports and 2 36-pin concentrators that support 7 workstations each using a 7-port octopus cable (part # 421-0181) per concentrator. Each 2236MXF will be shipped with one octopus. If planning to use more than 9 workstations per 2236MXF, an additional octopus cable must be ordered from WangDirect as part number 200-2650).
- . If the end-user desires memory greater than 4MB when updating a VLSI CPU or a CS/386 CPU to a CS/386 TURBO, it will be necessary to also order (at the same time) UJ-6059 (8MB), UJ-6061 (16MB) or UJ-6061 (16MB). For memory upgrades after the initial upgrade to a CS/386 Turbo, use UJ numbers 6067 through 6072.
- . The CS/386-400N through CS/386-3200N is only available as a new CPU in the N chassis. Therefore, if the customer wants to have a new CS/386 Turbo in a CS/386-D chassis, order a UJ-6047, CS-N to CS-D chassis update, with a CS/386-400N through CS/386-3200N CPU.
- . By running a cable from the external disk port on the external DPU to the disk port on the 22C11-HS, the internal storage devices of a D chassis, will be able to take advantage of the high-speed disk I/O channel.
- . If the end-user wishes to use both the 22C11-HS and a 2275 Multiplexor, e.g., more than 1 CPU to use a DS, run a cable from the MUX port on the 22C11-HS to a 22C80 port on the 2275MUX. You than plug the DS or equivalent storage device into the disk port on the 2275MUX.
- . The CS/386 Turbo also functions in 3-byte addressing mode, e.g., you are no longer limited to a 16MB maximum per disk platter address. To have disk platters of any size, requires a DS with a Revision Level 4 Prom.

Software

CS/386 Turbo systems and Turbo upgrade kits will be shipped with the CS/386 Turbo operating system, Release 1.0.

Product Restrictions

Only the 2 RS-232 ports on the 2236MXF support asyc. communications.

If using a mixture of 2236MXFs and 2236MXEs, the MXEs must be assigned the last partitions. An example is if using 1 MXF and 1 MXE, partitions 1-16 are on the MXF and 17-20 on the MXE. A system will support a maximum combination of 4 MXE/MXF controllers.

As the CS/386, partitions sizes are required to be 80% larger than a 2200 or VLSI partition.

INSTALLATION

As all other 2200 products. CS/386 Turbo products are Wang installed.

SUPPORT SERVICES

Current Wang Software Services (WSS) 2200 support policies and services apply. Refer to the Support Services Section of the latest Pricing Manual.

Customer Warranty

The CS/386 Turbo products are warranted to be free from defects in materials or workmanship for a period of 90 days from date of installation. Warranty is in accordance with terms and conditions in effect at the time of sales.

On-Site Maintenance Agreement

On-Site (Plan A); Wang's standard on-site maintenance agreement, provides for 12 months of on-site service.

Per-Call On-Site Service

Per-Call On-Site service is available on a time and material basis. Customers who wish to use this service should call the nearest Regional Call Control Center toll-free number to arrange for a service appointment.

DOCUMENTATION

Available Auto-Enclosed and through Wang Express.

Part Number	Description	Auto Enclosed	Wang Express
715-3947	CS/386 Turbo Data Sheet	No	Yes
741-1769-4	CS/386 Turbo Maintenance Manual	No	No
700-4080F	Multiuser BASIC-2 Language Reference Manual	Yes	Yes
715-3949	BASIC-2 Utilities Reference Manual	Yes	Yes
715-2364A	CS/TURBO User's Guide	Yes	Yes

Objectives/Product Strategy

The question that will most be asked is "Now that we are successfully migrating 2200 users to our SCO Unix platform using the NIAKWA Basic-2C Compiler and very shortly to the RS/6000, why do we need another model of the 2200?" Recent experiences selling NIAKWA/Unix have shown that not all users want to migrate off the 2200. Their reasons vary from the cost associated with migrating to another hardware platform, to not having the level of sophistication to handle Unix, or out in out refusing to give up their 2200. Where they won't buy a Unix system, they will buy a bigger and better 2200 product, or at least a set of boards to upgrade their present system.

Therefore, it is our hypothesis that 2200 users can be broken into 3 categories:

1. Does not want to leave the 2200 hardware platform.
2. Wants to leave the 2200 hardware platform.
3. Will accept the platform that best suits their needs as long as they can use their existing software.

It is for these reasons, Wang has opted to offer our 2200 users and VARs, alternative methods of protecting their investments in their BASIC-2 software. Hence, our BASIC-2 Platform Strategy approach. The objective of the BASIC-2 platform is to develop and maintain a series of industry standard hardware platforms that support the Wang BASIC-2 and the third party Basic-2 compilers (NIKWA and KCML), through both proprietary (BASIC-2) and non-proprietary (Unix) operating systems.

There are three major product series in the BASIC-2 platform:

- | | |
|-------------------|---|
| CS/386 Turbo: | The new INTEL 80386 (33MHz, 32-user/64 task CPUs and associated peripherals), designed to replace the 2200 VLSI series of CPUs. |
| Basic-2 Compilers | Basic-2C and KCML are BASIC-2 compilers that allows 2200 applications to run under SCO Unix or AIX on the IBM RS/6000. |
| PC2200: | PC2200 is a 2200 terminal emulator that allows an CS/386, CS, MICROVP, 2200 or Unix products to use a Wang PC or other XT or AT compatible Personal Computer as a CS/2200 terminal. PC2200 also provides the integration of BASIC-2 and MS-DOS and/or Unix functionality. |

In summary, the announcement of the CS/386 Turbo enhances our ultimate goal of offering our end users and VARs, the opportunity to migrate to the Wang hardware platform of their choice.



CS/386 Turbo

Early Performance Reports

by **Steve Shoesmith**

The CS/Turbo is finally a shipping product! This is great news for my CS/2200 users and a victory for the decimated CS/2200 staff now left at Wang.

"But, wait!" you say. Wasn't the initial release of the CS/386 a disaster? Yes, it was. I know because I was on the "bleeding edge" too with customers waiting months for a stable operating system.

Not wanting to go through that again, I asked for the names of beta test sites so that I could call and get the user's perspective. The news is good.

Mark DeGagne, a consultant to Budget Rent-A-Car in Canada, has found the Turbo to be "very, very stable".

The Turbo at this site shares disk space with CS/386's in a system supporting 100 users. SELECT H ON works even in a system this complicated. Mark tells me the machine has been in production use for 2 weeks.

The Turbo operating system shares a large portion of code with the CS/386 version. There are changes and additions to accommodate the new internal bus and peripherals. This OS has been undergoing testing at Wang and at test sites for as much as 14 months.

The folks at Rader Company in Portland, Oregon have tested their Turbo and they are pleased with its speed. They report that they have found no problems with stability. However, their Turbo is not yet in production use.

These users confirm that the Turbo is twice as fast as the CS/386 as expected (16 Mhz. Vs. 33 Mhz). Rader Company

found that some CPU operations were more than twice as fast.

This is not to say that the Turbo is perfect. Wang decided not to implement all of the \$GIO command set. Only the more "common" commands were included. Rader uses DATA 3500 extensively and DATA 3500 uses some "uncommon" \$GIOs.

The last word from Rader was that Wang was fixing this problem-but still not implementing all of \$GIO.

Editor's Note: Both Wang and the beta sites have reported that this \$GIO problem has been recently fixed.

troller throughput. The conditions of the test are as follows:

- Using DATA LOAD BM.
- Reading from sector zero each time.
- No other users on the system

This controller will have all of the features of the Rcv 4 prom in the DS cabinet:

- Variable platter sizes.
- 24 bit sector addressing.
- Compliant with the use of SELECT H ON.

Remember, the Turbo has a new internal bus which is much, much faster than the old bus. With the old bus, fast disk drivers were irrelevant. Throughput was limited to about 70,000 Bytes/sec. With the new bus, faster drives become a worthwhile investment.

And what can you hang on this controller? According to Mike Riley at Wang, driver software for HP, Micropolis, ~~Conner~~ ~~Peripheral~~ and Seagate drives will be available. You may put seven devices on this controller: 4 hard

drives, 150 Meg tapes and floppies. A larger capacity tape and a WORM drive are in the works. The Turbo will be a complete product only when this controller is available.

The Turbo may not win back many VARs. But, it is an excellent upgrade for CS/2200 users.

It is price and performance competitive with 386/486 UNIX systems without the expense and problems of converting to a very complex OS. **B2R**

Steve Shoesmith is the owner of Softworks, a systems integrator combining custom software and Wang CS/2200 hardware for professional photofinishing laboratories. He can be reached at 1510 W. Hemlock St, Oxnard, CA 93035, (805) 984-1631, FAX (805) 984-2111

Performance Graph

While Mark's client also has a problem with DATA 3500, his greatest criticism of the Turbo is that the SCSI controller is not yet available.

You can consolidate 2 CS/386's into 1 Turbo for simplicity without loss of performance. But, you won't gain any increase in system throughput due to the limited speed of current disk controllers.

The SCSI controller is not far off. Beta testing will begin this month (December). Jim Detman of ON-Line Systems tested the SCSI controller at Wang in November. He provided me with some preliminary performance data. In the graph above there are 2 curves; a Turbo/SCSI curve and a CS-D/DS curve. The graph shows a tremendous increase in disk con-

To : Distribution

From: Gene Schulz

Subj: BASIC-2 REPORT CS/386 TURBO Product Review

Date: April 3, 1992

The following is a reprint of the CS/386 TURBO Product Review that will appear in the 2nd Quarter 1992 issue of BASIC-2 REPORT, next week:

"We recently installed Wang's new TURBO CS/386 here at the BASIC-2 REPORT. We found this box so noteworthy that we wanted to share our experiences with you.

I LOVE THE NEW TURBO. But they say love is blind. There will always be a soft spot in my heart for the old 2200, so I should warn you that this is probably not a complete impartial review. I admit that I'm more inclined to overlook delays and start up problems.

We're excited simply because Wang had advanced the product line that launched BASIC-2. The simple fact that there is a TURBO is news by itself. However, when you discover that the TURBO is also a good computer, it just makes this experience that much better. We are obviously impressed with the TURBO. It's fast and it works great. It's also priced right.

We're hardcore UNIX fans, but we realize that UNIX is not the best choice for everyone. There are many 2200 users who should not migrate to UNIX because it can be more expensive. For those folks, to migrate to UNIX or Novell means buying an operating system and a new version of BASIC-2. Depending on the number of terminals, just the new operating system (Novell, UNIX, etc.) and a new version of BASIC-2 often costs more than the TURBO alone.

Wang does not charge for the new BASIC-2, nor do they need a separate operating system. You can still use old terminals, printers, disks and old controller boards. In fact, we can even reinstall the old CS or CS/386 boards, and reload older versions of BASIC-2 to support our clients who have not migrated yet.

We are benchmark testing the TURBO in phases and are not done yet. But since we are now a quarterly publication we didn't want to wait to share some of the results.

Our first phase tested with only older boards like the MXE/MXD multiplexers and disk controllers. They worked just fine and the TURBO was still pretty fast.

We then replaced the old controllers with Wang's new TURBO boards and noticed a big jump in performance. With the MXF controller, we could let PC2200 run our 386/486 PCs at 38,400 baud. WOW! What a difference that makes. The new disk controller also improved performance too. We're still using our old DS cabinet without the new R-4 PROM. Once we send this issue to the printers, we

will install the new PROM which lets us reconfigure our DS drive for beyond 16 meg platter sizes. The PROM also changes how disks are addressed. Instead of conventionally having sectors arranged one after another on the same platter, the R-4 uses a cylinder concept and puts the next sector on another platter. Its supposed to add another jump in disk performance. We're anxious to find out.

We also got Wang's new SCSI controller. We're also buying a 210 meg SCSI drive for about \$604 at our local computer store to test in a few weeks. Its also expected to yield an additional 25% increase in overall performance.

Our initial tests suggest that the TURBO is 5.3 times faster than a standard 2200 and about 2.5 times faster than the CS/386. We expect the TURBO's performance to be even better after we install the R-4 PROM and SCSI drive. Needless to say, we're very impressed. We'll publish our final results in the next issue, but here's what we've seen so far." Tim VeArd

<u>CPU</u>	<u>AIMS Remember</u> <u>Process with</u> <u>37 steps</u>	<u>AIMS FM</u> <u>Sort 850</u> <u>Records</u>
—		
CS/2200	39.15 min	57 sec
CS/386	15.54 min	25 sec
CS/386 TURBO	7.33 min	17 sec

To : Distribution

From: Gene Schulz

Subj: CS/386 TURBO Pricing

Date: September 23, 1991

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>PRICE</u>	<u>MAINT</u>
CS/386-400N	4MB CS/386 Turbo CPU	7,500	65
CS/386-800N	8MB CS/386 Turbo CPU	8,500	65
CS/386-1600N	16MB CS/386 Turbo CPU	10,500	65
CS/386-3200N	32MB CS/386 Turbo CPU	13,500	65

CS/Turbo-CK-xx Country Kit for all CS/386 Turbo models. Country codes
(xx): AE, AG, AS, AU, AZ, BF, CA, CF, DA, FI, FL, GE, HK,
IC, IT, NL, NO, PO, SF, SG, SI, SL, SP, SW, TU, UK, US, UV.

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>PRICE</u>	<u>MAINT</u>
2236MXF*	16-port Terminal I/O Controller	1,195	10
22C11-HS	High-Speed Printer/Disk Controller	700	10
2236MXF-CABLE	MXF 7 PORT OCTOPUS CABLE		

* Each 2236MXF will be shipped with one 7-port octopus cable. If planning to use more than 9 workstations per 2236MXF, an additional octopus cable must be ordered from WangDirect, \$125, as part number 200-2650).

INITIAL UPGRADE

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>PRICE</u>	<u>MAINT*</u>
MICROVP-TURBO	MICROVP To 4MB CS/386 Turbo CPU	5,000	+13
CS-TURBO	CS To 4MB CS/386 Turbo CPU	5,000	+13
CS-N TURBO	CS-N+CS/386-N To 4MB CS/386 Turbo CPU	5,000	+13
CS-D TURBO	CS-D+CS/386-D To 4MB CS/386 Turbo CPU	5,000	+13

* After update, the new monthly maintenance will be the former rate + \$13.

NOTE: For Turbo models greater than 4MB, you must add one of the following UJs at time of order:

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>PRICE</u>	<u>MAINT</u>
UJ-6059	4MB CS/386 TURBO o 8MB Turbo Memory	1,000	N/I
UJ-6060	4MB CS/386 TURBO to 16MB Turbo Memory	3,000	N/I
UJ-6061	4MB CS/386 TURBO to 32MB Turbo Memory	6,000	N/I

N/I = No Increase as memory size increases

SUBSEQUENT FIELD MEMORY UPGRADE

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>PRICE</u>	<u>MAINT</u>
UJ-6067	4MB To 8MB CS/386 Turbo CPU Memory Upgrade	1,500	N/I
UJ-6068	4MB To 16MB CS/386 Turbo CPU Memory Upgrade	3,500	N/I
UJ-6069	4MB To 32MB CS/386 Turbo CPU Memory Upgrade	6,500	N/I
UJ-6070	8MB To 16MB CS/386 Turbo CPU Memory Upgrade	2,500	N/I
UJ-6071	8MB To 16MB CS/386 Turbo CPU Memory Upgrade	5,500	N/I
UJ-6072	16MB To 32MB CS/386 Turbo CPU Memory Upgrade	3,500	N/I

N/I = No Increase as memory size increases

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VS OFFICE

Tuesday 11/26/91 12:00 pm Page: 1

To: Michael Bahia
From: 2200 MAILBOX CLUB
Subject: Country Kits/TURBO Order

MS014-A3A/LOWELL
Security: General
Date Received: 11/25/91

When ordering MICROVP, CS, CS-N and CS-D-TURBO upgrade kits, you must also order a country kit (example - CS/TURBO-CK-US) as if ordering a new CPU. The reason being the OS is enclosed with the country kit. This is a no charge item.

To : Distribution

From: Gene Schulz

Subj: CS/386 TURBO Pricing

Date: August 29, 1991

MODEL	DESCRIPTION	PRICE	MAINT
157-3548	CS/386-400N 4MB CS/386 Turbo CPU	7,500	xxx
-3549	CS/386-800N 8MB CS/386 Turbo CPU	8,500	xxx
-3550	CS/386-1600N 16MB CS/386 Turbo CPU	10,500	xxx
-3551	CS/386-3200N 32MB CS/386 Turbo CPU	13,500	xxx

MODEL	DESCRIPTION	PRICE	MAINT
200-2991	2236MXF 16-port Terminal I/O Controller	1,195	xxx
200-2992	22C11-HS High-Speed Printer/Disk Controller	700	xxx
	2236MXF-CABLES OCTOPUS CABLES		

INITIAL UPGRADE

MODEL	DESCRIPTION	PRICE	MAINT
00-6006	MICROVP-TURBO MICROVP To 4MB CS/386 Turbo CPU	5,000	xxx
00-6009	CS-TURBO CS To 4MB CS/386 Turbo CPU	5,000	xxx
00-6008	CS-N-TURBO CS-N+CS/386-N To 4MB CS/386 Turbo CPU	5,000	xxx
00-6007	CS-D-TURBO CS-D+CS/386-D To 4MB CS/386 Turbo CPU	5,000	xxx

NOTE: For Turbo models greater than 4MB, you must add one of the following UJs:

06-6059	UJ-6059 4MB CS/386 TURBO to 8MB Turbo Memory	1,000	N/I
06-6060	UJ-6060 4MB CS/386 TURBO to 16MB Turbo Memory	3,000	N/I
06-6061	UJ-6061 4MB CS/386 TURBO to 32MB Turbo Memory	6,000	N/I

SUBSEQUENT FIELD MEMORY UPGRADE

UJ-6067	4MB To 8MB CS/386 Turbo CPU Memory Upgrade	1,500	N/I
UJ-6068	4MB To 16MB CS/386 Turbo CPU Memory Upgrade	3,500	N/I
UJ-6069	4MB To 32MB CS/386 Turbo CPU Memory Upgrade	6,500	N/I
UJ-6070	8MB To 16MB CS/386 Turbo CPU Memory Upgrade	2,500	N/I
UJ-6071	8MB To 16MB CS/386 Turbo CPU Memory Upgrade	5,500	N/I
UJ-6072	16MB To 32MB CS/386 Turbo CPU Memory Upgrade	3,500	N/I

CS/386 Turbo-CK-xx Country Kit for all CS/386 Turbo models. Country codes (xx): AE, AG, AS, AU, AZ, BF, CA, CF, DA, FI, FL, GE, HK, IC, IT, NL, NO, PO, SF, SG, SI, SL, SP, SW, TU, UK, US, UV.

N/I = No Increase as memory size increases

To : Horace Tsiang
Bill Hsien
Charlie Herman

From: Gene Schulz

Subj: CS/386-400 - CS/386-3200 (CS/386 Turbo) Business Plan/FCS Requirements

Date: April 3, 1991

This document outlines the proposed business plan and FCS requirements for phase 2 of the CS/386 CPU. This new CPU will utilize the current CS/386-N chassis and involves a new CPU board, Mother Board, workstation controller (2236MXF) and disk controller (22C11-HS). Board upgrade versions will also be made available to existing VLSI and CS/386 CPU users.

The objectives of the attached plan are:

- . To improve CS/386 CPU performance by 200 to 300% for CPU intensive operations.
- . For the 386 CPU to be able to handle 32/64 users/tasks at the same level of performance that we currently can handle 16.
- . To provide an upgrade path for existing 2200/VLSI and CS/386 CPU users who don't want to migrate to another platform.
- . Unlimited disk addressing capability, e.g., the elimination of the 16MB platter size restriction and the ability to use the larger SCSI drives.
- . To provide a product that will address the current weakness of the CS/386 product line, e.g., CPU speed, I/O performance and the number of users it can support.
- . To provide a transition path for 2200/CS users to modern technology.
- . Further reinforces our dedication to our BASIC-2 Platform Strategy.

INTRODUCTION

When we first announced the CS/386 product line, our main goals were to provide a product that would address the traditional weaknesses of the CS/2200 product line, e.g., partition size, number of partitions, efficient filing systems, improved I/O performance, etc and to create a Wang CS/2200 "look-a-like" that will continue to touch, smell and feel like a 2200 but have a "state of the art" modern image in the small business marketplace, e.g. 80386 technology.

We succeeded in the following areas

- . In comparison to a VLSI 2200, the CS/386 was faster, CPU memory that could be allocated to program increased, the partition sizes increased, the number and size of global partitions increased, I/O improved slightly and we improved the interaction of BASIC-2 and MS-DOS.
- . We changed the image of the product as it now used a standard industry chip, a 80386.

Where we faltered:

- . Although the increase in speed was what we projected in comparison to a 2200 or VLSI 2200 and met our expectations, the 2200/BASIC-2 VARs felt it was not up to their performance expectations in comparison to NIAKWA's Basic-2C running on a PC platform. They felt it didn't go far enough, especially the fact that it could not run MS-DOS programs.
- . It took longer than expected to move the 2200 Operating System to a "bug-free" CS/386 Operating System. Again the VARs felt that it was taking too long to fix the OS and we lost more VARs to the Basic-2C NIAKWA world.

We feel that the CS/386-400 through CS/386-3200 is the product they wanted in the first place. However, if we had to do it all over again, we still would release the CS/386 when we did. If we did not, the erosion of 2200 VARs and end-users would have been far greater.

Product Description

Hardware

The phase 2 CS/386 CPUs will consist of a CS/386-N chassis with a new CPU board, two new Mother Boards (one for MicroVP/CS, one for CS-D/N and CS/386-D/N chassis), a new Workstation controller (2236MXF) and a new printer/disk controller (22C11-HS). The following is a list of features:

- . 33 MHz. 80386.
- . 4 to 32MB of RAM.
- . 32-bit address and data memory bus.
- . 2200 I/O bus interface.
- . 32 to 64 user/tasks.

- . Battery backed-up real-time clock.
- . Board compatible with existing VLSI and CS/386 systems, e.g. existing VLSI and CS/386 CPUs can be field upgraded. However, it will be necessary to offer two different size Mother Boards; one for MicroVPs and CSs, one for CS-D/Ns and CS/386-D/Ns.

2236MXF

- . 80286 12MHz MPU.
- . 256K SRAM.
- . Supports 16 workstations per MXF, 4 2236MXFs per system.
- . 2 regular RS-232 ports and 2 concentrators that support 7 workstations each.

22C11-HS

- . 80286 12MHz MPU.
- . 256K RAM.
- . Supports 1 disk port, 1 printer port and 1 multiplexing port (connection to a 2275MUX or 22C03-SCSI).

Software

New version of the CS/386 Operating System specific to the CS/386-400 through CS/386-3200, e.g., 64 partitions and 3-bit addressing.

Environment:

Must comply with the following standards for safety and electrical noise (EMI/RFI):

- . Domestic
 1. UL Standards for safety 114 (Office Appliance and Business Machines) or 478 (Data Processing Equipment).
 2. FCC Class A requirements for interference from computing devices.
 3. Wang Standard for electrostatic discharge (SPI 10-623).
 4. Wang Standard for Mechanical and Environmental Testing - SP 10-708
- . International
 1. CSA Standard for Safety C22.2 No. 154 (Data Processing Equipment).
 2. IEC 435 (Safety of Electrically Energized Office Machines).
 3. VDE Standard Class A for Germany.

Media

Complete DS media compatibility.

Performance

Should be 200 to 300% faster than a CS/386 CPU and 500% faster than a VLSI CPU. Disk performance should 30-50% faster using a DS.

Application Requirements

For current CS/2200 and CS/386 BASIC-2 applications to run "as is".

Support

- . Customer Service (CSO) should have all support plans in place by FCS.
- . Normal CS/2200 WSS support services.
- . All user manuals should be available FCS.

MARKET ANALYSIS

In FY'90, if you count both new CPUs and upgrades from VLSI to CS/386 upgrades, U.S. CPU unit bookings grew 4%, while International declined 29%. The reasons for the drop off in International sales were due to:

- . We had no one promoting the product line Internationally .
- . We had problems with the first several releases of the CS/386 operating system. As Europe (the largest part of our international business), did not have neither a 2200 marketing or support organization in place, problems went unanswered. The result was some of the countries lost interest in the product line and a great number of European VARs left the product and migrated to NIAKWA alternatives rather than wait on Wang.

The reasons for the increase in U.S. sales were due to:

- . We had Harris Gates promoting the product line and working with our VARs.
- . We had problems with the first several releases of the CS/386 operating system but we still had channels of communication with the U.S. field CE organization. The result was the problems were fixed and we proceeded to sell CS/386s to the user base.

The lesson learned is there still is a market for new 2200 CPUs. However, we continue to lose VARs to other hardware platforms. We are losing them for the following reasons:

- . They still worried about our ability to survive as a company.
- . They are disappointed with the CS/386.
- . Customer demands for open standards. i.e., especially in Europe.

We need to regain interest in the 2200 product and at the same time, our total BASIC-2 Platform Strategy. The key to getting back our 2200 VARs will not be the new CS/386 alone. Most of the VARs that left Wang did not leave the BASIC-2 language; they migrated to Basic-2C and other hardware platforms. The introduction of the CS/386-400 through the CS/386-3200 and the addition of Basic-2C and KCML, running on RISC/UNIX platforms, will give us what we need to attract BASIC-2/Basic-2C VARs back to Wang. Having the ability to sell a BASIC-2 Platform approach, e.g., "the hardware/OS platform of your choice," will result in increased bookings of all Wang products that support the BASIC-2 language.

Market Research

Before having made the decision to announce the product, based on the hypothesis that the market may have passed us by, e.g., it may be too late for the CS/386 Turbo as the VARs we need to sell the product have migrated to other platforms or we have lost too much of our base, we have done the following:

1. Over the last several months, key 2200 VARs, software vendors and end-users have been invited in for a demo and/or the opportunity to test their software on the new system. Results were very positive.
2. Our first beta site was installed two weeks ago. We still have a few bugs left but the initial customer reaction is a 60% increase in overall performance.
3. One of our key 2200 Master Distributors has been conducting his own demonstrations to his subVARs and/or their end-users. He has 6 orders. A second Master Distributor claims he has 20 orders "sight unseen."
4. John Baxi has been demonstrating the product to key European VARs. As a result of his success, at their own expense, England has requested 5 sets of beta boards, Germany 3 and Sweden 1.

It is our conclusion that from the pressure we are receiving from VARs and end-users to announce the product, we will sell more than enough units to justify announcing the product.

Market Requirements

Actual costs, and recommended U.S. selling prices and mo. maint. are as follows:

NEW CPU MODELS

<u>MODEL</u>	<u>MEMORY</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MAINT.</u>
CS/386-400N	4MB	2,239	7,500	70.1	73
CS/386-800N	8MB	2,428	8,500	71.4	101
CS/386-1600N	16MB	3,032	10,500	71.1	130
CS/386-3200N	32MB	4,025	13,500	70.2	160

NOTE: In order to simplify to number of models offered, A/D1 version will not be made available, on the theory that the user who would order a 32-user system, would not be able to get by with the ability to only have one fixed Winchester or would prefer to order external SCSI drives. The occasional customer wishing a new CS/386-D Turbo system, not a field upgrade, could order a CS/386-N Turbo and a UJ-6047.

386 CPU BOARDS (VLSI TO 386 Upgrades)

Models that can be field upgraded to a CS/386-400N through 3200Ns are the MICROVPs, CSs, CS-D/Ns, and all CS/386-D/N CPUs. Due to the size of different chassis, 2 different size mother boards are needed to accommodate MicroVPs and CSs, versus the CS-D/N and CS/386-D/N.

MICROVPs And CSs Field Upgrades

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>MEMORY</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MO. MAINT.</u> <u>CS/MICROVP</u>
UJ-xxxx	To CS/386-400 CPU	4MB	1,611	5,000	67.8	73
UJ-xxxx	To CS/386-800 CPU	8MB	1,810	6,000	69.8	101
UJ-xxxx	To CS/386-1600 CPU	16MB	2,404	8,000	70.0	130
UJ-xxxx	To CS/386-3200 CPU	32MB	3,397	11,000	69.1	160

NOTE: Sell and cost prices include both a CPU and Mother Board.

CS-D/Ns And CS/386-D/Ns Field Upgrades

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>MEMORY</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MO. MAINT.</u>	
						<u>N CPUs</u>	<u>D CPUs</u>
UJ-xxxx	To CS/386-400 CPU	4MB	1,611	5,000	67.8	73	88
UJ-xxxx	To CS/386-800 CPU	8MB	1,810	6,000	69.8	101	116
UJ-xxxx	To CS/386-1600 CPU	16MB	2,404	8,000	70.0	130	145
UJ-xxxx	To CS/386-3200 CPU	32MB	3,397	11,000	69.1	160	175

NOTE: Sell and cost prices include both a CPU and Mother Board.

New Controllers

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MAINT.</u>
2236MXF	16-Port I/O	400	1,195	66.5	15
22C11-HS	Dual Controller	234	700	66.6	10

Additional Memory Chips Only

Memory upgrades for installed CS/386-400 through 3200 Systems are as follows:

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MAINT</u>
UJ-xxxx	4MB to 8MB	203	1,500	86.5	28
UJ-xxxx	4MB to 16MB	969	3,500	72.3	57
UJ-xxxx	4MB to 32MB	1,990	6,500	69.4	87
UJ-xxxx	8MB to 16MB	969	2,500	61.2	29
UJ-xxxx	8MB to 32MB	1,990	5,500	63.8	59
UJ-xxxx	16MB to 32MB	969	3,500	72.3	30

MODEL NUMBERS

The following models will be discontinued:

- . CS-10D/N
- . CS/386-40D/N
- . CS/386/80D/N

Keeping one 512KB CS-D and one CS-N VLSI CPU, and the 1MB and 2MB versions of the CS/386-D/N CPUs in the product line for the smaller or traditional users, the CPU and upgrade offerings, in comparison to previous offerings, would be as follows:

<u>NEW MODELS</u>			<u>PREVIOUS MODELS</u>		
<u>MODEL</u>	<u>MEMORY</u>	<u>PRICE</u>	<u>MODEL</u>	<u>MEMORY</u>	<u>PRICE</u>
CS-5D	512K	4,950	CS-5D	512K	4,950
CS/386-10D	1MB	6,500	CS-10D	1MB	6,400
CS/386-20D	2MB	7,500	CS/386-10D	1MB	6,500
CS-5N	512K	3,950	CS/386-20D	2MB	7,500
CS/386-10N	1MB	5,500	CS/386-40D	4MB	8,500
CS/386-20N	2MB	6,500	CS/386-80D	8MB	9,500
CS/386-400N	4MB	7,500	CS-5N	1MB	3,950
CS/386-800N	8MB	8,500	CS-10N	1MB	5,400
CS/386-1600N	16MB	10,500	CS/386-10N	1MB	5,500
CS/386-3200N	32MB	13,500	CS/386-20N	2MB	6,500
			CS/386-40N	4MB	7,500
			CS/386-80N	8MB	8,500
UJ-6048	1MB	2,000	UJ-6048	1MB	2,000
UJ-6049	2MB	3,000	UJ-6049	2MB	3,400
UJ-6050	4MB	4,000	UJ-6050	4MB	4,000
UJ-6051	8MB	5,000	UJ-6051	8MB	5,000
UJ-XXXX	4MB	5,000			
UJ-XXXX	8MB	6,000			
UJ-XXXX	16MB	8,000			
UJ-XXXX	32MB	11,000			

Any VAR or end-user desiring a larger memory version of a CS-D/N or a CS/386-D/N, can order the largest memory system available plus a UJ kit. Any VAR or end-user desiring a CS/386-400D through 3200 "D" version, can order a CS/386-N Turbo and a UJ-6047, CS-N to CS-D upgrade kit.

Forecasts

U.S. Forecast

<u>MODEL</u>	<u>Q4 FY'91</u>	<u>Q1 FY'92</u>	<u>Q2 FY'92</u>	<u>Q3 FY'92</u>	<u>TOTAL</u>
CS/386-400N	25	25	25	25	100
CS/386-800N	25	25	25	25	100
CS/386-1600N	12	13	13	12	50
CS/386-3200N	5	5	5	5	20
UJ-6xxx	25	25	25	25	100
UJ-6xxx	25	25	25	25	100
UJ-6xxx	12	13	13	12	50
UJ-6xxx	5	5	5	5	20
2236MXF	135	135	135	135	540
22C11-HS	135	135	135	135	540

INT. Forecast

<u>MODEL</u>	<u>Q4 FY'91</u>	<u>Q1 FY'92</u>	<u>Q2 FY'92</u>	<u>Q3 FY'92</u>	<u>TOTAL</u>
CS/386-400N	25	25	25	25	100
CS/386-800N	25	25	25	25	100
CS/386-1600N	12	13	13	12	50
CS/386-3200N	5	5	5	5	20
UJ-6xxx	25	25	25	25	100
UJ-6xxx	25	25	25	25	100
UJ-6xxx	12	13	13	12	50
UJ-6xxx	5	5	5	5	20
2236MXF	135	135	135	135	540
22C11-HS	135	135	135	135	540

Worldwide Forecast

<u>MODEL</u>	<u>Q4 FY'91</u>	<u>Q1 FY'92</u>	<u>Q2 FY'92</u>	<u>Q3 FY'92</u>	<u>TOTAL</u>
CS/386-400N	50	50	50	50	200
CS/386-800N	50	50	50	50	200
CS/386-1600N	25	25	25	25	100
CS/386-3200N	10	10	10	10	40
UJ-6xxx	50	50	50	50	200
UJ-6xxx	50	50	50	50	200
UJ-6xxx	25	25	25	25	100
UJ-6xxx	10	10	10	10	40
2236MXF	270	270	270	270	1,080
22C11-HS	270	270	270	270	1,080

Announcements

	<u>U.S.</u>	<u>INT.</u>
Announce	06/01/91	06/01/91
FCS	06/31/91	06/31/91
Volume	07/30/91	07/30/91

UJ-5059 thru UJ-6062 are for CS and CS/386
UJ-6063 thru UJ-6066 are for MICROVP and CS
UJ-6067 thru UJ-6072 are CS/386 Memory Upgrades

Donna

----- Reply -----

To: Donna Santeufemio From: Eugene S. Schulz
Subject: CS/386 TURBO MODELS/PARTS Date Sent: 04/18/91

Is 5059 through 6062 MICROVP and CS Board Upgrade, 6067 through 6072 memory upgrades?

----- Original Memo -----

To: Eugene S. Schulz From: Donna Santeufemio
Subject: CS/386 TURBO MODELS/PARTS Date Sent: 04/17/91

Gene,

Listed below are the model/part numbers you requested:

MODEL #	CEI #	ITEM STATUS
CS/386-400N	157/177-3548	0
CS/386-800N	157/177-3549	0
CS/386-1600N	157/177-3550	0
CS/386-3200N	157/177-3551	0
2236MXF	200-2991	0
22C11-HS	200-2992	0
UJ-6059	205/206-6059	0
UJ-6060	205/206-6060	0
UJ-6061	205/206-6061	0
UJ-6062	205/206-6062	0
UJ-6063	205/206-6063	0
UJ-6064	205/206-6064	0
UJ-6065	205/206-6065	0
UJ-6066	205/206-6066	0
UJ-6067	205/206-6067	0
UJ-6068	205/206-6068	0
UJ-6069	205/206-6069	0
UJ-6070	205/206-6070	0
UJ-6071	205/206-6071	0
UJ-6072	205/206-6072	0

OCTOPUS CABLE FOR MXF 260-2650

The above part numbers are at Item Status "0" so your engineer can structure the bills of materials on the workbench system.

Any questions, please feel free to contact me.

Donna Santeufemio

To : Bill Hsien
Mike Runge

From: Gene Schulz

Subj: CS/386 Turbo Pricing Proposal

Date: July 30, 1991

Please find below a pricing proposal for the CS/386 Turbo CPU. This new CPU will utilize the current CS/386-N chassis and involves a new CPU board, Mother Board, workstation controller (2236MXF) and disk controller (22C11-HS). Board upgrade versions will also be made available to existing VLSI and CS/386 CPU users.

1. Business Objectives

- . To improve CS/386 CPU performance by 200 to 300% for CPU intensive operations.
- . For the Turbo 386 CPU to be able to handle 32/64 users/tasks at the same level of performance that the CS/386 can handle 16.
- . To provide an upgrade path for existing 2200/VLSI and CS/386 CPU users who don't want to migrate to another platform, e.g. Unix.
- . Unlimited disk addressing capability, e.g., the elimination of the 16MB platter size restriction and the ability to use the larger SCSI drives.
- . To provide a product that will address the current weakness of the CS/386 product line, e.g., CPU speed, I/O performance and the number of users it can support.
- . To provide a transition path for 2200/CS users to modern technology.
- . Further reinforces our dedication to our BASIC-2 Platform Strategy by offering our VARS and end-users two excellent choices, e.g., update to the CS/386 Turbo or migrate to Unix/Risc on our DYNAMIX/IBM product line.

2. Product/Pricing Strategy - The listed products should be priced as recommended for the following reasons:

- . To position the cost of acquisition between the cost of the current CS/386 and a Unix/NIAKWA system, e.g., a user who wouldn't spend \$20,000 to upgrade to Unix, would spend \$7,000 to update their 2200.
- . To maintain good profit margins but at the same time to make it financially attractive to update to the latest 2200 system.

cc : Paul Fitzpatrick
Jan Sheehan

3. Pricing Proposal

NEW CS/386 TURBO CPU MODELS

<u>MODEL</u>	<u>MEMORY</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MAINT.</u>
CS/386-400N	4MB	2,239	7,500	70.1	73
CS/386-800N	8MB	2,428	8,500	71.4	101
CS/386-1600N	16MB	3,032	10,500	71.1	130
CS/386-3200N	32MB	4,025	13,500	70.2	160

NOTE: In order to simplify to number of models offered, A "D" version will not be made available, on the theory that the user who would order a 32-user system, would not be able to get by with the ability to only have one fixed Winchester or would prefer to order external SCSI drives. The occasional customer wishing a new CS/386-D Turbo system, not a field upgrade, could order a CS/386-N Turbo and a UJ-6047 (CS-N to CS-D chassis upgrade).

386 TURBO CPU BOARDS (VLSI TO 386 Turbo Upgrades)

Models that can be field upgraded to a CS/386 Turbos are the MICROVPs, CSs, CS-D/Ns, and all CS/386-D/N CPUs. Due to the size of different chassis, 2 different size mother boards are needed to accommodate MicroVPs and CSs chassis, and the CS-D/N and CS/386-D/N chassis.

MICROVPs And CSs Field Upgrades

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>MEMORY</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MO. MAINT.</u> <u>CS/MICROVP</u>
UJ-6063	To CS/386-400 CPU	4MB	1,692	5,000	66.2	73
UJ-6064	To CS/386-800 CPU	8MB	1,892	6,000	68.5	101
UJ-6065	To CS/386-1600 CPU	16MB	2,486	8,000	68.9	130
UJ-6066	To CS/386-3200 CPU	32MB	3,479	11,000	68.4	160

NOTE: Sell and cost prices include both a CPU and Mother Board.

CS-D/Ns And CS/386-D/Ns Field Upgrades

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>MEMORY</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MO. MAINT.</u>	
						<u>N CPUs</u>	<u>D CPUs</u>
UJ-6059	To CS/386-400 CPU	4MB	1,692	5,000	66.2	73	88
UJ-6060	To CS/386-800 CPU	8MB	1,892	6,000	68.5	101	116
UJ-6061	To CS/386-1600 CPU	16MB	2,486	8,000	68.9	130	145
UJ-6062	To CS/386-3200 CPU	32MB	3,479	11,000	68.4	160	175

NOTE: Sell and cost prices include both a CPU and Mother Board.

New Controllers

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MAINT.</u>
2236MXF	16-Port I/O	439	1,195*	63.3	15
22C11-HS	Dual Controller	234	700	66.6	10

* Includes one 7-port octopus cable (part # 421-0181).

Additional Memory Chips Only

Memory upgrades for installed Turbo Systems are as follows:

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>COST</u>	<u>SELL</u>	<u>GPM</u>	<u>MAINT</u>
UJ-6067	4MB to 8MB	203	1,500	86.5	28
UJ-6068	4MB to 16MB	969	3,500	72.3	57
UJ-6069	4MB to 32MB	1,990	6,500	69.4	87
UJ-6070	8MB to 16MB	969	2,500	61.2	29
UJ-6071	8MB to 32MB	1,990	5,500	63.8	59
UJ-6072	16MB to 32MB	969	3,500	72.3	30

MODEL NUMBERS

The following models will be discontinued:

- . CS-10D/N
- . CS/386-40D/N
- . CS/386/80D/N

Keeping one 512KB CS-D and one CS-N VLSI CPU, and the 1MB and 2MB versions of the CS/386-D/N CPUs in the product line for the smaller or traditional users, the CPU and upgrade offerings, in comparison to previous offerings, would be as follows:

<u>NEW MODELS</u>			<u>PREVIOUS MODELS</u>		
<u>MODEL</u>	<u>MEMORY</u>	<u>PRICE</u>	<u>MODEL</u>	<u>MEMORY</u>	<u>PRICE</u>
CS-5D	512K	4,950	CS-5D	512K	4,950
CS/386-10D	1MB	6,500	CS-10D	1MB	6,400
CS/386-20D	2MB	7,500	CS/386-10D	1MB	6,500
CS-5N	512K	3,950	CS/386-20D	2MB	7,500
CS/386-10N	1MB	5,500	CS/386-40D	4MB	8,500
CS/386-20N	2MB	6,500	CS/386-80D	8MB	9,500
CS/386-400N	4MB	7,500	CS-5N	1MB	3,950
CS/386-800N	8MB	8,500	CS-10N	1MB	5,400
CS/386-1600N	16MB	10,500	CS/386-10N	1MB	5,500
CS/386-3200N	32MB	13,500	CS/386-20N	2MB	6,500
			CS/386-40N	4MB	7,500
			CS/386-80N	8MB	8,500

UJ-6048	1MB	2,000	UJ-6048	1MB	2,000
UJ-6049	2MB	3,000	UJ-6049	2MB	3,400
UJ-6050	4MB	4,000	UJ-6050	4MB	4,000
UJ-6051	8MB	5,000	UJ-6051	8MB	5,000
UJ-6059	4MB	5,000			
UJ-6060	8MB	6,000			
UJ-6061	16MB	8,000			
UJ-6062	32MB	11,000			
UJ-6063	4MB	5,000			
UJ-6064	8MB	6,000			
UJ-6065	16MB	8,000			
UJ-6066	32MB	11,000			

Any VAR or end-user desiring a CS/386-400D through 3200 "D" version, can order a CS/386-N Turbo and a UJ-6047, CS-N to CS-D upgrade kit.

4. Market Strategy

There are three major product series in the BASIC-2 platform:

- CS/386 Turbo:** The new INTEL 80386 (16MHz, 16-user) CPUs (and associated peripherals), designed to replace the 2200 VLSI series of CPUs. These CPUs include the current and to be announced new 64-user series (33MHz 80386) within 90 days.
- Basic-2 Compilers** Basic-2C and KCML are BASIC-2 compilers that allows 2200 applications to run under SCO Unix or RISC, on Wang's DYNAMIX/IBM Product Series. All 2200 workstations and printers can be used with DYNAMIX systems.
- PC2200:** PC2200 is a 2200 terminal emulator that allows an CS/386, CS, MICROVP, 2200, or DYNAMIX products to use a Wang PC or other XT or AT compatible Personal Computer as a CS/2200 terminal. PC2200 also provides the integration of BASIC-2 and MS-DOS and/or Unix functionality.

Within this platform, 2200 users/prospects/VARS now have three Wang hardware platform choices, and several proprietary or non-proprietary operating system choices. For example:

- 1 Traditional 2200 hardware, e.g., a CS/386-Turbo (80386) integrating with MS-DOS through PC workstations and PC2200.
- 2 Wang's Intel 80386/80486 Platform using SCO Unix and Basic-2C with the ability to have MS-DOS as a Unix shell, or integrating with MS-DOS through PC workstations and PC2200.
- 3 Larger Unix systems like the RS/6000 using RISC and KCML with the ability to integrating with MS-DOS through PC workstations and PC2200.

BASIC-2 VARS

The 2200 product has always been and will continue to be a third party product. We need to regain interest and confidence in the 2200 product and at the same time, our total BASIC-2 Platform Strategy. The key to getting back our 2200 VARS will not be the new CS/386 alone. Most of the VARS that left Wang did not leave the BASIC-2 language; they migrated to Basic-2C and other hardware platforms. The introduction of the CS/386-400 through the CS/386-3200 and the addition of Basic-2C and KCML, running on RISC/UNIX platforms, will give us what we need to attract BASIC-2/Basic-2C VARS back to Wang. Having the ability to sell a BASIC-2 Platform approach, e.g., "the hardware/OS platform of your choice," will result in increased bookings of all Wang products that support the BASIC-2 language.

Therefore, working through the previous Hal Fischer Revenue Task Force, we have instituted a 3 phase program to roll out Turbo:

1. Step 1 was a mailing (April 2) to 12,000+ BASIC-2 and Basic-2C end-users. The main emphasis was on the current CS/386, NIAKWA and our DX100, DX200 and DX2000.
2. Step 2 is a 2-part program (in progress) that sets up DYNAMIX/BASIC-2 Master Distributors and a recruiting program to get the NIAKWA VARS back to selling Wang BASIC-2 hardware again through these Master Distributors. A recruitment mailing will be made to 632 VARS announcing our new BASIC-2 Platform and how we have made it easier to resell Wang/IBM Hardware.
3. Step 3 will be a (proposed) mailing in Aug./Sept. to the same data base, announcing the CS/386 Turbo, our new RISC/MIPS product line and the KCML compiler. This is being coordinated with the VAR Groups as a kickoff for the new GSSR reps. program. The GSSRs are a special salesforce that will be calling on the installed Wang base. They are to work with, through and leverage VARS.

5. Monthly Maintenance

Recommended monthly maintenance is listed with each new product.

The new CS/386 Turbo requires a new BASIC-2 operating system and support utilities. This OS should be supported under Wang's WSS software contract. The monthly cost should be the same as the BASIC-2/386 which is \$17 for SSS and \$28 for TSS.

6. Forecasts

U.S. Forecast

<u>MODEL</u>	<u>Q1 FY'92</u>	<u>Q2 FY'92</u>	<u>Q3 FY'92</u>	<u>Q4 FY'92</u>	<u>TOTAL</u>
CS/386-400N	25	25	25	25	100
CS/386-800N	25	25	25	25	100
CS/386-1600N	12	13	13	12	50
CS/386-3200N	5	5	5	5	20
UJ-6059/6063	25	25	25	25	100
UJ-6060/6064	25	25	25	25	100
UJ-6061/6065	12	13	13	12	50
UJ-6062/6066	5	5	5	5	20
2236MXF	135	135	135	135	540
22C11-HS	135	135	135	135	540

INT. Forecast

<u>MODEL</u>	<u>Q1 FY'92</u>	<u>Q2 FY'92</u>	<u>Q3 FY'92</u>	<u>Q4 FY'92</u>	<u>TOTAL</u>
CS/386-400N	25	25	25	25	100
CS/386-800N	25	25	25	25	100
CS/386-1600N	12	13	13	12	50
CS/386-3200N	5	5	5	5	20
UJ-6059/6063	25	25	25	25	100
UJ-6060/6064	25	25	25	25	100
UJ-6061/6065	12	13	13	12	50
UJ-6062/6066	5	5	5	5	20
2236MXF	135	135	135	135	540
22C11-HS	135	135	135	135	540

Worldwide Forecast

<u>MODEL</u>	<u>Q1 FY'92</u>	<u>Q2 FY'92</u>	<u>Q3 FY'92</u>	<u>Q4 FY'92</u>	<u>TOTAL</u>
CS/386-400N	50	50	50	50	200
CS/386-800N	50	50	50	50	200
CS/386-1600N	25	25	25	25	100
CS/386-3200N	10	10	10	10	40
UJ-6059/6063	50	50	50	50	200
UJ-6060/6064	50	50	50	50	200
UJ-6061/6065	25	25	25	25	100
UJ-6062/6066	10	10	10	10	40
2236MXF	270	270	270	270	1,080
22C11-HS	270	270	270	270	1,080

7. Announcements

	<u>U.S.</u>	<u>INT.</u>
Pricing Up On Data Base	08/01/91	08/15/91
Announce	09/01/91	09/01/91
FCS	09/30/91	09/30/91
Volume	10/31/91	10/31/91

VS OFFICE

Friday

01/03/92 04:48 pm

Page:

1

To: Michael Bahia
From: Eugene Schulz
Subject: 2nd Octopus Cable

MS014-A3A/LOWELL
Security: General
Date Received: 12/13/91

When ordering a 2nd octopus cable for the 2236MXF, used on the new CS/386 TURBO, order as 2236MXF-Cable, not 200-2650, from WangDirect.

MEMORANDUM FOR THE DIRECTOR
SUBJECT: [Illegible]

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2200 MODEL COMPARISON CHART

The following chart gives general product specifications for most of the 2200 models shipped since 1972. Maximums are expressed in practical installable limits.

FEATURE	A/B/C WCS	T/S	PCS	VP	SVP	LVP	LVPC	MVP	MVPC	CS/ MICROVP (VLSI CPUs)	CS-D/N	386	TURBO
Memory	4- 16K	8K- 32K	8K- 32K	16K- 64K	16K- 128K	16K- 256K	32K- 512K	16K- 256K	32K- 512K	128K- 8M	128K- 8M	1M- 8M	4M- 32M
I/O Slots	3/6& 11	3/6& 9	1	9	1	3	7	9	7	9	9	9	9
Users	1	1	1	1	1-3	8	16	16	16	16	16	16	32*
Tasks	1	1	1	1	16	16	16	16	16	16	16	16	64
BASIC	X	X	X	-	-	-	-	-	-	-	-	-	-
BASIC-2	-	-	-	X	X	X	X	X	X	X	X	X**	X***
Control Memory	PROM	PROM	PROM	32K	32K	32K	32K	32K	32K	32K	32K	256K	256K
Field Upgrade	No	No	No	To MVP	OptW	To LVPC	No	No	No	386or Turbo	386or Turbo	To Turbo	??
Internal Tape Storage	-	-	80K some vers	-	-	-	-	-	-	-	150M CS-D only	150M CS-D only	150M CS-D only
Internal Diskette Storage	No	No	11K some vers	No	1.2M	1.2M	1.2M	No	No	No	1.2M CS-D only	1.2M CS-D only	1.2M CS-D only
Internal Disk Storage	No	No	No	No	2MB To 16MB	2MB To 16MB	2MB 32MB	No	No	No	20M- 140M CS-D only	20M- 140M CS-D only	20M- 140M CS-D only
External Storage	2260 2270 C only	2260 2270	some vers	2260 2270 2280 2275 DS	No	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 2270A 2280 2275 DS	2260 ?? 2280 2275 DS SCSI
TC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RAMdisk (CPU)	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes

* 32 recommended max with currently available hardware. 64 Users in future.

** requires CS/386 O/S

*** requires CS/386 Turbo O/S

[illegible]

COMPANY CONFIDENTIAL

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I. PRODUCT DESCRIPTION

A. OVERVIEW OF THE PRODUCT

The 386 Turbo is the latest edition to the 2200 family. It consists of 4 major components, a new CPU motherboard (2 versions, 1 for the CS and MicroVP and 1 for the CS-D/N), a new 386 based CPU board, a new 16 port MXF terminal controller, and a new high-speed printer/disk controller. Together this new hardware in conjunction with the new Operating System required provides dramatic improvement in performance over existing 2200 hardware. Some of the major advantages include:

- partitions supported increased from 16 to 64.
- terminals supported increased from 16 to 64. 32 current recommended max.
- memory sizes from 4 to 32 Meg, up from the 8 Meg previous max.
- CPU processing speed twice as fast as the 386, 4 to 6 times faster than the VLSI and MVP/LVPs.
- Disk I/O performance is up to 25% faster. The percentage of improvement will vary according to the number of users on the system and amount of disk access. See 22C11-2 under 'Major Components' for further details.

B. SIMILARITIES/DIFFERENCES (with other WANG products)

1) Software:

All software compatible to the 386 is 100% compatible to the 'Turbo'. For maximum performance some minor software changes may be required. Though the Turbo has it's own operating system, much of it is based on the existing 386 O/S. The new Turbo O/S maintains the look and feel of the traditional 2200 while increasing the number of users and partitions to 64 each.

2) Hardware:

All hardware supported on existing CS/386 CPUs is expected to be supported on the Turbo. Any 2200 chassis built specifically for a single board CPU which includes the MicroVP, the CS, the CS-D/N, and the CS/386-D/N can be upgraded with a Turbo card set. Proper installation into a MicroVP or CS will additionally require rails to be added around the I/O section through which the I/O controllers will secure to the chassis. These rails fill in a space created by the higher motherboard connectors required by the new Turbo controllers and are required to pass FCC standards. MVP chassis' upgraded to support the single board VLSI CPU are not supported. This includes the MVP128/512 chassis' which has the old MVP motherboard with the connectors removed for all the old MVP CPU boards except the one slot used for the VLSI card.

3) Other:

Existing VLSI and 386 CPU boards will run in the new Turbo motherboard. The motherboard is however mandatory for use of the Turbo CPU and the 2 new controllers. The 2 Turbo controllers also cannot operate without the Turbo CPU board. There are 2 versions of the motherboard. One version is compatible to the CS-D/N boxes. A 2nd version is required for the CS and MicroVP boxes for proper alignment of boards.

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C. ANNOUNCE/FIRST CUSTOMER SHIPMENT DATE

- | | | |
|-------------------|---------------------------|------------------|
| 1) Domestic: | Announced: Oct 1, 1991 | FCS: Nov 1, 1991 |
| | Volume Ship: Nov 15, 1991 | |
| 2) International: | Announced: Oct 1, 1991 | FCS: Nov 1, 1991 |
| | Volume Ship: Nov 30, 1991 | |

D. SERVICE OFFERINGS/WARRANTY

This product will be installed and maintained by Customer Engineering personnel for customers with On-Site service.

This product will be covered by the standard Wang 90 day warranty.

E. SPECIAL PROGRAM/PROCEDURES

N/A

F. MAJOR COMPONENTS

The CS/386 Turbo consists of 4 new boards and an operating system.

- 1) 210-9578 Motherbrd (CS-N/D); 210-9583 Motherbrd (CS & MicroVP):
The motherboard provides a 32 bit bus used by the Turbo CPU board to communicate with the new MXF Terminal Controller and the new High-Speed Disk/Printer Controller. This was done by adding a 3rd connector to each of the I/O slots offset and between the standard connectors currently used, and in-line with a new connector for the CPU board. The 9578 Motherboard is only compatible to the CS-N/D. The 9583 Motherboard is required for the CS and MicroVP.
- 2) 210-9576A CPU/Memory Board:
The Turbo CPU board consists of a 210-9576 motherboard and a 210-9577 daughterboard. It has a 33 MHz 386 based processor chip and can be loaded to 4 memory sizes, 4 Meg, 8 Meg, 16 Meg, and 32 Meg. It uses a 32 bit address and data memory bus. It also has a new real-time clock chip with a built-in battery at L5 of the daughterboard to keep time of day.
3. 212-9717 2236MXF Terminal Controller:
The MXF Controller is an intelligent controller which uses a 286 processor to support up to 16 terminals and communicates with the CPU via a 32 bit bus. The 286 processor allows the MXF to handle communication with the terminals on it's own enabling the CPU to do other tasks. The board consists of a 210-9579A I/O Processor Board and a 210-9580 Terminal Controller Board. There are 4 external connectors. The top 2 are RS232 connectors, identical to the RS232 ports on the existing MXE and MXD Controllers. They support the first 2 of the 16 ports. The bottom 2 connectors are standard 36 pin parallel connectors used to address 7 terminals each via the 421-0181 Octopus Cable. A maximum of 4 MXF Boards, 64 terminals, are supported per CPU. The turbo can be configured with a mix of MXF, MXE, and MXD Boards not to exceed 64 ports. See 'Configuration Requirements' for further details.

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4. 212-9718 22C11-2 High-Speed Printer/Disk (Dual) Controller:

The 22C11-2 is an intelligent controller with a 286 based processor. The board uses a 32 bit bus, 4 times the current bus size, through which it communicates with the CPU and is capable of handling disk I/O functions currently handled by the CPU board. By freeing up the CPU and handling the disk I/O on it's own, this new disk controller increases disk performance as the number of users increases. In the past, disk access was strictly a serial function. If the disk access time for a particular function was '5' seconds, then every user running that function would require '5' seconds. This is not the case with the 22C11-2. With 1 to 3 users accessing disk, performance will not change much, but as more users access disk and more work is off-loaded to the controller, improvements of up to 25% more throughput can be realized. Changes may be necessary with some software for maximum disk performance. Changing programs on disk to '386' or 'NEW' format is highly recommended. A new command, @MOVE!, is included in the Turbo operating system and can greatly simplify this process.

- The middle connector on this board is a disk Mux port activated by switch settings. If the disk port is not used, this board can be used like a 22C80 (210-7715) cabled to a CPU port on a 2275 MUX Master/Extender to access a Mux'd disk unit.
- The top connector on the board is a printer port using the standard 2200 Centronics interface compatible with all current 2200 printers.

5. CS/386 Turbo Operating System Release 1.0:

The Turbo Operating System is based on the current CS/386 Operating System and functions similarly. Some of the enhancements built into this operating system include:

- support of 64 terminals and 64 partitions.
- the \$MOVE! command which simplifies converting all programs on a surface from the old 2200 format to the 'NEW' 386 format.

G. CONFIGURATION REQUIREMENTS

Configuration requirements and restrictions are basically the same as the existing '386' CPUs except for the number of terminals and partitions. Both have been changed from 16 to 64. With the hardware available at the time of this plan, 32 terminals are the recommended max. Physically the maximum configuration of MXF, MXE, and MXD controllers would be 4 boards. You cannot have more than 4 total terminal controllers as is currently the case. All MXF boards are assigned first. Switch settings for the MXE/MXD boards are done the same way, but the MXF boards must be counted first. Example: with 2 MXF and 2 MXE boards, the 2 MXF boards are assigned terminals 1 to 32, the 1st MXE becomes board 3 (Sw 1 - 2 on only) 33 to 36, and the 2nd MXE board 4 (Sw 1 - 1,2 ON only) 37 to 40.

II. MAINTENANCE PHILOSOPHY

A. Maintenance Objectives

1) C.E. Level:

This product will operate in a similar way to existing 2200 systems. Effective maintenance of the Turbo system will require the following:

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- a) A working familiarity with the 2200 hardware and operating system.
- b) Skillful cause analysis at the system level.
- c) Knowledge of the diagnostics on the 2200 system.

2) Maintenance Procedures:

Maintenance on this product will be performed on-site by a Wang Customer Engineer. A working knowledge of the system along with built-in diagnostics in the hardware and operating system as well as existing on-line diagnostics will help the C.E. to isolate hardware failures to the board level. The CPU, MXF, and 22C11-2 boards all have LEDs that light during power up and go out if the boards pass built-in self tests. When a board failure occurs, that board will be replaced with a board from C.E. stock and the bad board will be returned through C.E. logistics channels for repair.

B. Types of contract to be offered

On-Site Maintenance Contracts will be offered.

C. P.M. requirements

1) Customer performed:

To insure proper operation of this product, the Customer should observe the Environmental, Power and Cabling, and Site Selection Considerations outlined in the CUSTOMER SITE PLANNING GUIDE (part # 700-5978).

2) WANG C.E. performed:

This product will not require scheduled preventive maintenance. However, a visual inspection of the cooling fans and cables and cleaning of the CPU cabinet would be appropriate on a 'next call' 'as needed basis'.

- a) Interval: N/A
- b) Parts/Consumables required: N/A
- c) Time to perform: N/A

D. Diagnostics required/available:

1) C.E. Level: 2200 Diagnostic Package (currently Rev 2.00.00, p/n 195-2956-0). This package includes diagnostics for:

- a) Printers/Plotters/Terminals p/n 732-0052B 5-1/4" DSDD
- b) Magnetic Media* p/n 732-8520A 5-1/4" DSDD
- c) Telecommunications p/n 732-0051 5-1/4" DSDD
- d) CPU/Memory Test (Some tests included in this group may not run on the Turbo) p/n 732-8521 5-1/4" DSDD

2) Customer Level: Machine level diagnostics are built into the O/S and will automatically run with power on. These diagnostics can also be continuously run by PF' key selection during boot. Customer Engineering should not depend on these diagnostics solely to identify problems. The first choice in diagnostics is to always use the on-line diagnostics included with the '2200 Diagnostic Pkg'.

* See TSB HWT 9640, page 4, item 9, due out 11/91 for changes needed.

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3) Built-in: The CPU, MXF, and 22C11-2 all have LEDs which light during power up self tests. If any of these LEDs stay on, the board has failed self-test and should be replaced.

III. TRAINING

A class was conducted by the 2200 Platform Group at the Lowell Education Center on May 21 through May 25, 1991. The CSO students are listed in Appendix A4.

Future training delivery is being evaluated.

A. CUSTOMER ENGINEER COURSE

1) COURSE OBJECTIVE:

The training course will provide information that will enable the Wang Customer Engineer to meet the Maintenance Objectives for this product. These Maintenance Objectives are detailed in section II of this plan.

2) TIMETABLE and FORMAT:

The 1st seminar on this product was given in MAY of 1991. C.E. Documentation has been given preliminary documentation and a card set and should be ready with the Maintenance Manual by November. If not ready for FCS, preliminary maintenance manuals will be provided on an as needed basis. A TSB, HWT 9640, due out in November will announce the product to the field and will provide basic information for installing and testing. It also provides a list hardware and software concerns that need to be considered when upgrading to the Turbo.

3) PREREQUISITES:

CS/386 Turbo Course prerequisites are:

- a) 6 months field experience following New Hire Training.
- b) Must be knowledgeable on the 2200 product line. Able to demonstrate proficiency in 2200 System Power Up and System Generation, familiar with 2200 peripheral device addressing, and able to run On-Line Diagnostics and/or write 2200 Basic routines to test peripherals.

B. SALES SUPPORT COURSE

1) TIMETABLE and FORMAT

The 2200 Product Line is normally sold through a close-knit VAR network highly familiar with the product, many of whom are in regular contact with the 2200 Group. These people will be generally familiar with the product through newsletters and marketing literature distributed by Wang and the User group and by their contacts with Wang and other VARs.

IV. SPECIAL TOOLS/TEST EQUIPMENT

No unique items required to service this product.

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V. OPERATING ENVIRONMENT

A. TEMPERATURE RANGE

Storage (packaged) 0 to 120 deg F (-17 to 50 deg C)
Operating 60 to 90 deg F (16 to 28 deg C)

B. VOLTAGE RANGE

115 VAC +/- 12 VAC at 60 Hz +/- 0.5 Hz
230 VAC +/- 24 VAC at 50 Hz +/- 0.5 Hz

C. HUMIDITY RANGE

Storage (packaged) 10% to 90%
Operating 20% to 80%
Wet Bulb Temperature 75 deg F max (24.4 deg C)

D. PHYSICAL SPECIFICATIONS

Physical specifications will vary according to the CPU cabinet the card set is installed in. The physical dimensions of the CS-D/N which the current motherboard is compatible to follows:

Height 23.9 inches 60.7 centimeters
Width 15 inches 38.1 centimeters
Depth 15.75 inches 40.0 centimeters

E. SERVICE SPACE REQUIREMENTS

Observe the service space requirements for the 2200 CPU in which the boards are installed. For the CS-D/N the space requirements are:

Front: 30" (91.4 cm)
Rear: 36" (76.2 cm)
Top: 20" (96.5 cm)

F. INPUT CURRENT

Observe the input current requirements for the 2200 CPU in which the boards are installed. For the CS-D/N these requirements are:
2.0 amps at 115 VAC 60 Hz (running)
1.0 amps at 230 VAC 50 Hz (running)

G. INPUT POWER

Input power drawn will be dictated by the 2200 CPU in which the boards are installed. For the CS-D/N the power drawn will be:
170 Watts
230 Volamps

H. POWER FACTOR

The power factor of the system in which it is installed will be unchanged. For the CS-D/N the power factor is:
0.74 lagging

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I. HEAT LOSS

The heat loss for the CPU in which the Turbo card set is installed will be virtually unchanged. For the CS-D/N: 581 BTU/hr (146.4 KgCal/hr.)

J. LEAKAGE CURRENT (grounding requirements)

The leakage current will be determined by the CPU in which the Turbo card set resides. For the CS-D/N: 0.2 Ampere at 115 VAC 60 Hz, 0.2 Ampere at 230 VAC 50 Hz

VI. POWER CORD DATA

A. PLUG TYPE

NEMA 5-15 120 VAC in all compatible domestic CPUs

B. LENGTH

Power cable length will be determined by the CPU in which the Turbo resides. For the CS-D/N: 6 feet (1.8 meters)

VII. DOCUMENTATION LIST

- A. PRINTS:.....210-9576
210-9577
210-9578
210-9579
210-9580
210-9581
210-9583
- B. MAINTENANCE MANUAL:.....741-1769-A Available 11/91
- C. VENDOR MANUALS:.....N/A
- D. DIAGNOSTIC ERROR LISTINGS:.....Included in Maintenance Manual
- E. P.M. PROCEDURES:.....N/A
- F. REPAIR PLAN:.....Rob Clark/Jim Riley
- G. SALES LITERATURE:.....Product Data Sheet by FCS
- H. OPERATORS' GUIDE/USER INFORMATION:...715-2364A Available by FCS

APPENDICES

MARKETING FORECAST

	Q2	Q3	Q4	Q1
	FY92	FY92	FY92	FY93
DOMESTIC	67	68	68	67
INTERNATIONAL	67	68	68	67
TOTAL	134	136	136	134

BETA SITES

Customer	Site Specifics
1. Wallaston Alloys Inc. Wood Road Braintree, MA Contact: Bill Hurley Tel: 617-848-3333	CPU Chassis: CS/N 16 Meg Memory 1 MFX Controller 2 Hi-Speed Disk Controller, 1 connected to a DS through a 2275MUX
2. Vectrocom Inc. 19 Donegani, Suite 707 Point Claire, Quebec Canada H9R2V6 Contact: Marc De Gagne Tel: 514-636-0743	CS or MicroVP supplied by Customer 210-9583 Motherboard CPU Board with 16 Meg Memory 1 MFX Controller with 2 Octopus Cables 1 High-Speed Printer/Disk Controller
3. Rader Companies P.O. Box 20128 Portland, Oregon 97220 Contact: Bill Chapin Tel: 503-255-5330	CPU Chassis: MicroVP to be supplied by cust. 210-9583 Motherboard CPU Board with 8 Meg Memory 2 MFX Controller with 4 Octopus Cables 1 Hi-Spd Disk Ctrlr used w/ NED's RAM Disk
4. Northeast Digital Corp. 124 Railroad Drive Northhampton Ind. Pk. Ivyland, PA. 18974	CPU Chassis: Customer's MicroVP 4 Meg Memory 1 MFX Controller 1 Hi-Spd Disk Ctrlr used w/diff drives including Px, 2275, & non-Wang

NOTES: All 4 sites to have a minimum of 1 complete card set. A set would include 1 motherboard, 1 CPU board, 1 MFX Terminal controller, and 1 Hi-Speed Disk controller.

PRODUCT MATURE PERFORMANCE PREDICTED

<u>Model Number</u>	<u>Product Description</u>	<u>Service Parameter</u>	<u>Rate per Year</u>	<u>Time (hours)</u>
CS/386 Turbo	2200 Computer System	Field Failures	.38	
		Calls	.77	
		MTTR		1.77
		Call Duration		2.82
		Installation Time		1.30
		PM Calls	0.00	
		PM MTTR		0.00
		FCO Calls	0.00	
		FCO MTTR		0.00
		Upgrades/Model	0.02	
		Upgrade Install Time		1.03

PRODUCT ANALYSIS WITH GROWTHProduct Field Failures/Year and Calls/Year
by Month after InstallationModel Number: CS/386 TurboProduct Description: 2200 Computer System

	<u>Month after Installation</u>							
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8+</u>
Field Failures/Year	1.03	0.41	0.39	0.39	0.39	0.39	0.39	0.39
Calls/Year	2.13	1.31	0.86	0.77	0.77	0.77	0.77	0.77

NOTE:

Every effort has been made to include the most current information available but, these part numbers are subject to change.

Customer Service Logistics will provide updated, released part numbers through the normal RSL process.

FRUs, CRUs,

per CPU:		: stocking :						
		: location :						
Quantity:	PART #	DESCRIPTION	FRU:	CRU:	Unique:	B	A	H
1	:210-9576-A	: CPU/Memory PCB (no SIMMS)	: X	:	:	:	:	:
4 or 8	:377-4533	: 1 Meg SIMM Module	: X	:	:	:	:	:
4 or 8	:377-4535	: 4 Meg SIMM Module	: X	:	:	:	:	:
1 to 4	:212-9717	: MXF 16 Port Terminal Cntrlr:	X	:	:	:	:	:
1 to 3	:212-9718	: Hi Speed Printer/Disk Cntllr:	X	:	:	:	:	:
1	:210-9578	: Turbo Motherbrd (for CS-D/N):	X	:	:	:	:	:
1	:210-9583	: Turbo Mbd (for CS & MicroVP):	X	:	:	:	:	:
2 / MXF:	421-0181	: MXF 7 Port Octopus Cable	: X	:	:	:	:	:
1	:458-5026	: New CPU Dr Cover for CS-D/N	:	:	:	:	:	:
	:	: Rail Kit for CS	:	:	:	:	:	:
2	:451-2782	: Top/Bot Rails for I/O Brds	:	:	:	:	:	:
2	:452-0830	: Side Rails for I/O section	:	:	:	:	:	:
1	:458-5194	: New CPU Door Cover for CS	:	:	:	:	:	:
	:	: Rail Kit for MicroVP	:	:	:	:	:	:
2	:451-2782	: Top/Bot Rails for I/O Brds	:	:	:	:	:	:
1	:452-0830	: Side Rail for I/O section	:	:	:	:	:	:
	:451-2781	: Top/Bot Rails for CP/PS Covr:	:	:	:	:	:	:
1	:455-0290	: Outer Rail for CPU/PS Cover	:	:	:	:	:	:

PARTS LIST

Diagnostic Part Number: 195-2956-0

Parts required for P.M.: N/A

CS/386 Turbo Seminar Attendees

<u>NAME</u>	<u>HOME LOCATION</u>
J. Forbes	Boston
B. Weir	Boston/R.I.
T.F. Wong	New Jersey
D. Kelch	Philadelphia
E. Ratka	Philadelphia
M. Rettig	Bethesda
T. Taylor	Va./Washington DC
D. Amini	Va./Washington DC
R. Pincek	Pittsburgh
S. Cheatham	Chicago
B. Griffin	Chicago
S. Schuster	Denver
D. Liao	California
P. Stieger	Seattle
A. Damiano	Canada
W. Duclos	Canada

Memo

To: Dave Camire, Mike Riley
From: Tim Gabriel x71221 M/S 014-99B
Subject: Status of CS 2200 Documentation
Date: 10/8/91

715-3997 (Basic-2/386 Turbo CSRN)

Has been sent to Print dept.

715-3949 Basic-2 Utilities Ref. Manual

Has been sent to Print dept and has come back from printer.

715-2364A CS/DN, CS/386 and CS/Turbo User's Guide

Has been sent to Print dept and has come back from printer.

700-4080F Multiuser Basic-2 Lang. Ref. Manual

Has been sent to Print dept.

715-3948 (Basic-2/386 Rel. 2.0 CSRN)

No information on this document. To be done sometime in the future by some other writing group.

Status

All the documents have gone to print, except the last CSRN (715-3948). Due to the increased workload and decreased staffing in the PCS writing group, Mike should look elsewhere for resources to complete that document when it is needed.

2200 TURBO 386

MODEL NO.
CS/386-400N 157/177-3548
CS/386-800N 157/177-3549
CS/386-1600N 157/177-3550
CS/386-3200N 157/177-3551

4 MEG MEMORY - 4 X 1MEG SIMMS

8 MEG MEMORY - 8 X 1MEG SIMMS

16 MEM MEMORY - 4 X 4MEG SIMMS

32 MEG MEMORY - 8 X 4 MEG SIMMS

*2790873 CABINET ASSY CS-DIN 2900685 SHPG PKG BOM: CS-D-2200- 290068502 SHPG PKG BOM, MFG 4490702 HANDLE CHASSIS 4585026 COVER, PANEL, REAR (WELD) 6152029 LABEL WARNING VOLTAGE SET 6152265 LBL DOCK MARGE ID 8X3 6153872 CORP SERIAL NO 6503200 SCR 6-32 5/8L PAN PHL SST 6504120 SCR 8-32 3/8L PAN PHL SEM 6560145 SHLD GSKT RECT .13 X .19 6661016 +6.0V LITHIUM/MANGANESE

2100576A CS/386 CPU TURBO 4 MEG 210-9577
--

206-6067 X 1 4 1Meg Simms 377-4533
--

OR

206-6067 X 2 8 1Meg Simms 377-4533
--

OR

206-6072 X 1 4 4Meg Simms 377-4535
--

OR

206-6072 X 2 8 4Meg Simms 377-4535
--

These controllers are optional
and are not necessarily part of
every system

22C11-RS PRINTER/DISK CNTRL 200-2992
--

212-9718
210-9579
210-9581
290-0156
615-2265
698-0082

223GMXF TERMINAL CNTRL 200-2991

212-9717
210-9579
210-9580
290-0407
421-0181
615-2265
698-0082

LEGEND

DASHED LEADER LINES REPRESENT
CUSTOMER ORDERABLE ITEMS.

SOLID LEADER LINES IDENTIFY
PARENT/CHILD RELATIONSHIPS.

SHADED BOXES REPRESENT ITEMS TO BE
PILOTTED.

BREAK LINE BOXES REPRESENT
UNRELEASED (ITEM STATUS 1) ITEMS.

SOLID LINE BOXES REPRESENT RELEASED
(ITEM STATUS 2) ITEMS.

RADIUS CORNER BOXES REPRESENT
CUSTOMER INSTALLABLE ITEMS.

ITALICS IDENTIFY MANUFACTURING
MIN/MAX INVENTORY ITEMS.

** IDENTIFYS FIELD REPLACEABLE
UNITS (FRUs).

PAGE 1

NAME	EXT	REV DATE	REV
CHARLES FUNK	78349	06/19/91	
TITLE			D
2200 TURBO 386			

EXISTING ITEMS COMMON TO ALL MODELS
* contains new mother board 210-9578

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CS/386 TURBO - DESCRIPTION/STRATEGY

REVIEWED 6/23/93

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07/09/92

CS/386-400N	4MB CS/386 Turbo CPU
CS/386-800N	8MB CS/386 Turbo CPU
CS/386-1600N	16MB CS/386 Turbo CPU
CS/386-3200N	32MB CS/386 Turbo CPU

2236MXF	16-port Terminal I/O Controller
22C11-HS	High-Speed Printer/Disk Controller

2 NEW INTELLIGENT HIGH SPEED CONTROLLERS (16 PORT TERMINAL CONTROLLER AND A PRINTER/DISK CONTROLLER)

The CS/386 Turbo System includes a CS/386-N chassis, a new CPU board, and a new mother board. The field upgrade kits include a new CPU board and one of two new mother boards (one for MicroVP and CS chassis, and one for CS-D/N and CS/386-D/N chassis). In order to take advantage of the new high-speed I/O channels, both new CPUs and field upgrades ^{would also require} require a 2236MXF 16-port I/O Controller and the 22C11-HS high-speed printer/disk I/O controller.

PRODUCT FEATURES

CS/386 CPU/mother board

80386-33MHz processor

Control memory contains 256KB of 32-bit words

32-byte address and data memory bus

STANDARD

2200 I/O bus interface FOR COMPATIBILITY WITH EXISTING 2200 CONTROLLERS.

4MB to 32MB of RAM; with any combination allocated to user memory or RAMdisk (ADDRESS 340)

AND ALL NON-ALLOCATED MEMORY AVAILABLE AS

Up to 64 partitions of any memory size; e.g., a 32MB system can be comprised of as much as a single 32MB partition or 64 500KB partitions

Can handle 32-users/64-tasks at the same level of performance that a CS/386 can handle 16/16

Any number of partitions, of any size, can be global partitions

Battery backed-up real-time clock

CPU board is compatible with existing VLSI and CS/386 systems, e.g. existing VLSI and

CS/386 CPUs can be field upgraded

Mother board is compatible with all existing VLSI and CS/386 controllers

SUPPORTS ALL EXISTING

Software compatible with all other 2200 CPUs

MULTI-USER

2236MXF

80286 12MHz coprocessor

256KB SRAM

The 2236MXF has two regular RS-232 ports and two 36-pin concentrators that support seven workstations each using a 7-port octopus cable per concentrator. Each 2236MXF is shipped with one octopus. If planning to use more than nine workstations per 2236MXF, an additional octopus cable (2236MXF-CABLE) must be ordered from Wang Express.

Supports 16 workstations per MXF, a maximum of four 2236MXFs or a total of four (MXEs, MXDs, TAPs and MXFs) combined, per system.

TERMINAL CONTROLLER

If using a mixture of 2236MXFs and 2236MXEs, the MXEs must be assigned the last partitions. For example, if using one MXF and one MXE, partitions 1-16 are on the MXF and 17-20 on the MXE. A system will support a maximum combination of four MXE/MXF controllers.

OLDER TERMINAL CONTROLLERS
OLDER CONTROLLERS

Product Restrictions:

Only the two RS-232 ports on the 2236MXF support asynchronous communications.

22C11-HS

80286 12MHz coprocessor

256K RAM

Supports one disk port, one printer port and one multiplexing port (connection to a 2275MUX, or the DPU of a CS-D or CS/386-D to allow these devices to work through and

PRINTER AND EITHER STANDARD DISK OR

take advantage of the high-speed I/O channel)

The internal storage devices of a D chassis can take advantage of the high-speed disk I/O channel by running a cable from the external disk port on the external DPU to the disk port on the 22C11-HS.

If a customer wants to use both the 22C11-HS and a 2275 multiplexor (e.g., more than one CPU to a DS), first run a cable from the MUX port on the 22C11-HS to a 22C80 port on the 2275MUX. Then plug the DS or equivalent storage device into the disk port on the 2275MUX.

CONFIGURATION INFORMATION

Accounts with MICROVPs, CSs, CS-D/Ns or CS/386-D/Ns, e.g., VLSI or CS/386 CPUs, can field upgrade their CPU(s) to a CS/386 Turbo.

CS/386 Turbo Systems can be sold as new CPUs or as field upgrades to existing VLSI or CS/386 systems. Order a new CPU if the prospect does not own any 2200 hardware, or the user's CPU cannot be field upgraded (e.g., a non-VLSI CPU such as a 2200, VP, SVP, LVP or MVP).

Required Components

The CS/386-400N through CS/386-3200N is available only as a new CPU in the N chassis. Therefore, a DS or equivalent storage is need for disk storage.

Customers ordering a new CPU or a upgrade kit must order a 2236MXF and 22C11-HS if they plan to take advantage of the new high-speed I/O. Users requiring the faster CPU speed but not faster I/O can operate current 2236MXEs and 22C11s in 8-bit mode.

Optional Components

Users are no longer limited to a 16MB maximum per disk platter address, since the CS/386 Turbo can function in 3-byte addressing mode. To have disk platters of any size requires a DS with a Revision Level 4 Prom.

Software

CS/386 Turbo systems and Turbo upgrade kits are shipped with the BASIC-2/TURBO operating system, Release ~~2.0~~ 2.1.

^{PROPERLY} WITH EXISTING PROGRAMS NOW RUNNING ON A NON-386 2200 CPU
To function ~~as a CS/386~~, partitions must be 80 percent larger than those on a 2200 or VLSI.

Objectives/product strategy

2200 customers fit into one of three categories. Either they:

Do not want to leave the 2200 hardware platform.

Want to leave the 2200 hardware platform.

Will accept the platform that best meets their needs, as long as they can use their existing software.

For these reasons, Wang has opted to offer our 2200 users and VARs alternative methods of protecting their investments in their BASIC-2 software. This approach exemplifies our BASIC-2 platform strategy, where the objective is to develop and maintain a series of industry standard hardware platforms that support the Wang BASIC-2 and the third party Basic-2 compilers (NIAKWA and KCML), through both proprietary (BASIC-2) and non-proprietary (UNIX) operating systems.

The BASIC-2 platform now includes three major product series:

CS/386 Turbo: This new INTEL 80386 (33MHz, 32-user/64 task CPUs and associated peripherals) is designed to replace the 2200 VLSI series of CPUs.

BASIC-2 compilers: BASIC-2 compilers (BASIC-2C and KCML) allow 2200 applications to run under SCO UNIX or AIX on the IBM RS/6000.

In summary, the announcement of the CS/386 Turbo moves us closer to our goal of offering end users and VARs the opportunity to migrate to the Wang hardware platform of their choice.

Customers will be asking the following question: "Now that Wang is successfully migrating 2200 users to its SCO UNIX platform using the NIAKWA Basic-2C Compiler, and will very shortly be migrating 2200 users to the RS/6000, why are you selling another model of the 2200?"

Recent experiences selling NIAKWA/UNIX have shown that not all users want to migrate off the 2200. Some don't want ~~from~~ the cost associated with migrating to another hardware platform, some don't feel they have the level of sophistication to handle UNIX, and still others simply refuse to give up their 2200. While they may not want a UNIX system, they are interested in upgrading their present system by purchasing a set of boards, or in purchasing a bigger and better 2200 product.

NOTE1: IF UPGRADING FROM A NON-386 2200 CPU, SOME SOFTWARE CHANGES MAY BE NECESSARY. THESE CHANGES WOULD INCLUDE ANY REFERENCE MADE BY AN EXISTING PROGRAM TO A SPECIFIC RESOURCE OR STATUS BYTE OF THE CURRENT OPERATING SYSTEM WHICH MAY NO LONGER APPLY. EXAMPLES WOULD INCLUDE THE CPU ID #, REFERENCE TO THE CPU TYPE STATUS BYTES (THESE 1ST 2 ALSO APPLY IF UPGRADING FROM A 386), REFERENCE TO A MEMORY BANK STATUS BYTES, ETC. ADDITIONALLY THE TURBO USES 10 BIT ACCURACY IN MATH CALCULATIONS TO THE RIGHT OF THE DECIMAL POINT WHILE NON-386 2200 CPUs HAVE 13 BIT ACCURACY. THIS IS A LIMITATION OF THE INTEL 386 CHIP. FRACTIONAL CALCULATIONS TO THE 13TH DIGIT MAY SLIGHTLY DIFFER. ANY PROGRAM MAKING A DECISION BASED ON 13 BIT ACCURACY MAY NEED TO BE CHANGED.

NOTE 2: THE 386 CHIP USED WITH THE TURBO IS A BINARY PROCESSOR. EXISTING 2200 PROGRAMS ~~ARE WRITTEN~~ ON NON-386 CPUs ARE WRITTEN IN BINARY CODED DECIMAL. PROGRAMS IN BINARY CODED DECIMAL ARE TRANSPARENTLY CONVERTED TO BINARY WHEN LOADED INTO MEMORY. IN BINARY THESE SAME PROGRAMS TAKE UP MORE SPACE. AS A GENERAL RULE OF THUMB, PARTITION SIZE SHOULD BE INCREASED 80% IF UPGRADING FROM A NON-386 CPU. FOR OPTIMUM PERFORMANCE IT IS RECOMMENDED PROGRAMS BE CONVERTED FROM THE 'OLD' BINARY CODED DECIMAL FORMAT TO THE 'NEW' BINARY FORMAT. ^{THESE} ~~THESE~~ ~~ARE~~ ^{ARE} COMMANDS ~~ARE~~ AVAILABLE WITH THE TURBO TO HELP AUTOMATE THIS PROCEDURE. THE ~~MOVE~~ #MOVE! COMMAND WILL MOVE ALL PROGRAMS FROM A DISK AND CONVERT THEM ON A SPECIFIED DESTINATION DISK. IF FOR SOME REASON THE PROGRAM CANNOT BE CONVERTED, THE PROGRAM IS LISTED ON THE SCREEN WITH AN ERROR MESSAGE PERTAINING TO WHY IT COULD NOT BE CONVERTED. BECAUSE MAXIMUM PROGRAM LINE LENGTH IS ^{STILL} 256, SOME PROGRAMS WHEN CONVERTED MAY HAVE LINES EXCEEDING THAT LIMIT. SHOULD THIS BE THE CASE, THE #MOVE! WILL ALSO INDICATE THE LINE # OF THE FIRST LINE IN THE PROGRAM TOO LONG. THESE LINES WILL NEED TO BE MANUALLY ~~CORRECTED~~ ^{SPLIT TO} ALLOW CONVERSION. A DIS

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CS/386 TURBO - BASIC SYSTEM COMPONENTS

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07/09/92

Basic System Components Include:

- o CS/386 CPU/mother board
- o 80386-33MHz processor
- o Control memory contains 256KB of 32-bit words
- o 32-byte address and data memory bus
- o 2200 I/O bus interface
- o 4MB to 32MB of RAM; with any combination allocated to user memory, or RAMdisk (address 345)
- o Up to 64 partitions of any memory size; e.g., a 32MB system can be comprised of as much as a single 32MB partition or 64 500KB partitions

Country Kits:

When ordering a CS/386 TURBO, a Country Kit Model Number(CS/TURBO-CK-xx), must be ordered.

OPTIONS

DISK CONTROLLERS

- 22C11-HS - High-Speed Printer/Disk Controller
- 2275MUX - 2275/DS Disk Multiplexing Unit supports up to 4 CPUs, THE CPU WARE USED AND 3 ADDITIONAL
- 2275MUXE - 2275/DS Disk Multiplexing Extender supports up to 4 CPUs (MUST BE USED WITH IN CONJUNCTION WITH THE 2275MUX WHEN MIXING MORE THAN 4 CPUs)
- 22C11 - Dual Controller for Disk/Diskette and Printer
- 22C80 - Disk Multiplexing Controller. One required for each CPU interfacing with 2280MUX or 2275MUX

LOCAL COMMUNICATIONS OPTION

- 2258-X - Allows the CS/386-D/N to communicate with a VS

PRINTER CONTROLLERS

- 22C11 - Dual Controller for Disk/Diskette and Printer
- 22C11-HS - High-Speed Printer/Disk Controller

TELECOMMUNICATIONS CONTROLLERS

- 2227B - Async. Communication Controller
- 2228B - Communication Controller 8K
- 2228C - Communication Controller for IBM 3275 Emulation.
- 2228D-4 64K Communication Controller RS-232-C/V.24/RS-449 only

WORKSTATION CONTROLLERS (MAXIMUM 4 OF ANY TYPE / SYSTEM)

- 2236MXF - 16-port Terminal I/O Controller
- 2236MXE - 4-Port Terminal Processor with Asynchronous Communication capabilities
- 22C32 - Triple Controller for diskette, printer and workstation

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CS/386 TURBO - DISK SUPPORT

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07/09/92

For detailed information regarding the following currently marketed disk drives, use the PF16 key and choose the PERIPHERALS pick off the 2200 PRODUCT menu.

Information regarding support of select discontinued disk drives can be found in the Discontinued Product Support section.

DS	Data Storage Cabinet
DS-1.2	1.2MB Floppy Diskette
DS-20	20MB Fixed Winchester
DS-32	32MB Fixed Winchester
DS-64	64MB Fixed Winchester
DS-140	140MB Fixed Winchester
DS-320	320KB Diskette Drive

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CS/386 TURBO - PRINTER SUPPORT

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05/26/93

For detailed information regarding the following currently marketed printers, use the PF16 key and choose the PERIPHERALS pick off the 2200 PRODUCT menu.

Information regarding support of select discontinued printers can be found in the Discontinued Product Support section.

2200-PM017	400 cps matrix printer
LDP16P-DSK	16PPM Laser printer
HQ200/HQ300	200/300 CPS MATRIX PRINTER (PRINTER DRIVER NORMALLY NEEDED)

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CS/386 TURBO - SOFTWARE SUPPORT

\$\$T

07/09/92

For detailed information regarding the following currently marketed software, use the PF16 key and choose the package(s) pick off the 2200 PRODUCT menu.

Information regarding support of select discontinued software can be found in the Discontinued Product Support section

2200/CS Word Processing 2.6
DATAMERGE
IDEAS Release 1
IDEAS Release 2
ISS Release 5.5

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CS/386 TURBO - TAPE SUPPORT

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07/09/92

For detailed information regarding the following currently marketed tape drives, use the PF16 key and choose the PERIPHERALS pick off the 2200 PRODUCT menu.

Information regarding support of select discontinued tape drives can be found in the Discontinued Product Support section.

2209A
DS-TS150
DS-TS150A

1600 bpi 9-track tape drive with controller
150MB tape streamer
150MB add on streamer

\$\$T

CS/386 TURBO - TELECOMMUNICATION SUPPORT

\$\$T

07/09/92

For detailed information regarding the following currently marketed telecommunications, use the PF16 key and choose the package(s) pick off the 2200 PRODUCT menu.

IBM BSC Batch
Remote Control and Maintenance

\$\$T

CS/386 TURBO - WORKSTATION SUPPORT

\$\$T

07/09/92

For detailed information regarding the following currently marketed workstations, use the PF16 key and choose the PERIPHERALS pick off the 2200 PRODUCT menu.

Information regarding support of select discontinued workstations can be found in the Discontinued Product Support section.

2536DW

Async Workstation

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CS/386 TURBO - DOCUMENTATION

\$\$T

07/09/92

LITERATURE

Part Number

Description

700-4080F
715-2364A
715-3947
715-3949A
741-1769-A A

Multiuser BASIC-2 Language Reference Manual
CS/TURBO User's Guide
CS/386 Turbo Data Sheet
BASIC-2 Utilities Reference Manual
CS/386 Turbo Maintenance Manual

FOCUS

Date

CS/386 TURBO

10/01/91

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CS/386 TURBO - UPGRADE INFORMATION

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07/09/92

MICROVP-TURBO	MICROVP To 4MB CS/386 Turbo CPU
CS-TURBO	CS To 4MB CS/386 Turbo CPU
CS-N-TURBO	CS-N+CS/386-N To 4MB CS/386 Turbo CPU
CS-D-TURBO	CS-D+CS/386-D To 4MB CS/386 Turbo CPU

NOTE: For Turbo models greater than 4MB, add one of the following at the same time you order a Turbo upgrade:

UJ-6059	4MB CS/386 TURBO to 8MB Turbo Memory
UJ-6060	4MB CS/386 TURBO to 16MB Turbo Memory
UJ-6061	4MB CS/386 TURBO to 32MB Turbo Memory

Subsequent field upgrades

UJ-6067	4MB To 8MB CS/386 Turbo CPU Memory Upgrade
UJ-6068	4MB To 16MB CS/386 Turbo CPU Memory Upgrade
UJ-6069	4MB To 32MB CS/386 Turbo CPU Memory Upgrade
UJ-6070	8MB To 16MB CS/386 Turbo CPU Memory Upgrade
UJ-6071	8MB To 16MB CS/386 Turbo CPU Memory Upgrade
UJ-6072	16MB To 32MB CS/386 Turbo CPU Memory Upgrade

- o Customers updating to a CS/386 Turbo from a VLSI CPU or a CS/386 CPU, and desiring ~~desired~~ memory greater than 4MB, must include an order for UJ-6059 (8MB), ~~UJ-6060~~ (16MB), or UJ-6061 (32MB). For memory upgrades after the initial upgrade to a CS/386 Turbo, use UJ numbers 6067 through 6072.
- o The CS/386-400N through CS/386-3200N is available only as a new CPU in the N chassis. If a customer wants a new CS/386 Turbo in a CS/386-D chassis, order a UJ-6047, CS-N to CS-D chassis upgrade, and a CS/386-400N through CS/386-3200N CPU.
- o Customers ordering a CS/386-400N through CS/386-3200N receive a CS-N chassis with the new Turbo CPU and mother board. Customers ordering MICROVP-TURBO, CS-TURBO, CS-N-TURBO and CS-D-TURBO receive a CPU board and a mother board ~~for~~ their CPU.

ONLY TO UPGRADING EXISTING

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CS/386 TURBO - DISCONTINUED PRODUCT SUPPORT

\$\$T

06/08/93

The following products though discontinued are currently supported on the TURBO. This list is not all inclusive.

DISK DRIVES:

2230-1	Fixed/removable disk drive
2230-2	Fixed/removable disk drive
2230-3	Fixed/removable disk drive
2260B	10MB fixed/removable disk drive
2260BC	5MB fixed/5MB removable disk drive with 22C13 controller
2260C	5MB fixed/5MB removable disk drive with 22C12 controller
2270A-1	.25MB Industry Compatible Single Removable Diskette Drive
2270A-2	.50MB Industry Compatible Dual Removable Diskette Drive
2270A-3	.75MB Industry Compatible Triple Removable Diskette Drive
2275-10	10MB 5 1/4" Winchester Drive 320KB Floppy Drive
2275-20	Dual 10MB 5 1/4" winchester drive
2275-30	30MB 5 1/4" Winchester Drive 320KB Floppy Drive
2275-60	Dual 30MB 5 1/4" winchester drive
2280-1	13.4 Removable/13.4MB fixed disk drive
2280-2	13.4 Removable/40.2MB fixed disk drive
2280-3	Removable/67MB fixed disk drive
2280-3A	13.4 Removable/67MB fixed disk drive with 22C14 DPU
2280N-1	13.4 Removable/13.4MB fixed disk drive without DPU
2280N-3A	13.4 Removable/67MB fixed disk drive without DPU
DS-10R	10MB Removable drive for DS

TAPE DRIVES:

2209	800 bpi 9-Track tape drive
2229	Four track, 6400 bpi, 14MB tape drive
DS-TS	45MB tape streamer

PRINTERS/PLOTTERS:

2200-PM018	60 cps daisy printer
2201L	15 cps output writer
2211M	printer multiplexer:
2221W	200 cps matrix printer with stand
2231	80 column line printer
2231W-1	120 cps 112 column matrix printer
2231W-2	120 cps 132 column matrix printer
2231W-3	Graphic matrix printer
2231W-6	70 cps 132 column high density matrix printer
2232-A	Digital flatbed plotter
2232B	Digital flatbed plotter
2235	180/222 cps 10/12.2 pitch bidirectional matrix printer
2241	80 column thermal printer
2245	80 cps draft matrix printer
2245/160	160 cps 132 column draft matrix printer
2251	60 cps matrix printer
2261	High speed printer
2261W	220 lpm dual pitch matrix printer
2263	1400 lpm 64 character line printer
2263-2	600 lpm 64 character line printer
2263-3430	lpm 96 character line printer
2271	Bidirectional output writer
2271P	Plotting output writer
2272-1	One-pen drum plotter

2272-2	Three-pen drum plotter
2273-1	250 lpm band printer with 1 utility B print band
2273-2	600 lpm band printer with 1 utility C print band
2281	Daisy output writer
2281P	30 cps plotting output writer
2281W	30 cps Wang daisy printer/plotter
DW/22-20	20 cps bidirectional daisy printer
DM50/300	50/300 cps multifunctional matrix printer
LCS15-DSK	15 ppm laser printer
LCS8-DSK	8 ppm postscript laser printer
LCS15-CMB	15 ppm laser printer
LDP8-DSK	8 ppm laser printer
PM060	Multifunctional matrix printer

WORKSTATIONS:

2236DE	Interactive DP workstation
2236DW	Interactive DP/WP workstation
2282	Graphic CRT
2326DW	DP/WP workstation with expanded keyboard
2336DE	DP Workstation
2336DW	DP/WP Workstation
2236MXD	4-Port Terminal Multiplexer
2426DW	DP/WP Workstation with Expanded Keyboard
2436DE	DP Workstation
2436DW	DP/WP Workstation
2436WP	512K CPU, 1 Floppy System
2436WP-1	512K CPU, 2 Floppy System and Printer
2436WP-2	512K CPU, Winchester and Printer
PC/APC PC/APC	
with PC/2200 Support Utilities Software	

CONTROLLERS:

2207A	I/O interface controller
2227N	Null Modem
2228D-4E	64KB communications controller
2228D-4X	64KB data communications controller X.21 only
2228D-8E	128KB communications controller
2228D-8X	28KB data communications controller X.21 only
2228N	Null Modem
2230MXA	Disk multiplexer controller
2230MXB	Disk multiplexer controller
2280MUX	Disk multiplexing unit
2280MUX-E	Disk multiplexer for 4 additional CPUs
22C01	Output write/plotter controller
22C02	Printer/Plotter Controller
22C03	Disk/Diskette drive controller
22C05	2230/2240 disk drive controller
22C12	2260C disk drive controller
22C13	2260C disk drive controller for multiplexing
22C14	DPU for 2280 Disk Drive

SOFTWARE:

195-2217-X Wang P.R.I.S.M. software
 Univac 1004 RMS-1 Batch Emulation
 Univac Uniscope 100/200 Single Station Emulation
 CDC UT200 Emulation
 3271 BSC Emulation
 Asynchronous Communications
 Burroughs Poll/Select
 PC2200 Emulation Software

\$\$T

CS/386 TURBO - INTERNATIONAL CONSIDERATIONS

\$\$T

07/09/92

- o The international model numbers for the CS/386 TURBO are the same as the domestic model numbers. When ordering a CS/386 TURBO, a country kit, CS/TURBO-CK-XX, must be ordered for each CPU. A country kit is a no charge item containing a country-specific power cord and documentation.
- o The following country kits are available for the CS/386 TURBO CPUs:

Model Number	Country Kit Code
--------------	------------------

AE	Azerty English
AG	Argentina
AS	Australia
AU	Austria
AZ	Azerty French
BF	Belgium French
CA	Canadian English
CF	Canadian French
DA	Danish
FI	Finnish
FL	Flemish
GE	German
HK	Hong Kong
IC	Icelandic
IT	Italy
NL	Netherlands
NO	Norway
PO	Portuguese
SF	Swiss French
SG	Swiss German
SI	Swiss Italian
SL	Swiss Latin
SP	Spanish
SW	Sweden
TU	Turkish
UK	United Kingdom
UV	Universal

\$\$T

CS/386 TURBO - ADDITIONAL INFORMATION

\$\$T

07/09/92

- o CS/386 Turbo products are Wang-installed.
- o Current Wang Software Services (WSS) 2200 support policies and services apply.
- o The CS/386 Turbo products are warranted to be free from defects in materials or workmanship for a period of 90 days from date of installation. Warranty is in accordance with terms and conditions in effect at the time of sales.
- o On-Site (Plan A), Wang's standard on-site maintenance agreement, provides for 12 months of on-site service.

CS / 3 8 6 T U R B O

B E T A T E S T P L A N

Prepared By,
Mike Bahia
BASIC-2 Platform Group

BETA TEST CRITERIA

No major failures relating to hardware or software for a period of 30 days.

OBJECTIVES:

The beta test site is a controlled customer site of a pilot system, dedicated to testing applications for the purpose of evaluating a product's adherence to design specifications and performance criteria. It also is used to highlight reliability/maintainability problems experienced during installation and support of a 'live system' that would adversely impact the ability of Customer Engineering to properly support the product in the field. The product platform group has the overall responsibility, control, and monitoring function for the beta site(s). A representative of the platform group will be the focal point for the beta test site, documenting and communicating product and servicing concerns and recommendations to the platform group.

BETA SITE SELECTION CRITERIA:

The beta site is specifically selected to extensively test a product in a controlled customer environment prior to first customer shipment of that product. Products released to a customer not conforming to this plan prior to official product release will not be considered part of the beta test plan.

- The Beta Site must be a current user of Wang equipment.
- The Beta Site must not be a critical account.
- A Beta Site Agreement must be signed by the prospective Beta Site before the beta test cycle begins.
- The Customer must not expect or depend on the new product to fulfill production needs.
- The Beta Site should be within one to two hours travel time from the Home Office when possible.
- The proposed site must be within 25 miles of a Customer Engineering Branch Service Office.
- The Branch Service Office must have sufficient Field Engineering manpower to assign/provide primary hardware support by qualified individuals as necessary.
- A qualified Support Analyst must be assigned to the Beta Site to interface with the customer and provide direct software support.
- Duration of the Beta Site testing will not be less than 60 days.
- The test site configuration must exceed the average system size for that product, as projected by Marketing for shipment during the next fiscal year.

RESPONSIBILITIES OF THE BETA SITE CUSTOMER:

- Provide Wang Laboratories with a high level, technical contact to function as administrator for the Beta testing.
- Provide the technical support, close supervision, and analysis required by the Beta testing.
- Provide Wang with thorough, complete, and timely feedback on the product being tested, both in the area of problems encountered and suggestions for enhancements.
- Provide time for meetings with Wang representatives during normal business hours to discuss the progress and status of the testing.
- Review and comment on documentation and training materials being utilized.
- Realize that Beta testing may disrupt normal operations and Wang cannot be held liable for these disruptions.
- Provide Wang representatives with access to the equipment during normal business hours for software and hardware upgrades, fixes, etc., when necessary.
- Provide existing hardware as needed and agreed upon with Wang to adequately test the Beta product.
- Provide a reasonable office environment and the standard office equipment to support the operation of the Beta test equipment, i.e., electricity, phone lines, etc.

RESPONSIBILITIES OF WANG LABORATORIES:

C.E. Branch

- The Branch Manager will provide field personnel to survey the site prior to installation of the beta equipment.
- The local Branch Manager will assign a Customer Engineer familiar with the product to install, maintain, and monitor the Beta site on a daily basis for the duration of the beta test period.
- The assigned Customer Engineer will be the customer contact for support of all Beta Site hardware and will serve as the primary focal point for all hardware problems and questions.
- The Branch will co-ordinate the ordering and replacing of parts for standard released products at the site for hardware used in the Beta testing.
- After completion of the Beta test and acceptance by the Customer and Customer Engineering, full support of the product will be provided by local support personnel.

Home Office

- Provide the assigned site Customer Engineer with Home Office training and the necessary preliminary documentation and diagnostics.
- Provide Area Technical Support personnel with the necessary preliminary documentation.
- Provide appropriate training to all Support personnel at the Home Office and in the field.
- Provide hardware and software support for the product under test to the field as needed.
- Travel to the site as needed for problem solving.
- Maintain a problem tracking system (PTR).
- Keep Product Management and R&D informed in a timely manner on the status and progress made at the beta site/s.
- Provide input as to reliability and maintainability of the beta equipment.
- Provide a Beta Test Plan to all participants at least 30 days prior to the test cycle when possible.
- Provide tested spare boards to the site as needed to maintain the Beta equipment.

I. BETA SITES:

There are plans for 4 domestic Beta Test Sites at this time.

All 4 sites will have a minimum of 1 complete card set. A set would include 1 motherbrd, 1 CPU brd, 1 MXF Terminal Controller, and 1 Hi-speed Disk Controller. Below is the proposed configurations requested.

Beta Site Customers

1. Wollaston Alloys Inc.

Wood Road

Braintree, Ma

Contact: Bill Murley / LORSEN / SUSAN

Tel: 617-848-3333

Wang Contacts

Area Mgr: Bill Moore

ATSM: Al Capua

ATS: John Forbes

BM: Lynne Sibo

CE: Brian Weir

pager

Telephone

617-556-3635

617-556-3612

617-556-3655

508-820-0360

508-238-7993

617-669-1991

Site Specifics:

CPU chassis: CS/N

16 Meg Memory

1 MXF Controller

1 Hi-Speed Disk Controller connected to a DS through a 2275MUX

2. Vectrocom Inc.

19 Donegani, Suite 707

Pointe Claire, Quebec

Canada H9R2V6

Contact: Marc De Gagne

Tim Onyschuk

Tel. 514-596-0743

695-8500

Reg Mgr: Rick Gray

Supp Mgr: Florent Coache 514-861-9571

DTS: Jacques Hamel 514-861-9571

BM: Florent Coache 514-861-9571

CE: Wayne DuClos 514-861-9571

PTR - C410007495

Site Specifics:

CPU chassis: CS or MicroVP supplied by customer

210-9583 Motherboard (ser # 00474369)

CPU Board with 16 Meg Memory (ser # 00899921 and 00899602)

1 MXF Controller (ser # 00484354 and 00409160) with 2 Octopus Cables

1 Hi-Speed Disk Ctrlr (ser # 00899892 and 00899529)

3. Rader Companies

6005 Northeast 82nd Avenue

Portland, Oregon 97220

Contact: Bill Chapin

Jim Symington

Tel: 503-255-5330

Area Mgr: Jim Smith

ASM: John Bender 206-340-6663

ATS: Paul Stieger 503-624-1240

BM: Rich Clyde 503-624-0268

CE: Carol Forsberg 503-624-0268

Site Specifics:

CPU chassis: MicroVP or CS supplied by customer

210-9583 Motherboard (ser # 00753044)

CPU Board with 8 Meg Memory (ser # 00899914 and 00320378)

2 MXF Brds (ser # 00484003/00409194 & 00899505/00381630) w/ 4 Oct Cables

1 Hi-Spd Disk Brd (ser # 00484383/00484268) to be used w/ NED's RAM Disk

4. ~~Northeast Digital Corp.~~

~~124 Railroad Drive~~ 267 GREEN DR

~~Northampton Industrial Park~~

~~Lyndall, PA 18974~~ CHURCHVILLE, PA 18966

Contact: Dan Collins

Tel: 215-364-9644

Area Mgr: Bob Johnstone

ASM: Ron Geyer 215-651-8534

ATS: Dieter Kelch 215-651-8544

BM: Joe Massanova 215-564-6535

CE: Ed Ratka 215-354-9200

pager

215-899-7076

Site Specifics:

CPU chassis: customer's MicroVP

4 Meg Memory

1 MXF Controller

1 Hi-Spd Disk Ctrlr used w/ diff drives including Px, 2275, & non-Wang

1/27 1.07

1/22 1.06
1.15

1/21 1.06
1.07
12/10 1.03
FEB X 3311042906
2 DAY
12/16 1.04
FEB X 1923111005

WANG TEST SITE AGREEMENT

WANG

USER Name and Address:

IUE Local 275
2216 Flatbush Ave
Brooklyn, NY 11223

Date _____

Test Period 90 days

USER Contacts:

Test Product:

CS/386 Turbo 4 M CPU ESD
210-2523 Motherboards
212-2927 22011-SCSI Controller

(1) _____

(2) _____

(3) _____

This Agreement sets forth the terms and conditions under which USER will assist Wang Laboratories, Inc. ("WANG") in testing and evaluating the Test Product as follows:

1. USER will have a non-transferable right to use the Test Product, including any related computer programs and documentation ("Software"), experimentally during the Test Period at no charge. The Test Period will begin when the Test Product is installed at USER's premises and will continue for the period specified above unless terminated in accordance with paragraph 8 or extended by mutual agreement of the parties. At the conclusion of the Test Period, USER agrees to surrender the Test Product and all copies of the Software to WANG unless USER has entered into a separate agreement with WANG to purchase or lease the Test Product.

2. USER agrees to assist WANG in testing and evaluating the Test Product for WANG's benefit by fully implementing all of the applications and features supplied and by maintaining for WANG a written record of USER's evaluation, including the defects and deficiencies discovered by USER during the Test Period. USER's evaluation may be used in the development of this or other WANG products so all submissions regarding the Test Product will become the property of WANG.

3. USER agrees, for the purpose of evaluating the Test Product, to permit WANG representatives access to the Test Product during normal business hours and to permit WANG representatives to meet during normal business hours with the USER Contacts identified above who will perform the testing and evaluation.

4. No title to or ownership of the Test Product or any Software is transferred hereby. WANG retains the right during the Test Period to modify, revise or remove the Test Product and any Software furnished to USER hereunder from USER's premises.

II. Beta Site Home Office Contacts

<u>Home Office Support</u>	<u>Contact</u>	<u>Telephone</u>
R&D Beta Site Coordinator	Mike Bahia	508-656-0256
Beta Site Support Engineer	" "	" "
Additional Support Personnel	Mike Riley	508-967-0524
	Tyler Olsen	508-967-0339
Platform Manager	Gene Schulz	508-967-2790

III. Beta Site Spares

Due to the limited number of boards currently available, all spare boards will be controlled and distributed by the Beta Site Coordinator on an 'as needed basis'.

If a board failure occurs or is assumed to have occurred, the CE should attempt to call the Beta Site Support Engineer before going on-site. At that time actions to be taken will be determined to insure if a hardware problem does exist, R&D gets the information they need to quickly isolate the problem. Upon identifying a board as a problem the CE will call the Support Engineer again to determine if any additional steps should be taken to further identify the problem and to make arrangements for receiving a spare. The bad board will be returned to the Beta Site Coordinator with a completed Repair Tag attached detailing the problem including the error codes seen. The board should be shipped to arrive within 2-3 days maximum to the following address:

Wang Laboratories
1 Industrial Ave.
Lowell, Ma. 01851
Attention: Mike Bahia
MailStop 014-A3A

The Beta Site Support Engineer will then test the board to verify the problem and forward it to an R&D Engineer to identify the specific cause.

IV. Preparation

The assigned CE as identified by the Branch Manager will be provided documentation and training as necessary by R&D to install, monitor, and maintain the beta site for the duration of the test period.

The Beta Site Coordinator will contact the Beta sites to establish the hardware needs of each site and coordinate those needs with the available hardware. Once the hardware has been procured, the Coordinator will arrange with the Branch Manager for shipment of the hardware to the field. The Coordinator will also maintain a set of tested spares for support of the beta sites.

The Platform Manager will determine when the product is ready to go to beta test as determined by the full working status of the product in alpha test.

The Customer will be advised by the Beta Site Coordinator that the beta test equipment is for test purposes only and that Wang is not responsible for lost data or down time caused by the beta system. The Customer will be advised not to process non-recoverable data.

The Branch Manager will be responsible to have a Beta Test Site Agreement signed by the Customer prior to installation. The Agreement will be provided by the Platform Group if not already available at the Branch.

V. Implementation

Note: Hardware is already installed at Wollaston Alloys in Braintree, MA and Northeast Digital Corp. in Pennsylvania.

A Home Office Support Engineer will be on-site during the unpacking and installation of hardware if required.

The Branch Manager will coordinate installation of the beta equipment with the Customer.

Home Office Support will be readily available for phone support and technical back up for the Customer, the Customer Engineer, and any Support Personnel involved.

The Beta Site Coordinator will open a PTR at the appropriate time as a log for tracking problems and performance.

The Customer will call the Call Control Center to report any hardware problems. The Customer will have the option of calling the Call Control Center to contact the Branch or calling Beta Site Support directly for software support as determined locally by the Branch and the Customer.

The assigned CE will handle all first line hardware problems. Before going on site the CE will call the Beta Site Support Engineer to discuss what actions should be taken or leave an appropriate message if not available. After identifying the problem on site the CE again will call the Home Office Support Engineer to communicate the latest status and to determine if any additional actions may be required. Again if not available a message should be left.

The assigned CE will call the Customer on a weekly basis for a status update. That status will then be forwarded to the Beta Site Support Engineer either by telephone, Wang Office, or by an update to the PTR call.

VS OFFICE

Monday

11/11/91 09:20 am

Page:

CC: Michael Bahia
From: Michael Bahia
Subject: PCBASIC2

MS014-A3A/LOWELL
Security: General
Date Received: 11/11/91

John, Thanks for the feedback on the beta sites and on the Lasers. Will get you the fixed Turbo O/S as soon as it is available. Mike B

To: Michael Bahia
Subject: PCBASIC2

Reply From: Kirit Baxi
Date Sent: 11/11/91

Mike
Thanks for the feedback from SAS I do not see any problems wollaston having the changes installed. All SAS have to do is to install the new ISS utilities with the KFAM107X background program.
The german beta is going well. they have just secured an order from BASF so far as the UK sites are concerned they are running trouble free. I have asked them to withdraw the beta hardware by end of dec. they must therefore place an order. Thanks for the info on the OS bug. Let me have the fixed code ASAP.
Regards
John Baxi
PS I pressed wrong key so you have two updates.

To: Kirit Baxi
Subject: PCBASIC2

Reply From: Michael Bahia
Date Sent: 08/11/91

John, Yes, I did get the diskette created although I did not have enough memory to run it, BASIC2, on my PC Classic. Will this run on a PC380?
Talked to Tim at SAS and your KFAM changes look good. He cannot find any problems in the lab environment. Next step is to try it on a live system. Tim is going to ask Victor to install it at Wollaston Alloys. Is there any reason not to do this?
What is happening with the Turbo sites in England & Germany? Please provide some detailed feedback. A major problem has been found with the latest Turbo O/S, 1.0 and 1.01. If two jobs are sent to a printer on the new bus at the same time, the pages of both printouts may be mixed together. We saw this problem at Wollaston when I installed 1.0.
Regards,
Mike

To: Michael Bahia
Subject: PCBASIC2

Original Memo From: Kirit Baxi
Date Sent: 11/08/91

Mike

VS OFFICE

Monday

11/11/91 09:20 am

Page: 2

Did you manage to recover the diskette from office?
Regards
John Baxi

TO: M. J. Jau

FROM: Wen Shui

RE: Environmental Approval For 2200 CS 386 Turbo

DATE: February 3, 1992

.....

A working unit of 2200 CS 386 Turbo was used for our environmental approval test in our chambers. The unit was not fully loaded and the power dissipation of the entire unit was measured at 108 Watts. The following is the configuration of the unit for our tests:

Cardcage

<u>Slot #</u>	<u>Description</u>
0	CPU board # 210-9576A/210-9577
2	Printer/Disk Control Board # 210-9581/210-9579
5	Term Control board # 210-9580/210-9579

Power Supply

1 x SPS255

Cooling Fans

1 x power supply exhaust fan, 50 CFM 115v AC WPN 400-1025
2 x cardcage exhaust fan, 60 CFM 12v DC, WPN 400-1049

Air Vents

System and power supply air inlet vents 13.133 in(2) on front bezel
System air exhaust vents 7.436 in(2) on top rear panel

The result of our environmental tests was satisfactory. Therefore, 2200 CS386 Turbo is qualified as Wang Standard Commercial Product and is acoustically suitable for operation in CLASS A environment.

Recommendation

1. For safety purpose, finger guard should be installed at the exhaust side of the two cardcage exhaust fans.
2. The system cooling design which we completed in last year for Taiwan R&D was particularly for this system. Any design change of the CPU board or other configurations will need a re-evaluation of the system cooling.
3. To my understanding, there will not be any storage device such as hard drives installed in this product. If in future there will be any storage device installed, we will need to check the device specification and re-evaluate the system cooling and the system noise level.

cc: Carlo Albano
Duncan Chou
Gerry Crean
Charles Funk
Alex Gliksberg
Bill Hsien
John Lynch

Package Subject: Env. Appr. 2200CS386Turbo

Item Title: Cover Memo

This memo is in regard to your your attached Environmental Procedure for the CS/386 Turbo. Under recommendation 3 you indicated you believed this product would not have internal storage devices. That is incorrect. This unit is sold with readily available upgrades for an internal floppy, a 150 Meg Streamer Tape Drive, and 1 internal Fixed Winchester. Units with various combinations of drives in them are in the field and upgradeable to a Turbo. Spoke with Mike Riley this morning and he indicated the Turbo with drives installed had been tested by your group. He thought it may have been documented under a different model number. With drives installed the unit would be described as either a 'CS-D Turbo' or possibly a 'CS/386-x00D'. If the testing has not been done we will try to accomodate you with whatever hardware you may need. No units are sold with drives installed. All drives are purchased as upgrades to the product. Please let me know if this additional testing is needed.

Best Regards,
Mike Bahia

cc: Charlie Funk
M.J. Jau
John Lynch
Mike Riley
Gene Roy
Gene Schulz
Ralph Welsch

CC: Mike Bahia
From: Mike Bahia
Subject: Fan Guard Question

W0000600 6FLT3
Security: Limited
Date Received: 02/12/92

Wen,

Have read your attached report recommending fan guards for the CS/386 Turbo. Do not feel this is a necessary expense in that the fans used have no real danger. These fans are plastic & I have stuck my unprotected finger into the blade purposely on several occasions to stop the fan for heat testing the CPU boards. Charlie Funk and myself repeated this procedure today. Hundreds of these chassis' are in the field. No problems have been reported to my

As any danger these fans may cause is in all probability non-existent, there would appear no need for the fan guards. If you have questions on this or other concerns relating to the fan guards please contact me.

Your concerns and input are greatly appreciated

Regards,

Mike Bahia
Product Support

cc: Charlie Funk
John Lynch
Mike Riley
Gene Roy
Gene Schulz
Ralph Welsch

19 DONEGANI, SUITE 707
POINTE CLAIRE, QUÉ.
H9R 2V8

TÉL.: (514) 694-0127

FAX: (514) 694-7892

VECTROCOM

CONSULTANTS EN INFORMATIQUE

Vectrocom Inc.

SPÉCIALISÉS EN SERVICES DE TÉLÉCOMMUNICATIONS • COMPUTER AND TELECOMMUNICATIONS SYSTEMS CONSULTANTS

15 1992

Wednesday Manager

M. Gagne
CS/

our letter of intent to serve as a Beta testing site for the new
and BUS SCSI controller for the CS/386 Turbo computer system.

usual, we will provide all the debugging information to your technical
as quickly as possible. You can expect the same quality for Beta
testing as we have provided with the CS/386 and the Turbo.

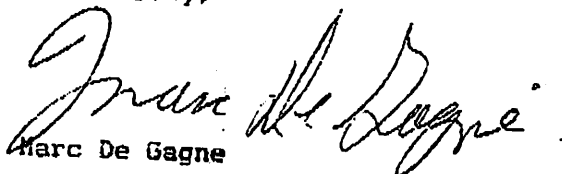
We also intent to test the performance levels of the new SCSI controller
under control loads and under the use of our application software using
real operational data duplicates. We will be able to give you very
specific results of its performance ratios.

We wish to proceed with the tests of the SCSI controller as soon as
possible. The demand for the CS/386 turbo with the SCSI controller is
currently high in our customer base. We expect to sell 20 to 25 systems in
1992 to our miscellaneous accounts alone.

It is therefore important that the SCSI controller be ready as soon as
possible. Testing of the SCSI controller is a top priority issue for us. It
will be given full and immediate attention.

We appreciate the evolution of the CS/386 Turbo. You have our full and
continuing support to the CS/2200 product line.

Yours truly,


Marc De Gagne



Friday May 1st, 1992

M. Dave Monroe
Wang Canada Limited
66 Leek Crescent, Wang Way
Richmond Hill, Ontario

Dear Dave,

The CS/2200 product line has not lately showed any sales activity for Wang Canada. Because of this fact, little or no attention has been given to the product line.

There is currently no R&D discount program for VARs, the pricing schedule is way out of line (60% higher than U.S. pricing after the exchange) and there is no promotion activity being done.

The only marketing program to surface lately was a year ago and was a total political, marketing and not to mention ethics disaster which put myself and others in a very difficult position.

In effect, the CS/2200 product line for Wang Canada sits along the dead products with the OIS and the PC Classics.

In the U.S. and other countries however, the CS/2200 is alive and well. The product line is still a very valid and promoted Basic-2 option for Wang Laboratories and there is continuing extensive R&D by Wang.

Vectrocom is very active in this product platform. We are dynamically involved with Wang Labs. for the R&D and promotion of the CS/2200 product line. Our current Canadian and U.S. business is now booming and as a Canadian company, we would very much like to forward our hardware business to Wang Canada.

To do this, we need Wang Canada to revise its commitment to the product line. We realise that the current unacceptable status of the product line (price and marketing) in Canada is simply due to lack of attention because of the null sales activity.

To change this dormant status to a dynamic one, we need immediate attention towards the Canadian pricing of the CS/2200 product line. We ask that Wang Canada reduces the price of the product line by 25% to be more compatible with all the other countries including the U.S., or that Wang Canada gives Vectrocom an additional 25% margin on prices so that we can transfer the discount to our customers.

The CS/2200 product line competes with PC alternatives including clones. The prices established by Wang Labs, were well thought of for that purpose. This competitiveness must be maintain.

In consideration for Wang Canada to participate with Vectrocom in the promotion and sale of the CS/2200 product line, I ask you to consider the following points :

- .1 Current pricing policy is an average 60% higher than in the U.S. after factoring the exchange. We can buy new equipment from U.S. Master VARs and even regular VARs for 25% less than from Wang Canada even with our current Canadian discount. Surely Wang Canada is not buying those computers for a higher price than regular U.S. VARs!
- .2 The discount table for the CS/2200 product line is based on the VS table. This alone is odd considering the price ranges of the two product lines.
- .3 Vectrocom Inc. is currently the only Canadian Wang VAR to actively promote the hardware of the CS/2200 product line. The only sales activity Wang Canada is likely to see for the CS/2200 product line is through Vectrocom.
- .4 Vectrocom is actively involved with the R&D of the CS/2200 product line and has substantial investment in this platform, including product development that will be promoted and sold by Wang Laboratories.
- .5 Vectrocom has already purchased commitments for several CS/Turbos with SCSI-II (to 4 customers in the next 12 months in Canada and the U.S.). We have budgeted a minimum sale of 20 systems for the first 12 months following the formal release of the SCSI-II controller. Each system is valued at between \$15,000 and \$22,000.
- .6 In addition to our local miscellaneous market, we support two vertical markets, Manufacturing and Insurance Brokers in both Canada and the U.S.. We are promoting the Wang CS/2200 product line as our main platform.

Vectrocom is committed to Wang, -to the CS/2200 product line and to working with Wang Canada.

If necessary, we will be happy to meet with yourself and Wang Canada's upper management in Montreal or Toronto to discuss these issues. We would also appreciate the involvement of Pierre Nadeau since our day to day business is done with the Montreal office.

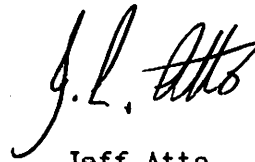
Attached to this letter is a brief summary of Vectrocom's product activity that might be useful to you and your team.

We appreciate the attention you will give to our request and hope to hear from you soon.

Yours Truly,



Marc De Gagne
President



Jeff Atto
Secretary-Treasurer

c.c. Pierre Nadeau, Wang Canada Montreal

VECTROCOM
MAIN MARKET SEGMENTS

Our two vertical markets are manufacturing and insurance brokers. We also have a certain number of local miscellaneous accounts, accounts that are very active and still in the Wang world because of our support to them.

Manufacturing :

We have been serving the manufacturing sector for the last couple of years. This market is currently very active, both in Quebec and in the U.S..

We sell hardware, software and consulting in this market segment. Although we use a base software platform, each installation is highly customized. The variations of operations between manufacturing industries is too great to supply a single "shrink wrap" type package. Our systems intergrate on-line operations, production planning and method & procedures in addition to accounting, order entry, inventory control and sales & commissions.

Five People are involved for this platform, including two industrial Engeneering experts, one of witch was the former head of industrial Engeneering for Canada Post Eastern division.

Insurance Brokers :

Our insurance broker package was started one year ago. We are curenly in the process of Beta testing at a customer site. This customer is NOT an existing Wang or CICS customer. We plan to formally introduce the package in June.

We will sell both hardware and software to insurance brokers. We are planning to cover Eastern Canada and New England. We are currently making arrangements for the distribution of the software in the rest of North America. The software is intended to be a "Shrink Wrap" type package. The distribution channel will be solely composed of Wang people or Wang VAR's. We have no current intentions to promote the product on non-Wang hardware.

We currently have the help of key people in the insurance industry such as the management of a major insurance company (supplier to brokers) and the head of the insurance accountants group. We also have an insurance business veteran representing a major insurance distributor working with us as a consultant.

Current status for the Insurance Brookers system :

One year ago it was unclear which direction Wang and Redshaw were taking. For us it was simply too risky to rely on the make or break of that relationship for the access to that market.

Our motivation to build a computer solution for the insurance broker business came from our own relationship with the industry and the potential to new business.

Wang Canada will benefit from our efforts and so will the CS/2200 product line (mainly the Turbo), not just by maintaining the existing customer base in the Wang world but also by bringing in new customers.

Other Ventures :

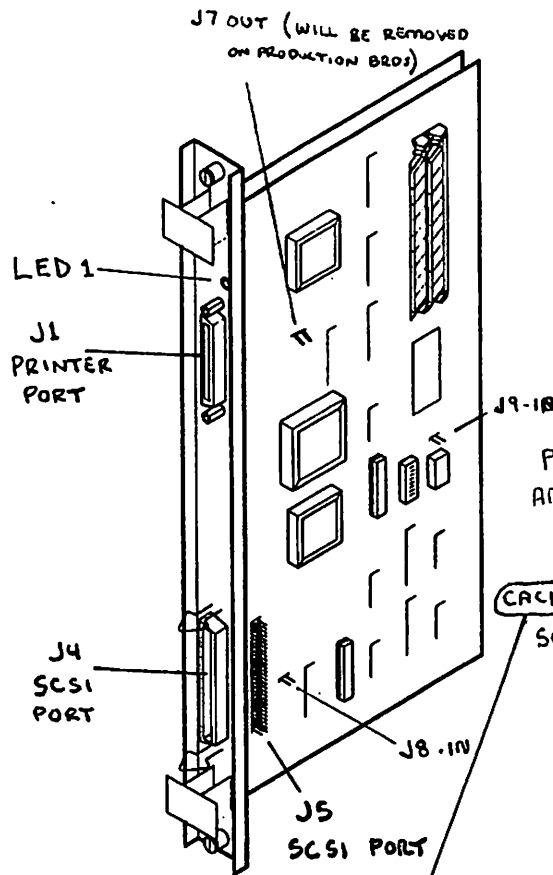
We are currently working on R&D projects that will serve the CS/Turbo product line. These "horizontal" products will be promoted and sold by Wang Laboratories. The main product will greatly contribute to the value and sales potential of the CS/Turbo product line for all markets including insurance brokers. Needless to say, that some people in the towers are very concerned with the success of these projects.

These projects are 100% financed by Vectrocom Inc. and let it be known that assistance from the so-called "Wang-Quebec government" partnership agreement would have been greatly appreciated for these projects.

NOTE : All of our software is fully supported on Unix, including the IBM RS6000. In addition to being a Wang Beta testing site, we are also a KCML (Kerridge) Beta testing site. The CS/Turbo is the platform we mainly promote.

22C11-SCSI CONTROLLER 212-9727

SCSI/PRINTER CONTROLLER 210-9582

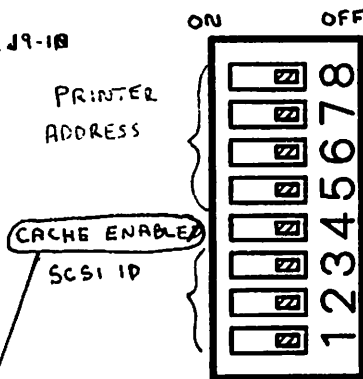


O/S 1.15
EARLY
VERSION PROMS
PRINTER ADDRESS

	5	6	7	8
215	OFF	ON	OFF	ON
216	ON	OFF	OFF	ON
217	OFF	OFF	OFF	ON

O/S 1.18 + HIGHER
RØ + PROMS
W/ DATE CODE 7/7 + ↑

	5	6	7	8
	SAME			
	OFF	ON	ON	OFF
	ON	ON	ON	ON



~~CACHE DISABLED~~

O/S 1.15
EARLY
VERSION PROMS
4 ON - CACHE ENABLE

O/S 1.18 + HIGHER
RØ PROMS & PROMS
W/ DATE CODE 7/7 OR HIGHER
4 OFF - CACHE ENABLE

O/S 1.15
EARLY
VERSION PROMS
SCSI ID

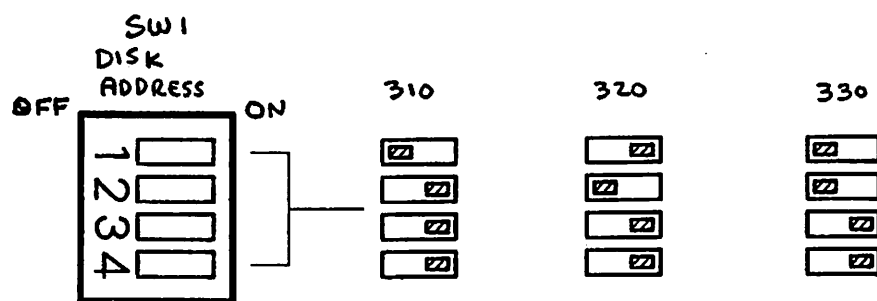
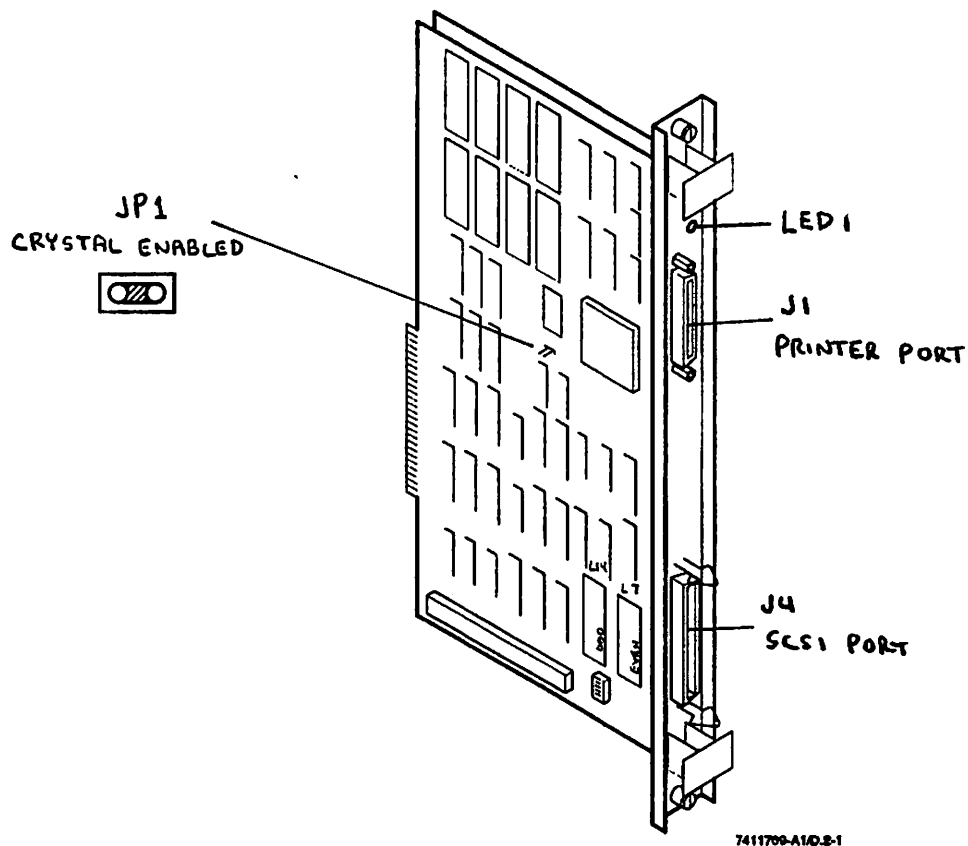
	1	2	3	SUGGESTED ID
ID 7	ON	ON	ON	
6	OFF	ON	ON	
5	ON	OFF	ON	
4	OFF	OFF	ON	
3	ON	ON	OFF	
2	ON	OFF	ON	
1	ON	OFF	OFF	
0	OFF	OFF	OFF	

O/S 1.18 + HIGHER
RØ + PROMS W/
DATE CODE 7/7 OR HIGHER

	1	2	3	SUGGESTED ID
ID 7	SAME			
6	ON	ON	OFF	
5	SAME			
4	ON	OFF	OFF	
3	OFF	ON	ON	
2	SAME			
1	OFF	OFF	ON	
0	SAME			

22C11-SCSI CONTROLLER 212-9727

HIGH SPEED I/O PROCESSOR 210-9579

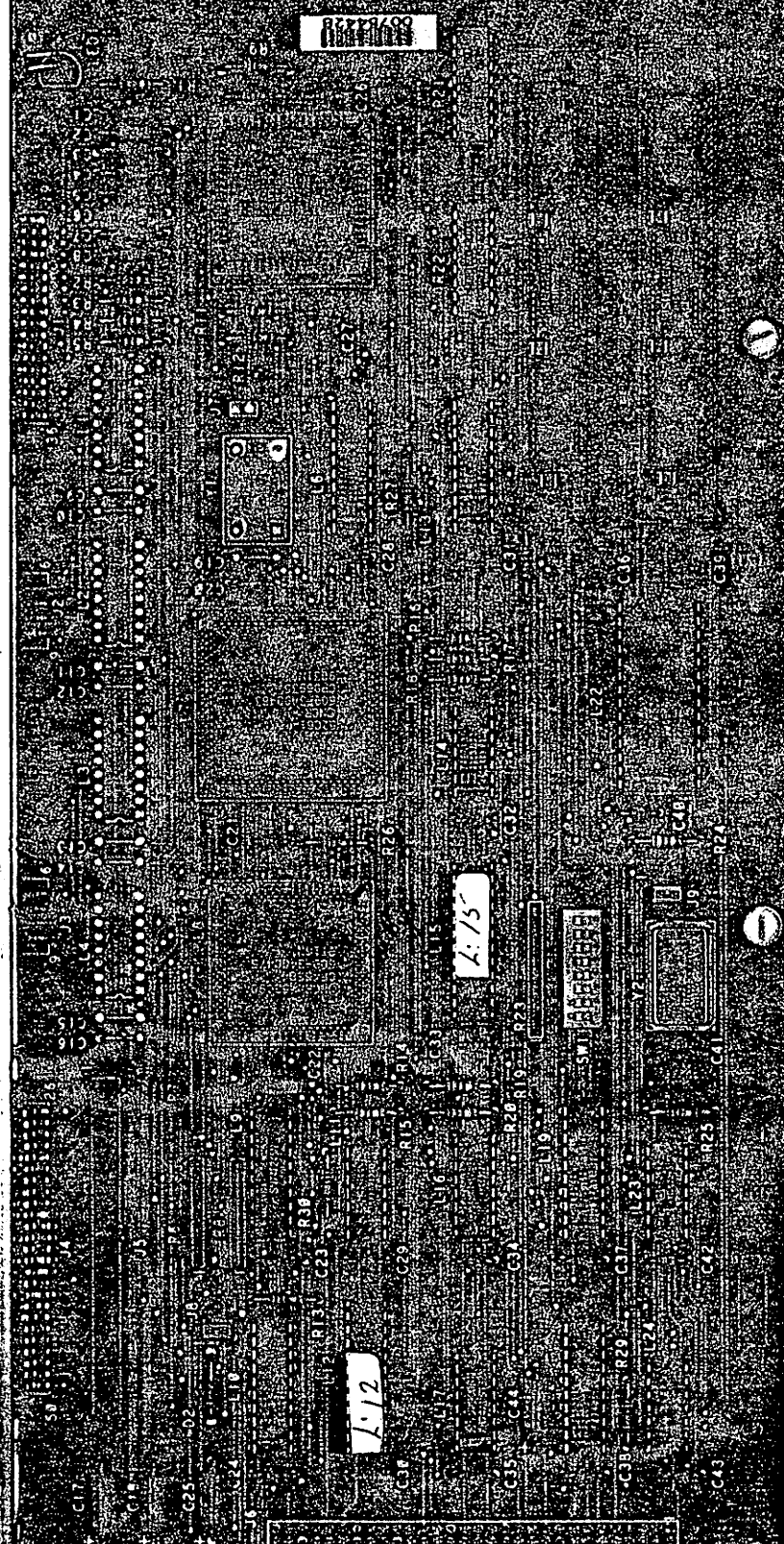


ON

88447668

4.75

1.2



JULY 6/1992

1. Hardware Switch Setting:

On 286 Site: Switch Setting like 22C11-HS for 310, 320 and 330
On I/O Slave Side: Switch 1 to 3 is for Initiator ID
Switch 4 is for Cache Enable/Disable Indicator
Switch 5 to 8 is for Printer Port ID

for examples:

	1	2	3	4	5	6	7	8
on	x		x			x		x
off		x		X	x		x	

Initiator ID is 5
Cache is enabled
Printer ID is 15h

	1	2	3	4	5	6	7	8
on		x	x	X		x	x	x
off	x				x			

Initiator ID is 3
Cache is disabled
Printer ID is 17h

SCSI I/O CABLE - 421-0066

2. Software for Controller:

.The MicroCode Name in OS Dekette is @22C11SS

.New Statement on OS for SCSI Control as Follows:

```
$SCSI INQUIRY T/Dxx,  
$SCSI FORMAT T/Dxx,(ID)  
$SCSI ID T/Dxx,A$()  
$SCSI READ T/Dxx,(ID)A$()  
$SCSI WRITE T/Dxx,(ID)A$()  
$SCSI CONFIG T/Dxx,A$()
```

Where Dxx is Controller Select for 310,320 and 330
ID is SCSI Drive ID form 0 to 7
A\$() is a 512 byte alpha string for READ and Write

\$SCSI INQUERY T/Dxx,	Inquery all Drive ID of Controller and ReBuild Config Table
\$SCSI FORMAT T/Dxx,(ID)	Preformat SCSI Drive by ID Select (Will set Block Length to 512 Byte)
\$SCSI ID T/Dxx,A\$()	Read Controller I/O slave switch.
\$SCSI READ T/Dxx,(ID)A\$()	Read Platter Config Table from SCSI Drive by ID (Block 0 in Physical) and the format of Platter Config Table as follows:

for master:

Byte 0-3 is Config Label and it must be 'scsi'
 Byte 4-7 is Start Address of first platter by sector (Must Even Boundary)
 Byte 8-11 is Length of this platter by sector (Must Even Boundary)
 Byte 12-19 is second platter definitions
 Byte 20-27 is third platter definitions

.
.
.

Byte 116-123 is fifteen platter definitions
 Byte 124-127 is four byte terminator and it's value must be FF FF FF FF

for slave:

Byte 148-151 is Config Label and it must be 'scsi'
 Byte 152-155 is Start Address of first platter by sector
 Byte 156-159 is Length of this platter by sector
 Byte 160-167 is second platter definitions
 Byte 168-175 is third platter definitions

.
.
.

Byte 264-271 is fifteen platter definitions
 Byte 272-275 is four byte terminator and it's value must be FF FF FF FF

Byte 300-511 is Reserved

\$SCSI WRITE T/Dxx,(ID)A\$()	Same as READ
------------------------------	--------------

3. SCSI Tape Command:

```
$SCSI TAPE REWIND T/Dxx,  
$SCSI TAPE ERASE T/Dxx,  
$SCSI TAPE RETENSION T/Dxx,  
$SCSI TAPE READ T/Dxx,A$()  
$SCSI TAPE WRITE T/Dxx,A$()  
$SCSI TAPE WMARK T/Dxx,  
$SCSI TAPE RMARK T/Dxx,(N)  
$SCSI TAPE EDATA T/Dxx,  
$SCSI TAPE BACKUP T/Dpp,(S,E)  
$SCSI TAPE RESTORE T/Dpp,(S,E)
```

Where Dxx is Controller Select

A\$() is alpha string buffer

N is Number of Read Mark

Dpp is platter address to be backup to same controller tape drive

S is start sector address of backup

E is end sector address of backup

\$SCSI TAPE REWIND T/Dxx,	Do Rewind of Tape
\$SCSI TAPE ERASE T/Dxx,	Do Erase of Tape
\$SCSI TAPE RETENSION T/Dxx,	Do Retension of Tape
\$SCSI TAPE READ T/Dxx,A\$()	Do Read Block Datas from Tape No of Block to be Read will dependent Buffer Size (Divide by 512 and round to integer)
\$SCSI TAPE WRITE T/Dxx,A\$()	Same as READ
\$SCSI TAPE WMARK T/Dxx,	Write File Mark
\$SCSI TAPE RMARK T/Dxx,(N)	Read N File Mark
\$SCSI TAPE EDATA T/Dxx,	Position Pointer to end of data of Tape
\$SCSI TAPE BACKUP T/Dpp,(S,E)	Backup Dpp Platter from S to E sector to Same Controller Tape Drive
\$SCSI TAPE RESTORE T/Dpp,(S,E)	Restore same controller Tape Drive to Dpp Platter from S to E sector

4. System Table Build Sequence:

Controller Software will scan SCSI Drive ID from 7 to 0 when power ON and then will put first Removable Direct Access Device to D10 and Second to D1F and First Sequential Access Device to D5F and other None Removable Direct Access Device will put from D11 to D5E by each Drive Config Block 0.

For Removable Device can not be Config by Platters and the whole Drive only have one platter. Only one Sequential Device and two Removable Direct Device Can Be use on system and The Other will be ignored. The Maximus Platter Number is D5F and the other also will be ignored.

\$SCSI CONFIG T/Dxx,

Get System Config Table and format as follows:

Byte 0-47 is Drive 0 Status
Byte 48-95 is Drive 1 Status
Byte 96-143 is Drive 2 Status
Byte 144-191 is Drive 3 Status
Byte 192-239 is Drive 4 Status
Byte 240-287 is Drive 5 Status
Byte 288-335 is Drive 6 Status
Byte 336-383 is Drive 7 Status

The Definition of 48 bytes Drive Status is:

Byte 0 OFF for Drive NO Exist
 80 Bit for Removable Drive
 00 For Direct Access Device
 01 For Sequential Access Device

Byte 1 Zero for NO Platter Config Table Exist
 None Zero for Have Platter Config Table Exist

Byte 2-5 Total Blocks Number of this Drive (Double Word Format)
Byte 6-9 Block Length of this Drive (256,512,1024 or 2048)
Byte 10-15 Reserve
Byte 16-47 Vendor Specify Information

Byte 384-393 D10 Platter Data Example for 310
Byte 394-403 D11 Platter Data
Byte 404-413 D12 Platter Data
.
.
.
Byte 694-703 D5F Platter Data

The definitions of the 10 Bytes Platter data is:

Byte 0 OFF for NO Exist
 80 Bit for Removable Drive
 00 For Direct Access Device
 01 For Sequential Access Device

Byte 1 SCSI Drive ID
Byte 2-5 Starting Address of this platter by sector
Byte 6-9 Length of this platter by sector

**	**
**	**
**	**
**	**
**	**
**	**

**

P R E L I M I N A R Y

**
 **
 MAINTENANCE PLAN
 **

[illegible]

***	***
***	***

```

**
**
**      CS/386 Turbo 22C11-SCSI Controller
**

```

★★	★★
★★	★★

[illegible]

**	Product Line Manager	Product Line Director	**
**	Gene Roy	Mike Runge	**
**			**

**	Product Line Manager	Product Line Director	**
**	Gene Roy	Mike Runge	**
**			**

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I. PRODUCT DESCRIPTION

A. OVERVIEW OF THE PRODUCT

The 22C11-SCSI Controller is a new intelligent controller for use with the CS/386 Turbo CPU. It provides the Turbo with an industry standard SCSI interface capable of significant disk I/O performance beyond anything currently now available to the product line. The SCSI controller has 2 Meg of on-board cache dedicated to it. Taking full advantage of the potential of this controller may require some programming changes. With this controller and the drives tested, multiple sectors can be read as quickly as 1 sector. If only reading 1 sector per access, throughput will be minimized. The number of sectors to read for optimum performance may vary from drive to drive. Changing programs on disk to 386 or 'NEW' format is recommended. A new command operational with the Turbo system is available to greatly simplify this process (\$MOVE!). The board consists of a 210-9579 High Speed I/O Processor Board and a 210-9582 SCSI/Printer Controller Board. The 9579 I/O Processor Board is the same basic board used with the Turbo MXF Terminal Controller and the 22C11-HS Printer/Disk Controller. The 9582 board handles all communication to any attached device. It has 2 common SCSI connectors, J4 external on the bottom half of the outer rail, and J5 found on the board just behind J4. These connectors provide an A Cable connection for either a 50 pin shielded amphenol connector via J4, or a 50 pin ribbon cable via J5. The SCSI port is ANSI X3.131-1986 compatible. The SCSI bus can support 8 SCSI devices of which the controller itself will be one. The controller has it's own unique device number set via switches. At the top of the outer rail is a standard 2200 Centronics printer interface, J1. Because printing from this port uses a 256K cache buffer and is controlled by the 286 processor freeing the CPU to other tasks, it too can enhance performance.

B. SIMILARITIES/DIFFERENCES (with other WANG products)

1) Software:

Use of the 22C11-SCSI Controller requires at minimum Turbo General Release 1.10.00 or higher. All standard BASIC-2 disk commands compatible to the DS with the CS/386 or Turbo are 100% compatible to the 22C11-SCSI disks. There are also new commands to talk directly to the SCSI disk drives and tapes. Unlike current disk drives now used with the 2200 product line which are pre-configured through switches and prom based code, SCSI disk drives must be configured through software. This is done with a new utility program which will be included with the Turbo Operating System. New menu picks will include 'SCSI Configuration' and updated versions of the 'Tape Backup and Restore' programs which will work with both the DS and SCSI. The 'SCSI Configuration' menu pick steps the user through the processes needed to initially setup the drive for use including a low level SCSI format and configuring the hard disk drive/s for various platter sizes. Pre-release versions of this software allow from 1 to 15 master addresses (D11-D1F, D21-D2F, or D31-D3F) or from 1 to 14 slave addresses (D51-D5E, D61-D6E,

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or D71-D7E) per disk drive, with a maximum of 29 hard disk addresses per controller. The first master and slave addresses (D10, D20, D30, D50, D60, & D70)) will be reserved for floppy drives and the last slave address for tape (D5F, D6F, or D7F). Final version software is expected to allow from 1 to 28 addresses per disk drive and per controller to take better advantage of systems with one large drive. The final version utility is also expected to reserve the last master address (D1F, D2F, or D3F) for a 2nd optional tape unit. After configuring the drive/s, all surfaces should be formatted using the standard 2200 format (\$FORMATDISKT/Dxx). A 16 Meg surface can be formatted in a matter of seconds dependent on drive speed. This overwrites any code which may have been written to disk with the SCSI format which may create confusion for the system. Anytime a drive is to be reconfigured, both a low level SCSI format via the utility and a 2200 format should be done to insure all new surfaces are 100% clean. The 'Backup' & 'Restore' to SCSI Tape procedures are quite similar to the DS tape procedures. The main difference is you cannot append to a tape on 'Backup'. This is because the tape drives currently available write in a serial format and do not have the separate directory track used with the DS version tape drives. At this writing, if using a 5 1/4" SCSI floppy, only 1.2M 2200 diskettes formatted in DOS format (512 byte sectors) are compatible. A DOS format can be done on a 1.2M DS floppy by using the 'Format Disk Platter' menu pick from the main menu of the operating system. Once into the program, you enter the floppy address and you will be prompted to select either 'CS/2200 format' or 'DOS format'. Any 1.2M diskette formatted in DOS format written by a 1.2M DS floppy drive will be readable on the SCSI floppy. The SCSI floppy drive suggested by Wang will only write in 1.2M format. Properly created, these diskettes will be readable on the DS 1.2M floppy. Diskettes in standard 2200 format (256 byte sectors), both 360K and 1.2M, are expected to be supported with a future release of the O/S. All Turbo O/S disks are being created in DOS format for SCSI floppy compatibility. If set up properly, a boot can be done from the SCSI floppy before configuring the drives.

2) Hardware:

As stated, the controller consists of 2 boards and is supported only in a CS/386 Turbo CPU. The 210-9579 High-Speed I/O Processor Board is the same board used with the MXF and 22C11-HS but with it's own proms at location L7 and L14. The 210-9582 SCSI/Printer Controller is new. The printer port supports all existing 2200 printers. Multiplexing to multiple CPU's is not currently supported.

The SCSI port is compatible to the same SCSI devices supported on our VS systems which use the SSM-C SCSI Storage Module and the MDSC SCSI Mini Data Storage Cabinet. These 2 units will be the offered Wang devices for housing SCSI drives for the Turbo. As each SCSI device is handled by a transparent driver imbedded in microcode, some SCSI devices may not be compatible unless they comply with existing drivers for devices that have already been tested. R&D will add drivers for those SCSI devices which become popular. Current supported devices include: see next page.

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CDC Magnetic Periph Model 94221 150MB HH Disk Drive	725-3822
Micropolis Model 1684 326MB HH Disk Drive	725-4895
Micropolis Model 1578 326MB FH Disk Drive	725-3814
Hewlett Packard Model 97548S 647MB FH Disk Drive	725-4858
Archive Model 2150S 150MB HH Viper Tape Drive	725-3820
Archive Model 4320NT 1.2GB HH Python Tape Dr	see Appx A3
Teac FD-55GS 751-U 5 1/4" Floppy Drive (not avail from Wang)	

3) Other:

The normal procedure for powering disk units in the past has been to power the disk units up last after the CPU. With the SCSI devices currently being used, the SCSI unit must be powered on first and allowed to complete any self-test it may run. This normally takes just a few seconds and often completes with a clicking noise. None of the above listed devices on their own require more than 15 seconds. Multiple drives in a single cabinet may need more time. Once all drives within a unit complete self-tests the CPU can be turned on. After powering on the CPU, between 10 and 15 seconds, the CPU will go out and talk to the drive. Usually the drive LED will blink twice during this period. When booting the CPU, RESET should not be keyed until this communication takes place, otherwise the drive/s may not be recognized by the system. If the SCSI unit is to be powered off while the system is up and running, all existing accesses and all drive activity should be allowed to complete to prevent problems. The system should recognize any SCSI device which was operational before the unit was powered down. Any physical changes such as adding a device or changing a device ID # will require the system be rebooted.

C. ANNOUNCE/FIRST CUSTOMER SHIPMENT DATE

- | | | |
|-------------------|------------------------------|--------------------|
| 1) Domestic: | Announce: July 1, 1992 | FCS: July 31, 1992 |
| | Volume Ship: August 31, 1992 | |
| 2) International: | Announce: July 1, 1992 | FCS: July 31, 1992 |
| | Volume Ship: August 31, 1992 | |

D. SERVICE OFFERINGS/WARRANTY

This product will be installed and maintained by Customer Engineering personnel for customers with On-Site service.

This product will be covered by the standard Wang 90 day warranty.

E. SPECIAL PROGRAM/PROCEDURES

N/A

F. MAJOR COMPONENTS

- 1) 210-9579 High-Speed I/O Processor:
Contains a 286 processor which controls all I/O to any attached SCSI device or printer freeing the CPU to go off and handle other tasks. Communication to the CPU is handled via the 32 bit bus now present with the Turbo.
- 2) 210-9582 SCSI/Printer Controller Board:
The 9582 Controller Board was designed to maximize total system

COMPANY PROPRIETARY

performance. It's major components include an NCR 53C90A SCSI Controller, an NCR 52C61 High Performance Memory Array Controller, a 16C452 2S/1P Serial/Parallel Controller, and a 2 Meg DRAM cache buffer.

G. CONFIGURATION REQUIREMENTS

Use of the 22C11-SCSI Controller requires the following:

1. Turbo CPU
2. Turbo General Release 1.10.00 (beta test) 291-1001A
3. New Disk/Tape Utilities for SCSI (included w/ future O/S's)
4. SSM-C SCSI Storage Module or a MDSC Mini Data Storage Cabinet
5. The following is a list of SCSI devices that have been tested. Devices other than those listed would need to be thoroughly tested to insure proper operation. Some may require a software driver be built and imbedded in microcode by R&D.

All new drivers will be built at the discretion of Wang Labs.

CDC Magnetic Periph Model 94221 150MB HH Disk Drive 725-3822

Micropolis Model 1684 326MB HH Disk Drive 725-4895

Micropolis Model 1578 326MB FH Disk Drive 725-3814

Hewlett Packard Model 97548S 647MB FH Disk Drive 725-4858

Archive Model 2150S 150MB HH Viper Tape Drive 725-3820

Archive Model 4320NT 1.2GB HH Python Tape Dr see Appx A3

Teac FD-55GS 751-U 5 1/4" Floppy Drive (not avail from Wang)

6. SINGLE-ENDED TERMINATOR AT END OF SCSI CHAIN 725-7269/725-4910

II. MAINTENANCE PHILOSOPHY

A. Maintenance Objectives

1) C.E. Level:

This board will operate in a similar way to existing 2200 controllers. Effective maintenance of the 22C11-SCSI will require the following:

- a) A working familiarity with the 2200 hardware and O/S.
- b) Skillful cause analysis at the system level.
- c) Knowledge of the diagnostics on the 2200 system.
- d) A working knowledge of SCSI drives.

2) Maintenance Procedures:

Maintenance on this product will be performed on-site by a Wang Customer Engineer. A working knowledge of the system along with built-in diagnostics in the hardware and operating system as well as existing on-line diagnostics will help the C.E. to isolate hardware failures. The 22C11-SCSI board has an LED that lights during power up and goes out if the board passes built-in self test. When a board failure occurs, that board will be replaced with a board from C.E. stock and the bad board will be returned through C.E. logistics channels for repair.

B. Types of contract to be offered

On-Site Maintenance Contracts will be offered.

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C. P.M. requirements

1) Customer performed:

To insure proper operation of this product, the Customer should observe the Environmental, Power and Cabling, and Site Selection Considerations outlined in the CUSTOMER SITE PLANNING GUIDE (part # 700-5978).

2) WANG C.E. performed:

This product will not require scheduled preventive maintenance.

D. Diagnostics required/available:

1) C.E. Level:

Magnetic Media p/n 732-8520A 5-1/4" DSDD
This diagnostic disk is part of the 2200 Diagnostic Package (currently Rev 2.00.00, p/n 195-2956-0).

2) Customer Level: Machine level diagnostics built into the Operating System run a cursory test to all the Turbo specific controllers to check status during boot if RESET is not keyed. There are also similar tests that check communication between the controller and the CPU which can be selected by PF' key during boot. Customer Engineering should not depend on these diagnostics solely to identify problems. Problems especially of an intermittent nature will not likely fail with these tests.

3) Built-in: The 22C11-SCSI has a LED which will light during power up self tests. If the LED stays on, the board has failed self-test and should be replaced.

Note: On the pre-release SCSI beta boards the LED is not functioning and is on always. This does not affect normal operation.

III. TRAINING

There is no planned training on this product or the product line at this time. In response to a memo sent out by CSO in the fall of 1991, the domestic field offices indicated their personnel had enough experience on the product line where a formal training class was not deemed necessary. There will be an announcement TSB with technical information to support initial installations. An addendum to the Maintenance Manual, part number 741-1769A will follow.

A. CUSTOMER ENGINEER COURSE:

N/A

B. SALES SUPPORT COURSE

1) TIMETABLE and FORMAT

The 2200 Product Line is normally sold through a close-knit VAR network highly familiar with the product, many of whom are in regular contact with the 2200 Group. These people will be generally familiar with the product through newsletters and marketing literature distributed by Wang and the User group and by their contacts with Wang and other VARs.

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IV. SPECIAL TOOLS/TEST EQUIPMENT

No unique items required to service this product.

V. OPERATING ENVIRONMENT

A. TEMPERATURE RANGE

Storage (packaged) 0 to 120 deg F (-17 to 50 deg C)
Operating 60 to 90 deg F (16 to 28 deg C)

B. VOLTAGE RANGE

115 VAC +/- 12 VAC at 60 Hz +/- 0.5 Hz
230 VAC +/- 24 VAC at 50 Hz +/- 0.5 Hz

C. HUMIDITY RANGE

Storage (packaged) 10% to 90%
Operating 20% to 80%
Wet Bulb Temperature 75 deg F max (24.4 deg C)

D. PHYSICAL SPECIFICATIONS

The controller is a mother/daughter board setup using 1 CPU I/O slot.

Height 14.9 inches (35.3 centimeters)
Width 1.15 inches (2.9 centimeters)
Depth 8.32 inches (21.1 centimeters)

E. SERVICE SPACE REQUIREMENTS

Observe service space requirements for unit models involved.

F. INPUT CURRENT

Observe the input current requirements for the 2200 CPU in which the board is installed. For the CS-D/N these requirements are:
2.0 amps at 115 VAC 60 Hz (running)
1.0 amps at 230 VAC 50 Hz (running)

G. INPUT POWER

Input power drawn will be dictated by the 2200 CPU in which the boards are installed. For the CS-D/N the power drawn will be:
170 Watts
230 Voltamps

H. POWER FACTOR

The power factor of the system in which it is installed will be unchanged. For the CS-D/N the power factor is:
0.74 lagging

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I. HEAT LOSS

The heat loss for the CPU in which this board is installed will be virtually unchanged. For the CS-D/N:
581 BTU/hr (146.4 KgCal/hr.)

J. LEAKAGE CURRENT (grounding requirements)

The leakage current will be determined by the CPU in which the Turbo card set resides. For the CS-D/N:
0.2 Ampere at 115 VAC 60 Hz, 0.2 Ampere at 230 VAC 50 Hz

VI. POWER CORD DATA

N/A

VII. I/O CABLE DATA

Maximum SCSI cable length from controller to last device:
18.75 feet (6 meters)

VIII. DOCUMENTATION LIST

- ```

A. PRINTS:.....210-9579
 210-9582

B. MAINTENANCE MANUALS:.....741-1769-A (includes Turbo)
 741-2009 5 1/4" SCSI Devs & Cbnt
 741-1874-A SCSI SSM-C (repl by 2009)
 741-1879 SCSI MDSC (repl by 2009)

C. VENDOR MANUALS:.....N/A

D. DIAGNOSTIC ERROR LISTINGS:.....Included in Turbo Maintenance
 Manual (741-1769-A)

E. P.M. PROCEDURES:.....N/A

F. REPAIR PLAN:.....??

G. SALES LITERATURE:.....see Focus, July 7, 1992

H. OPERATORS' GUIDE/USER INFORMATION:.in process

```

**APPENDICES**

**COMPANY PROPRIETARY**

MARKETING FORECAST

|               | ! | Q1   | ! | Q2   | ! | Q3   | ! | Q4   | ! |
|---------------|---|------|---|------|---|------|---|------|---|
|               | ! | FY93 | ! | FY93 | ! | FY93 | ! | FY93 | ! |
| DOMESTIC      | ! | 25   | ! | 25   | ! | 25   | ! | 25   | ! |
| INTERNATIONAL | ! | 25   | ! | 25   | ! | 25   | ! | 25   | ! |
| TOTAL         | ! | 50   | ! | 50   | ! | 50   | ! | 50   | ! |

PRODUCT MATURE PERFORMANCE PREDICTED

| <u>Model Number</u> | <u>Product Description</u> | <u>Service Parameter</u> | <u>Rate per Year</u> | <u>Time (hours)</u> |
|---------------------|----------------------------|--------------------------|----------------------|---------------------|
| 22C11-SCSI          | SCSI/Printer Contrlr       | Field Failures           | 0.06                 |                     |
|                     |                            | Calls                    | 0.40                 |                     |
|                     |                            | MTTR                     |                      | 1.77                |
|                     |                            | Call Duration            |                      | 2.82                |
|                     |                            | Installation Time        |                      | 1.30                |
|                     |                            | PM Calls                 | 0.00                 |                     |
|                     |                            | PM MTTR                  |                      | 0.00                |
|                     |                            | FCO Calls                | 0.00                 |                     |
|                     |                            | FCO MTTR                 |                      | 0.00                |
|                     |                            | Upgrades/Model           | 0.02                 |                     |
|                     |                            | Upgrade Install Time     |                      | 1.03                |

PRODUCT ANALYSIS WITH GROWTHProduct Field Failures/Year and Calls/Year  
by Month after InstallationModel Number: 22C11-SCSIProduct Description: Turbo SCSI/Printer Controller

|                     | <u>Month after Installation</u> |          |          |          |          |          |          |           |
|---------------------|---------------------------------|----------|----------|----------|----------|----------|----------|-----------|
|                     | <u>1</u>                        | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8+</u> |
| Field Failures/Year | 0.18                            | 0.07     | 0.07     | 0.07     | 0.07     | 0.07     | 0.07     | 0.07      |
| Calls/Year          | 0.36                            | 0.19     | 0.14     | 0.13     | 0.13     | 0.13     | 0.13     | 0.13      |

**NOTE:**

Every effort has been made to include the most current information available, but these part numbers are subject to change.

Customer Service Logistics will provide updated, released part numbers through the normal RSL process.

PARTS LIST

FRUs, CRUs,

|                   |                                 | : stocking :                 |                         | : location : |   |
|-------------------|---------------------------------|------------------------------|-------------------------|--------------|---|
| :PART #           | : DESCRIPTION                   | :FRU:CRU:Unique:             | B                       | A            | H |
| :212-9727         | : 22C11-SCSI Controller         | : X :                        | :                       | :            | : |
| Related hardware: |                                 |                              |                         |              |   |
| :725-3822         | : Mag Periph 94221 150M HH Dsk: | X :                          | :                       | :            | : |
| :725-4895         | : Micropolis 1684 326M HH Disk: | X :                          | :                       | :            | : |
| :725-3814         | : Micropolis 1578 326M FH Disk: | X :                          | :                       | :            | : |
| :725-4858         | : HP Model 97548S 647M FH Disk: | X :                          | :                       | :            | : |
| :725-3820         | : Archive 2150S 150M HH Tape    | : X :                        | :                       | :            | : |
| :725-5981         | : Archive 4320NT 1.2G HH Tape   | : not avail at this writing: |                         |              |   |
| :421-0066         | : 50 Pin I/O Cable-SSM & MDSC   | : X :                        | :                       | :            | : |
| :                 | : 50 Pin SCSI Ribbon Cable      | :                            | : not avail from Wang : |              |   |
| :725-4910         | : 50 Pin SCSI Terminator w/LED: | X :                          | :                       | :            | : |
| :725-7269         | : Term (repl'd by 725-4910)     | : X :                        | :                       | :            | : |
| :725-1294         | : 600' Data Cart Tape/Arch 150: | X :                          | :                       | :            | : |
| :725-9119         | : 4mm Data Cart Tape/Arch 1.2G: | X :                          | :                       | :            | : |
| :                 | : TEAC FD-55GS 751-U 5 1/4" Dr: | : not avail from Wang :      |                         |              |   |

Diagnostic Part Number: 195-2956-0

Parts required for P.M.: N/A

5/3/93

22C11-SCSI Test Sites

| site             | location             | contact         | telephone    | VAR                  | location         | contact      | telephone    |
|------------------|----------------------|-----------------|--------------|----------------------|------------------|--------------|--------------|
| Domestic         |                      |                 |              |                      |                  |              |              |
| ALFA Color       | Gardenia, CA         | Steve Shoesmith | 310-532-2532 |                      |                  |              |              |
| Bay City Metals  | Compton, CA          | John Kneen      | 800-245-9047 |                      |                  |              |              |
| Boorum & Pease   | Syracuse, NY         | Jim Dettman     | 315-472-4385 |                      |                  |              |              |
| Eastern Computer | Pasadena, MD         | Bill Duncan     | 410-437-8840 |                      |                  |              |              |
| KMart            | Farmington Hills, MI | Greg Belinski   | 313-280-7191 | Springfield Computer | Jacksonville, FL | Tom Farr     | 904-354-0291 |
| Local 295        | Brooklyn, NY         | David Si        | 718-434-2711 | ABC Computer         | Pineland, SC     | Dave Bormes  | 803-726-6767 |
| VCR              | Indianapolis, IN     | Tim Veard       | 407-722-0220 |                      |                  |              |              |
| Canada           |                      |                 |              |                      |                  |              |              |
| Sintra Inc       | Montreal             | Germain Perron  | 514-341-5331 | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Sintra Metropole | Montreal             | Jean Huart      | 514-638-0172 | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Terrace Paving   | Terrace, BC          | Kristian Nelson | 604-635-9676 | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Wapiti Gravel    | Grande-Prairie, AB   | Carlos Caires   | 403-532-1790 | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |

Germany  
Alec GMBH  
Wolfgang Borke 49-231-923700

## 22C11-SCSI Test Sites

| site             | location             | contact         | telephone     | VAR                  | location         | contact      | telephone    |
|------------------|----------------------|-----------------|---------------|----------------------|------------------|--------------|--------------|
| Domestic         |                      |                 |               |                      |                  |              |              |
| ALFA Color       | Gardenia, CA         | Steve Shoemith  | 310-532-2532  |                      |                  |              |              |
| Bay City Metals  | Compton, CA          | John Kneen      | 800-245-9047  |                      |                  |              |              |
| Boorum & Pease   | Syracuse, NY         | Jim Dettman     | 315-472-4385  |                      |                  |              |              |
| Eastern Computer | Pasadena, MD         | Bill Duncan     | 410-437-8840  |                      |                  |              |              |
| KMart            | Farmington Hills, MI |                 | 313-280-7191  | Springfield Computer | Jacksonville, FL | Tom Farr     | 904-354-0291 |
| Local 295        | Brooklyn, NY         | David Si        | 718-434-2711  | ABC Computer         | Pineland, SC     | Dave Bormes  | 803-726-6767 |
| VCR              | Indianapolis, FL     | Tim Veard       | 407-722-0220  |                      |                  |              |              |
| Canada           |                      |                 |               |                      |                  |              |              |
| Sintra Inc       | Montreal             | Germain Perron  | 514-341-5331  | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Sintra Metropole | Montreal             | Jean Huart      | 514-638-0172  | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Terrace Paving   | Terrace, BC          | Kristian Nelson | 604-635-9676  | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Wapiti Gravel    | Grande-Prairie, Alb  | Carlos Caires   | 403-532-1790  | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Germany          |                      |                 |               |                      |                  |              |              |
| Alec GMBH        |                      | Wolfgang Borke  | 49-231-923700 |                      |                  |              |              |
| requesting board |                      |                 |               |                      |                  |              |              |
| Babyfare Inc.    | Brooklyn, NY         | Stuart Schlein  | 718-436-8100  | Information Spectrum | Cherry Hill, NJ  | Mark S       | 609-667-6161 |

as of 9/24/92

# 22C11-SCSI Test Sites

| site             | location             | contact         | telephone     | VAR                  | location         | contact      | telephone    |
|------------------|----------------------|-----------------|---------------|----------------------|------------------|--------------|--------------|
| Domestic         |                      |                 |               |                      |                  |              |              |
| ALFA Color       | Gardenia, CA         | Steve Shoemith  | 310-532-2532  |                      |                  |              |              |
| Bay City Metals  | Compton, CA          | John Kneen      | 800-245-9047  |                      |                  |              |              |
| Boorum & Pease   | Syracuse, NY         | Jim Dettman     | 315-472-4385  |                      |                  |              |              |
| Eastern Computer | Pasadena, MD         | Bill Duncan     | 410-437-8840  |                      |                  |              |              |
| KMart            | Farmington Hills, MI |                 | 313-280-7191  | Springfield Computer | Jacksonville, FL | Tom Farr     | 904-354-0291 |
| Local 295        | Brooklyn, NY         | David Si        | 718-434-2711  | ABC Computer         | Pineland, SC     | Dave Bormes  | 803-726-6767 |
| VCR              | Indianalantic, FL    | Tim Veard       | 407-722-0220  |                      |                  |              |              |
| Canada           |                      |                 |               |                      |                  |              |              |
| Sintra Inc       | Montreal             | to be installed | 514-341-5331  | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Sintra Metropole | Montreal             | to be installed | 514-638-0172  | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Terrace Paving   | Terrace, BC          |                 |               | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Wapiti Gravel    | Grande-Prairie, Alb  |                 |               | Vectrocom            | Montreal         | Marc DeGagne | 514-695-8500 |
| Germany          |                      |                 |               |                      |                  |              |              |
| Alec GMBH        |                      | Wolfgang Borke  | 49-231-923700 |                      |                  |              |              |
| requesting board |                      |                 |               |                      |                  |              |              |
| Babyfare Inc.    | Brooklyn, NY         | Stuart Schlein  | 718-436-8100  | Information Spectrum | Cherry Hill, NJ  | Mark S       | 609-667-6161 |



Product Name: SCSI Disk Controller For The CS/386 TURBO

Date Available: July 1, 1992

Where Available: Worldwide

How To Order: Normal Ordering Channels

Model Number Description

22C11-SCSI Printer/SCSI Disk Controller 212-9727

Replaces: The 22C03-SCSI, SCSI disk controller for the 2200 product line.

#### Discontinued/Obsolete Products:

| Discontinued Prod.<br>(model number) | Description          | Replaced By<br>(model number) | Effective<br>Date |
|--------------------------------------|----------------------|-------------------------------|-------------------|
| 22C03-SCSI                           | SCSI Disk Controller | 22C11-SCSI                    | 07/1/92           |

#### PRODUCT ABSTRACT

The SCSI TURBO disk controller looks and performs like the 22C11, Printer/Disk controller and takes one I/O slot. The following is a list of functions/features:

- . CS/386 TURBO compatibility only.
- . Will support up to 7 SCSI diskette, disk and tape devices, in the standard 2200 disk format. Tested devices include the Wang SSM-C and MDSC-D enclosures, with the Wang 145MB, 320MB, 650MB SCSI disk drives, and the 150MB tape cartridge and 1.3GB SCSI DAT tape drive.
- . Will support non-Wang SCSI devices.
- . Unlimited disk addressing capability (no 16MB platter restriction).
- . Wang disk cache (2MB) algorithms (the same as the DS).
- . External printer port with a 256KB buffer.
- . Talks directly to the new high-speed I/O bus, not the 2200 bus.

#### CONFIGURATION INFORMATION

Requires an I/O slot on a CS/386-400N through CS/386-3200N CPU or a field upgraded CPU. Existing users of MICROVPs, CSs, CS-D/Ns or CS/386-D/Ns, e.g., VLSI or CS/386 CPUs, can field upgrade their CPU(s) to a CS/386 Turbo.

#### Required Components

The 22C11-SCSI is only a controller. SCSI drives, cabinets, cables and power supplies, like the Small Storage Module or Mini Data Storage Cabinet, with drives/tape, must be ordered.

## Software

22C11-SCSI support utilities, are included with the CS/386 TURBO operating system.

## Product Restrictions

- . The 22C11-SCSI can only be used on a CS/386 TURBO CPU.
- . Multiplexing is not currently supported.
- . We have not built in any restrictions that require the use of Wang SCSI devices. However, device testing has been limited to the SCSI products sold by Wang. We have found through beta site testing, that variations from SCSI standards, from manufacturer to manufacturer, do exist.

## INSTALLATION

As all other 2200 products, the 22C11-SCSI is Wang installed.

## SUPPORT SERVICES

Current Wang Software Services (WSS) 2200 support policies and services apply. Refer to the Support Services Section of the latest Pricing Manual.

### Customer Warranty

CS/386 Turbo controllers are warranted to be free from defects in materials or workmanship for a period of 90 days from date of installation. Warranty is in accordance with terms and conditions in effect at the time of sales.

### On-Site Maintenance Agreement

On-Site (Plan A), Wang's standard on-site maintenance agreement, provides for 12 months of on-site service.

### Per-Call On-Site Service

Per-Call On-Site service is available on a time and material basis. Customers who wish to use this service should call the nearest Regional Call Control Center toll-free number to arrange for a service appointment.

## Objectives/Product Strategy

Since the announcement of the CS, Wang has sold over 7,000 Data Storage Cabinets (DS). A good number of these DSs, originally sold with single 64MB fixed Winchester, have been updated to a second (or third) 64MB or 140MB fixed Winchester. However, because of the limitations of ST-506 technology, the 140MB fixed Winchester is the largest disk offering that is now or will be available in the future for the DS.

The maximum storage now available, using a DS on a non-TURBO, is 316MB per cabinet, 3 cabinets per system, for a total of 948MB per CPU. With the availability of 3-bit addressing on the CS/386 TURBO, the 16MB platter restriction does go away. However, without the availability of larger drives, as offered on SCSI, the typical 2200 TURBO user, would not be able to take advantage of the elimination of the 16MB platter restriction. For example, each 140MB drive can now be a platter. However, due to power restrictions, only 3 drives can be put in a DS (2 140MB and 1 64MB). With SCSI technology, each controller can support (using 650MB drives as an example) 7 times 650MB times 3 controllers, for a total of 13.6GB.

In addition, with the increased CPU speed of the TURBO, the current ST-506 drives are holding the I/O system back.

## Benefits

### Wang Benefits:

Being able to offer SCSI storage devices on the 2200 product line, will provide the following benefits to Wang:

1. Increased TURBO and disk sales to current 2200 users. There is increased demand for larger and faster disk drives. These drives will open new business opportunities for Wang to sell new technology to a mature installed base, estimated to be 20,000-30,000 worldwide. If 2200 users want SCSI, they must update to TURBO.
2. Compatibility with other Wang product lines. The 2200 product line will now be able to offer the same SCSI devices and cabinets, e.g., the SCSI Storage Module and Mini Data Storage Cabinet being offered on the VS and PC product lines. This means we receive the additional benefits of increased quantity buy discounts from our suppliers, common product line spare parts, servicing, support, etc.
3. Unix Compatibility We currently do not have any 2200 media compatibility with our SCO Intel products (except a 1.2MB diskette), and the RISC 6000. The 150MB SCSI tape cartridge would provide the media compatibility needed to migrate 2200 users to a KCML/NIAKWA/Unix/RISC platform. Compatible drives would also encourage users to buy CS/386 TURBOs today if they know they will have an easier migration path in the future to Unix/RISC.

### User Benefits:

In addition to increased capacity and I/O speed, our users will enjoy reduced storage costs. Using the current SCSI disk prices and the DS, the following is a "Cost-To-User" comparison of a SCSI Mini Data Storage Cabinet versus a similar ST-506/QIC-2 configuration on a DS:

| <u>DESCRIPTION</u>                 | <u>MDSC-D</u><br><u>320MB</u> | <u>DS</u><br><u>316MB</u> |
|------------------------------------|-------------------------------|---------------------------|
| Storage Cabinet                    | \$ 3,000                      | \$ 2,500                  |
| Diskette 1.2MB                     | N/A                           | 200                       |
| 150MB Tape Cart. or Cassette       | 1,995                         | 1,500                     |
| 320MB SCSI Drive                   | 4,495                         | N/A                       |
| 64MB ST-506                        | N/A                           | 2,095                     |
| 140MB (Configured as 112MB) ST-506 | N/A                           | 3,500                     |
| 140MB ST-506                       | N/A                           | 3,500                     |
| SUBTOTAL                           | 9,490                         | 13,295                    |
| Controller                         | 1,295                         | 700                       |
| SUBTOTAL                           | 10,785                        | 13,995                    |

In summary, the announcement of the 22C11-SCSI enhances our ultimate goal of offering our end users and VARs, the opportunity to migrate to the Wang hardware platform of their choice.

To : Bill Hsien  
Mike Runge

From: Gene Schulz

Subj: CS/386 TURBO 22C11-SCSI Controller Pricing

Date: May 27, 1992

This document outlines the proposed pricing for the CS/386 TURBO SCSI disk controller, designed by Taiwan 2200 R&D.

## 1. Business Objectives

- . To increase the sale of Wang products to BASIC-2 (2200) users and through BASIC-2 VARs to new and existing users, as the direct result of offering the ability to use SCSI drives on the CS/386 TURBO. The ability to provide SCSI drives will provide the following business opportunities:
  - . 2200 users, who have not yet updated to TURBO and wish to increase their I/O storage capabilities and throughput, will be required to update to the CS/386 TURBO. This will create new markets, e.g., we had great success in upgrading the 2200 user base from 2280 Phoenix drives to the DS. SCSI availability, will create the potential to sell CS/386 TURBOS, along with SSM-Cs and MDSC-Ds to the 2200 user base, even if they have updated to a DS.
  - . Users who have upgraded to TURBO are now prospects for Wang's line of SCSI storage devices, with all the associated benefits of SCSI, e.g., larger and lower-cost disk drives, faster disk drives, increased I/O speed, etc.
  - . SCSI provides data and program migration capability (using either NIAKWA or KCML) for users and/or VARs wanting to migrate their applications to SCO UNIX, RISC or LANs, now or in the future, e.g., a window to OFFICE 2000.

For the 2200 product line to be able to use the same SCSI disk and tape drives (like the SCSI Storage Module or Mini Data Storage Cabinet) offered on other Wang Products, thereby reducing R&D development costs by eliminating the need for any additional 2200 disk drive development.

## 2. Product/Pricing Strategy - The 22C11-SCSI should be priced as recommended for the following reasons:

- . To position the cost of the new SCSI controller in the same price range as other 2200 controllers.
- . To maintain good profit margins but at the same time to make it financially attractive to update to the latest disk technology

### 3. Pricing Proposal

MODEL # 22C11-SCSI, Part # 200-2076

| <u>BUILD SITE</u> | <u>TOTAL DIRECT COST</u> | <u>SELLING PRICE</u> | <u>GPM</u> | <u>MAINT.</u> |
|-------------------|--------------------------|----------------------|------------|---------------|
| PB                | \$473.88                 | \$1,295              | 63.4%      | \$10/mo.      |

### 4. Market Strategy

Since the announcement of the CS, Wang has sold over 7,000 Data Storage Cabinets (DSs). A good number of these DSs, originally sold with single 64MB fixed Winchester, have been updated to a second (or third) 64MB or 140MB fixed Winchester. However, because of the limitations of ST-506 technology, the 140MB fixed Winchester is the largest disk offering that is now or will be available in the future for the DS.

The maximum storage now available on a DS is 316MB per cabinet, 3 cabinets per system, for a total of 948MB per CPU. The present 2200 architecture could support 448MB (28 fixed platters of 16MB per platter) per data storage cabinet but we don't offer ST-506 disk drives beyond 140MB in 5 1/4" technology.

With the availability of 3-bit addressing on the CS/386 TURBO, the 16MB platter restriction does go away. However, without the availability of larger drives, as offered on SCSI, the typical 2200 TURBO user, would not be able to take advantage of the elimination of the 16MB platter restriction.

In addition, with the increased CPU speed of the TURBO, the current ST-506 drives are holding the system back.

#### Benefits

##### Wang Benefits:

Being able to offer SCSI storage devices on the 2200 product line, will provide the following benefits to Wang:

1. Increased TURBO and disk sales to current 2200 users. There is increased demand for larger and faster disk drives. These drives would open new business opportunities for Wang to sell new technology to a mature installed base, estimated to be 20,000-30,000 worldwide.
2. Compatibility with other Wang product lines. The 2200 product line would now be able to offer the same SCSI devices and cabinets, e.g., the SCSI Storage Module and Mini Data Storage Cabinet being offered on the VS and PC product lines. This means we receive the additional benefits of increased quantity buy discounts from our suppliers, common product line spare parts, servicing, support, etc.
3. Unix Compatibility We currently do not have any media compatibility with our SCO Intel products (except a 1.2MB diskette) and the RISC 6000. The 150MB SCSI tape cartridge would provide the media compatibility needed to migrate 2200 users and VARs moving to a KCML/NIKWA/Unix/RISC platform. Compatible drives would also encourage users to buy CS/386 TURBOs today if they know they will have an easy migration path in the future to Unix/RISC.

### User Benefits:

Using the current SCSI disk prices and the DS, the following is a "Cost-To-User" comparison of a SCSI Mini Data Storage Cabinet versus a similar ST-506/QIC-2 configuration on a DS:

| <u>DESCRIPTION</u>                 | <u>MDSC-D</u><br><u>326MB</u> | <u>DS</u><br><u>316MB</u> |
|------------------------------------|-------------------------------|---------------------------|
| Storage Cabinet                    | \$ 3,000                      | \$ 2,500                  |
| Diskette 1.2MB                     | N/A                           | 200                       |
| 150MB Tape Cart. or Cassette       | 1,995                         | 1,500                     |
| 320MB SCSI Drive                   | 4,495                         | N/A                       |
| 64MB ST-506                        | N/A                           | 2,095                     |
| 140MB (Configured as 112MB) ST-506 | N/A                           | 3,500                     |
| 140MB ST-506                       | N/A                           | 3,500                     |
| SUBTOTAL                           | 9,490                         | 13,295                    |

The following is a "Cost -To-User" comparison of the Small Storage Module versus a similar configuration on a DS:

| <u>DESCRIPTION</u>           | <u>SSM-C</u><br><u>145MB</u> | <u>DS</u><br><u>140MB</u> |
|------------------------------|------------------------------|---------------------------|
| Storage Cabinet              | \$ 500                       | \$ 2,500                  |
| Diskette 1.2MB               | N/A                          | 200                       |
| 150MB Tape Cart. or Cassette | 1,995                        | 1,500                     |
| 145MB SCSI Drive             | 2,495                        | N/A                       |
| 140MB ST-506                 | N/A                          | 3,500                     |
| SUBTOTAL                     | 4,990                        | 7,700                     |

### Risks

1. Users/VARS could just buy the controller board from us and SCSI drives on the open market.
2. SCSI drives are only cost effective and available at 150MBs and up, e.g., the small storage user would not have available the increased I/O speed benefits unless they were willing to pay for capacity they don't need.

### 5. Forecasts

#### U.S. Forecast

| <u>MODEL</u> | <u>Q1 FY' 93</u> | <u>Q2 FY' 93</u> | <u>Q3 FY' 93</u> | <u>Q4 FY' 93</u> | <u>TOTAL</u> |
|--------------|------------------|------------------|------------------|------------------|--------------|
| 22C11-SCSI   | 50               | 50               | 50               | 50               | 100          |

#### International Forecast

| <u>MODEL</u> | <u>Q1 FY' 93</u> | <u>Q2 FY' 93</u> | <u>Q3 FY' 93</u> | <u>Q4 FY' 93</u> | <u>TOTAL</u> |
|--------------|------------------|------------------|------------------|------------------|--------------|
| 11-SCSI      | 50               | 50               | 50               | 50               | 100          |

#### Worldwide

| <u>MODEL</u> | <u>Q1 FY' 93</u> | <u>Q2 FY' 93</u> | <u>Q3 FY' 93</u> | <u>Q4 FY' 93</u> | <u>TOTAL</u> |
|--------------|------------------|------------------|------------------|------------------|--------------|
| 22C11-SCSI   | 100              | 100              | 100              | 100              | 200          |

Potential 1st Year \$\$ Business Opportunity

|       |                          |                  |
|-------|--------------------------|------------------|
| 200   | 22C11-SCSI Controllers   | \$ 259,000       |
| 200   | SCSI Cabinets and Drives | <u>1,448,000</u> |
| TOTAL |                          | 1,707,000        |

Plus, it is estimated that at least an additional 100 TURBO systems will be sold because of the need to update to a TURBO in order to use SCSI drives.

|                          |               |                  |
|--------------------------|---------------|------------------|
| 100                      | CS/386 TURBOS | <u>1,200,000</u> |
| TOTAL Business Potential |               | 2,907,000        |

6. Announcements

|                         | <u>U.S.</u> | <u>INT.</u> |
|-------------------------|-------------|-------------|
| Pricing Up On Data Base | 06/01/92    | 06/01/92    |
| Announce                | 07/01/92    | 07/01/92    |
| FCS                     | 07/31/92    | 07/31/92    |
| Volume                  | 08/31/91    | 08/31/91    |

CC: Mike Bahia W0000600 6FLT3  
From: Bob Eastman Security: General  
Subject: Memo: 22C11-SCSI Maint. Date Received: 07/24/92

---

July 24, 1992

Gene,

I spoke with Don Blair today, and we decided to assign a Plan A (on-site) monthly maintenance price of \$10 per month.

This is the same maintenance price as is assigned to the \$700 22C11-HS, and although this is only a projected 20% maintenance margin, I think there is reason to believe that our maintenance margin might even be a little higher than this projection, and we hope that this maintenance price - which is obviously lower as-a-percentage-of-List than the 22C11-HS might encourage a greater take rate.

As 22C11-SCSI is coded WANG-installable, I have assigned a 3% installation charge.

Although it is standard procedure for the Product Manager to submit the Pricing Data Consolidation Form to Janet Sheehan, I am going to hand-deliver your original PDCF and Proposal to Jan Sheehan if I do not hear from you by 4:45pm, given the urgent nature of this.

If you have any questions about what I have done, give me a call.

Bob, x71693



Package Subject: SCSI Controller

Item Title: SCSI Controller

3/18/92 10:45 Am

Mike,

You set wrong switch on SCSI printer Port.

1 2 3 4 5 6 7 8

on (up) x x x x x

is 1e addrees for printer port (your board)

off(down) x x x

1 2 3 4 5 6 7 8

on (up) x x x x x

is 17 address of printer port

off(down) x x x

1 2 3 4 5 6 7 8

on x x x x x

is 16 address of printer port

off x x

I will send my floppy drive to you and please tell your Mail Stop.

Regards

Duncan Chou

p.s. DO NOT forgot only two terminator on a SCSI Bus in two end. One for Controller and the other on BUS end.

-----

Reply -----

To: Duncan Chou  
Subject: SCSI Controller

From: Michael Riley  
Date Sent: 03/17/92

Duncan

The two CPU have a timing problem... I think that one of the PALs when it get hot will stop working... To test, just put the CPU in a system and start to run.... Both will fail in about 5 min. (system will hang !!)  
The SCSI board Rev. D (has a problem with it.. your people can fix it!!!) This is the controller I am testing and the LED dose not go out... Can you tell me how get that LED to go off... Can you get the Printer port to work on that board ??? If not, what needs to be done????

Michael Riley

----- Reply -----

To: Michael Riley  
Subject: SCSI Controller

From: Duncan Chou  
Date Sent: 03/17/92

Mike,

Today, I recieved your boards and for DAT test is OK on our controller.  
What's kind problem on the CPUs ??? How can I to test your problem ???

Regards

-----

Package Subject: SCSI Controller

Duncan Chou

p.s. We have a engineer on H/O now and he will return in two weeks, Please give him anything that you want to send me (such as WORM). His name is Randy Chen. (you ask Emery Su to touch him)

----- Reply -----

To: Duncan Chou  
Subject: SCSI Controller

From: Michael Riley  
Date Sent: 03/09/92

Duncan

You said that you had a 1.2G WORM in Taiwan that you could use!!!

The DAT drive will leave today with 2 CPU boards that have hardware timing problems... I need someone to look at this problem and tell me if we have a problem that needs a redesign !!!!

Also a Will send a Rev. D SCSI board for you to test with...

Michael Riley

----- Reply -----

To: Michael Riley  
Subject: SCSI Controller

From: Duncan Chou  
Date Sent: 03/09/92

Mike,

Where are 1.2G WORM ??? - I can not process any for Nothing !!!!

Can you tell John Why he need above TAPE Status ????

Regards

Duncan Chou

----- Original Memo -----

To: Duncan Chou  
Subject: SCSI Controller

From: Michael Riley  
Date Sent: 03/05/92

Duncan

I have a couple Beta locations for the SCSI and they want to know when will the Floppy drive be up and running???? Also they want to know when will the Printer port be running ????

The tape utility is all most finished for the first pass... John need to get some more status out of the tape drive... End of Tape, Begening of Tape, End of Record, End of File, Is their a buffer that he can go to, to get this type of status ????

I hope to send out to you the DAT Drive Tomorrow or Monday...

Have you made any progress on getting the 1.2G WORM to work ????

Michael Riley

Package Subject: Rev 1.15 of Turbo

Item Title: Rev 1.15 of Turbo

Make,

Is backup from tape to DS/SCSI or backup from DS to SCSI ????

Regards

Duncan Chou

p.s. Do you get your SCSI printer and floppy work ????

----- Original Memo -----

To: Duncan Chou  
Subject: Rev 1.15 of Turbo

From: Michael Riley  
Date Sent: 03/10/92

Duncan

I have GOOD news and BAD new !!!!!

The GOOD news is that Rev. 1.15 is looking good !!!!

The BAD news is that the new SCSI PROMs dose Not fix MY floppy access problem !!!!! What is the switch setting for your floppy drive ???? We both have the same drive type, so, if yours works mine should !!!!

Also, I set the printer ID as given, and I still can not get the printer port to print ( Im set up for 217!!!!) What is the problem ????

This is a BIG problem , Do a BACKUP to a DS on a HS controller from a SCSI Platter... I timed mine system and it took 40 sec. to do 1 transaction of 32 sectors !!!!! This is a problem !!!!! A backup on the same DS unit takes less than 1 sec. per 32 sectors transaction....

Do you have any ideas on why the backup is so SLOW between HS controllers ????

Michael Riley

Package Subject: Rev 1.15 of Turbo

3/10/92 12:00 PM

FROM DUNCAN

Item Title: Notes

Attached package are New SCSI EPROM and New Rev 1.15 O.S. of Turbo with

1. DATA SAVE/LOAD BM problem that reported by Mike
2. SCSI Microcode Floppy problem

Regards  
Duncan Chou

p.s. I did not recieve your bugs listing that still DID NOT solved.  
Please check your terminaling on your SCSI BUS !!!  
The printer port setting of SCSI as follows:

|     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |  |
|-----|---|---|---|---|---|---|---|---|--|
| on  |   |   |   |   |   |   |   |   |  |
|     |   |   |   |   |   |   |   |   |  |
| off |   |   |   |   |   |   |   |   |  |
|     |   |   |   |   |   |   |   |   |  |
| on  |   |   |   |   |   |   |   |   |  |
|     |   |   |   |   |   |   |   |   |  |
| off |   |   |   |   |   |   |   |   |  |

for 217 (bit 1,2,3 for SCSI ID and bit 4 for MUX used for cache enabled bit 5,6,7,8 for printer ID)

for 216

To: Michael Riley  
From: Duncan Chou  
Subject: New PROM of SCSI

W0000600 6FLT3  
Security: Confidential  
Date Received: 03/09/92

Mike,

We have problem on HD and DD setting of SCSI Floppy Drive and I will give you the new PROM and MicroCode.

SCSI Printer ID setting as follows:

1 2 3 4 5 6 7 8  
on x x for ID 16  
x x  
off

1 2 3 4 5 6 7 8  
on x for ID 17  
x x x  
off

Regards  
Duncan Chou

----- Reply -----

To: Duncan Chou  
Subject: New PROM of SCSI

From: Michael Riley  
Date Sent: 03/06/92

Duncan

The Floppy states that it is a 1.2M( SCSI CONFIG Program) I put a 1.2M in my floppy drive and do a LISTDCT/D30 (SCSI is set for 330) and I get a A03 error....Your Rev. B controller also gives a A03 error... My Floppy drive is set up for ID 6... Give me ALL of your jumpers for your SCSI Floppy!!!!

The printer port: I have my set for 217 , On the 9582 board switch 1 to 7 are ON and 8 is OFF..(Controller address is 7) My board just looks at me when I tell it to print !!!!! Your Rev. B and my Rev. C & D do not print... I am useing a 2245 printer... It works on a 22C11HS!!!!

How do you get your SCSI controller to print ????

Michael Riley

P.S. On my Rev. D board and your new PROMS. When I start the system from the SCSI the LED goes out !!!!!

----- Reply -----

To: Michael Riley  
Subject: New PROM of SCSI

From: Duncan Chou  
Date Sent: 03/05/92

Mike,

The printer port and Floppy drive is work and I do not know where are your problem.

Regards  
Duncan Chou

----- Original Memo -----

To: Duncan Chou  
Subject: New PROM of SCSI

From: Michael Riley  
Date Sent: 03/04/92

Duncan

This PROM file did NOT fix the Power Up LED Problem !!!! It still stays ON!  
Take the PROM File you sent me off the VS and make a set of PROMs and test them out !!!!

Did you get the printer working ????

I tested out the Floppy and I can not get it to read a 1.2M or a 366K Floppy,

Dose the floppy work ???? The controller need to be able to read 1.2M and 360K floppys...The drive has the ability to do both !!!! You can do as the DS dose, try to read floppy as a 1.2M first, if fails, try to read it as a 360K, if fails, then a I93 error....

Michael Riley

To: Michael Riley  
From: Duncan Chou  
Subject: SCSI Controller

W0000600 6FLT3  
Security: Confidential  
Date Received: 02/24/92

-----  
Mike and John,

I have changed the configure ID from 'scsi' to 'scsI' for Master ID and 'scsi' for Slave ID (i.e. I for Master and i for Slave on Configure Block and byte 3 (from 0) on each drive)

You can use \$SCSI CONFIG command to get drive state and use config flag that locate on byte 1 (count from 0) that 0 for No Config on this drive and I for Master and i for Slave to replace Nonzero for configured flag.

Above changes will put into Rev 1.12 and I also will put Mux function from now.

Regards  
Duncan Chou

----- Original Memo -----  
To: Duncan Chou  
Subject: SCSI Controller  
From: Michael Riley  
Date Sent: 02/03/92

Duncan

I want to set up the SCSI Controller the same way as we did for the DS Rev.4 ...Each SCSI disk (SCSI ID) can be set to be a MASTER or a SLAVE address... So if I have two SCSI 150Meg Drives, I can have 7 Platters on the MASTER addressing (D11,D12,D13,D14,D15,D16,D17) and 7 platters on the SLAVE addressing (D51,D52,D53,D54,D55,D56,D57) on order to do this we must ADD a byte to SCSI CONFIG file telling if this drive is a MASTER or SLAVE Drive... If I have 3 150Meg. Drives, Controller ID 7, Drives are ID 5 , ID 4, ID 2... I set ID 5 to a MASTER (D11,-D15), Set ID 4 to SLAVE (D51-D55), and ID 2 to MASTER (D16-D1A) If total number of platters is grater then 30 for the MASTER or SLAVE then that disk is not used...

How soon can you make a change to the SCSI CONFIG lay out to put in the MASTER/ SLAVE byte ???? John is holding up the SCSI Utility untill he knows how you are going to make this change....

Michael Riley

w/ TURBO O/S 1.12 on ROMs NEED NEW PROMS ON SCSI CONTROLLER

# ARDAT

## ARCHI

| S8                       | S7                       | S6                       | S5                       | S4                       | S3                       | S2                       | S1 - OFF                 |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Self-Test                | Reserved                 | Parity                   | SCSI Mode                | SCSI ID                  | - ON                     |                          | Default Settings         |
| ON-Enable                | ON-Enable                | ON-SCSI2                 | OFF OFF OFF 0            |                          |                          |                          |                          |
| OFF-Disable              | OFF-Disable              | OFF-SCSI1                | OFF OFF OFF 1            |                          |                          |                          |                          |
|                          |                          |                          | OFF ON ON 2              |                          |                          |                          |                          |
|                          |                          |                          | OFF ON ON 3              |                          |                          |                          |                          |
|                          |                          |                          | ON OFF OFF 4             |                          |                          |                          |                          |
|                          |                          |                          | ON OFF ON 5              |                          |                          |                          |                          |
|                          |                          |                          | ON ON OFF 6              |                          |                          |                          |                          |
|                          |                          |                          | ON ON ON 7               |                          |                          |                          |                          |

\*Some General purpose default settings may.

**SCSI CONNECTOR**

REMOTE ☐ TERMINATOR ☐ SW1

OC POWER ☐



THEORY OF OPERATION  
for  
PCA 210-9582 SCSI-II DAUGHTER BOARD

PRELIMINARY

(COMPANY CONFIDENTIAL)

AUTHOR : Nai-Chi Doong  
DATE : MAY. 6, 1991

REVISION : R00

REFERENCE DOCUMENT NO. HM-XXXX

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## 1.0 SCOPE

This documentation only describes the PCA 210-9582 SCSI-II  
daughter board for the PCA 210-9579 HIGH SPEED CONTROLLER.

The SCSI-II controller offers much higher disk I/O speed than the 22C11-II Disk Interface with the new industrial standard SCSI-II Interface while retains the software compatibility with all the BASIC-II I/O statements.

The following discussions will focus on the Theory of Operation of the PCA 210-9582. The circuit implementation conforms to the Hardware Design Specification of PCA 210-9582.

As for the PCA 210-9579, please refer to the Theory of Operation  
of HCC (High speed channel I/O controller).

## 2.0 GENERAL DESCRIPTION

The PCA 210-9582 is based on the local I/O bus interface to develop an I/O structure which can maximize the total system performance.

The PCA 210-9582 implements the SCSI-II, Centronics and two 9 pin serial interfaces. It is composed of an NCR 53C90A

SCSI-II

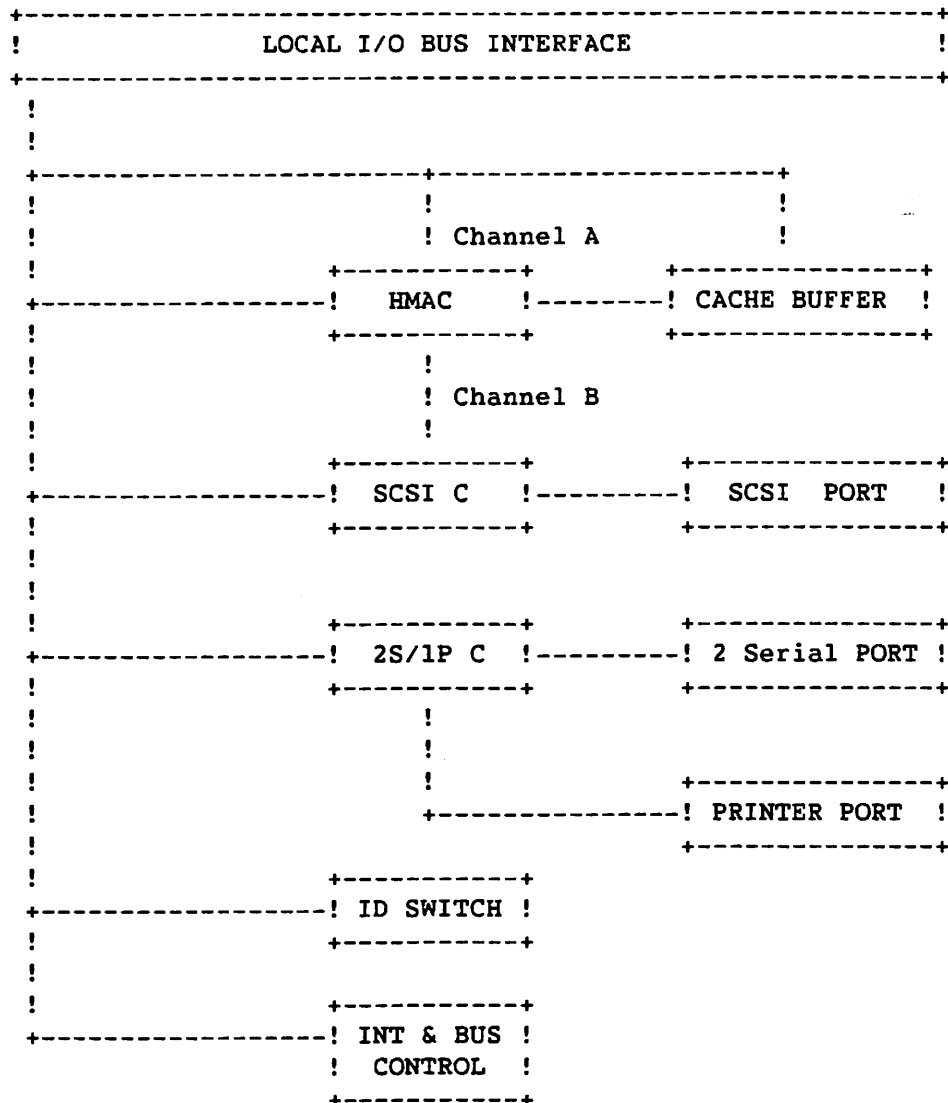
controller, an NCR 52C61 High Performance Memory Controller,

a

16C452 2S/1P controller, and 2 MB of DRAM cache buffer.

### FEATURES

- o SCSI-II ANSI X3.131-1986 compatible
- o Up to 4.8 MB/S sync/async single-ended SCSI
- o 2 MB of DRAM cache buffer
- o CPU <-> CACHE speed > 1.5 MB/S
- o Pseudo DMA and standard I/O interface for cache access
- o 2 9-pin RS-232 async interfaces
- o Centronics interface



### 3.0 HARDWARE FUNCTIONAL DESCRIPTION

The hardware units of PCA 210-9582 are mainly composed of bus command decoder, interrupt and bus ready control, DRAM cache buffer, SCSI interface, RS-232 interface, printer interface, miscellaneous control port, and ID switch. By issuing various I/O read write command, signal handshaking will be proceeded between SCSI-II and the high speed channel I/O controller.

The following discussions will focus on the hardware function of the PCA 210-9582 SCSI-II interface daughter board.

#### 3.1 Description of Components

| ! COMPONENT | ! DESCRIPTION                                 | ! |
|-------------|-----------------------------------------------|---|
| ! L1 - L4   | ! RS-232D Transceivers                        | ! |
| ! L5        | ! Serial/Parallel Controller                  | ! |
| ! L6,L13    | ! DRAM Address/Control Bus Driver             | ! |
| ! L7        | ! High Performance Memory Array Controller    | ! |
| ! L8        | ! SCSI Controller                             | ! |
| ! L9        | ! Bidirectional Transceiver for the data bus  | ! |
| !           | ! of the local I/O channel                    | ! |
| ! L10       | ! Upper nibble of the interrupt vector        | ! |
| ! L12       | ! Wait State Generator                        | ! |
| ! L15       | ! Interrupt vector generator and DRAM CAS     | ! |
| !           | ! selector                                    | ! |
| ! L16       | ! Miscellaneous Control Port                  | ! |
| ! L17       | ! Address Decoder to select different devices | ! |
| ! L18,L21   | ! DRAM                                        | ! |
| ! L19       | ! DIP switch buffer                           | ! |
| ! L20       | ! Address buffer from PCA 210-9579 to         | ! |
| !           | ! different I/O devices                       | ! |
| ! L22       | ! Bidirectional data latch and parity error   | ! |
| !           | ! checker/generator (odd parity)              | ! |
| ! JP2       | ! Termpwr jumper for the SCSI interface       | ! |

NOTE : Since A0 is not used for decoding, all the addresses are incremented by 2.

### 3.2 Interrupt & Bus Ready Control

There are six interrupt sources in the PCA 210-9582 in order to provide the Local I/O Bus interrupt to the 286 ( on PCA 210-9579 ). The interrupt sources can be disabled by setting either the Misc Control or respective controller itself. The interrupt priority is decoded in descending order. The vector is generated for both the first and second INTA cycles.

L15 takes the interrupt requests and interrupt mask signals from L16 to generate the interrupt vectors. L15 also takes the CAS from the 52C61 and DRAM bank select signals and issues CAS to the selected DRAM. The channel B ACK is used to decide whether it is a CPU access or a SCSI access.

The 12.5MHz clock is inverted and fed to L12 as the clock of the internal shift register. This shift register is triggered by any access of the devices on PCA 210-9582. L12 generates necessary wait states for devices with respective speeds.

### 3.3 Pseudo DMA access

Before the pseudo DMA operation, channel A of the 52C61 should be set to proper operation mode, i.e. the address length, the starting address, and control operation. When the CPU accesses the pseudo DMA port, the channel A DMA request is asserted. After the access is granted, the request signal is cleared. Then, the shift register is triggered for generating wait states. If the request cannot be granted (i.e. length = 0), no ready signal will be generated. The system will be hung.

### 3.4 52C61 Controller

52C61 performs the DMA operation and arbitration of 3 different channels, DRAM interface signal generation, DRAM refresh, and parity check and generation. The input clock frequency is 24 MHz. The following must be configured before normal operation:

1. Fly-by mode disabled.
2. Parity through disabled.
3. MBUSGEN disabled.
4. MBUSCHKU enabled.
5. MBUSCHKB enabled.
6. Refresh timer register = 91 (decimal).
7. RAM speed control register bit0 = 1.
8. Parity set to ODD.

### 3.5 53C90A Controller

53C90A performs SCSI bus operations through DMA channel B or programmed I/O. The 24 MHz oscillator input is also used as clock. The following must be set before normal operation:

1. Clock conversion = 5.
2. DREQ high impedance set to LOW.

### 3.6 16C452 Controller

The 16C452 is a PC compatible 2S/1P controller. The input clock frequency is 1.8432 MHz. For the operation of this chip, please refer to the data sheet of 16C452 as well as the PC technical reference.

### 3.7 Miscellaneous control port

Some interrupt mask, LED control, and cache buffer bank selection can be done by setting the following :

| ! ADDRESS | ! DO ! | DESCRIPTION                   |
|-----------|--------|-------------------------------|
| ! 1E00    | ! 0 !  | DISABLE PRINTER INTERRUPT     |
| ! 1E00    | ! 1 !  | ENABLE PRINTER INTERRUPT      |
| ! 1E02    | ! 0 !  | DISABLE HMAC INTERRUPT        |
| ! 1E02    | ! 1 !  | ENABLE HMAC INTERRUPT         |
| ! 1E04    | ! 0 !  | DISABLE SCSI INTERRUPT        |
| ! 1E04    | ! 1 !  | ENABLE SCSI INTERRUPT         |
| ! 1E06    | ! 0 !  | reserved                      |
| ! 1E06    | ! 1 !  | reserved                      |
| ! 1E08    | ! 0 !  | SET CPU RAM ACCESS TO BANK 0! |
| ! 1E08    | ! 1 !  | SET CPU RAM ACCESS TO BANK 1! |
| ! 1E0A    | ! 0 !  | TURN LED ON                   |
| ! 1E0A    | ! 1 !  | TURN LED OFF                  |
| ! 1E0C    | ! 0 !  | CLEAR PARITY CHECK            |
| ! 1E0C    | ! 1 !  | ENABLE PARITY CHECK           |

All the DOs are set to 0 upon system reset. The parity error flag can be cleared by writing 1E0CH a 0. To enable the parity check circuit again, write 1E0C a 1.

#### 4.0 DOCUMENT REFERENCE

- \* Theory of Operation of PCA 210-9579 High Speed Channel I/O Controller
- \* Hardware Design Specification of PCA 210-9582 SCSI-II Disk Interface Daughter Board
- \* Wang Laboratories Inc. SCSI-2 Bus Protocol
- \* NCR 52C60/52C61 High Performance Memory Array Controller Data Manual
- \* NCR 53C90A, 53C90B Advanced SCSI Controller Data Sheet
- \* SIS 82C452 Single Chip Multi-I/O Data Sheet
- \* IBM PC AT Technical Reference



HARDWARE DESIGN SPECIFICATION

for

PCA 210-9582 SCSI-II DAUGHTER BOARD

PRELIMINARY

(COMPANY CONFIDENTIAL)

AUTHOR : Nai-Chi Doong

DATE : MAY. 6, 1991

REVISION : R00

REFERENCE DOCUMENT NO. HM-XXXX

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## 1.0 SCOPE

This specification only describes the PCA 210-9582 SCSI-II  
daughter board for the PCA 210-9579 HIGH SPEED CONTROLLER.

The SCSI-II controller offers much higher disk I/O speed than the 22C11-II Disk Interface with the new industrial standard SCSI-II Interface while retains the software compatibility with all the BASIC-II I/O statements.

The following discussions will focus on the I/O port definitions, bus command decoder, the electrical characteristics of all the interfaces, and some control functions of the PCA 210-9582.

As for the PCA 210-9579, please refer to the Hardware Design Specification of HCC (High speed channel I/O controller).

## 2.0 GENERAL DESCRIPTION

The PCA 210-9582 is designed to replace the old 22C80 Disk Controller as well as the 22C11-II Printer Disk Controller.

The PCA 210-9582 implements the SCSI-II, Centronics and two 9 pin serial interfaces. It is composed of an NCR 53C90A

SCSI-II

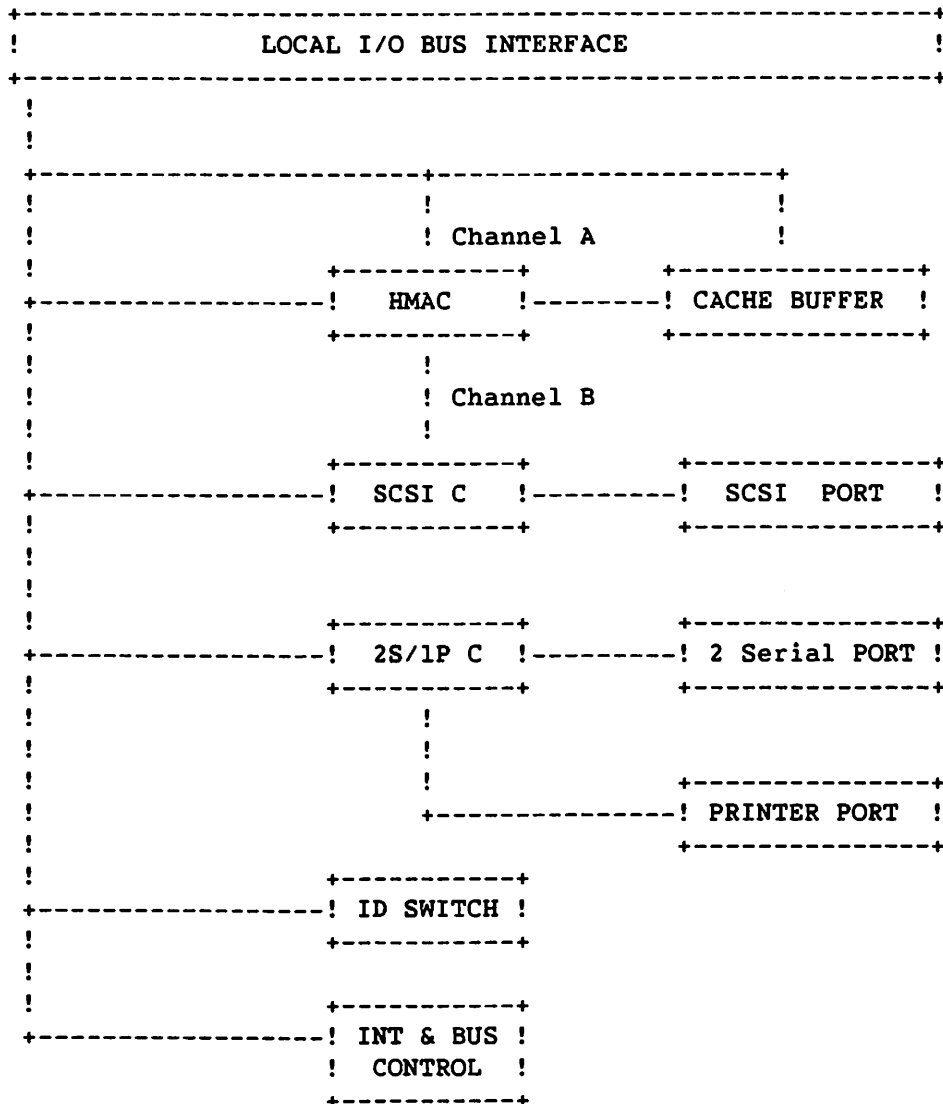
controller, an NCR 52C61 High Performance Memory Controller,

a

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- o SCSI-II ANSI X3.131-1986 compatible
- o Up to 4.8 MB/S sync/async single-ended SCSI
- o 2 MB of DRAM cache buffer
- o CPU <-> CACHE speed > 1.5 MB/S
- o Pseudo DMA and standard I/O interface for cache access
- o 2 9-pin RS-232 async interfaces
- o Centronics interface



### 3.0 HARDWARE OPERATIONAL FEATURES

The hardware units of PCA 210-9582 are mainly composed of bus command decoder, interrupt and bus ready control, DRAM cache buffer, SCSI interface, RS-232 interface, printer interface, miscellaneous control port, and ID switch. By issuing various I/O read write command, signal handshaking will be proceeded between SCSI-II and the high speed channel I/O controller.

The following discussions will focus on the hardware features of the PCA 210-9582 SCSI-II interface daughter board.

#### 3.1 I/O Port Definitions

The base addresses of on board I/O use 16 bit address decode. Data are accessed through the lower 8 bits of the data bus. The following table illustrates the I/O port definitions of PCA 210-9582.

| ! DESCRIPTION   | ! A A A A A A A A A A A A A A A R !   | ! PORT # ! |
|-----------------|---------------------------------------|------------|
| !               | ! 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 / ! | ! (BASE) ! |
| !               | ! 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0 W ! |            |
| ! DRAM PORT     | ! 0 X X 1 0 0 0 X X X X X X X X X B ! | ! 1000H !  |
| ! 52C61 HMAC    | ! 0 X X 1 0 0 1 X X S S S S S S X B ! | ! 1200H !  |
| ! 53C90A SCSI   | ! 0 X X 1 0 1 0 X X X X S S S S X B ! | ! 1400H !  |
| ! SERIAL PORT 0 | ! 0 X X 1 0 1 1 X X X X S S S S X B ! | ! 1600H !  |
| ! SERIAL PORT 1 | ! 0 X X 1 1 0 0 X X X X S S S S X B ! | ! 1800H !  |
| ! PRINTER PORT  | ! 0 X X 1 1 0 1 X X X X S S S S X B ! | ! 1A00H !  |
| ! ID SWITCH     | ! 0 X X 1 1 1 0 X X X X X X X X R !   | ! 1C00H !  |
| ! MISC CONTROL  | ! 0 X X 1 1 1 1 X X X X S S S S X W ! | ! 1E00H !  |

#### NOTE :

- 1) B indicates that both read and write operations are allowed.  
R indicates that only read operation is allowed.  
W indicates that only write operation is allowed.
- 2) X indicates that this line is not decoded.
- 3) S indicates that this line is used to select different registers inside the controller.
- 4) postfixed H means the digit is hexadecimal.

### 3.2 Interrupt & Bus Ready Control

There are six interrupt sources in the PCA 210-9582 in order to provide the Local I/O Bus interrupt to the 286 ( on PCA 210-9579 ). The interrupt sources can be disabled by setting either the Misc Control or respective controller itself. The interrupt priority is decoded in descending order. The vector is generated for both the first and second INTA cycles. The table of interrupt vectors is listed below:

| +-----+              |                    |   |
|----------------------|--------------------|---|
| ! Interrupt Source ! | Interrupt Vector ! |   |
| +-----+              |                    |   |
| ! parity error !     | 30H                | ! |
| ! HMAC !             | 31H                | ! |
| ! 53C90A !           | 32H                | ! |
| ! serial port 0 !    | 33H                | ! |
| ! serial port 1 !    | 34H                | ! |
| ! printer port !     | 35H                | ! |
| +-----+              |                    |   |

A local bus ready signal must be issued to terminate a bus cycle whenever the local read, write, or interrupt acknowledge cycle is completed. The timing of the ready signal has to be synchronous with PHI-2 in order to meet the 286 CPU timing requirements. ( Refer to the appendix 5 of H/W design spec for PCA 210-9579 ).

The access time and cycles for different I/O devices are listed below :

| +-----+             |         |           |   |
|---------------------|---------|-----------|---|
| ! DEVICE !          | CYCLE ! | TIME (ns) | ! |
| +-----+             |         |           |   |
| ! DRAM !            | 3       | 240       | ! |
| ! 52C61 !           | 3       | 240       | ! |
| ! 53C90A !          | 3       | 240       | ! |
| ! SERIAL PORT !     | 3       | 240       | ! |
| ! PRINTER PORT !    | 4       | 320       | ! |
| ! ID SWITCH !       | 1       | 80        | ! |
| ! MISC CONTROL !    | 1       | 80        | ! |
| ! INT ACKNOWLEDGE ! | 1       | 80        | ! |
| +-----+             |         |           |   |

### 3.3 Pseudo DMA access

There are 2 MB of DRAM in the PCA 210-9582 as the SCSI-II cache buffer. The memories are divided into 2 banks. The SCSI controller and CPU can access different memory banks to maximize memory utilization. The access time of the DRAM must be less than 85ns. The data rate flown between the CPU and cache buffer using the repeat I/O string byte command will be more than 1.5 MB/S.

### 3.4 SCSI-II interface

There are 2 connectors for SCSI interface. Only A CABLEs are provided. Both synchronous and asynchronous protocols are supported. Single-ended passive termination is implemented. The connector type and locations are listed below :

| ! location ! | connector type              | ! contact set! |
|--------------|-----------------------------|----------------|
| ! J4 !       | ! shielded alternative 2    | ! 2 !          |
| ! J5 !       | ! nonshielded alternative 2 | ! 1 !          |

For the details of the connector spec, please refer to the SCSI-II Bus Protocol ( P/N 191-7249 ). The maximum SCSI bus transfer rate is 4.8 MB/S for both sync and async operation.

### 3.5 Printer interface

The printer port is compatible with the standard Centronics Interface. All the handshaking timing requirements & procedures for printer port can be found in the Centronics Interface Spec or the hardware manuals of attached printers. This printer port is located in J1.

### 3.6 Serial interface

2 serial ports are provided in PCA 210-9582. These ports are compatible with the PC 9 pin serial interfaces. For the

specification, please refer to the PC technical reference.

The maximum data transfer rate is 112K bps. They are located in the position of J2 and J3. The electrical characteristics conform to the EIA RS-232D specification.

### 3.7 Miscellaneous control port

Some interrupt mask, LED control, and cache buffer bank selection can be done by setting the following :

| ! ADDRESS | ! D0 | ! DESCRIPTION                   | ! |
|-----------|------|---------------------------------|---|
| ! 1E00    | ! 0  | ! DISABLE PRINTER INTERRUPT     | ! |
| ! 1E00    | ! 1  | ! ENABLE PRINTER INTERRUPT      | ! |
| ! 1E02    | ! 0  | ! DISABLE HMAC INTERRUPT        | ! |
| ! 1E02    | ! 1  | ! ENABLE HMAC INTERRUPT         | ! |
| ! 1E04    | ! 0  | ! DISABLE SCSI INTERRUPT        | ! |
| ! 1E04    | ! 1  | ! ENABLE SCSI INTERRUPT         | ! |
| ! 1E06    | ! 0  | ! reserved                      | ! |
| ! 1E06    | ! 1  | ! reserved                      | ! |
| ! 1E08    | ! 0  | ! SET CPU RAM ACCESS TO BANK 0! | ! |
| ! 1E08    | ! 1  | ! SET CPU RAM ACCESS TO BANK 1! | ! |
| ! 1E0A    | ! 0  | ! TURN LED ON                   | ! |
| ! 1E0A    | ! 1  | ! TURN LED OFF                  | ! |
| ! 1E0C    | ! 0  | ! CLEAR PARITY CHECK            | ! |
| ! 1E0C    | ! 1  | ! ENABLE PARITY CHECK           | ! |

All the D0s are set to 0 upon system reset.

### 3.8 Power consumption

The typical current rating provides PCA 210-9582 are listed below :

| ! power source | ! current rating (Amp) | ! |
|----------------|------------------------|---|
| ! +5V          | ! 1.5A                 | ! |
| ! +12V         | ! N/A                  | ! |
| ! -12V         | ! N/A                  | ! |



#### 4.0 DOCUMENT REFERENCE

- \* Hardware Design Specification of PCA 210-9579 High Speed Channel I/O Controller
- \* Hardware Design Specification of PCA 210-9581 22C11-II Disk Interface Daughter Board
- \* Wang Laboratories Inc. SCSI-2 Bus Protocol
- \* NCR 52C60/52C61 High Performance Memory Array Controller Data Manual
- \* NCR 53C90A, 53C90B Advanced SCSI Controller Data Sheet
- \* SIS 82C452 Single Chip Multi-I/O Data Sheet
- \* IBM PC AT Technical Reference

# Appendix 1. Local I/O Bus Pin Assignments

| Pin No. ! | Signal Name | !! | Pin No. ! | Signal Name |
|-----------|-------------|----|-----------|-------------|
| 1 !       | +12V        | !! | 2 !       | -12V        |
| 3 !       | +12V        | !! | 4 !       | -12V        |
| 5 !       | +5V         | !! | 6 !       | -5V         |
| 7 !       | BHE#        | !! | 8 !       | LA0         |
| 9 !       | LA1         | !! | 10 !      | GND         |
| 11 !      | LA2         | !! | 12 !      | LA3         |
| 13 !      | LA4         | !! | 14 !      | LA5         |
| 15 !      | +5V         | !! | 16 !      | LA6         |
| 17 !      | LA7         | !! | 18 !      | LA8         |
| 19 !      | LA9         | !! | 20 !      | GND         |
| 21 !      | LA10        | !! | 22 !      | LA11        |
| 23 !      | LA12        | !! | 24 !      | LA13        |
| 25 !      | +5V         | !! | 26 !      | LA14        |
| 27 !      | LA15        | !! | 28 !      | LA16        |
| 29 !      | LA17        | !! | 30 !      | GND         |
| 31 !      | LD0         | !! | 32 !      | LD1         |
| 33 !      | LD2         | !! | 34 !      | LD3         |
| 35 !      | +5V         | !! | 36 !      | LD4         |
| 37 !      | LD5         | !! | 38 !      | LD6         |
| 39 !      | LD7         | !! | 40 !      | GND         |
| 41 !      | LD8         | !! | 42 !      | LD9         |
| 43 !      | LD10        | !! | 44 !      | LD11        |
| 45 !      | +5V         | !! | 46 !      | LD12        |
| 47 !      | LD13        | !! | 48 !      | LD14        |
| 49 !      | LD15        | !! | 50 !      | GND         |
| 51 !      | M/IO L#     | !! | 52 !      | L RD#       |
| 53 !      | L RWR#      | !! | 54 !      | L RDY#      |
| 55 !      | +5V         | !! | 56 !      | INTAB       |
| 57 !      | GS#         | !! | 58 !      | PHI 2       |
| 59 !      | L RESET     | !! | 60 !      | GND         |

NOTE : "#" indicates the active LOW signal

## APPENDIX 2. SCSI-II Interface Pin Assignments

| Pin No. | ! Signal Name | !! | Pin No. | ! Signal Name |
|---------|---------------|----|---------|---------------|
| 1       | ! GND         | !! | 26      | ! DB0#        |
| 2       | ! GND         | !! | 27      | ! DB1#        |
| 3       | ! GND         | !! | 28      | ! DB2#        |
| 4       | ! GND         | !! | 29      | ! DB3#        |
| 5       | ! GND         | !! | 30      | ! DB4#        |
| 6       | ! GND         | !! | 31      | ! DB6#        |
| 7       | ! GND         | !! | 32      | ! DB7#        |
| 8       | ! GND         | !! | 33      | ! DBP#        |
| 9       | ! GND         | !! | 34      | ! GND         |
| 10      | ! GND         | !! | 35      | ! GND         |
| 11      | ! GND         | !! | 36      | ! GND         |
| 12      | ! GND         | !! | 37      | ! TERMPWR     |
| 13      | ! NC          | !! | 38      | ! GND         |
| 14      | ! GND         | !! | 39      | ! GND         |
| 15      | ! GND         | !! | 40      | ! GND         |
| 16      | ! GND         | !! | 41      | ! ATN#        |
| 17      | ! GND         | !! | 42      | ! GND         |
| 18      | ! GND         | !! | 43      | ! BSY#        |
| 19      | ! GND         | !! | 44      | ! ACK#        |
| 20      | ! GND         | !! | 45      | ! RST#        |
| 21      | ! GND         | !! | 46      | ! MSG#        |
| 22      | ! GND         | !! | 47      | ! SEL#        |
| 23      | ! GND         | !! | 48      | ! C/D#        |
| 24      | ! GND         | !! | 49      | ! REQ#        |
| 25      | ! GND         | !! | 50      | ! I/O#        |

### NOTE :

1. # indicates active low signal.
2. NC indicates no connection.
3. This pin assignment is for J4.

| Pin No. | ! | Signal Name | !! | Pin No. | ! | Signal Name |
|---------|---|-------------|----|---------|---|-------------|
| 1       | ! | GND         | !! | 2       | ! | DB0#        |
| 3       | ! | GND         | !! | 4       | ! | DB1#        |
| 5       | ! | GND         | !! | 6       | ! | DB2#        |
| 7       | ! | GND         | !! | 8       | ! | DB3#        |
| 9       | ! | GND         | !! | 10      | ! | DB4#        |
| 11      | ! | GND         | !! | 12      | ! | DB6#        |
| 13      | ! | GND         | !! | 14      | ! | DB7#        |
| 15      | ! | GND         | !! | 16      | ! | DBP#        |
| 17      | ! | GND         | !! | 18      | ! | GND         |
| 19      | ! | GND         | !! | 20      | ! | GND         |
| 21      | ! | GND         | !! | 22      | ! | GND         |
| 23      | ! | GND         | !! | 24      | ! | TERMPWR     |
| 25      | ! | NC          | !! | 26      | ! | GND         |
| 27      | ! | GND         | !! | 28      | ! | GND         |
| 29      | ! | GND         | !! | 30      | ! | GND         |
| 31      | ! | GND         | !! | 32      | ! | ATN#        |
| 33      | ! | GND         | !! | 34      | ! | GND         |
| 35      | ! | GND         | !! | 36      | ! | BSY#        |
| 37      | ! | GND         | !! | 38      | ! | ACK#        |
| 39      | ! | GND         | !! | 40      | ! | RST#        |
| 41      | ! | GND         | !! | 42      | ! | MSG#        |
| 43      | ! | GND         | !! | 44      | ! | SEL#        |
| 45      | ! | GND         | !! | 46      | ! | C/D#        |
| 47      | ! | GND         | !! | 48      | ! | REQ#        |
| 49      | ! | GND         | !! | 50      | ! | I/O#        |

NOTE :

1. # indicates active low signal.
2. NC indicates no connection.
3. This pin assignment is for J5.

# APPENDIX 3. Serial Interface Pin Assignments

| Pin No. | ! Signal Name   | !! | Pin No. | ! Signal Name |
|---------|-----------------|----|---------|---------------|
| 1       | !Carrier Detect | !! | 6       | ! DSR         |
| 2       | ! Rx Data       | !! | 7       | ! RTS         |
| 3       | ! Tx Data       | !! | 8       | ! CTR         |
| 4       | ! DTR           | !! | 9       | ! RI          |
| 5       | ! GND           | !! |         |               |

# APPENDIX 4. Printer Interface Pin Assignments

| Pin No. | ! Signal Name | !! Pin No. | ! Signal Name |
|---------|---------------|------------|---------------|
| 1       | ! STROBE#     | !! 19      | ! GND         |
| 2       | ! PD0         | !! 20      | ! GND         |
| 3       | ! PD1         | !! 21      | ! GND         |
| 4       | ! PD2         | !! 22      | ! GND         |
| 5       | ! PD3         | !! 23      | ! GND         |
| 6       | ! PD4         | !! 24      | ! GND         |
| 7       | ! PD5         | !! 25      | ! GND         |
| 8       | ! PD6         | !! 26      | ! GND         |
| 9       | ! PD7         | !! 27      | ! GND         |
| 10      | ! ACK#        | !! 28      | ! GND         |
| 11      | ! BUSY        | !! 29      | ! GND         |
| 12      | ! PE          | !! 30      | ! GND         |
| 13      | ! SLCT IN #   | !! 31      | ! INIT#       |
| 14      | ! AUTO FD XT# | !! 32      | ! ERROR#      |
| 15      | ! NC          | !! 33      | ! GND         |
| 16      | ! GND         | !! 34      | ! NC          |
| 17      | ! GND         | !! 35      | ! NC          |
| 18      | ! NC          | !! 36      | ! SLCT        |

## NOTE :

1. # Indicates active low signal.
2. NC indicates no connection.

## Diagnostic Program Document

Documentation Release: R 0.01

Software Release:

Documentation Part No.:

ECO Number:

Package Number:

PROM Part Numbers: 378-???? and 378-????

Program Name : 22C11-SCSI Disk Controller BIT

Originator : Milton Chen

Date : August 12, 1991

### Table of Contents

1.0 Reference Documentation

2.0 Configuration Requirements

3.0 Program Description

4.0 Load Procedure

5.0 Operating Instruction

6.0 Miscellaneous

7.0 Program Revision History

Appendix A: Test Description and Error Table

Appendix B: Program Listing

Engineering Service Department  
Wang Computer (Taiwan) Ltd.  
2, Science-Based Industrial Park  
Hsinchu, Taiwan, R.O.C

## 1.0 REFERENCE DOCUMENTATION

22C11-SCSI Disk Interface Hardware Design Specification  
High Speed I/O Controller Hardware Design Specification  
NCR 53C90 Advanced SCSI Controller Data Sheet  
NCR 52C61 High Performance Memory Array Controller Data Sheet  
SIS 82452 2S/1P Data Sheet

## 2.0 CONFIGURATION REQUIREMENTS

### 2.1 Hardware

Minimum required configuration for the BIT diagnostic must reside at 22C11-SCSI mother board (210-9579-??).and insert in the high speed channel board.

Printer - if burn-in mode printer test is to be performed.

### 2.2 Software

Two 64K PROMs loaded with the latest release of the firmware located at L07(even) and L14(odd) on the 210-9579-?? 22C11-SCSI mother board.

## 3.0 PROGRAM DESCRIPTION

### 3.1 Applications

To test hardware located on the 22C11-SCSI board and clear a path for the 2200 Operating System. There is also a board repair diagnostic included in the PROM code, it provided QC pretest of Manufacturing production and CE field repair.

### 3.2 User interface

The user interface in the customer environment is through the use of LED that is located on the daughter board. Build In Test is in operation, LED will be turned on. Upon completion of BIT the LED is turned off. The test PCA 210-9579 error, the LED always ON, can not be turn off. If looping ( Run-in test ) is a function selected then upon completion of diagnostic test pass the LED will turn off about one second and then turned on again as the next times of test begins.

The ICE286 (In Circuit Emulator) may be halted on an error and viewing of registers will contain specific fault isolation information.

### 3.3 Hardware tested

The hardware on the board consists of 80286 CPU, two 64K PROMs, 256K SRAM, 2M DRAM.



### 3.4 Tests in The Program

| <u>Name of Test</u>             | <u>Hardware Tested</u>           |
|---------------------------------|----------------------------------|
| 1. 80286 CPU test               | Test 80286 CPU                   |
| 2. 4K Bytes Semaphore Area Test | First 4K memory test             |
| 3. SRAM Data Bus Test           | SRAM data bus test               |
| 4. SRAM Address Line Test       | SRAM address line test           |
| 5. SRAM Write/Read Test         | Test SRAM W/R                    |
| 6. HMAC 52C61 P-channel Test    | Test DRAM through HMAC P-channel |
| 7. HMAC 52C61 A-channel Test    | Test DRAM through HMAC A-channel |
| 8. Parity Test                  | Test DRAM parity errors          |
| 9. SCSI 53C90A Controller Test  | Test 53C90A SCSI controller      |
| A. System Interrupt Test        | Test the Interrupt Vectors       |
| B. 82C452 Chip Test             | Printer Test                     |

### 4.0 LOAD PROCEDURES

Upon power on the program is automatically running.

### 5.0 OPERATING INSTRUCTIONS

There is two types of diagnostic employed by the 22C11-SCSI PROM: Normal power-up mode and Burn-in mode.

When power is applied to the unit, Normal power-up mode will be entered.

#### 5.1 Normal power-up

After power-up the LED located on the 22C11-SCSI daughter board, will be turn on. Until had finished diagnostic test program. LED will be turned off.

PCA 210-9579 test fail, the LED is keep ON.

#### 5.2 Burn-in mode

In order to perform the Run-in test, the 22C11-SCSI daughter board of DIP switch (SW1), must set OFF ('00').

Printer test will be performed in the Run-in mode.

Upon completion of diagnostic test pass, the LED will be turned off and turned on again as the next times diagnostic test begins.

## 6.0 MISCELLANEOUS

### 6.1 Switch Setting

The SWITCH on the 22C11-HS mother board (210-9579-1A) is setting ID control card. If DIP switch setting is as follows:

| SW bit No. | 1   | 2   | 3  | 4  |                         |
|------------|-----|-----|----|----|-------------------------|
|            | OFF | ON  | ON | ON | -- 1st 22C11-SCSI board |
|            | ON  | OFF | ON | ON | -- 2nd 22C11-SCSI board |
|            | OFF | OFF | ON | ON | -- 3rd 22C11-SCSI board |

The SWITCH on the 22C11-SCSI daughter board (210-9582) L:SW1 is printer MUX and DISK switch.

SW bit No. 1 - 3  
select SCSI ID.

SW bit No. 4  
select MUX / DISK.

SW bit No. 5 - 7  
select printer ID.

If this switch set all of bits 'OFF' that is Diagnostics " RUN-IN " mode.

7.0 PROGRAM REVISION HISTORY

5180 Initial Release

APPENDIX A  
TEST DISCRIPTION AND ERROR TABLE

## A.1 TEST DESCRIPTION

### [ TEST-1 ] 80286 CPU Test

Purpose: Verify flags reg ,conditional jmp and read/write  
general and segment register.

### [ TEST-2 ] First 4K Semaphore Area Test

Purpose: First 4K bytes test for system semaphore area.

```
BEGIN
 FOR J=3 (three patterns: 55AA,AA55,0000)
 WRITE memory flood 2K words
 READ verify content data
 NEXT J (next pattern)
END.
```

[ TEST-3 ] SRAM Data Bus Test

Purpose: Data bus short or open test

```
BEGIN
 FOR DX:= Memory size seg.
 FOR I:= 2 (two pattern: 0000-8000, FFFF-7FFF)
 FOR SI:=0001
 FOR CX:=16 times
 BX: current test pattern, AX: next pattern
 XCHG DS:SI, test pattern
 NEXT CX (next pattern)
 NEXT SI (next address)
 NEXT I
 NEXT DX (next 64K bank)
 END.
```

[ TEST-4 ] SRAM Address Line Test

Purpose: Check SRAM address bus

```
BEGIN
 FOR I=4k bank
 Flood background data '55' to bank
 write a data 'C3' at address (0100:003C)
 FOR J=11 (100:0001, 100:0002, 0004, 0008 ..
 4000, 8000)
 read/verify content of current address
 if not equal 55H then occur error
 NEXT J (next addrs.)
 NEXT I (next bank)
END
```

[ TEST-5 ] SRAM Write/Read TEST

Purpose: SRAM write and read diverse pattern test.

```
BEGIN
 FOR I (4K bytes bank)
 FOR J=3 (three patterns : AA55,55AA,0000)
 WRITE memory flood 2K words
 READ verify content data
 NEXT J (next pattern)
 NEXT I (next bank)
END.
```

[ TEST-6 ] Parity Test

Purpose: Generate a parity error to test the parity Checking circuit.

Test Procedure:

1. enable parity error check.
2. Write through P-channel with even parity.
3. Read from A-channel with odd parity.
4. Check if Int 30 occurred.

[ TEST-7 ] HMAC 52C61 P-channel Test

Purpose: Test DRAM through P-channel.

Begin

```
FOR DI = 0 TO 1 two banks
 FOR SI = 1 TO 26 (64K*16= 1M)
 FOR J = 256 TO 1 loop 64K
 FOR I = 256 TO 1 bytes
 Write FF, FE, ..., 01, 00
 NEXT I
 NEXT J

 FOR K = 256 TO 1 loop
 FOR L = 256 TO 1 bytes
 Read FF, FE, ..., 01, 00
 NEXT L
 NEXT K
 NEXT SI
NEXT DI
```

[ TEST-8 ] HMAC 52C61 A-channel Test

Purpose: Test DRAM through A-channel.

```
Begin
 FOR BP = 0 TO 1 two banks
 FOR DI = 0 TO 1 two 512K blocks
 FOR SI = 1 TO 256 (64K*16= 1M)
 FOR J = 256 TO 1 loop 64K
 FOR I = 256 TO 1 bytes
 Write FF, FE, ..., 01, 00
 NEXT I
 NEXT J
 NEXT SI
 NEXT DI
 NEXT BP
```

[ TEST-9 ] 53C90A SCSI Chip Test

Purpose: Test the configuration register and FIFO registers.

[ TEST-A ] Printer Test

Purpose: This test is performed under Run-in mode.



## A.2 ERROR TABLE

When LED is always ON, can not be turn off, that is hanged.  
Using ICE ( In Circuit Emulator ) to find which test is failure.

The register BP will save error code, it aids manufacturing field to isolate fault information.

Besides, CS386 TUBRO CPU board can diplay ERROR CODE on the terminal.

[ Error code 01 ]

Definition: CPU 80286 contional jmp, general register  
and segment error.

[ Error code 02 ]

Definition: First 4K byte test error result from memory  
fail.

[ Error code 03 ]

Definition: SRAM data bus error, cause memory data bus error.

[ Error code 04 ]

Definition: SRAM Invalid Memory Address line, cause memory  
addressing error.

[ Error code 05 ]

Definition: SRAM memory cell defect cause write/read error.

[ Error code 06 ]

Definition: SCSI DRAM cache buffer parity error.

[ Error code 07 ]

Definition: SCSI DRAM cache buffer R/W error through P-Channel.

[ Error code 08 ]

Definition: SCSI DRAM cache buffer R/W error through A-channel.

[ Error code 09 ]

Definition: SCSI controller chip error.

**APPENDIX B**  
**PROGRAM LISTING**

Fax to Wang Labs  
Attn Micheal Riley

From Teac America Inc.  
Frank Luna - Tech Support Eng.

Mode Select command for the following TRACK Format.  
Normal density - 256/sector, 16 sectors/track, 40tk/side  
250 kbytes/sec - transfer rate

Mode Select Command, hex data  
15, 00, 00, 00, 2C, 00      6 byte command  
00, 27, 00, 08      4 byte header  
00, 00, 00, 00, 00, 00, 01, 00      8 byte block descriptor  
  
05, 1E, 00, FA, 02, 10, 00, 10      32 byte page code 5  
00, 28, 00, 00, 00, 00, 00, 3C  
00, 00, 96, 05, 46, 60, 02, 00  
00, 00, 25, 00, 00, 00, 00, 00

Mode Select Command for the following TRACK Format.  
Hi density - 256/sector, 32 sectors/track, 80 tks/side  
500 kbytes/sec - transfer rate.

Mode Select Command, hex data  
15, 00, 00, 00, 2C, 00      6 byte command  
00, 1B, 00, 00      4 byte header  
00, 00, 00, 00, 00, 00, 01, 00      8 byter block descriptor  
  
05, 1E, 01, F4, 02, 20, 01, 00      32 byte page code 5  
00, 50, 00, 00, 00, 00, 00, 1E  
00, 00, 96, 05, 46, 60, 01, 00  
00, 00, 2D, 00, 00, 00, 00, 00

ATTN:

Duncan Chou.

011 886 27150348

### 3.12 DRIVE TABLE MODULE

- a. Data Structure Description - There are 6 drive tables: one each for the 360Kb floppy drive, the 10MB removable Winchester, the 10Mb Winchester, the 20Mb Winchester, the 32Mb Winchester, and the 64Mb Winchester. These tables are used to hold the information that physically describes the drives and is used to control their operations.
- b. Data Structure Format - Each table is eight bytes long and holds the following information as shown below: the number of heads per platter, the number of cylinders per platter, the number of the cylinder at which to enable Reduced-Write-Current, the high byte of the number of sectors per platter, and the number of platters per drive. The drive table contents are given in Appendix F, Drive Tables.

|               | BYTE | USE                                             |
|---------------|------|-------------------------------------------------|
| heads/platter | 0    | # of heads/platter                              |
| cyls/platter  | 1    | low byte of # of cylinders/platter - 1          |
|               | 2    | high byte of # of cylinders/platter - 1         |
| RWC CYL       | 3    | RWC cylinder address/4                          |
| SECTDP/PLAT   | 4    | # of sectors/platter, high byte                 |
| PLATDRIVE     | 5    | # of logical platters/drive                     |
| ALTDRIVE      | 6    | # of cylinders reserved for alternate sectoring |

TABLE 3.6  
DRIVE TABLE FORMAT

- c. Associated Data Structures - DrvTabls points to the location of the drive tables in PROM.
- d. Access Routines - None.

# APPENDIX F DRIVE TABLES

## F.1 FlopTab - 360Kb 5 1/4" dual sided floppy drive

|    |    |                                            |
|----|----|--------------------------------------------|
| DB | 2  | # of heads per platter                     |
| DW | 40 | # of cylinders per platter                 |
| DB | 32 | Cylinder number of Reduced-Write-Current/4 |
| DB | 05 | # of sectors per platter                   |
| DB | 01 | # of platters per drive                    |
| DB | 00 | # of cylinders for alternate sectoring     |

## F.2 RWinch10 - 10Mb removable cartridge Winchester Drive

|    |         |                                            |
|----|---------|--------------------------------------------|
| DB | 2       | # of heads per platter                     |
| DW | 610 - 1 | # of cylinders per platter                 |
| DB | 32      | Cylinder number of Reduced-Write-Current/4 |
| DB | 152     | # of sectors per platter                   |
| DB | 01      | # of platters per drive                    |
| DB | 02      | # of cylinders for alternate sectoring     |

## F.3 FWinch10 - 10Mb Winchester Drive

|    |         |                                            |
|----|---------|--------------------------------------------|
| DB | 4       | # of heads per platter                     |
| DW | 306 - 1 | # of cylinders per platter                 |
| DB | 32      | Cylinder number of Reduced-Write-Current/4 |
| DB | 152     | # of sectors per platter                   |
| DB | 01      | # of platters per drive                    |
| DB | 02      | # of cylinders for alternate sectoring     |

## F.4 FWinch20 - 20Mb Winchester Drive

|    |         |                                            |
|----|---------|--------------------------------------------|
| DB | 2       | # of heads per platter                     |
| DW | 612 - 1 | # of cylinders per platter                 |
| DB | 32      | Cylinder number of Reduced-Write-Current/4 |
| DB | 152     | # of sectors per platter                   |
| DB | 02      | # of platters per drive                    |
| DB | 02      | # of cylinders for alternate sectoring     |

## F.5 FWinch32 - 32Mb Winchester Drive

|    |         |                                            |
|----|---------|--------------------------------------------|
| DB | 4       | # of heads per platter                     |
| DW | 512 - 1 | # of cylinders per platter                 |
| DB | 32      | Cylinder number of Reduced-Write-Current/4 |
| DB | 254     | # of sectors per platter                   |
| DB | 02      | # of platters per drive                    |
| DB | 04      | # of cylinders for alternate sectoring     |

## F.6 FWinch64 - 64Mb Winchester Drive

|    |          |                                            |
|----|----------|--------------------------------------------|
| DB | 2        | # of heads per platter                     |
| DW | 1024 - 1 | # of cylinders per platter                 |
| DB | 32       | Cylinder number of Reduced-Write-Current/4 |
| DB | 254      | # of sectors per platter                   |
| DB | 04       | # of platters per drive                    |
| DB | 08       | # of cylinders for alternate sectoring     |

TEAC America Inc., 7733 Telegraph Rd., Montebello, CA 90640  
Phone: (213)726-0303 ext 789 Fax: (213)727-7674

\*\*\*\*\*

FACSIMILE COVER PAGE

DATE : 5-15-92.

FAX TO: Wang Labs.

ATTN : Michael Riley

FAX # : (508) 969-2125

# OF PAGES: \_\_\_\_\_

MESSAGE: Mode select Command info.  
for the FD 55 GS-751.

Duncan: TEAC states that our Floppy can  
do 256 BYTE sectors.  
Command Mode G, Sectors: 26, Gap 2: 22  
Gap 3 = 54, Log. Block Size = 4159

From the desk of

Frank Luna

TO: DUNCAN CHOU  
FROM: Michael Riley  
Date: 5/15/92.

## 5.7.9 MODE SELECT (MSL): 15H

| BYTE | bit 7                 | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit 1 | bit 0 |
|------|-----------------------|-------|-------|-------|-------|-------|-------|-------|
| 0    | 0                     | 0     | 0     | 1     | 0     | 1     | 0     | 1     |
| 1    | Logical Unit Number   |       |       | PF    | 0     | 0     | 0     | 0     |
| 2    | 0                     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 3    | 0                     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 4    | Parameter List Length |       |       |       |       |       |       |       |
| 5    | 0                     | 0     | 0     | 0     | 0     | 0     | Flag  | Link  |

Command Disconnect: No

## (1) Function

(a) This command is to transfer action parameters to the FC-1.

| Name               | Description                      | Number of bytes |
|--------------------|----------------------------------|-----------------|
| Header             | Medium type                      | 4               |
| Block Descriptor   | Related Blocks in medium         | 8               |
| Page 0 Descriptor  | Related Unit Attention           | 4               |
| Page 1 Descriptor  | Related Error Recovery           | 8               |
| Page 5 Descriptor  | Related FDD                      | 32              |
| Page 20 Descriptor | Related Serial Number            | 12              |
| Page 22 Descriptor | Related the Controller Parameter | 16              |

(b) The number of bytes of the parameter to be transferred is set to the Parameter List Length. When it is 0, the command is normally terminated with no processing.

## (c) PF (Page Format)

PF = 1: Shows the parameter determined by CCS.

PF = 0: Shows the parameter is vendor unique.

PF is as above, but the FC-1 doesn't accept the vendor unique parameter (PF = 0). But if PF is accidentally set to 0, there is no trouble because the FC-1 doesn't check if to PF = 1 or PF = 0.

## (d) Mode Select Parameter List

The details of the MODE SELECT PARAMETER LIST are shown in Tables 5-5.

~ 5-8.

The MODE SELECT PARAMETER LIST can assume any one of the following formats: HEADER, HEADER + BLOCK DESCRIPTOR, HEADER + more than one PAGE PARAMETER, HEADER + BLOCK DESCRIPTOR + more than one PAGE PARAMETER.

- (e) When only Header (other than Medium Type 00), or Header and Block Descriptor (follows Parameter List Length) are specified, the Page 5 parameter is set to the default value.

(2) CHECK CONDITION

CHECK CONDITIONS (SENSE KEY) that may occur for this command are given as below.

- (a) HARDWARE ERROR
- (b) ILLEGAL REQUEST
- (c) UNIT ATTENTION

(3) Notes

- (a) This command should be given when loading a medium to specify its action mode.
- (b) This command can be executed when the drive is not yet ready.



## Header

| BYTE | bit 7                                | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit 1 | bit 0 |
|------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| 0    | Reserved (00H)                       |       |       |       |       |       |       |       |
|      | 0                                    | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 1    | Medium Type                          |       |       |       |       |       |       |       |
|      | x                                    | x     | x     | x     | x     | x     | x     | x     |
| 2    | Reserved (00H)                       |       |       |       |       |       |       |       |
|      | 0                                    | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 3    | Block Descriptor Length (00H or 08H) |       |       |       |       |       |       |       |
|      | x                                    | x     | x     | x     | x     | x     | x     | x     |

## Block Descriptor

| BYTE | bit 7                    | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit 1 | bit 0 |
|------|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| 0    | Density Code (00H)       |       |       |       |       |       |       |       |
|      | 0                        | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 1    | Number of Blocks (00H)   |       |       |       |       |       |       |       |
|      | x                        | x     | x     | x     | x     | x     | x     | x     |
| 2    | Number of Blocks (00H)   |       |       |       |       |       |       |       |
|      | x                        | x     | x     | x     | x     | x     | x     | x     |
| 3    | Number of Blocks (00H)   |       |       |       |       |       |       |       |
|      | x                        | x     | x     | x     | x     | x     | x     | x     |
| 4    | Reserved (00H)           |       |       |       |       |       |       |       |
|      | 0                        | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 5    | Block Length (MSB) (00H) |       |       |       |       |       |       |       |
|      | 0                        | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 6    | Block Length             |       |       |       |       |       |       |       |
|      | x                        | x     | x     | x     | x     | x     | x     | x     |
| 7    | Block Length (LSB)       |       |       |       |       |       |       |       |
|      | x                        | x     | x     | x     | x     | x     | x     | x     |

(Table 5-5) HEADER or BLOCK DESCRIPTOR

| MEDIUM TYPE       | 05H          | 06H | 0AH *1 | 0DH *1  | 12H *1     |
|-------------------|--------------|-----|--------|---------|------------|
| PAGE 5            |              |     |        |         |            |
| Transfer Rate     | 500K         | ←   | ←      | ←       | 250K       |
| Sector Size       | 128          | ←   | 512    | 256     | ←          |
| Density           | FM           | ←   | FM/MFM | ←       | ←          |
| # Head            | 1            | 2   | ←      | 1       | 2          |
| Sectors/Track     | 26           | ←   | 15     | 9       | ←          |
| # Cylinders       | 77           | ←   | ←      | 40      | ←          |
| Write Precomp     | no           | ←   | ←      | ←       | ←          |
| Reduced Current   | no           | ←   | ←      | ←       | ←          |
| Step Rate         | 3 ms         | ←   | ←      | ←       | 4 ms       |
| Head Settle Delay | 28 ms        | ←   | ←      | 22 ms   | 28 ms      |
| Motor On Delay    | 0.4 sec      | ←   | ←      | 0.5 sec | ←          |
| Motor Off Delay   | 7 sec        | ←   | ←      | ←       | ←          |
| True Ready        | no           | ←   | ←      | ←       | ←          |
| Starting Sector # | 1            | ←   | ←      | ←       | ←          |
| Motor On          | 1            | ←   | ←      | ←       | ←          |
| Steps/Cylinder    | 1            | ←   | ←      | ←       | ←          |
| Precomp Level     | 2 (125 ns)   | ←   | ←      | ←       | 2 (250 ns) |
| Pin 34            | 2 (Dsk Chng) | ←   | ←      | ←       | ←          |
| Pin 2             | 0            | ←   | ←      | ←       | ←          |
| Pin 4             | 0            | ←   | ←      | ←       | ←          |
| Pin 1             | 0            | ←   | ←      | ←       | ←          |

| MEDIUM TYPE       | 16H          | 1AH | 1BH          | 1EH     | 20H        |
|-------------------|--------------|-----|--------------|---------|------------|
| PAGE 5            |              |     |              |         |            |
| Transfer Rate     | 250K         | ←   | 500K         | ←       | ←          |
| Sector Size       | 256          | 512 | ←            | ←       | ←          |
| Density           | MFM          | ←   | ←            | ←       | ←          |
| # Head            | 2            | ←   | ←            | ←       | ←          |
| Sectors/Track     | 8            | ←   | 15           | 9       | 15         |
| # Cylinders       | 80           | ←   | ←            | ←       | ←          |
| Write Precomp     | no           | ←   | yes          | no      | yes        |
| Reduced Current   | no           | ←   | ←            | ←       | ←          |
| Step Rate         | 4 ms         | ←   | 3 ms         | ←       | ←          |
| Head Settle Delay | 28 ms        | ←   | 22 ms        | ←       | ←          |
| Motor On Delay    | 0.4 sec      | ←   | 0.5 sec      | 0.4 sec | ←          |
| Motor Off Delay   | 7 sec        | ←   | ←            | ←       | ←          |
| True Ready        | no           | ←   | ←            | ←       | ←          |
| Starting Sector # | 1            | ←   | ←            | ←       | ←          |
| Motor On          | 1            | ←   | ←            | ←       | ←          |
| Steps/Cylinder    | 1            | ←   | ←            | ←       | ←          |
| Precomp Level     | 0            | ←   | 2 (125 ns)   | 0       | 2 (125 ns) |
| Pin 34            | 2 (Dsk Chng) | ←   | ←            | ←       | ←          |
| Pin 2             | 0            | ←   | D (High Den) | 0       | ←          |
| Pin 4             | 0            | ←   | ←            | ←       | ←          |
| Pin 1             | 0            | ←   | ←            | ←       | ←          |

| MEDIUM TYPE       | 21H *1       | 22H *1 | 23H | 24H   | 26H   |
|-------------------|--------------|--------|-----|-------|-------|
| PAGE 5            |              |        |     |       |       |
| Transfer Rate     | 500K         | 250K   | ←   | 500K  | 250K  |
| Sector Size       | 256          | ←      | 512 | ←     | ←     |
| Density           | FM/MFM       | ←      | MFM | ←     | ←     |
| # Head            | 1            | 2      | ←   | ←     | ←     |
| Sectors/Track     | 9            | ←      | ←   | 18    | 10    |
| # Cylinders       | 40           | ←      | 80  | ←     | ←     |
| Write Precomp     | no           | ←      | ←   | ←     | ←     |
| Reduced Current   | no           | ←      | ←   | ←     | ←     |
| Step Rate         | 3 ms         | 4 ms   | ←   | 3 ms  | 4 ms  |
| Head Settle Delay | 28 ms        | ←      | ←   | 22 ms | 28 ms |
| Motor On Delay    | 0.4 sec      | ←      | ←   | ←     | ←     |
| Motor Off Delay   | 7 sec        | ←      | ←   | ←     | ←     |
| True Ready        | no           | ←      | ←   | ←     | ←     |
| Starting Sector # | 1            | ←      | ←   | ←     | ←     |
| Motor On          | 1            | ←      | ←   | ←     | ←     |
| Steps/Cylinder    | 2            | ←      | 1   | ←     | ←     |
| Precomp Level     | 0            | ←      | ←   | ←     | ←     |
| Pin 34            | 2 (Dsk Chng) | ←      | ←   | ←     | ←     |
| Pin 2             | 0            | ←      | ←   | ←     | ←     |
| Pin 4             | 0            | ←      | ←   | ←     | ←     |
| Pin 1             | 0            | ←      | ←   | ←     | ←     |

| MEDIUM TYPE       | 27H          | 28H     | 29H   | 8CH   |
|-------------------|--------------|---------|-------|-------|
| PAGE 5            |              |         |       |       |
| Transfer Rate     | 250K         | 500K    | 250K  | 1M    |
| Sector Size       | 512          | ←       | ←     | 256   |
| Density           | MFM          | ←       | ←     | ←     |
| # Head            | 2            | ←       | ←     | ←     |
| Sectors/Track     | 9            | 18      | 10    | 61    |
| # Cylinders       | 40           | 80      | ←     | ←     |
| Write Precomp     | no           | ←       | ←     | ←     |
| Reduced Current   | no           | ←       | ←     | ←     |
| Step Rate         | 4 ms         | 3 ms    | 4 ms  | 3 ms  |
| Head Settle Delay | 28 ms        | 22 ms   | 28 ms | 20 ms |
| Motor On Delay    | 0.4 sec      | 0.5 sec | ←     | ←     |
| Motor Off Delay   | 7 sec        | ←       | ←     | 5 sec |
| True Ready        | no           | ←       | ←     | ←     |
| Starting Sector # | 1            | ←       | ←     | ←     |
| Motor On          | 1            | ←       | ←     | ←     |
| Steps/Cylinder    | 2            | 1       | ←     | ←     |
| Precomp Level     | 0            | ←       | ←     | ←     |
| Pin 34            | 2 (Dsk Chng) | ←       | ←     | ←     |
| Pin 2             | 0            | D       | 5     | D     |
| Pin 4             | 0            | ←       | ←     | ←     |
| Pin 1             | 0            | ←       | ←     | ←     |

| BYTE | bit 7                                         | bit 6   | bit 5          | bit 4    | bit 3                    | bit 2 | bit 1 | bit 0 |
|------|-----------------------------------------------|---------|----------------|----------|--------------------------|-------|-------|-------|
| 0    | R                                             | R       | Page Code = 5H |          |                          |       |       | (05H) |
|      | 0                                             | 0       | 0              | 0        | 0                        | 1     | 0     | 1     |
| 1    | Page Length                                   |         |                |          |                          |       |       | (1EH) |
|      | 0                                             | 0       | 0              | 1        | 1                        | 1     | 1     | 0     |
| 2    | Transfer Rate (MSB)                           |         |                |          |                          |       |       |       |
| 3    | Transfer Rate (LSB)                           |         |                |          |                          |       |       |       |
| 4    | Number of Heads                               |         |                |          |                          |       |       |       |
| 5    | Sectors per Track                             |         |                |          |                          |       |       |       |
| 6    | Data Bytes per Physical Sector (MSB)          |         |                |          |                          |       |       |       |
| 7    | Data Bytes per Physical Sector (LSB)          |         |                |          |                          |       |       |       |
| 8    | Number of Cylinders (MSB)                     |         |                |          |                          |       |       |       |
| 9    | Number of Cylinders (LSB)                     |         |                |          |                          |       |       |       |
| 10   | Starting Cylinder-Write Precompensation (MSB) |         |                |          |                          |       |       |       |
| 11   | Starting Cylinder-Write Precompensation (LSB) |         |                |          |                          |       |       |       |
| 12   | Starting Cylinder-Reduced Write Current (MSB) |         |                |          |                          |       |       |       |
| 13   | Starting Cylinder-Reduced Write Current (LSB) |         |                |          |                          |       |       |       |
| 14   | Drive Step Rate (MSB)                         |         |                |          |                          |       |       |       |
| 15   | Drive Step Rate (LSB)                         |         |                |          |                          |       |       |       |
| 16   | Drive Step Pulse Width                        |         |                |          |                          |       |       | (00H) |
| 17   | Head Settle Delay (MSB)                       |         |                |          |                          |       |       |       |
| 18   | Head Settle Delay (LSB)                       |         |                |          |                          |       |       |       |
| 19   | Motor On Delay                                |         |                |          |                          |       |       |       |
| 20   | Motor Off Delay                               |         |                |          |                          |       |       |       |
| 21   | TSBY (0)                                      | SEN (1) | MO (1)         | Reserved |                          |       |       |       |
| 22   | Reserved                                      |         |                |          | Step Pulses per Cylinder |       |       |       |
| 23   | Write Precompensation Level                   |         |                |          |                          |       |       |       |
| 24   | Head Load Delay                               |         |                |          |                          |       |       |       |
| 25   | Head Unload Delay                             |         |                |          |                          |       |       |       |
| 26   | PIN 34 Definition                             |         |                |          | PIN 2 Definition         |       |       |       |
| 27   | PIN 4 Definition                              |         |                |          | PIN 1 Definition         |       |       |       |
| 28   | Reserved                                      |         |                |          |                          |       |       | (00H) |
| 29   | Reserved                                      |         |                |          |                          |       |       | (00H) |
| 30   | Reserved                                      |         |                |          |                          |       |       | (00H) |
| 31   | Reserved                                      |         |                |          |                          |       |       | (00H) |

R: Reserved

(Table 5-8) Page Descriptor

(Page code 5: FLEXIBLE DISK DRIVE GEOMETRY PARAMETERS)

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you want*

Wang Laboratories, Inc.  
Corporate BMS Workbench  
5 Levels BOM Report  
Requestor: AXT

Date: Tuesday June 23, 1992  
Time: 11:02 AM  
Page: 1

Proj Ctl#:

| Assy#: 2109582                        |                | Desc1: SCSI 2 SLAVE BD |              | Stat: 0 Rev: AG |             | Last Modified: 06/23/1992 |            | By: ART     |            | Last Auto Update: 00/00/0000 |                | Assy Level: 1 |  |
|---------------------------------------|----------------|------------------------|--------------|-----------------|-------------|---------------------------|------------|-------------|------------|------------------------------|----------------|---------------|--|
| Desc2:                                |                |                        |              |                 |             |                           |            |             |            |                              |                |               |  |
| Component Item/<br>Description        | Item<br>Status | No-Wang<br>Ind         | Qty Per Assy | U M             | Qty<br>Type | Comp<br>Type              | ECO Number | CQVL<br>Ind | Value Type | Ref Desg<br>From             | Ref Desg<br>To |               |  |
| 2099582<br>SCSI 2 SLAVE               | 0              |                        | 1.0000       | EA              | 1           | 5                         | R&D        | N           |            | @00000002                    |                |               |  |
| 3330964<br>RES NET 220/330 OHM TYPE   | 2              |                        | 3.0000       | EA              | 1           | 1                         | R&D        | 0           |            | R6                           | R8             |               |  |
| 3774563<br>SIMM 1MX9 CMOS DRAM LDLS   | 1              |                        | 2.0000       | EA              | 1           | 1                         | R&D        | 0           |            | L18<br>L21                   |                |               |  |
| 3775350<br>PLCC 16C452 DUART & PARAL  | 2              |                        | 1.0000       | EA              | 1           | 1                         | R&D        | 0           |            | L5                           |                |               |  |
| 3775467<br>PLCC 53C90A SCSI CONTR. C  | 1              |                        | 1.0000       | EA              | 1           | 1                         | R&D        | 0           |            | L8                           |                |               |  |
| 3775623<br>PLCC 52C61 MEMORY ARRAY    | 1              |                        | 1.0000       | EA              | 1           | 1                         | R&D        | 0           |            | L7                           |                |               |  |
| 4490247<br>HANDLE, FACEPLATE          | 2              |                        | 2.0000       | EA              | 1           | 1                         | R&D        | 0           |            | M6                           | M7             |               |  |
| 4522872<br>FACEPLATE, MACHINED        | 1              |                        | 1.0000       | EA              | 1           | 1                         | R&D        | 0           |            | M1                           |                |               |  |
| 4613141<br>SCREW CAP HOUSING B6422-2  | 2              |                        | 2.0000       | EA              | 1           | 1                         | R&D        | 0           |            | M2                           | M3             |               |  |
| 4620291<br>STANDOFF, MALE/FEMALE B681 | 2              |                        | 2.0000       | EA              | 1           | 1                         | R&D        | 3           |            | M12                          | M13            |               |  |
| 6154810<br>LABEL, FACE PLATE          | 1              |                        | 1.0000       | EA              | 1           | 1                         | R&D        | 0           |            | M16                          |                |               |  |
| 6502099<br>SCR 4-40 1/4L PAN PHL SST  | 2              |                        | 2.0000       | EA              | 1           | 1                         | R&D        | 0           |            | M14                          | M15            |               |  |
| 6509529<br>SCR CPTV PNL 8-32 7/16DIS  | 2              |                        | 2.0000       | EA              | 1           | 1                         | R&D        | 0           |            | M4                           | M5             |               |  |
| 6510030<br>SCR #4 1/2L SLFTPG TY-B P  | 2              |                        | 4.0000       | EA              | 1           | 1                         | R&D        | 0           |            | M8                           | M11            |               |  |

Wang Laboratories, Inc.  
Corporate BMS Workbench  
5 Levels BOM Report  
Requestor: AXI

Date: Tuesday June 23, 1992  
Time: 11:02 AM  
Page: 2

Proj Ctl#:

| Assy#: 2099582                       |             | Desc1: SCSI 2 SLAVE       |         | Stat: 0                   |     | Rev: AI                   |           | By: ART                   |          | Last Auto Update: 00/00/0000 |                  |            |
|--------------------------------------|-------------|---------------------------|---------|---------------------------|-----|---------------------------|-----------|---------------------------|----------|------------------------------|------------------|------------|
| Desc2:                               |             | Last Modified: 06/23/1992 |         | Last Modified: 06/23/1992 |     | Last Modified: 06/23/1992 |           | Last Modified: 06/23/1992 |          | Last Modified: 06/23/1992    |                  |            |
| Component Item/Description           | Item Status | No-Wang Ind               | Qty     | Per Assy                  | U M | QTY Type                  | Comp Type | ECO Number                | CQVL Ind | Value Type                   | Ref From         | Desg To    |
| 3001833<br>CAP .1 UF 50V +80-20% Z5U | 2           |                           | 24.0000 | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | C19<br>C26       | C24<br>C43 |
| 3002637<br>CAP 1500 PF 100VDC 10% NP | 2           |                           | 8.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | C1               | C8         |
| 3004022<br>CAP 15 UF 20V 10% TANTALU | 2           |                           | 2.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | C17              | C18        |
| 3004066<br>CAP 22 UF 20V 10% TANTALU | 2           |                           | 2.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | C25<br>C44       |            |
| 3211020<br>CLK OSC 24.0 MHZ .01% TTL | 2           |                           | 1.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | Y2               |            |
| 3251516<br>SW DIP SLIDE SPST 8 POS   | 2           |                           | 1.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | SW1              |            |
| 3301034<br>RES 33 OHM 1/4W 5% METAL  | 2           |                           | 1.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | R25              |            |
| 3302011<br>RES 100 OHM 1/4W 5% METAL | 2           |                           | 10.0000 | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | R9<br>R26        | R13<br>R30 |
| 3302040<br>RES 390 OHM 1/4W 5% METAL | 2           |                           | 1.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | R1               |            |
| 3304011<br>RES 10K OHM 1/4W 5% METAL | 2           |                           | 12.0000 | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | R2<br>R14<br>R24 | R5<br>R20  |
| 3330835<br>RES NET 33 OHM TYPE: 16/0 | 2           |                           | 2.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | R21              | R22        |
| 3330891<br>RES NET 10K OHM TYPE: 10/ | 2           |                           | 1.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | R23              |            |
| 3500288<br>CON BRK-WY HDR 25-25P .1C | 2           |                           | 1.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | J5               |            |
| 3501027<br>CON DR8BN RCPT 50P SLDR T | 2           |                           | 1.0000  | EA                        | 1   | 1                         | R&D       |                           | 0        |                              | J4               |            |

Assy#: 2099582      Desc1: SCSI 2 SLAVE      Stat: 0    Rev: AI      Assy Level: 2  
 Desc2:                      Last Modified: 06/23/1992    By: ART      Last Auto Update: 00/00/0000

| Component Item/<br>Description       | Item<br>Status | No-Wang<br>Ind | Qty<br>Per Assy | U M | Qty<br>Type | Comp<br>Type | ECO<br>Number | CQVL<br>Ind | Value<br>Type | Ref<br>From | Desg<br>To |
|--------------------------------------|----------------|----------------|-----------------|-----|-------------|--------------|---------------|-------------|---------------|-------------|------------|
| 3502096<br>CON DRBBN RCPT 36P SLDR T | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | J1          |            |
| 3504506<br>CON SHUNT JUMPER ASSY 2P  | 2              |                | 3.0000          | EA  | 1           | 1            | R&D           | 0           |               | P1          | P3         |
| 3505300<br>CON BRK-WY HDR 2P .1C     | 2              |                | 2.0000          | EA  | 1           | 1            | R&D           | 0           |               | J8          | J9         |
| 3505401<br>CON BRK-WY HDR 30-30P .1C | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | J6          |            |
| 3700075<br>LED RED DIFFUSED RED      | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | LED1        |            |
| 3760611<br>IC 74F244 OCT BFR W/T-S   | 2              |                | 5.0000          | EA  | 1           | 1            | R&D           | 0           |               | L6          | L20        |
| 3760664<br>IC 74F00 QUAD 2-INP NAND  | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | L11         |            |
| 3760666<br>IC 74F04 HEX INV 14 PIN   | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | L23         |            |
| 3760678<br>IC 74F32 QUAD 2-INP OR    | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | L24         |            |
| 3760682<br>IC 74F74 DL D FF POS-EDG- | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | L14         |            |
| 3760710<br>IC 74F245 OCT BI-DIR XCVR | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | L9          |            |
| 3760731<br>IC 74ALS138 DCDR/MUX 3 TO | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | L17         |            |
| 3760897<br>IC 74F259 8BIT ADRSBL LCH | 2              |                | 1.0000          | EA  | 1           | 1            | R&D           | 0           |               | L16         |            |

Proj Ctl#:

Assy#: 2099582 Desc1: SCSI 2 SLAVE Desc2: Stat: 0 Rev: AI Last Modified: 06/23/1992 By: ART Last Auto Update: 00/00/0000 Assy Level: 2

| Component Item/<br>Description       | Item<br>Status | No-Hang<br>Ind | Qty Per Assy | U M | Qty<br>Type | Comp<br>Type | ECO Number | CQVL<br>Ind | Value Type | Ref<br>From | Desg<br>To |
|--------------------------------------|----------------|----------------|--------------|-----|-------------|--------------|------------|-------------|------------|-------------|------------|
| 3761419<br>IC 74F552 OCT RGTRED XCVR | 1              |                | 1.0000       | EA  | 1           | 1            | R&D        | 0<br>3      |            | L22         |            |
| 3769070<br>SKT PLCC 68P .1/.05C SLDR | 2              |                | 2.0000       | EA  | 1           | 1            | R&D        | 0<br>1      |            | L5<br>L8    |            |
| 3769084<br>SKT PLCC 84P .1/.05C SLDR | 2              |                | 1.0000       | EA  | 1           | 1            | R&D        | 0<br>1      |            | L7          |            |
| 3769099<br>SKT SIP 8P .1C SLDR TL    | 2              |                | 3.0000       | EA  | 1           | 1            | R&D        | 0<br>3      |            | R6<br>R8    |            |
| 3769329<br>SKT SIMM 30P .1C SLDR TL  | 2              |                | 2.0000       | EA  | 1           | 1            | R&D        | 0<br>3      |            | L18<br>L21  |            |
| 3777251RA<br>WAIT STATE GENERATOR    | 1              |                | 1.0000       | EA  | 1           | 5            | R&D        | N           |            | L12         |            |
| 3777252RA<br>INTERRUPT CONTROLLER    | 1              |                | 1.0000       | EA  | 1           | 5            | R&D        | N           |            | L15         |            |
| 3802501<br>DIO STKY 20V 1A D0-41     | 2              |                | 1.0000       | EA  | 1           | 1            | R&D        | 0<br>3      |            | D2          |            |
| 5109582<br>SCSI 2 SLAVE BD           | 1              |                | 1.0000       | EA  | 1           | 1            | R&D        | 0<br>3      |            | @0000001    |            |
| 6152318<br>LABEL, BARCODE            | 2              |                | 1.0000       | EA  | 1           | 1            | R&D        | 0<br>3      |            | BC1         |            |



Proj Ctl#:

Assy#: 3777251RA Desc1: WAIT STATE GENERATOR Stat: 1 Rev: AA Assy Level: 3  
Desc2: Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000

| Component Item/<br>Description       | Item<br>Status | No-Wang<br>Ind | Qty<br>Type | Per<br>Type | Assy<br>Type | U<br>Type | M<br>Type | Comp<br>Type | ECO<br>Type | Number<br>Type | CQVL<br>Ind | Value<br>Type | Ref<br>From | Desg<br>To |
|--------------------------------------|----------------|----------------|-------------|-------------|--------------|-----------|-----------|--------------|-------------|----------------|-------------|---------------|-------------|------------|
| 3771186<br>IC GAL 20V8 15NS 24P CMOS | 2              |                | 1.0000      | EA          | 1            | 1         |           |              |             |                | 0           |               |             |            |
|                                      |                |                |             |             |              |           |           |              |             |                | 3           |               |             |            |

Proj Ctl#:

Assy#: 377252RA Desc1: INTERRUPT CONTROLLER Stat: 1 Rev: AA Last Modified: 00/00/0000 By: Last Auto Update: 00/00/0000 Assy Level: 3  
Desc2:

| Component Item/<br>Description | Item<br>Status | No-Wang<br>Ind | Qty<br>Type | Per<br>Type | Assy<br>Type | U<br>Type | M<br>Type | ECO<br>Type | Number | CQVL<br>Ind | Value<br>Type | Ref<br>From | Desg<br>To |
|--------------------------------|----------------|----------------|-------------|-------------|--------------|-----------|-----------|-------------|--------|-------------|---------------|-------------|------------|
|--------------------------------|----------------|----------------|-------------|-------------|--------------|-----------|-----------|-------------|--------|-------------|---------------|-------------|------------|

|                                      |   |  |  |        |    |   |   |     |  |   |  |  |  |
|--------------------------------------|---|--|--|--------|----|---|---|-----|--|---|--|--|--|
| 3771186<br>IC GAL 20V8 15NS 24P CMOS | 2 |  |  | 1.0000 | EA | 1 | 1 | N/B |  | 0 |  |  |  |
|--------------------------------------|---|--|--|--------|----|---|---|-----|--|---|--|--|--|

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END OF REPORT

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TECHNICAL SERVICE BULLETIN  
SECTION: SoftWare Technical

NUMBER: SWT 9388 REPLACES: \_\_\_\_\_ DATE: 06/17/94 PAGE 1 OF 1

MATRIX ID. 4302 PRODUCT/RELEASE# CS/Turbo: Basic-2/Turbo O/S 1.30.01

TITLE: New Operating System Release for the CS/Turbo

PURPOSE:

To inform the Field that a new CS/Turbo Operating System, Release 1.30.01, is now available through Software Distribution and Control, and for customers through Wang Telesales, 1-800-TEL-WANG.

EXPLANATION:

Maintenance Release 1.30.01 for the CS/Turbo has been officially released and should be available through SDC as of 6/17/94. This release solves a number of unique problems and should be installed at any site that may be encountering operating system related problems. Since the last general release of the O/S, release 1.1, 23 O/S bug fixes have been made as well as several command enhancements and a number of corrections to the included utilities. Among the more significant changes and enhancements:

- Corrects potential intermittent terminal hangs that may occur in execution of a LINPUT command.
- Corrects an intermittent hang condition which could occur when multiplexing 2 or more CPUs with 2 or more disk units.
- Resolves a problem where multiple commands on the same line in a global partition may not execute if in a higher partition number than the calling partition. (note: related bug w/ INPUT command found if in global partition with lower #. Circumvent by using LINPUT.)
- Supports 3 Byte Addressing and resolves all known and reported problems with 3 Byte Addressing.
- SELECT NEW/OLD has been enhanced. The only way to change the default on a partition is by executing either SELECT NEW or SELECT OLD.
- MOVE command has been enhanced to allow creation of a 3 Byte Address on the fly or conversion back to standard format on the fly.

NOTE: Use of Turbo O/S 1.30.01 requires the latest proms be installed on the Turbo CPU, the MKF Terminal Controller, and the 22C11-HS Printer/Disk Controller. See TSB HWT 9889, Matrix 4103, dated 4/13/94 for details on ordering and additional technical information.

To order this O/S through Software Distribution and Control, send a Wang Office to SDC Customer Service. Include your name, RDB, complete ship to address, media type, and request the Basic-2/Turbo O/S Rel 1.30.01

Order Model #: ~~Basic-2/Turbo-O-9~~ Part #: ~~291-1001-G~~  
CS/TURBO-O/S-H 195-6887WH

For questions concerning this TSB contact: Mike Bahia 508-656-0256

OUP: Continuation Engineering

MAIL STOP: 019-690

C O M P A N Y C O N F I D E N T I A L

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**TECHNICAL SERVICE BULLETIN**  
**SECTION: HardWare Technical**

NUMBER: HWT 9889 REPLACES: \_\_\_\_\_ DATE: 04/13/94 PAGE 1 OF 1

MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO

TITLE: FCOs 1501/1502/1503: New Proms for Turbo Boards Available

**PURPOSE:**

To inform the Field of the availability of 3 new FCOs to update the proms on the Turbo CPU Board and the 2 Turbo controllers, the 2236MXF and the 22C11-HS. These proms are necessary to run Turbo release 1.18 or higher.

**EXPLANATION:**

A new set of Turbo board proms have been released. These proms have been updated to implement improvements in the built-in diagnostics and in combination with Operating Systems 1.18 and above, correct certain O/S related anomalies in prior releases. Although these proms will run with older releases of the O/S, older proms are not compatible with 1.18 and above. The boot will fail with a hang in the process of loading the O/S. All systems currently running with release 1.18 or higher should already have updated proms installed. This can be verified if the following revision or checksum is indicated on the handwritten label:

CPU L64 - 378-9508 R2x checksum 6664 / L50 - 378-9509 R2x checksum 91F8  
MXF L14 - 378-9510 R3x checksum 9B7C / L7 - 378-9511 R3x checksum B7F9  
HS L14 - 378-9512 R1x checksum BC0E / L7 - 378-9513 R1x checksum 9687

As of April 11, 1994 all boards and orders filled by Home Office should also have the new proms. If installing a replacement board with new proms, all proms should be updated to avoid mixing old and new. These FCOs can be ordered through Logistics Order Processing as of April 22, 1994. The kit part numbers are as follows:

FCO 1501 FCO Kit # 728-0443 to update the 210-9576A Turbo CPU Brd  
contains: 378-9508R3 installed at L64 378-9509R3 installed at L50  
FCO 1502 FCO Kit # 728-0444 to update the 212-9717 MXF Controller  
contains: 378-9510R4 installed at L14 378-9511R4 installed at L7  
FCO 1503 FCO Kit # 728-0445 to update the 212-9718 22C11-HS Controller  
contains: 378-9512R2 installed at L14 378-9513R2 installed at L7

Detailed instructions on installing and testing the system after the update are included with the kit and should be read before the site visit. If you have questions concerning this TSB contact:

Mike Bahia (508)656-0256

GROUP: Continuation Engineering MAIL STOP: 019-690

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TECHNICAL SERVICE BULLETIN  
SECTION: SoftWare Technical

NUMBER: SWT 9371 REPLACES: SWT 9351 DATE: 05/18/93 PAGE 1 OF 6

MATRIX ID. 4302 PRODUCT/RELEASE# CS/386 TURBO

TITLE: TURBO Operating System Status Update

PURPOSE:

To provide information on the current status of the operating system and to inform the field of potential problems and how to work around them. To alert the field to a new maintenance release that fixes 2 of these problems, 1.18Q.

EXPLANATION:

Currently all existing Turbo sites should be running with either General Release 1.1 (same as 1.15) or either maintenance release 1.18 or 1.07.

Currently all Turbo systems are shipped with General Release 1.1.

The following is a brief overview of the releases currently being used:

Rel 1.07 - some early sites may be running error free with this release.

If so, you may or may not want to try one of the newer releases. Read through before deciding. The most serious problem with this release involves the possibility of a data integrity error if using the multi-sector write DATASAVE BM command. This command is fairly new having been added in with release 3.0 of the CS Multi-user Operating System. As such, it has not been widely used. It is used with AIMS Software and those customers with AIMS Software should use either General Rel 1.1 or maintenance release 1.18/1.18Q.

Turbo General Release 1.1 - this release corrects the multi-sector write problem found with release 1.07 with the DATASAVE BM command. It also seems to provide improved overall performance over 1.07. However, some users on this O/S have had a problem where intermittently an individual terminal may hang during data entry on a LINPUT or KEYIN command. In worst case under heavy data entry, this may occur 3-4 times a day. If this occurs, the user may be able to HALT/STEP through and CONTINUE or may have to key RESET. This does not affect system operation. This data entry problem is fixed with 1.18/1.18Q.

Rel 1.18 - this release fixes the terminal hang problem during data entry with release 1.1. It also requires a new pair of prompts for the CPU (contains ID #) and each Turbo specific controller present. One drawback for some users has been the I/O balance between disk and terminals when compared to release 1.1. With this release it appears disk I/O has been given greater priority in relation to the MXF brd. This can result in a performance issue at sites with heavy data entry. See bug 13 on page 5 for more information. (See also 1.18Q.)

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 019-690

C O M P A N Y C O N F I D E N T I A L

WANG Laboratories, Inc.

**TECHNICAL SERVICE BULLETIN**  
**SECTION: SoftWare Technical**

NUMBER: SWT 9371      REPLACES: SWT 9351      DATE: 05/18/93      PAGE 2 OF 6

MATRIX ID. 4302      PRODUCT/RELEASE# CS/386 TURBO

TITLE: TURBO Operating System Status Update

Rel 1.18Q - same as 1.18 with 2 additional fixes. See problems 7 & 14.  
Contact Product Support if you would like a copy of this release.

Over the last several months a number of personnel changes in R&D have set back our delivery of bug fixes. However, we do have a man dedicated to this problem and we are committed to resolving the open issues. This has been a difficult situation for many of us and we appreciate the patience and understanding of both the field and our customers.

The following is a list of the open Critical and P1 bugs that have been identified on the Turbo. Included with each problem is a suggested workaround or circumvention that could eliminate or minimize the problem until an actual fix is available. The bugs have been categorized to more quickly identify the area of concern.

**Background Tasks:**

1. PTR M5/17018 - CRITICAL. A program line with a DEFFN' statement may ignore any command following the DEFFN' on the same line if in a background task. Only one reported instance of this at this time.  
Workaround: Should this problem occur, move all commands following the DEFFN' statement in question to a new line.

**High Speed Printer Port:**

2. PTR M2/17591 - CRITICAL. The 256K High Speed printer buffer currently is set with a 1 character overflow. If the data string sent to the printer exceeds the remaining space in the buffer a hang occurs.  
Workaround: This problem is most likely to occur when sending large print jobs to slow printers on the High Speed port. Use faster printers on the High Speed port. Should this problem still occur, use a standard printer controller until the problem is resolved.

3. PTR M2/17591 - CRITICAL. This problem relates back to problem 2. In some instances the system is using the 256K buffer on the High Speed controller to determine Ready instead of the printer. In these cases, as long as the buffer has space remaining, even with no printer connected, data could be sent to the buffer. If the buffer is filled, it can result in the entire system hanging until an attached printer is made Ready.  
Workaround: Make sure any printer used with the High Speed port is turned on and Ready when the system is up. If necessary revert back to a standard printer controller until this issue is resolved.

GROUP: 2200 Basic 2 Platform Group      MAIL STOP: 019-690

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TECHNICAL SERVICE BULLETIN  
SECTION: SoftWare Technical

NUMBER: SWT 9571 REPLACES: SWT 9351 DATE: 05/18/93 PAGE 3 OF 6

MATRIX ID. 4302 PRODUCT/RELEASE# CS/386 TURBO

TITLE: TURBO Operating System Status Update

4. PTR M2/17591 - CRITICAL. A GIO command used to determine if the printer is Ready, if allowed to continuously loop while the printer is Deselected, can eventually cause the system to hang until the printer is Selected.

Workaround: Avoid using routines that constantly monitor the printer port. Make sure any printer used with the High Speed port is turned on and Ready when the system is up. If necessary revert back to a standard printer controller until this issue is resolved.

5. PTR M2/17689 - CRITICAL. A GIO sequence which works with the 386 and on the old bus to determine if the printer is READY or NOT READY if used with the High Speed printer port can cause the disk port on that board to hang or severely slow down. If the printer is NOT READY, NOT READY is printed on the screen but disk performance slows way down. If the printer is READY and the program left running, within a few minutes the printout goes NOT READY or hangs and disk access on that board is hung.

Workaround: To clear the hang without powering off the system:

- a. RESET any workstation accessing that disk.
- b. Key in the following command: \$CLEAR215 then Return.
- c. Power printer off and on.
- d. Send something to the print buffer. Disk should be ok.

Avoid using routines that constantly monitor the printer port. If needed, revert back to a standard printer controller until this issue is resolved.

Muxing Disks:

6. M2/17594 - CRITICAL. Intermittent I90 errors occur if using the 22C11-HS Mux port. The more terminals controllers in the Turbo the more likely the problem.

Workaround - Use the standard 22C80 controller, 210-7715, e-rev 10 in place of the 22C11-HS Mux port.

7. M2/17629 - CRITICAL. If 2 Turbos are mux'd to 2 disk units with at least 2 partitions on each system constantly hogging a disk address in each disk unit, then releasing, intermittent hangs could occur. SELECT H is OFF.

Fixed on rel 1.18Q. Contact Product Support for a copy. See page 6.

GROUP: 2200 Basic 2 Platform Group

MAIL STOP: 019-690

C O M P A N Y C O N F I D E N T I A L

WANG Laboratories, Inc.

TECHNICAL SERVICE BULLETIN  
SECTION: Software Technical

NUMBER: SWT 9371 REPLACES: SWT 9351 DATE: 05/18/93 PAGE 4 OF 6

MATRIX ID. 4302 PRODUCT/RELEASE# CS/386 TURBO

TITLE: TURBO Operating System Status Update

8. M9/5029 - P1. Intermittent hangs may occur with SELECT H ON (platter hog for DS only) in a multiple CPU environment.

Workaround: SELECT H should not be used at this time in a multi-CPU environment. See number 10 also.

Three Byte Addressing:

9. M2/17596 - CRITICAL. The RENAME command may corrupt the disk index if using a 3 byte index (supported only on the DS with the R4 prom).

Workaround: Do not use the RENAME command if using a 3 byte address. Save the program you wanted renamed under a new name by loading into memory and using SAVEDCT. SCRATCH the file under the old name and use the MOVE command to move all files to a clean or spare address. SCRATCHed files are not moved. Use COPY to move the data from the output address used with the MOVE back to the original address.

Disk Related:

10. M2/17451 - P1. If 2 partitions are constantly accessing the same DS using the 22C11-HS, 1 using \$OPEN/\$CLOSE with SELECT H ON and 1 just reading/writing disk, the partition using SELECT H ON may hang until the non-hogging partition finishes. On the old bus access by both partitions was very consistent but the non-hogging partition still received 3 accesses to every 1 for the hogging partition.

Workaround: - Do not use SELECT H ON especially if using the 22C11-HS with disk. See number 8 also.

11. P2/17750 - P1. If an I9x error occurs in accessing a disk address, any access by another partition to that same address may result in a hang until RESET is keyed from the partition that experienced the error. If any other partition is hung trying to access the same address before RESET is keyed on the initial partition, all access to that address will be hung until every partition trying to access that address is RESET.

Workaround: Avoid intentionally causing disk errors. Use the Device Table (LIST DT) to determine the next partition hogging the disk and RESET the partition. Do not allow users to restart until all partitions that were accessing the problem address have been RESET. This can be verified by the absence of a partition number following the master address, 310, 320, or 330, whichever applies, in the MDT field of the Device Table.

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 019-690

C O M P A N Y C O N F I D E N T I A L

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TECHNICAL SERVICE BULLETIN  
SECTION: SoftWare Technical

NUMBER: SWT 9371 REPLACES: SWT 9351 DATE: 05/18/93 PAGE 5 OF 6

MATRIX ID. 4302 PRODUCT/RELEASE# CS/386 TURBO

TITLE: TURBO Operating System Status Update

12. P8/20511 - P1. If a program is renamed and a new program requiring more disk space using the old name is saved all within 1 program, the program executes but an error A01 (not enough memory) occurs when you try to load the program.

Workaround: Use immediate mode for renaming and resaving programs.

Performance:

13. C41/8916 - CRITICAL. With release 1.18, running a heavy disk I/O job while several users are heavily into data entry may cause response time delays for screen updates especially as compared to 1.1. It appears that disk I/O receives a higher I/O priority than the MXF terminal controller with this release. This seems to only be a problem at those sites with heavy data entry.

Workaround: When possible, run heavy disk I/O programs at times when screen I/O and keyboard entry are at lower or more moderate levels. Go back to release 1.1.

Note: See problems 5 and 10 which could also be seen as performance problems.

Specific Command Related:

14. P2/17460 - P1. If a REM% command is followed by a HEX 7D or 7E, other commands on the same line following it will be ignored.

Fixed on rel 1.18Q. Contact Product Support for a copy. See page 6.

MXF:

15. P1. MXF Octopus ports will not give a DTR indication to a modem. Therefore they will not support a remote terminal. Ports 1 and 2 are OK. Workaround: Use MXF ports 1 or 2, or use a MXE or MXD for remotes.

16. P1. If RESET is keyed during a GIO/005 command to an MXF port, intermittently subsequent GIO commands will no longer execute or the port will hang. Must reboot to correct. Problem is more persistent with ports 2-16.

Workaround: If this problem pertains to your system, use an MXE port instead.

GROUP: 2200 Basic 2 Platform Group

MAIL STOP: 019-690

C O M P A N Y C O N F I D E N T I A L

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TECHNICAL SERVICE BULLETIN  
SECTION: SoftWare Technical

NUMBER: SWT 9371 REPLACES: SWT 9351 DATE: 05/18/93 PAGE 6 OF 6

MATRIX ID. 4302 PRODUCT/RELEASE# CS/386 TURBO

TITLE: TURBO Operating System Status Update

ADDITIONAL INFORMATION:

The bugs listed in this TSB are limited to those which possibly could affect system operation, data integrity, or performance. If you have a customer experiencing one of these problems a PTR should be opened for that customer describing the problem and referencing the PTR number that it would appear to relate to. This will help us to prioritize the problem and insure that this customer will get a copy of the fix as soon as it has been tested and verified. For a listing or discription of other bugs that have been identified or for any problems you would like to discuss please call Mike Bahia at the number shown below.

If General Release 1.1 is needed, it can be ordered via Wang Office from:

Software Distribution and Control 508-967-4600

Wang Office ID: SDC Customer Service

Supply them with: Your Name, RDB, Ship to Address, & Part #

734-8446A - Turbo General Rel 1.10.00 (1.2M 5 1/4" disk)

731-8026A/27A/28A - Turbo General Rel 1.10.00 (3 360K disks)

291-1001-A - Turbo Rel 1.10.00 package (includes both above)

(If needed quickly please indicate, otherwise 1-2 week delivery)

For Turbo Operating System 1.18Q or for any problems or questions concerning the Turbo Operating System or any other 2200 or BASIC-2 related problem please contact:

Mike Bahia, 2200 Product Support 508-656-0256

GROUP: 2200 Basic 2 Platform Group

MAIL STOP: 019-690

C O M P A N Y C O N F I D E N T I A L

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**WANG**

TECHNICAL SERVICE BULLETIN  
SECTION: HardWare Technical

NUMBER: HWT 9737 REPLACES: \_\_\_\_\_ DATE: 08/11/92 PAGE 1 OF 1  
MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO  
TITLE: ECO to correct heat related CPU Board Failures

PURPOSE:

To inform the field of a new ECO which addresses a potentially critical heat related problem with the Turbo CPU Board. The problem was described in TSB HWT 9705 from 4/28/92.

EXPLANATION:

Some Turbo CPU Boards, 210-9576A, have failed intermittently due to marginal changes in timing as the board warms up under normal operating conditions. These timing changes are normal but obviously should not cause a problem. The typical symptoms seen would either be a syntax error (P56, S19, etc.) or a system hang. These failures can be very intermittent and are more likely to occur when the CPU has been on for an extended period or in a warm environment.

If this problem exists it can readily be reproduced by running the on-line CPU Instruction Exerciser Test from the CPU/Memory Test Diagnostic, part # 732-8521 included with the 2200 Diagnostic Package. Run this test from multiple terminals for 30 to 60 minutes with only the fan over the CPU board unplugged or stopped. Most bad boards have failed within 15 minutes during 1 of the 'SORT' or '\$PACK/\$UNPACK' tests. Do not leave the fan off for more than an hour. It is possible should a failure occur that it may be a bad SIMM. In this case, replace the SIMM and re-test the board.

2200 Diagnostic Package, Rev 2.00 195-2956-0 (includes all diags)

CORRECTIVE ACTION:

ECO 60545 was written to address this issue. It replaces the original 20 nanosecond Cache Memory chips at locations L1,L2,L7,L8,L13,L14,L20, & L21 with faster 15 ns chips. The 15 ns chips can be identified by the -15 on the chip (Toshiba TC5588P-15). The board E-rev changes to 3. These chips are soldered in and cannot be replaced in the field. All boards in stock and all returned for repair will be updated. All boards shipped from Manufacturing after July 13th will have the faster chips. If you need a board, place a P1 order through standard Logistic channels. Verify all new installations and replacement boards have the 15 ns chips. If there are any questions concerning this TSB please contact:

Mike Bahia, 2200 Product Support tel: (508)-656-0256

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 019-690

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TECHNICAL SERVICE BULLETIN  
SECTION: HardWare Technical

WANG

NUMBER: HWT 9728 REPLACES: \_\_\_\_\_ DATE: 07/14/92 PAGE 1 OF 6  
MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO  
TITLE: 22C11-SCSI Announcement: New SCSI Controller

PURPOSE:

To inform the field of the new SCSI Controller for the CS/386 TURBO and provide information on installing and testing.

EXPLANATION:

The 22C11-SCSI Controller (212-9727) is a new intelligent controller for use with the CS/386 Turbo CPU. It provides the Turbo with an industry standard SCSI interface capable of disk I/O performance beyond anything now available to the product line. With it, the faster and larger capacity disk and tape drives available to SCSI can now be used. Taking full advantage of the potential of this controller may require some programming changes. With this controller and the drives tested, multiple sectors can be read as quickly as 1 sector. If only reading 1 sector per access, throughput will be minimized. The number of sectors to read for optimum performance may vary from drive to drive. Changing programs on disk to '386' or 'NEW' format is recommended. A new command operational with the Turbo system is available to greatly simplify this process (\$MOVE!). The SCSI bus can support 8 SCSI devices of which the controller itself will be one. Multiplexing to multiple CPU's is not currently supported. The board also provides a standard 2200 Centronics printer interface, incorporating a 256K cache buffer.

Highlights and Advantages:

- ANSI X3.131-1986 compatible.
- 2 Meg of on-board cache dedicated to the SCSI bus.
- dramatic increase in disk and tape storage capabilities.
- supports up to a total of 7 SCSI devices /controller, 3 SCSI &/or disk controllers per CPU.
- supports up to 29 hard disk addresses, 2 floppy drives, and 1 tape /ctrlr.
- any 1 hard disk can be configured for from 1 to 29 addresses.
- supports 3 byte addressing (allows use of a surface greater than 16 Meg).
- 100% compatible to existing BASIC-2 disk commands.
- uses SCSI drives and cabinets (SSM SCSI Storage Module & MDSC Mini Data Storage Cabinet) that are used with VS.
- choice of SCSI cable connection; J4, Amphenol type or J5, ribbon cable.
- standard 2200 Centronics printer port, J1, with 256K cache buffer.

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MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO  
TITLE: 22C11-SCSI Announcement: New SCSI Controller

## EXPLANATION (cont'd):

### Configuration Requirements:

1. Turbo CPU ~~1.30.01~~ ~~1.30.01~~
2. Turbo General Release ~~1.10.00~~ (beta test) 291-1001XC
3. New Disk/Tape Utilities for SCSI (included w/ future O/S's) DISK UTILITIES 1.1 731-8015D
4. SSM-C SCSI Storage Module or a MDSC Mini Data Storage Cabinet
5. Max SCSI cable length from controller to last device: 18.75 feet
6. See parts list (pg 6) for currently supported SCSI devices.

### Hardware:

The board consists of a 210-9579 High Speed I/O Processor and a 210-9582 SCSI/Printer Controller. The 9579 I/O Processor is the same board used with the Turbo MXF Controller and the 22C11-HS Printer/Disk Controller, but with it's own proms at location L7 and L14. The 9582 board is new. It handles all communication to any attached SCSI device or printer. It has 2 common SCSI connectors, J4 external on the bottom half of the outer rail, and J5 found on the board just behind J4. This provides connections for either a 50 pin shielded amphenol connector via J4, or a 50 pin ribbon cable (not available from Wang) via J5. The board gives compatibility to the same SCSI devices supported on VS systems which use the SSM-C SCSI Storage Module and the MDSC SCSI Mini Data Storage Cabinet. These 2 units will be the offered Wang devices for housing SCSI drives for the Turbo. As each SCSI device is handled by a transparent driver imbedded in microcode, some SCSI devices may not be compatible unless they comply with existing drivers for devices already tested. R&D will add drivers for those SCSI devices which become popular. For currently supported devices see the 'parts list' on page 6. The printer port, J1, supports all existing 2200 printers.

### Switch Settings and Jumpers:

|                                                                       |                            |                    |                        |
|-----------------------------------------------------------------------|----------------------------|--------------------|------------------------|
| 210-9582 SW1 1,2,3 - SCSI ID #: 4 - Cache Enable: 5,6,7,8 - Prtr Addr |                            |                    |                        |
| *** w/ early                                                          | : SCSI ID 7 = 1,2,3 All ON | : Cache On = 4 ON  | : 215 = 5,7 OFF 6,8 ON |
| version proms :                                                       | :                          | :                  | : 216 = 6,7 OFF 5,8 ON |
| :                                                                     | : Jumpers J8 IN, J9 IN     | :                  | : 217 = 5,6,7 OFF 8 ON |
| *** w/ RO &                                                           | : same as above            | : Cache On = 4 OFF | : 215 = same as above  |
| proms dated :                                                         | :                          | :                  | : 216 = 5,8 OFF 6,7 ON |
| 7/6 or higher :                                                       | :                          | :                  | : 217 = 5 OFF 6,7,8 ON |

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 MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO  
 TITLE: 22C11-SCSI Announcement: New SCSI Controller

## EXPLANATION (cont'd):

210-9579 SW1 (Disk Addr)

310 = 1 OFF only

320 = 2 OFF only

330 = 1,2 OFF only

Jumpers

JP1 - IN (clock enable)

Powering the SCSI Unit ON and OFF:

Note: The following information on powering up the system is based on the current beta hardware. For first customer ship, other than powering the SCSI unit first, the boot procedure should be similar to existing systems. The normal procedure for powering up disk units in the past has been to power the disk unit/s up last after the CPU. With the beta hardware, the SCSI unit must be powered on first and all SCSI devices allowed to complete any self-tests that may exist. This normally takes just a few seconds and with many drives completes with a clicking noise and the drive LED going out. Most of the tested devices so far complete within 15 seconds. Multiple drives in a single cabinet may need more time. Once all drives within a unit complete their self-tests, the CPU can be turned on. After powering on the CPU, between 10 and 15 sec with 1 drive, the CPU will go out and talk to the drive/s. Usually the drive LED will blink twice during this period. When booting the CPU, RESET should not be keyed until this communication takes place, otherwise the drive/s may not be properly recognized by the system. If using a SCSI floppy, additional tests are done in the boot process. Allow up to a minute for these tests to complete. With the proper floppy drive, you can boot before configuring the SCSI devices. At the time of this writing, the suggested floppy drive (see 'parts list') would only read a 1.2M 2200 diskette formatted in DOS format. All Turbo O/S disks from Software Distribution are in DOS format. With 2 floppy drives, the drive with the lowest ID # would be the bootable drive (D10, D20, or D30 dependent on controller address). See 'Software Setup' for more information. If the SCSI unit is to be powered off while the system is up and running, all accesses and all drive activity should be allowed to complete to prevent problems. After repowering, the system should recognize any SCSI device operational before the unit was powered down. Any physical changes such as adding a device or changing a device ID # will likely require the system to be rebooted.

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# TECHNICAL SERVICE BULLETIN

## SECTION: HardWare Technical

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NUMBER: HWT 9728 REPLACES: \_\_\_\_\_ DATE: 07/14/92 PAGE 4 OF 6  
 MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO  
 TITLE: 22C11-SCSI Announcement: New SCSI Controller

### EXPLANATION (cont'd):

#### Software Setup:

Use of the 22C11-SCSI Controller requires at minimum Turbo General Release 1.18.00 or higher. Unlike current disk drives now used with the 2200 product line which are pre-configured through switches and prom based code, SCSI disk drives must be configured through software. This is done with a new utility program which will be included with the Turbo Operating System. From the main menu new picks will include 'SCSI Configuration' and updated versions of the 'Tape Backup and Restore' programs which will work with both the DS and SCSI. The 'SCSI Configuration' menu pick steps the user through the processes needed to initially setup the drive for use including a low level SCSI format and configuring the hard disk drive/s for various platter sizes. Some pre-release versions of this software allow either 1 to 15 master addresses (D11-D1F, D21-D2F, or D31-D3F) or 1 to 14 slave addresses (D51-D5E, D61-D6E, or D71-D7E) per disk drive, with a maximum of 29 hard disk addresses per controller. The first master and slave addresses (D10, D20, D30, D50, D60, & D70) are reserved for floppy drives and the last slave address for tape (D5F, D6F, or D7F). ~~Final~~ CURRENT version software will allow from 1 to all 29 addresses to be assigned to 1 drive to take better advantage of systems with one large drive. After configuring the drive/s, all surfaces should be formatted via a normal 2200 format (\$FORMATDISK/Dxx). A 16 Meg surface can be formatted in a matter of seconds dependent on drive speed. This overwrites any code written to disk with the SCSI format which may create confusion for the system. Anytime a drive is to be reconfigured, both a low level SCSI format and a 2200 format should be done to insure all new surfaces are 100% clean. The SCSI format can be done via the utility or with the following command; \$SCSI FORMAT T/Dxx, (ID#). All data is lost. The 'Backup' & 'Restore' to SCSI Tape procedures are quite similar to the DS tape procedures. The main difference is you cannot append to a tape on 'Backup'. This is because the tape drives currently available write in a serial format and do not have the separate directory track used with the DS version tape drives. If using O/S 1.1 (same as 1.15) with a 5 1/4" SCSI floppy, only 1.2M 2200 diskettes formatted in DOS format (512 byte sectors) are compatible. A DOS format can be done on a 1.2M DS floppy by

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### EXPLANATION (cont'd):

using the 'Format Disk Platter' menu pick from the main menu or the DOS utilities. The SCSI floppy drive suggested by Wang normally writes in 1.2M format. These diskettes will be compatible with existing 2200 1.2M drives. Standard 2200 format diskettes (256 byte sectors), both 360K and 1.2M, can be read with the latest software and prompts. All Turbo O/S disks are created in DOS format. Booting can be done from the SCSI floppy before configuring the drives (see 'Powering the SCSI Unit ON and OFF' for more info). All standard BASIC-2 disk commands compatible to the DS with the CS/386 or Turbo are 100% compatible.

### ADDITIONAL INFORMATION:

Diagnostics: Built-in: The 22C11-SCSI has a LED which will light during power up self tests. If the LED stays on, replace the board. See note.

Note: On some pre-release SCSI beta boards the LED is not functioning and is on always. This does not affect normal operation.

Customer Level: Machine level diagnostics built into the Operating System run a cursory test to all the Turbo specific controllers to check status during boot if RESET is not keyed. There are also similar tests that check communication between the controller and the CPU which can be selected by PF' key during boot. Customer Engineering should not depend on these diagnostics solely to identify problems. Problems especially of an intermittent nature will not likely fail with these tests.

CE Level: Magnetic Media (for 5-1/4" DSDD) p/n 732-8520A  
 Included in the current 2200 Diagnostic Pkg Rev 2.00.00 p/n 195-2956-0

Note: These diagnostics were built for other drives and may not fully recognize the SCSI drives. Tests should work as long as the sector limits are correct. Program "MULTIDSK" must be revised to run on the Turbo or the following message will occur, "CPU SOFTWARE MUST BE UPGRADED TO RUN THIS PROGRAM". On the latest version, 69C1, this message is on line 175. On the previous line, 170 in this case, which begins as follows:

170 P\$=\$PSTAT(1):...etc.

append to the end of the line: :IF STR(P\$,9,1)="T" THEN 180

Program FTU must also be revised. With the latest version of FTU, rev 8734, line 120 needs to be changed. Line 120 begins as follows:

120 B\$=\$PSTAT(1):...etc. Delete everything from the first colon to the end.

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## SECTION: HardWare Technical

NUMBER: HWT 9728 REPLACES: \_\_\_\_\_ DATE: 07/14/92 PAGE 6 OF 6MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBOTITLE: 22C11-SCSI Announcement: New SCSI Controller

## ADDITIONAL INFORMATION (cont'd):

Miscellaneous:

The following maintenance manuals will provide additional information on the Turbo and details on setting up the SCSI drives and cabinets:

|            |                                                  |
|------------|--------------------------------------------------|
| 741-1769-A | CS, CS/386, Turbo Maintenance Manual             |
| 741-2009   | 5 1/4" SCSI Devices & Storage Cabinets Maint Mnl |
| 741-1874-A | SCSI SSM-C Maint Mnl (replaced by 741-2009)      |
| 741-1879   | SCSI MDSC Maint Mnl (replaced by 741-2009)       |

Anomalies:

1. A bug exists with the pre-release software which causes an error if using a virgin tape. This can be circumvented by placing a REM command in front of the failing REWIND or RETENSIONING command. **FIXED w/ 0/5 1.18 Q & ABOVE**
2. The system may not recognize a change of floppies and may read cache.
3. With pre-release s/w, error codes for tape are misleading. Axx errors will display if a tape problem exists. If using tape, read the command line should a failure occur to determine if the error occurred on a Tape command. If so, a tape related problem exists. Axx errors normally indicate an operator error or a bad CPU board.

Note: These problems should be resolved by FCS (first customer ship).

Parts list:

| :PART #   | : | DESCRIPTION           | : | FRU: |
|-----------|---|-----------------------|---|------|
| :212-9727 | : | 22C11-SCSI Controller | : | X :  |

Related hardware:

|           |   |                               |                              |
|-----------|---|-------------------------------|------------------------------|
| :725-3822 | : | Mag Periph 94221 150M HH Dsk: | X :                          |
| :725-4895 | : | Micropolis 1684 326M HH Disk: | X :                          |
| :725-3814 | : | Micropolis 1578 326M FH Disk: | X :                          |
| :725-4858 | : | HP Model 97548S 647M FH Disk: | X :                          |
| :725-3820 | : | Archive 2150S 150M HH Tape    | : X :                        |
| :725-5981 | : | Archive 4320NT 1.2G HH Tape   | : not avail at this writing: |
| :421-0066 | : | 50 Pin I/O Cable-SSM & MDSC   | : X :                        |
| :         | : | 50 Pin SCSI Ribbon Cable      | : not available from Wang :  |
| :725-4910 | : | 50 Pin SCSI Terminator w/LED: | X :                          |
| :725-7269 | : | Term (repl'd by 725-4910)     | : X :                        |
| :725-1294 | : | 600' Data Cart Tape/Arch 150: | X :                          |
| :725-9119 | : | 4mm Data Cart Tape/Arch 1.2M: | X :                          |
| :         | : | TEAC FD-55GS 751-U 5 1/4" Dr: | : not available from Wang :  |

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## TECHNICAL SERVICE BULLETIN

### SECTION: Software Technical

NUMBER: SWT 9351 REPLACES: \_\_\_\_\_ DATE: 05/12/92 PAGE 1 OF 2

MATRIX ID. 4302 PRODUCT/RELEASE# CS/386 TURBO

TITLE: TURBO Operating System Status: General Release 1.10.00

#### PURPOSE:

To provide information on the current status of the operating system and General Release 1.10.00 now being shipped with Turbo orders.

#### EXPLANATION:

Currently all existing Turbo sites should be running with either Maintenance Release 1.07 or 1.15. The operating system shipped with orders up until May 1st, General Release 1.0 had several problems, the most notable of which affected DS Tape backup. It should not be used. Up until now we have been tracking all shipments and forwarding either Maintenance Release 1.07 or 1.15 to the technical support people for that site. As the number of orders has increased, it has become difficult to continue doing this. To alleviate the problem, Release 1.15 has been packaged with all new orders as Turbo General Rel 1.10.00. As of May 5, 1992, all Turbo orders will ship with this release.

The following is a brief overview of releases 1.07 and 1.15 (1.10):  
Rel 1.07 - most sites are currently running error free with this release.

There are problems reported against it but most would not affect a standard end-user operation. The most critical issue is the possibility of a data integrity error under certain instances with a multi-sector write DATASAVE BM command. This has not been a problem for most customers. The problem has occurred with AIMS Software and those customers with AIMS Software should use 1.15 (General Rel 1.1).

Rel 1.15 (Turbo General Release 1.1) - this release corrects the multi-sector write problem found with release 1.07 when running AIMS Software. It also seems to provide improved overall performance over 1.07. However, some users on this O/S have had a problem where intermittently an individual terminal may hang on a LINPUT or KEYIN (keyboard entry to screen) command. If this occurs, the user may be able to HALT/STEP through and CONTINUE or may have to key RESET. This does not affect other users. Because of this issue, those customers now running error free on 1.07 have not been updated.

A new bug has just been identified with both these releases involving SELECT H ON (platter hog). When used with the Turbo 22C11-HS Controller, disk access can be erratic and the system may appear to momentarily hang

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NUMBER: SWT 9351 REPLACES: \_\_\_\_\_ DATE: 05/12/92 PAGE 2 OF 2  
MATRIX ID. 4302 PRODUCT/RELEASE# CS/386 TURBO  
TITLE: TURBO Operating System Status: General Release 1.10.00

at times. With an old style disk controller, SELECT H appears to work properly. Until a fix is available, it is suggested SELECT H not be used if using a 22C11-HS Controller for disk access.

CORRECTIVE ACTION:

R&D is working both of these issues. Once a fix can be verified, it will be made available as a general release and announced via a TSB.

It is important to continue to insure all customers are on either Maintenance Release 1.07 or 1.15 (General Release 1.1). If currently running error free on 1.07, it is suggested to remain there until we have a resolution for the terminal hang bug. If for some reason General Release 1.1 is needed, it can be ordered through Wang Office from:

Software Distribution and Control 508-656-4300

Wang Office ID: SDC Customer Service

Supply them with: Your Name, RDB, Ship to Address, & Part #

734-8446A - Turbo General Rel 1.10.00 (1.2M 5 1/4" disk)

731-8026A/27A/28A - Turbo General Rel 1.10.00 (3 360K disks)

291-1001-A - Turbo Rel 1.10.00 package (includes both above)

(If needed quickly please indicate, otherwise 1-2 week delivery)

Any problems found with release 1.1 should be escalated via PTR to RDB 8760 as a customer call. If you have problems or questions concerning the Turbo Operating System or any other 2200 related problem please contact:

Mike Bahia, 2200 Product Support 508-656-0256

ADDITIONAL INFORMATION:

If upgrading the Turbo O/S, all files should be overwritten to insure all are at the latest rev. On Rel 1.0, the following 3 files had problems:

1. DS Utility 'Backup Disk to Tape' program '@DSTAPEB' had a problem with multiple address backups to a 45M Tape Drive. (fixed on 1.07 & higher)

2. Customer level diagnostic file "@DG2" had a display problem and would fail the 'Peripheral Card Interrupt Test' with R2 proms currently used on the CPU board. (fixed on 1.07 and higher)

3. '@GENPART' has been updated to correctly handle print drivers assigned to partitions 17 and higher and to be downward compatible to non-386 systems (MVP, LVP, VLSI, etc.). (fixed on 1.15)

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TECHNICAL SERVICE BULLETIN  
SECTION: HardWare Technical

NUMBER: HWT 9705 REPLACES: \_\_\_\_\_ DATE: 04/28/92 PAGE 1 OF 1  
MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO  
TITLE: Potential CPU Board Failures

PURPOSE:

To inform the field of a potential critical problem with the Turbo CPU Brd.

EXPLANATION:

Recently, a problem with the Turbo CPU Board, 210-9576, has come to light. A higher than normal failure rate has caused us to re-examine CPU boards that have failed in the field. Most of the boards found bad seem to have related problems. On site, the typical symptoms seen would either be a syntax error (P56, S19, etc.) or a system hang. Sometimes these failures seem to occur first with a particular terminal which makes it look like a possible port or memory problem, but with this problem changing ports or replacing or swapping a SIMM module will not correct it. These failures can be very intermittent and are more likely to occur when the CPU has been on for an extended period or in a warm environment. R&D is working this issue and we hope to have a solution shortly.

CORRECTIVE ACTION:

If this problem exists it can readily be reproduced by running the on-line CPU Instruction Exerciser Test from the CPU/Memory Test Diagnostic. Run this test from multiple terminals for 30 to 60 minutes with the fan over the CPU board unplugged or stopped. Most bad boards failed within 15 minutes during 1 of the 'SORT' or '\$PACK/\$UNPACK' tests. Do not leave the fan off for more than an hour. It is possible should a failure occur that it may be a bad SIMM. If that is the case only the bad SIMM should be replaced. If the board is bad please contact Product Support:

Mike Bahia, 2200 Product Support 508-656-0256

Until a fix is found and implemented all replacement CPU boards and all Turbo installations should be tested this way to insure the CPU Board is good. This is also an excellent way to test all other 2200 CPUs, especially if trying to find an intermittent problem. Every CE working on 2200 CPUs should have this diagnostic as well as their own O/S disk. This diagnostic can be ordered from Software Distribution as follows:

2200 Diagnostic Package, Rev 2.00 195-2956-0 (includes all diags)

CPU/Memory Test, Rev 18A4 732-8521 (just CPU diag)

The above part numbers will come on 5 1/4" DSDD floppy disks.

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TECHNICAL SERVICE BULLETIN  
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NUMBER: HWT 9694 REPLACES: \_\_\_\_\_ DATE: <sup>4 7</sup>~~08/26~~/92 PAGE 1 OF 1

MATRIX ID. 4103 PRODUCT/RELEASE# CS-TURBO, MicroVP-TURBO

TITLE: Potential TURBO Motherboard Problem with the CS and MicroVP

PURPOSE:

To inform the field of a potential problem with the 210-9583 Motherboard when upgrading a CS or MicroVP to a Turbo.

EXPLANATION:

Due to variances in manufacturing from one CS to another, there are problems with the screw holes in the motherboard lining up. If the motherboard has to be positioned too far to the left to line up the screws for the I/O section, R7, a 10 pin terminating resistor for the standard I/O bus could short out against the chassis. R7 is found to the right of J21, the bottom CPU board connector. If R7 does short, the standard old controllers will fail to work properly. If only new Turbo controllers are installed, the system may come up but there could be reliability problems. In a unit with both new and old controllers where the new controllers are used to boot the system, the common symptoms are for the system to hang during the loading of the O/S but before @GENPART is loaded.

CORRECTIVE ACTION:

This problem is easily circumvented by covering the bottom 5 pins for R7 on the etch side of the motherboard with a piece of electrical tape. If these pins are sharp it would be wise to snip the exposed ends and/or use a 2nd layer of tape. All 210-9583 Turbo Motherboards installed and to be installed should have this change whether used with the CS or the MicroVP. Even if there are no problems currently, seating or reseating boards could eventually result in slight movement of the motherboard which could lead to intermittent shorting.

The 210-9583 Motherboard is only used with the CS and MicroVP. This is not a problem with the CS-D/N chassis' which uses the 210-9578 Motherboard. The CS chassis can be distinguished from the CS-D/N by the following:

|                  | CS                            | CS-D/N                          |
|------------------|-------------------------------|---------------------------------|
| Power Sw:        | lower right front corner.     | top front.                      |
| Front Panel:     | 1 solid piece, not removable. | panels or openings for drives.  |
| Internal Drives: | not possible.                 | optionally to left of power sw. |
| Card Cage:       | frame separates CPU from I/O. | not separated.                  |

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NUMBER: HWT 9640 REPLACES: \_\_\_\_\_ DATE: <sup>11/5</sup>~~10/15~~/91 PAGE 1 OF 7  
MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP  
TITLE: 2200 Update - CS/386 TURBO Announcement

PURPOSE:

To inform the field of the new CS/386 TURBO CPU card set, and provide information on installing and testing.

EXPLANATION:

The CS/386 Turbo is the latest edition to the 2200 family of processors. It consists of 4 new major components; a motherboard (2 versions), a 386 based 33 Meg Hz CPU Board, and 2 new intelligent controllers; a 16 port MXF Terminal Controller, and a 22C11-HS Printer/Disk Controller. The 2 controllers have 286 processors that allow them to handle communication with the peripherals which in the past was handled by the CPU. This helps I/O performance by allowing the CPU to go on to other tasks until the Controller completes it's job and signals the CPU for attention. The new motherboards contains a 3rd 140 pin connector used by the CPU for all communication to the new controllers. This new communication path utilizes a 32 bit data bus as opposed to the 8 bit bus used with the older controllers. The Hi-Speed Printer/Disk Board includes a disk MUX port, J3, functionally equal to the 22C80 (210-7715), which can be used instead of the standard disk port. See page 7 for part #'s and board information.

This hardware along with the new Turbo O/S required provides the following enhancements over existing 2200s:

- partitions supported increased from 16 to 64.
- terminals supported up from 16 to 64. 32 is the current recommended max.
- up to 32 Meg memory. 4 memory sizes available, 4, 8, 16, and 32.
- extended RAM Disk capabilities, all non-partitioned memory, address 340.
- CPU processing time twice as fast as the CS/386, up to 6 times faster than the VLSI and MVP/LVP CPUs.
- new \$MOVE! command simplifies converting programs to 'NEW' format.
- Disk I/O performance up to 25% faster dependent on the number of users.
- supports 3 byte addressing. Will require new prom in DS or new SCSI brd.

HARDWARE COMPATIBILITY

The Turbo Card Set can be installed in any CPU chassis built for a single board VLSI or 386 CPU. This would include the MicroVP, CS, CS-D, and

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MATRIX ID. 4103

PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

TITLE: 2200 Update - CS/386 TURBO Announcement

### EXPLANATION (cont'd):

CS-N. All I/O Controllers and all peripherals currently supported by these CPUs are expected to be supported by the Turbo. Some of the older disk drives such as the 2270A still need to be fully evaluated. The Turbo has the same I/O board restrictions found with current 2200 CPU's. There is still a legal limit of 4 terminal controllers total, 3 disk controllers (310, 320, and 330), and 3 printer controllers (215, 216, and 217). Terminal controllers can be of different types, MXFs, MXEs, MXDs, etc, but the MXFs should be addressed first. The new motherboards will support the VLSI & 386 CPU boards but these CPUs will not support the new controllers.

#### SOFTWARE COMPATIBILITY

'386' CPUs: The Turbo Operating System is based on the latest CS/386 O/S and has the look & feel of it's 2200 predecessors. As such, most programs now running on a 2200 '386' CPU should run without change. The exception would be programs that reference a status byte in the O/S or the CPU ID number. There could also be a problem with non-standard GIO commands. See item 12 on page 5 for more information. Although no additional memory is needed for programs when upgrading from a '386', there is additional overhead used by the operating system. With programs that come close to using the entire partition, a small amount of additional memory may be necessary. As with the '386', it is critical to have programs on disk in 'NEW' or '386' format for maximum disk I/O performance. See item 14, pg 5.

VLSI & older CPUs: Most software running on non-386 2200 CPUs will run on the Turbo, but there may be some changes needed to insure proper operation and maximum performance. Most of these changes are the same ones required when upgrading from a non-386 to the CS/386 CPU Board. The following is a list of things, both hardware and software, to be aware of to help insure a smooth installation:

1. Environment: Because of the increase in speed with the Turbo, it could be more sensitive to power, grounding, and static. If there are concerns about the environment, they should be followed up on, documented, and made known to the customer. Existing sites with environmental issues, even if not affecting the current system, can be especially critical as it gives the appearance the new hardware is at fault.

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MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP  
TITLE: 2200 Update - CS/386 TURBO Announcement

EXPLANATION (cont'd):

2. E-Rev: The problem with having down rev boards is common, especially with sites not under Wang Maintenance. Although having the latest e-rev boards is preferable, the latest e-rev is not always needed. The following is a list of boards that require a minimum e-rev or prom revision for proper operation as known at this time.

| Model #  | Part #    | Description    | min E-Rev | Prom Revision          |
|----------|-----------|----------------|-----------|------------------------|
| 2275 MUX | 210-8824  | Master Mux Brd | 4         | n/a                    |
| 22C80    | 210-7715  | Slave Mux Brd  | 10        | n/a                    |
| CS-D     | 212-7113  | CS-D DPU Board |           | R3 FCO 1376 (728-0387) |
| DS       | 210-8826A | DS DPU Brd     |           | R3 FCO 1375 (728-0386) |
| 2536DW   | 210-9557  | Term Cont Brd  | 3         | R2 FCO 1411 (728-0421) |

3. Existing Controllers: When upgrading, it is possible that marginal problems may exist with controllers currently on the system though it may be running error free. Because the Turbo is so much faster, if a marginal problem does exist with a controller, it is much more likely to occur. Do not assume the problem is the Turbo because the controllers worked before the upgrade. All controllers must be set for legal addresses; 310 ,320, 330 for disk, 215, 216, 217 for printers. All sw's OFF or ON is not legal.

4. Upgrades: When installing the Turbo card set in an existing CPU, there are some important steps related to properly positioning the motherboard. Refer to the CS System Maint Mnl (741-1769A). A TSB will also follow.

Operating System

5. Partition size: When upgrading from a non-386 CPU, partition size must be increased about 80% as a general rule of thumb. This is because the 386 CPUs use a binary format and non-386 CPUs are in binary coded decimal, BCD. Some commands as well as variables require more space in binary. If inadequate partition size is set, A01 and A02 errors will occur. Partitions can be of any size as long as available memory is not exceeded.

6. Global Partitions: Any partition of any size may be global to any other partition. Bank partitions do not exist with the CS/386 and Turbo.

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 014-A3A

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MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

TITLE: 2200 Update - CS/386 TURBO Announcement

EXPLANATION (cont'd):

7. Device Table: Within "@GENPART" only 1 entry may be made per disk controller address. There are only 3 supported disk controller addresses: /310, /320, & /330. For example, for controller address /310 make a single entry /310 in the device table and not 1 for every address or for the tape drive such as /D10, /D11, /D12, /D51, or /D5F etc. Additional entries could result in I92 errors if RESET is keyed while accessing disk or possibly in other unforeseen errors.

Programming and Operational Problems and Concerns

8. Increasing the partition size for some programs can create a problem. Certain sort modules and possibly other programs may make a calculation based on partition size. One such program is part of KFAM and the ISS Utilities. In program "SORT.402A" line 4590 should be changed:  
From: 4590 M1=INT(M\*1024)-698 To: 4590 M1=INT(MIN(M,64)\*1024)-698  
These type changes should be made by the customer's software vendor.

9. For any program or software package that looks for CPU type, the partition status line byte 9 is coded as "T" for the Turbo, "W" for the CS/386, "M" for MVP/LVP/VLSI, and "V" for VP. Certain versions of TOM software utilize this bit and would need to be changed. In the ISS Utilities, program "ISS.000M" needs this change. In line 420, change the "M" to a "T":

420 A\$=\$PSTAT(#PART):IF STR(A\$,9,1)="M" THEN S3=4:...etc.

This problem may also occur running Multi-Disk, "MULTIDSK", where you see the message, "CPU SOFTWARE MUST BE UPGRADED TO RUN THIS PROGRAM". On the latest version, 69C1, this message is on line 175. On the previous line, 170 in this case, which begins as follows: 170 P\$=\$PSTAT(1):...etc. append to the end of the line: :IF STR(P\$,9,1)="T" THEN 180

Program FTU from the same Magnetic Media Diagnostic Disk also must be revised. With the latest version of FTU, rev 8734, corrected for the CS/386, line 120 needs to be changed or a similar message to that shown above for MULTIDSK will be given. Line 120 begins as follows:  
120 B\$=\$PSTAT(1): IF STR(B\$,9,1)..etc. After the first colon ':' insert:  
IF STR(B\$,9,1)="T" THEN 125: DELETE ENTIRE LINE STARTING AT FIRST COLON

GROUP: 2200 Basic 2 Platform Group

MAIL STOP: 014-A3A

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TITLE: 2200 Update - CS/386 TURBO Announcement

EXPLANATION (cont'd):

10. If the current 2200/VLSI software makes decisions using partition status line bytes 10 & 11, a change would be required to run on the Turbo or the "386" CPU. Under the non-386 multi-user operating systems, byte 10 denotes memory bank and byte 11 the amount of partition memory. On the Turbo and 386 bytes 10 and 11 signify partition size. There are no banks.

11. Floating Point mathematics on the Turbo & '386' insures accuracy to only 10 digits compared with 13 digits with earlier 2200 CPUs. This could cause the 9th through 13th numbers to the right of the decimal point to be slightly different after a calculation between these machines. Programs dependent on 13 digit accuracy may need to be altered by the programmer.

12. GIO commands are handled differently on the Turbo from both the CS/386 and non-386 CPUs. Each GIO command had to be recoded individually. The standard GIOs have all been done, but for those programmers who developed there own GIOs, there may be a problem. In this case, the problem should be escalated via a PTR to RDB 8760. In the PTR, provide the specific GIO with an exact explanation of it's purpose. This will help to prevent delays in correcting. With non-386 CPUs, GIO commands could speed up processing because they directly addressed code in the O/S. With the Turbo and the 386 this is not the case and usually a GIO will be slower than the basic command it replaces. Customers may want to consider replacing GIOs with the applicable basic command where possible.

13. The first byte of a header record for a program on disk must be 40, 50, 60, or 70. If the 2nd digit is other than 0 an error A01 may occur. Older 2200 systems did not care about this bit and it was used by some programmers to protect their software.

14. For maximum disk performance, it is critical to have programs in 'NEW' or '386' format. As mentioned, the Turbo is coded in binary while non-386 2200s are in binary coded decimal, BCD. Programs in binary require more memory. When loading a program in 'OLD' format (BCD) on the Turbo it has to go through a conversion process which slows down disk I/O. If the

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MATRIX ID. 4103

PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

TITLE: 2200 Update - CS/386 TURBO Announcement

EXPLANATION (cont'd):

program is in a binary (NEW or 386) format this conversion process is eliminated. There are 2 Basic-2 commands to aid the user in making this conversion, 'SELECT NEW' and '\$MOVE!'. As mentioned, programs require more space when converted to 'NEW' format both in memory and on disk. Additionally any long program line of approximately 190 characters or more when converted to 'NEW' format could exceed the 256 character/line limit requiring the line to be split into 2 lines to enable the conversion. Noting that, if the 'SELECT NEW' command is executed, any program saved will be in the 'NEW' format. Any program in new format can be identified by a ' after the P for program when LISTing the disk, P'. The 'SELECT OLD' command allows you to change to 'OLD' or BCD format and is the default at boot time. The 'LIST SELECT' command can be used to identify if 'OLD' or 'NEW' format is currently selected. The '\$MOVE!' command is used to move an entire address from 'OLD' to 'NEW' format. It provides the ability to identify each program that cannot be MOVE'd and the 1st line number in that program needing a line split. '\$MOVE!' does this on the fly while converting all other programs and moving all other files. Non-386 CPUs cannot read programs in 'NEW' format. Data files are loaded as is with all CPU types and have no effect on performance. The conversion process should be done by a programmer or the system administrator and not by Wang.

ADDITIONAL INFORMATION:

Diagnostics: Both new I/O boards & the CPU have LEDs which light with power on and go out if built in self-tests pass, normally within 3 seconds. Future controllers planned may run tests that extend beyond 3 seconds. If an LED stays on it indicates a failure & the board should be replaced. After completing these self-tests, boot prom diagnostics begin on the system console testing memory and communication with the new controllers. Failures would readily point to one or more of the boards. On-line diagnostics remain the most viable way to test the system.  
2200 Diagnostic Package Rev 2.00.00 195-2956-0  
See item 9, page 4 for changes required to run Multi-Disk Diagnostics.  
Maintenance Manual: 741-1769-A (this is an addendum to the CS Maint Mnl)

GROUP: 2200 Basic 2 Platform Group

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MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MicroVP

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ADDITIONAL INFORMATION (cont'd):

Part Numbers and Board Specific Technical Information:

|          |                     |          |      |     |     |     |     |
|----------|---------------------|----------|------|-----|-----|-----|-----|
| 210-9578 | CS-D/N Motherboard  | Testpts: | TP1  | TP2 | TP3 | TP4 | TP5 |
|          |                     |          | -12V | 12V | 5V  | -5V | 0V  |
| 210-9583 | MicroVP/CS Motherbd | Testpts: | TP1  | TP2 | TP3 | TP4 | TP5 |
|          |                     |          | -12V | 12V | 5V  | -5V | 0V  |

210-9576A Turbo CPU w/out mem (consists of 210-9576 Mbd & 9577 Dbd)

Can be loaded with 4/8/16/32 Meg.

377-4533 1 Meg SIMMS (for 4 Meg use L3,L10,L18,L29, 8 Meg fully load)

377-4535 4 Meg SIMMS (for 16M use L3,L10,L18,L29, 32 Meg fully load)

Switches - 1M SIMMs SW1 = 4 ON only 4 Meg SIMMS SW1 = all OFF

Jumpers - 9576 Motherboard J6,J7 IN; J4,J8 OUT

J5 1-2 = 27C256 E Proms at L50/L64

J5 2-3 = 27C512 E Proms at L50/L64

9577 Daughterbrd J3 IN; J4 OUT

212-9717 MXF Ctlr (consists of 210-9579 I/O Proc & 9580 Term Cont)

421-0181 MXF 7 Port Octopus Cable (MXF has 2 RS232 ports/2 Oct ports)

Switches - 9579 I/O Proc SW1 sets MXF Brd #. Brd 1 - 3 OFF only;

Brd 2 - 2,4 ON only; Brd 3 - 1,4 ON only; Brd 4 - 4 ON only

Switches - 9580 Term Ctlr SW1-SW8 set baud rates for the 16 ports

From top - SW1 5-8 port 1, 1-4 port 2, SW2 5-8 port 3, etc.

Common baud rates: 38400 - 1 or 5 OFF only

19200 - 2 or 6 OFF only, 9600 - 3,4 or 7,8 ON only

2400 - 4 or 8 ON only, 1200 - 2,3 or 6,7 ON only

Jumpers: 210-9579 Mbrd - P1 IN; 210-9580 Dbrd - JP1 IN

212-9718 22C11-HS Prtr/Disk Ctlr (9579 I/O Proc & 9581 Periph Ctlr)

Switches - 9579 I/O Processor SW1 sets Disk Address

310=1 OFF only; 320=2 OFF only; 330=1,2 OFF only

Switches - 9581 Periph Controller SW1 selects Disk or Mux Port

1 ON only Disk Port J2 active; 2 ON only Mux Port J3 active

SW2 Printer Address

215=1,3,5 ON only; 216=2,3,5 ON only; 217=1,2,3,5 ON only

Jumpers: 210-9579 - P1 IN

GROUP: 2200 Basic 2 Platform Group

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**FCO: 1501**

**Equipment Affected:** Turbo CPU Board (p/n 210-9576A) for the  
CS/386 400N/800N/1600N/3200N, CS-D/N-Turbo,  
CS-Turbo, and MicroVP-Turbo

**FCO Class:** Next Call

**Estimated Installation Time:** 30 Minutes

**Approval Date:** April 11, 1994

1. REASON FOR CHANGE

Required for operation with all Basic-2 Turbo operating system releases starting with maintenance release 1.18 and including the latest general release, 1.30.01, due out in spring, 1994.

2. DESCRIPTION OF CHANGE

Two PROMs are replaced on the 210-9576A Turbo CPU Board at locations L50 and L64 with revision R3 proms.

3. DOCUMENTATION AFFECTED

N/A

FCO 1501

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#### 4. PREREQUISITE (S)

##### A. Hardware

The 210-9576A CPU Board should be at E-REV 3 before performing this FCO. If not, a new board must be ordered thru Logistic Order Processing (see Section 8 for mailing address). An E-REV 3 board can be identified by the 15 ns chips at L1,L2,L7,L8,L13,L14,L20, & L21 as identified by a -15 on the chip (Toshiba TC5588P-15). The old boards have 20 ns chips which are normally marked with a -20.

All Turbo controllers in this same CPU must also be updated at the same time. The 2236MXF Controller must have R4 proms at locations L7 and L14 of the 9579A I/O processor board. The 22C11-HS Printer/Disk Controller must have R2 proms at locations L7 and L14 of it's 9579-1A I/O processor board. See FCO 1502, part number 728-0444, for the MXF and FCO 1503, part number 728-0445, for the 22C11-HS.

##### B. Software

In limited testing done with older releases of the Basic-2/Turbo Operating System, (releases 1.07 and general release 1.1) these proms appear to work fine. It is highly recommended however to be running the newest release of the operating system, 1.30.01.

#### 5. INSTALLATION PROCEDURE

A. Power down the system using standard power down procedures, disk drives first, then CPU. Remove the CPU board cover, then remove the 210-9576A Turbo CPU Board. Refer to APPENDIX C, section 6.4 of the Maintenance Manual titled, "Wang Computer System, Models: CS, CS-N, CS-D, CS/386, and CS/386 Turbo", part number 741-1769-A, for more information on removing the CPU board if necessary.

B. Rework the 210-9576A CPU Board as follows:

1. Remove the proms at L50 and L64 located along the edge of the main CPU board between the SIMM modules and the daughterboard.  
Install new prom, part # 378-9509-R3, at location L50.  
Install new prom, part # 378-9508-R3, at location L64.
2. Add an E-REV 4 Sticker to the upper right corner on the circuit side of the board.

- C. To complete the installation of the FCO, fill in the applicable information on the Field Change History tag. (Part #615-3299).

NOTE: The Field Change History tags can be obtained by placing a routine order through the Logistics Order Processing System.

- D. Replace the 210-9576A CPU Board and reassemble the unit by reversing Step A.

- E. Perform the check-out procedure described in Section 6.

#### 6. CHECK-OUT PROCEDURE

With workstation 1 on, power on the CPU. LEDs on all Turbo controllers will come on and go out within 3 to 4 seconds indicating the Power On Bit Tests have passed. If the CPU has also passed it's Bit Test, (both LEDs on momentarily then off), self-tests will begin displaying on the screen. Allow these tests to run to completion insuring all tests complete without error. Upon completion the 'Mount System Platter, Press Reset' message displays. Power on any disk drives if not on already. Press SHIFT/RESET and key the correct SF key to boot the system. At the initial boot menu where the choice is operating system or diagnostics, select the diagnostics and allow these tests to run a few passes. Complete testing by bringing the system all the way up and running an on-line test. It is highly suggested to use the CPU Instruction Exerciser to test on line using several terminals. The part number for this package is 195-2956-0. See the Product Maintenance Manual titled 'Wang Computer System, Models: CS, CS-N, CS-D, CS/386, CS/386 Turbo', part number 741-1769-A, Appendix C, page C-29 for more details on these diagnostics.

#### 7. FCO KIT PARTS LISTING

KIT #728-0443

| <u>Item</u> | <u>Qty</u> | <u>Item Description</u> |
|-------------|------------|-------------------------|
| 729-1882    | 1          | FCO Document 1501       |
| 378-9508-R3 | 1          | CPU Boot PROM for L64   |
| 378-9509-R3 | 1          | CPU Boot PROM for L50   |
| 615-1283-4  | 1          | E-REV 4 Sticker         |

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8. FCO KIT AVAILABILITY DATE

**NOTE:**

When determining kit requirements, be aware that manufacturing has cut this change into this product as of April 11, 1994. Products shipped/installed after this date will contain this FCO.

FCO Kit #728-0443 will be available April 22, 1994 and can be obtained by placing a special order. Special orders for FCO kits are exempt from the established approval loop. They should be mailed directly to:

Logistics Order Processing  
Wang Laboratories  
836 North Street  
Tewksbury, MA 01876  
Att'n: Order Services  
M/S 027-15A

Dealers may obtain the FCO Kit by completing a Dealer Parts Sales form and sending it to:

Dealer Distribution Center  
Wang Laboratories  
836 North Street  
Tewksbury, MA 01876  
M/S 027-15B

9. REMOVED PARTS DISPOSITION

Place the PROMs removed in the box the new Kit was received in and mail to:

Defective Returns  
Wang Laboratories  
Building 7, Dock 8  
836 North Street  
Tewksbury, MA 01876

10. MISCELLANEOUS

N/A

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**FCO: 1502**

**Equipment Affected: 2236MXF Terminal Controller (p/n 212-9717) for the  
CS/386 400N/800N/1600N/3200N, CS-D/N-Turbo,  
CS-Turbo, and MicroVP-Turbo**

**FCO Class: Next Call**

**Estimated Installation Time: 20 Minutes**

**Approval Date: April 11, 1994**

**1. REASON FOR CHANGE**

Required for operation with all Basic-2 Turbo operating system releases starting with maintenance release 1.18 and including the latest general release, 1.30.01, due out in spring, 1994.

**2. DESCRIPTION OF CHANGE**

On the 2236MXF Controller two PROMs are replaced on the 210-9579A I/O Processor Board at locations L7 and L14 with revision R4 proms.

**3. DOCUMENTATION AFFECTED**

N/A

FCO 1502

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#### 4. PREREQUISITE (S)

##### A. Hardware

The Turbo CPU Board and all Turbo controllers in this same CPU must also be updated at the same time. The Turbo CPU Board must have R3 prompts at locations L50 and L64 of the 9576A board. Any 22C11-HS Printer/Disk Controller (212-9718) installed must have R2 prompts at locations L7 and L14 of its 9579-1A I/O processor board. See FCO 1501, part number 728-0443, for the CPU board, and FCO 1503, part number 728-0445, for the 22C11-HS.

##### B. Software

In limited testing done with older releases of the Basic-2/Turbo Operating System, (releases 1.07 and general release 1.1) these prompts appear to work fine. It is highly recommended however to be running the newest release of the operating system, 1.30.01.

#### 5. INSTALLATION PROCEDURE

A. Power down the system using standard power down procedures, disk drives first, then the CPU. Remove the I/O cables, 2 screws each, and mark them to indicate the port to plug them back into. Remove the 2236MXF Controller Board by loosening the screws at the top and bottom of the I/O rail. Refer to section 7.2.2 of the Maintenance Manual titled, "Wang Computer System, Models: CS, CS-N, CS-D, CS/386, and CS/386 Turbo", part number 741-1769-A, for more information on general I/O board removal if necessary.

B. Rework the 210-9579A I/O Processor Board of the controller as follows:

1. Remove the prompts at L7 and L14 located next to switch 1. Install new prom, part # 378-9511-R4, at location L7. Install new prom, part # 378-9510-R4, at location L14.
2. Add an E-REV 4 Sticker to the lower right corner on the component side of the board following the E under capacitor C61.

- C. To complete the installation of the FCO, fill in the applicable information on the Field Change History tag. (Part #615-3299).

NOTE: The Field Change History tags can be obtained by placing a routine order through the Logistics Order Processing System.

- D. Replace the 2236MXF Controller Board and reconnect the cables by reversing Step A.

- E. Perform the check-out procedure described in Section 6.

#### 6. CHECK-OUT PROCEDURE

With workstation 1 on, power on the CPU. Verify the LED on the 2236MXF controller comes on and goes out within 3 to 4 seconds indicating the Power On Bit Test has passed. Once the Bit tests have passed on the boards where they are used, self-tests will begin displaying on the screen. Allow these tests to run. Once the initial DRAM test completes, two tests are run against the Turbo Controllers, the 'System Interface Control Card Diagnostic' and the 'High Speed Channel Bus Test'. Watch to insure these tests pass for each controller. Upon completion of these tests the 'Mount System Platter, Press Reset' message displays. Power on the disk drive/s if not on already. Press RESET and key the correct SF key to boot the system. At the initial boot menu where the choice is operating system or diagnostics, select the diagnostics and allow the tests to run a few passes. Complete testing by bringing the system all the way up and verifying all terminals on all ports are up and active by running a program or diagnostic.

The part number for the 2200 Diagnostic Package which includes a full range of system and peripheral tests is 195-2956-0. See the Product Maintenance Manual titled 'Wang Computer System, Models: CS, CS-N, CS-D, CS/386, CS/386 Turbo', part number 741-1769-A, Appendix C, page C-29 for more details on the various diagnostic tests described herein.

#### 7. FCO KIT PARTS LISTING

KIT #728-0444

| <u>Item</u> | <u>Qty</u> | <u>Item Description</u> |
|-------------|------------|-------------------------|
| 729-1883    | 1          | FCO Document 1502       |
| 378-9510-R4 | 1          | MXF PROM for L14        |
| 378-9511-R4 | 1          | MXF PROM for L7         |
| 615-1283-4  | 1          | E-REV 4 Sticker         |

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8. FCO KIT AVAILABILITY DATE

**NOTE:**

When determining kit requirements, be aware that manufacturing has cut this change into this product as of April 11, 1994. Products shipped/installed after this date will contain this FCO.

FCO Kit #728-0444 will be available April 22, 1994 and can be obtained by placing a special order. Special orders for FCO kits are exempt from the established approval loop. They should be mailed directly to:

Logistics Order Processing  
Wang Laboratories  
836 North Street  
Tewksbury, MA 01876  
Att'n: Order Services  
M/S 027-15A

Dealers may obtain the FCO Kit by completing a Dealer Parts Sales form and sending it to:

Dealer Distribution Center  
Wang Laboratories  
836 North Street  
Tewksbury, MA 01876  
M/S 027-15B

9. REMOVED PARTS DISPOSITION

Place the PROMs removed in the box the new Kit was received in and mail to:

Defective Returns  
Wang Laboratories  
Building 7, Dock 8  
836 North Street  
Tewksbury, MA 01876

10. MISCELLANEOUS

N/A

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**FCO: 1503**

**Equipment Affected: 22C11-HS Printer/Disk Controller (p/n 212-9718) for  
the CS/386 400N/800N/1600N/3200N, CS-D/N-Turbo,  
CS-Turbo, and MicroVP-Turbo**

**FCO Class: Next Call**

**Estimated Installation Time: 20 Minutes**

**Approval Date: April 11, 1994**

**1. REASON FOR CHANGE**

Required for operation with all Basic-2 Turbo operating system releases starting with maintenance release 1.18 and including the latest general release, 1.30.01, due out in spring, 1994.

**2. DESCRIPTION OF CHANGE**

On the 22C11-HS Printer/Disk Controller, two PROMs are replaced on the 210-9579-1A I/O Processor Board at locations L7 and L14 with revision R2 proms.

**3. DOCUMENTATION AFFECTED**

N/A

FCO 1503

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COMPANY CONFIDENTIAL

#### 4. PREREQUISITE (S)

##### A. Hardware

The CPU Board and all Turbo controllers in this same CPU must also be updated at the same time. The Turbo CPU Board must have R3 proms at locations L50 and L64 of the 9576A board. Any 2236MXF Terminal Controller (p/n 212-9717) must have R4 proms at locations L7 and L14 of it's 9579A I/O processor board. See FCO 1501, part number 728-0443, for the CPU board and FCO 1502, part number 728-0444, for the MXF.

##### B. Software

In limited testing done with older releases of the Basic-2/Turbo Operating System, (releases 1.07 and general release 1.1) these proms appear to work fine. It is highly recommended however to be running the newest release of the operating system, 1.30.01.

#### 5. INSTALLATION PROCEDURE

A. Power down the system using standard power down procedures, disk drives first, then CPU. Remove the I/O cables, 2 screws each, and mark them to indicate the port to plug them back into. Remove the 22C11-HS Printer/Disk Controller by loosening the screws at the top and bottom of the I/O rail. Refer to section 7.2.2 of the Maintenance Manual titled, "Wang Computer System, Models: CS, CS-N, CS-D, CS/386, and CS/386 Turbo", part number 741-1769-A, for more information on general I/O board removal if necessary.

B. Rework the 210-9579-1A I/O Processor Board of the controller as follows:

1. Remove the proms at L7 and L14 located next to switch 1. Install new prom, part # 378-9513-R2, at location L7. Install new prom, part # 378-9512-R2, at location L14.
2. Add an E-REV 3 Sticker to the lower right corner on the component side of the board following the E under capacitor C61.

- C. To complete the installation of the FCO, fill in the applicable information on the Field Change History tag. (Part #615-3299).

NOTE: The Field Change History tags can be obtained by placing a routine order through the Logistics Order Processing System.

- D. Replace the 22C11-HS Controller Board and reconnect the cables by reversing Step A.

- E. Perform the check-out procedure described in Section 6.

#### 6. CHECK-OUT PROCEDURE

With workstation 1 on, power on the CPU. Verify the LED on the 22C11-HS Controller comes on and goes out within 3 to 4 seconds indicating the Power On Bit Test has passed. Once the Bit tests have passed, self-tests will begin displaying on the screen. Allow these tests to run. Once the initial DRAM test completes, two tests are run against the Turbo Controllers, the 'System Interface Control Card Diagnostic' and the 'High Speed Channel Bus Test'. Watch to insure these tests pass for each controller. Upon completion of these tests the 'Mount System Platter, Press Reset' message displays. Power on the disk drive/s if not on already. Press RESET and key the correct SF key to boot the system. At the initial boot menu where the choice is operating system or diagnostics, select the diagnostics. Run 2 or 3 passes. Key Shift/RESET to end. Complete testing by bringing the system all the way up and verifying communication to any disk or printer connected. Run a program or diagnostic to verify proper operation of the disk.

The part number for the 2200 Diagnostic Package which includes a full range of system and peripheral tests is 195-2956-0. See the Product Maintenance Manual titled 'Wang Computer System, Models: CS, CS-N, CS-D, CS/386, CS/386 Turbo', part number 741-1769-A, Appendix C, page C-29 for more details on the various diagnostic tests described herein.

#### 7. FCO KIT PARTS LISTING

KIT #728-0445

| <u>Item</u> | <u>Qty</u> | <u>Item Description</u> |
|-------------|------------|-------------------------|
| 729-1884    | 1          | FCO Document 1503       |
| 378-9512-R2 | 1          | 22C11-HS PROM for L14   |
| 378-9513-R2 | 1          | 22C11-HS PROM for L7    |
| 615-1283-3  | 1          | E-REV 3 Sticker         |

FCO 1503

- 3 -

COMPANY CONFIDENTIAL



8. FCO KIT AVAILABILITY DATE

**NOTE:**

When determining kit requirements, be aware that manufacturing has cut this change into this product as of April 11, 1994. Products shipped/installed after this date will contain this FCO.

FCO Kit #728-0445 will be available April 22, 1994 and can be obtained by placing a special order. Special orders for FCO kits are exempt from the established approval loop. They should be mailed directly to:

Logistics Order Processing  
Wang Laboratories  
836 North Street  
Tewksbury, MA 01876  
Att'n: Order Services  
M/S 027-15A

Dealers may obtain the FCO Kit by completing a Dealer Parts Sales form and sending it to:

Dealer Distribution Center  
Wang Laboratories  
836 North Street  
Tewksbury, MA 01876  
M/S 027-15B

9. REMOVED PARTS DISPOSITION

Place the PROMs removed in the box the new Kit was received in and mail to:

Defective Returns  
Wang Laboratories  
Building 7, Dock 8  
836 North Street  
Tewksbury, MA 01876

10. MISCELLANEOUS

N/A

FCO 1503

- 4 -

COMPANY CONFIDENTIAL

WANG ECO

CONTROL NO 061466

CLASS 1  
CLASS 2 ☒  
CLASS 3 ☐

SHEET 1 OF 6

|                                                                                                                                                                                                                                                    |  |                                                                          |               |                 |                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------|---------------|-----------------|-------------------|
| ORIGINATOR:<br>Mike Bahia                                                                                                                                                                                                                          |  | DEPT:<br>167                                                             | EXT:<br>60256 | M/S:<br>019-690 | DATE:<br>02/03/94 |
| PART(S) AFFECTED:<br>110-9576A, 110-9579A,<br>& 110-9579-LA                                                                                                                                                                                        |  | P/N DESCRIPTION:<br>CS386 CPU TURBO 4 MEG &<br>386 MASTER I/O CONTROLLER |               |                 |                   |
| MODEL(S) AFFECTED: CS-TURBO,<br>CS-N/D-TURBO, MICROVP-TURBO,<br>CS/386-400N, 2236MXF, 22C11-HS                                                                                                                                                     |  | DWG(S) AFFECTED:                                                         |               |                 |                   |
| DESCRIPTION OF CHANGE:                                                                                                                                                                                                                             |  |                                                                          |               |                 |                   |
| Delete from BOM 110-9576A proms 378-9508R2 & 378-9509R2<br>& add new proms 378-9508R3 & 378-9509R3 (REF DES L64 & L50)<br>Change item status for new 378-9508R3 & 378-9509R3 to 2.<br>Change item status for old 378-9508R2 & 378-9509R2 to 4,     |  |                                                                          |               |                 |                   |
| Delete from BOM 110-9579A proms 378-9510R3 & 378-9511R3<br>& add new proms 378-9510R4 & 378-9511R4 (REF DES L14 & L7)<br>Change item status for new 378-9510R4 & 378-9511R4 to 2.<br>Change item status for old 378-9510R3 & 378-9511R3 to 4,      |  |                                                                          |               |                 |                   |
| Delete from BOM 110-9579-LA proms 378-9512R1 & 378-9513R1<br>& add new proms 378-9512R2 & 378-9513R2 (REF DES L14 & L7)<br>Change item status for new 378-9512R2 & 378-9513R2 to 2.<br>Change item status for old 378-9512R1 & 378-9513R1 to 4,    |  |                                                                          |               |                 |                   |
| See continuation sheet E-REV.                                                                                                                                                                                                                      |  |                                                                          |               |                 |                   |
| REASON/SYMPOTM FOR CHANGE:                                                                                                                                                                                                                         |  |                                                                          |               |                 |                   |
| Proms are required for any Turbo O/S Release higher than General Release 1.10. These later O/S's are not compatible with the older proms. The new proms also correct problems running some of the built-in diagnostics for the boards in question. |  |                                                                          |               |                 |                   |

|                                                    |  |                  |  |
|----------------------------------------------------|--|------------------|--|
| EFFECTIVITY DATE                                   |  | CONFORMANCE DATE |  |
| 04/01/94                                           |  | 04/11/94         |  |
| REMARKS: ECO to follow to upgrade all field units. |  |                  |  |

|                                |                  |      |               |     |
|--------------------------------|------------------|------|---------------|-----|
| CURRENT BUILD SITE INFORMATION | PB               | PKWD | ME            | WPR |
|                                | IR               | TAI  | AU            | MX  |
| APPROVALS                      | SIGNATURE        |      | DATE          |     |
| ECO CHAIRPERSON                | Hans C. Donahue  |      | 2/21/94       |     |
| PROGRAM MGR.                   | J. A. Whit       |      | 3/21/94       |     |
| DESIGN ENG.                    | J. A. Whit       |      | 3/21/94       |     |
| COMPLIANCE ENG.                | Michael P. Smith |      | 3/29/94       |     |
| SECURE SYSTEMS                 |                  |      |               |     |
| ORIGINATOR                     | Mike Bahia       |      | 2/4/94        |     |
| ECO ANALYST                    | R. J. Baerment   |      | 3/29/94 Rev 1 |     |

WANG ECO

CONTROL NO 061466

CONTINUATION SHEET

SHEET 2 OF 6

Remove the following Item status 4 prompts  
from the Product structure database.

378-9508R2  
378-9509R2  
378-9510R3  
378-9511R3  
378-9512R1  
378-9513R1

NOTE: Create a 210 Assembly drawing for 210-9579A  
and 210-95791A. Eliminate the 110 Assembly dwg,  
from the board package. 210 drawings will reflect  
reference locations for ALL components.

On PCB 210-9576A merge 110 Assembly documentation onto the  
210 assembly drawing, thus eliminating the 110 Assembly Dwg.

ECO NO 061466

SHT 3 OF 6  
CHANGE  
DOCUMENT

ECO 061466

CONFIGURATION REVISION

E-REV

SCHEMATIC

210 ASSEMBLY DRAWING

CAD DATABASE

510 FAB DRAWING

ARTWORK LAYERS

DRILL/ROUTING DATA

MECHANICAL OUTLINE

REWORK INSTRUCTION

PROD. STD DEV. NOTICE

CORP. BOM EFFECT. DATE

**WANG**

LABORATORIES, INC.

PCA  
CONFIGURATION  
DOCUMENT

PCA PART NUMBER

\* CHANGE PENDING

210-9576A

ITEM MASTER DESCRIPTION CS 386 TURBO CPU

PAGE \_\_\_ OF \_\_\_



ECO NO 061466

SHT 5 OF 6

CHANGE DOCUMENT

ITEM STATUS

ITEMS

CONFIGURATION REVISION

E-REV

SCHEMATIC

210 ASSEMBLY DRAWING

110 ASSEMBLY DRAWING

510 FAB DRAWING

ARTWORK LAYERS

DRILL/ROUTING DATA

MECHANICAL OUTLINE

REWORK INSTRUCTION

PROD. STD DEV. NOTICE

CORP. BOM EFFECT. DATE

DWG: 004370

DWG: 010266

DWG: 010882

DWG: 010189

DWG: 010082

ECO 59643

ECO 59938

ECO 61466

PCA  
CONFIGURATION  
DOCUMENT

PCA PART NUMBER

310-9579-1A

\* CHANGE PENDING

ITEM MASTER DESCRIPTION HI SPEED Channel

PAGE

OF 1

I/O CONTROL MOTHER BD

11/6/91

4-1-94

ECO NO 06/466

SHT 6 OF 6

CHANGE DOCUMENT

| ITEM STATUS            | DWO # 044270 | DWO # 214266 | DWO 214880 | DWO: 010189 | DWO: 010082 | ECO 59911 | ECO 59938 | ECO 61466 |
|------------------------|--------------|--------------|------------|-------------|-------------|-----------|-----------|-----------|
|                        | Ø            | Ø            | Ø          | Ø           | 1           | 1         | 2         | 2         |
| ITEMS                  |              |              |            |             |             |           |           |           |
| CONFIGURATION REVISION | Ø            | 1            | 2          | 3           | 4           | 5         | 6         | 7         |
| E-REV                  | Ø            | 1            | 1          | 1           | 1           | 2         | 3         | 4         |
| SCHEMATIC              | Ø            | 1            | 1          | 1           | 1           | 1         | 1         | 1         |
| 210 ASSEMBLY DRAWING   |              |              |            |             | NA          | NA        | NA        | 0         |
| 110 ASSEMBLY DRAWING   |              | 1            | 1          | 2           | 2           | 2         | 2         | N/A       |
| 510 FAB DRAWING        | Ø            | 1            | 2          | 2           | 2           | 2         | 2         | 2         |
| ARTWORK LAYERS         | Ø            | 1            | 1          | 1           | 1           | 1         | 1         | 1         |
| DRILL/ROUTING DATA     | Ø            | 1            | 1          | 1           | 1           | 1         | 1         | 1         |
| MECHANICAL OUTLINE     | Ø            |              |            | 0           | 0           | 0         | 0         | 0         |
| REWORK INSTRUCTION     | N            | N            | Ab         | NO          | NO          | YES       | NO        | NO        |
| CORP. BOM EFFECT. DATE |              |              |            |             |             | 11/6/91   | 1-30-92   | 9-1-94    |

PCA

CONFIGURATION  
DOCUMENT

PCA PART NUMBER

210-9579A

PAGE -- OF --

ITEM MASTER DESCRIPTION HI-SPEED

10-92420

CLASS 1 X  
CLASS 2  
CLASS 3

WANG ECO

CONTROL NO

60595

ORIGINATOR: Michael Riley DEPT: 15 EXT: 70524 M/S: 019-690 SHEET 1 OF DATE: 07/01/92

|                                                           |                                                           |
|-----------------------------------------------------------|-----------------------------------------------------------|
| PART(S) AFFECTED:<br>210-9576A/209-9576                   | P/N DESCRIPTION:<br>CS386 TURBO CPU                       |
| MODEL(S) AFFECTED:<br>CS386-Turbo                         | DWG(S) AFFECTED:<br>209-9576                              |
| DESCRIPTION OF CHANGE:<br>Change 209-9576 BOM as follows: |                                                           |
| DELETE<br>DESCRIPT CV<br>377-1188                         | Qti.<br>8 ea<br>Ref. Desg.<br>L1,L2,L7,L8,L13,L14,L20,L21 |
| ADD<br>377-1168                                           | 8 ea<br>L1,L2,L7,L8,L13,L14,L20,L21                       |
| REMARKS:<br>7-10-92 7-13-92                               |                                                           |

|                                |                      |                   |      |
|--------------------------------|----------------------|-------------------|------|
| CURRENT BUILD SITE INFORMATION | 1PB X IP             | PKWJMF X TA AU MX | DATE |
| ECO CHAIRPERSON                | John Mayfield 7/1/92 |                   |      |
| PROGRAM MGR.                   | NGK 7/1/92           |                   |      |
| DESIGN ENG.                    | Michael Riley        | 07/01/92          |      |
| COMPLIANCE ENG.                | AD                   | 7/1/92            |      |
| SECURE SYSTEMS                 |                      |                   |      |
| ORIGINATOR                     | Michael Riley        | 07/01/92          |      |
| ECO ANALYST                    | P. Dargatzis         | 7/1/92            |      |
| OTHER                          | J. G. Taylor 7/1/92  |                   |      |

ENCL 2-3

REASON/SYMPOM FOR CHANGE:

To fix a temp. related timing problem which normally RESULTS IN SYNTAX ERRORS OR SYSTEM HANGS.



**SHT 2 OF**

# childcare booklet

| ECO NO                 | SHT | OF  | CHANGE DOCUMENT |
|------------------------|-----|-----|-----------------|
| 60546                  | 2   | OF  |                 |
| ITEM STATUS            |     |     |                 |
| ITEMS                  |     |     |                 |
| CONFIGURATION REVISION | 0   | 1   | DWO# 004726     |
| E-REV                  | 0   | 1   | DWO# 004700     |
| SCHEMATIC              | 0   | 1   | DWO# 008285     |
| 210 ASSEMBLY DRAWING   | 0   | 1   | DWO# 00876d     |
| 110 ASSEMBLY DRAWING   | 0   | 1   | DWO# 008537     |
| 510 FAB DRAWING        | 0   | 1   | ECO 59498       |
| ARTWORK LAYERS         | 0   | 1   | ECO 59811       |
| DRILL/ROUTING DATA     | 0   | 1   | DWO 59920       |
| MECHANICAL OUTLINE     | 0   | 1   | DWO 59938       |
| REWORK INSTRUCTION     | 0   | 1   | ECO 60545       |
| CORP. BOM EFFECT. DATE | N/A | N/A |                 |



**LABORATORIES, INC.**

**PCA  
CONFIDENTIAL IN  
DOCUMENT**

**PCA PART NUMBER**

**210-9576 A**

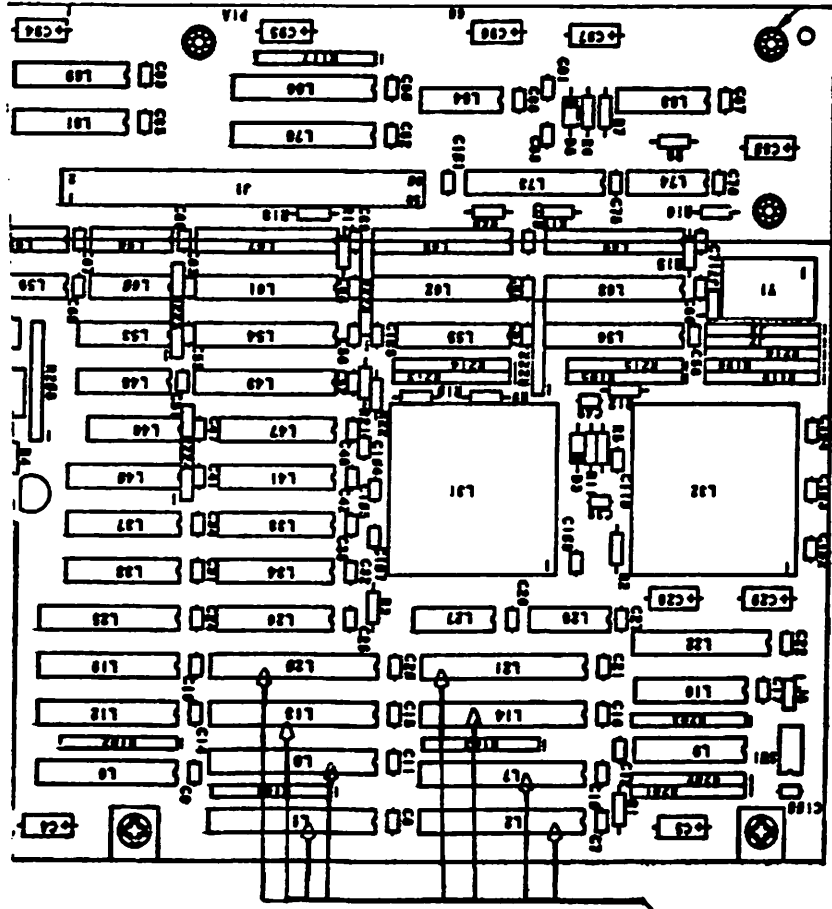
### MASTER DESCRIPTION

CS 386 74 TURBO

**PAGE 7 OF 30**

**17-2652**

ECO NO 60545  
SHT 3 OF 10



1. REMOVE L1,L2,L7,L8,L13,L14,L20, AND L21.  
REPLACE WITH 377-1168.

# TSO PRODUCT SUPPORT IMPACT REVIEW CHECKLIST

WANG BCO#

60545

OEM BCO#

PRO

1. WANG MODEL #s AFFECTED: 25/320-400N/-800N/-1600N/-3200N (MILCOUP-TURBO CO-TSPC) CO-INT.

2. WANG FRU(s) #s AFFECTED: 210-35765

3. IS THERE AN IMPACT ON WANG INSTALLED BASE? (If NO, go to 7) YES ☒ NO ☐

4. OF MODEL #s IMPACTED - UNIT FAILURES EXPECTED?: ALL UNITS ☐ SOME UNITS ☒

5. HOW ARE THESE UNITS IMPACTED? (Check any that apply):

|                |       |              |                                     |               |                                     |
|----------------|-------|--------------|-------------------------------------|---------------|-------------------------------------|
| SAFETY         | _____ | INTERMITTENT | <input checked="" type="checkbox"/> | ENHANCEMENT   | _____                               |
| FCC COMPLIANCE | _____ | HARD FAILURE | _____                               | RELIABILITY   | <input checked="" type="checkbox"/> |
| TEMPEST INTEG. | _____ | CATASTROPHIC | _____                               | OTHER (See 7) | _____                               |

| 6. FLR DATA:    |        | Product Failure Data NOT APPLIC |             |                | Parts Related To BCO/FR |                     |             |
|-----------------|--------|---------------------------------|-------------|----------------|-------------------------|---------------------|-------------|
| Unit Population | last   | Total Calls                     | Total Fails | Fails per Year | Total Used              | Reduction by BCO/FR | Reduced FFY |
| 100             | 12 mo. | _____                           | _____       | _____          | _____                   | 8                   | _____       |

7. FIELD REQUIREMENTS:

|         |                  |                                     |
|---------|------------------|-------------------------------------|
| Level A | Information only | _____                               |
| Level B | TSB required     | <input checked="" type="checkbox"/> |
| Level C | FCC required     | _____                               |

FCC requirements \_\_\_\_\_ Next Call \_\_\_\_\_ Est. installation time \_\_\_\_\_  
Immediate \_\_\_\_\_ Est. # of units to FCC \_\_\_\_\_

8. FSC REQUIREMENTS:

|         |                          |                                     |
|---------|--------------------------|-------------------------------------|
| Level A | Information only         | _____                               |
| Level B | Upgrade on failure only  | _____                               |
| Level C | Upgrade all assy's (MUB) | <input checked="" type="checkbox"/> |

9. LOGISTICS REQUIREMENTS:

|         |                          |                                     |
|---------|--------------------------|-------------------------------------|
| Level A | Information only         | _____                               |
| Level B | Future purchases         | _____                               |
| Level C | Purge stock (FSC rework) | <input checked="" type="checkbox"/> |

ANY OTHER INFO TO CLARIFY IMPACT: (S/W range, documentation (i.e. Product Maintenance Manual, Service Handbook, etc.), configurations, repair/test process(es), tooling, etc.)

THIS PROBLEM COULD RESULT IN HANGS OR SYSTEM ERRORS ON ANY SYSTEM  
THAT DOES NOT HAVE AN UPDATED BOARD. A TSB WAS WRITTEN  
DESCRIBING THE PROBLEM TO THE FIELD. A FOLLOWUP TSB WILL BE  
WRITTEN TO INFORM THE FIELD OF THE FIX.

REVIEWER'S SIGNATURE: Michael B. [Signature] DATE: 2/3/92

(OVER FOR DEFINITIONS):  
WRITE CLEARLY AND USE BLACK INK

TO: DISTRIBUTION  
FROM: ED MAHONEY  
DATE: JULY 21, 1992  
SUBJECT: 2200 TURBO CPU BD. RELEASED FROM HOLD STATUS

---

PRODUCT RELEASED FROM HOLD STATUS

DATE: JULY 21, 1992

PRODUCT LINE: 2200/SPECIAL PRODUCTS

PART NUMBER: 212-9719, 212-9720, 212-9721, 212-9722 & 210-9576-A

WHERE USED: 157/177-3548, 157/177-3549, 157/177-3550, 157/177-3551, 200-6006,  
200-6007, 200-6008 & 200-6009

REASON: A CLASS 1 ECO HAS BEEN WRITTEN (#60545) TO CHANGE THE SPEED OF EIGHT  
SRAM DEVICES TO CORRECT A TEMPERATURE RELATED TIMING PROBLEM.

ACTION: FA&T HAS TESTED THIS FIX ON A DEFINITE PROBLEM BOARD (HEAT/TIMING) IN  
A MODIFIED CHASSIS WITH SEVERAL USER'S FOR A TOTAL OF 24 HRS. THE PROBLEM HAS  
NOT OCCURED. FA&T/PCB REPAIR HAS MOTIFIED/IMPLIMENTED A NEW TEST STRATEGY FOR  
THIS CPU BOARD BASED ON THE PROBLEMS THAT HAVE OCCURED.

FOR FURTHER INFO CONTACT:

PROGRAM MANAGER MIKE RILEY X70524  
FINAL LINE ENGINEER ED MAHONEY X67249

DISTRIBUTION: AL NADEAU STAN PREBLE JIM LEMAY  
BILL SPERA BILL TODD BOB HAIGH  
TED HAJJAR JUDY MENDES MIKE RILEY  
EUGENE SCHULZ

CLASS 1  
CLASS 2 X  
CLASS 3

WANG ECO

CONTROL NO 60291

ORIGINATOR: Charles Funk DEPT: 022 EXT: 78349 M/S: 014-49A DATE: 04/28/92 SHEET 1 OF

PART(S) AFFECTED:  
210-9583

P/N DESCRIPTION:  
CS TURBO MOTHERBOARD

MODEL(S) AFFECTED:  
2200 TURBO

DWG(S) AFFECTED:  
**PRELIMINARY**

DESCRIPTION OF CHANGE:

Change 80M for 210-9583 as follows:

WLI# Description QTY UM type  
ADD: 660-4026 Tape 1/16 thk 1/2 wide foam 0 ea 3

ECO TO BE

MAY 20 1992

REVIEWED

REASON/SYMPOM FOR CHANGE:

To prevent potential shorting problem when motherboard is installed in old CS cabinet. Tape is used as an insulator on solder side of the board.

PART(S) AFFECTED DISPOSITION

|                  |              |
|------------------|--------------|
| 1-Use As is      | 2-Rework     |
| 3-Scrap          | 4-Next Order |
| 5-See Remarks    |              |
| Cust. Field      | Fin. Stock   |
| Units Spare Ret. | Goods WIP    |
|                  | Next Order   |

|                  |   |   |                  |   |   |
|------------------|---|---|------------------|---|---|
| 1                | 1 | 2 | 2                | 2 | 2 |
| EFFECTIVITY DATE |   |   | CONFORMANCE DATE |   |   |

REMARKS:

|                                |           |                |        |
|--------------------------------|-----------|----------------|--------|
| CURRENT BUILD SITE INFORMATION | PB X IR   | PKWD ME TAI AU | WPR MX |
| APPROVALS                      | SIGNATURE |                | DATE   |

ECO CHAIRPERSON

PROGRAM MGR.

DESIGN ENG.

COMPLIANCE ENG.

SECURE SYSTEMS

ORIGINATOR Charles Funk 4/28/92

ECO ANALYST E. Dargatzoulis 5/4/92

OTHER

Rev 1

152

WANG ECO

CONTROL NO 59357

PRIORITY 1  
 PHASE-IN 2 **X**  
 DOCUMENTATION 3

Fed?

SHEET 1 OF 3

DATE: 08/05/91

M/S: 014-690

EXT: 70524

DEPT:

ORIGINATOR: Michael Riley

PART(S) AFFECTED:  
 458-5026

P/N DESCRIPTION:  
 COVER PANEL, REAR

MODEL(S) AFFECTED:  
 CS-D/cs-w

DWG(S) AFFECTED:  
 458-5026

## DESCRIPTION OF CHANGE:

Update Rear door assembly by adding Strip, Ground  
 458-7075...

**PRELIMINARY**

## DISPOSITION CODES:

1-Use As is 2-Rework  
 3-Scrap 4-Next Order 5-See Remarks

| Cust. | Field | Field | Fin.  | Stock | WIP | Next  |
|-------|-------|-------|-------|-------|-----|-------|
| Units | Spare | Ret.  | Goods |       |     | Order |
| 1     | 1     | 1     | 1     | 2     | 2   | 4     |

EFFECTIVITY DATE

CONFORMANCE DATE

REMARKS:

CURRENT  
 BUILD  
 SITE  
 INFORMATION

|    |      |    |     |
|----|------|----|-----|
| PB | PKWD | ME | WPR |
| X  |      |    |     |
| IR | TAI  | AU | MX  |

APPROVALS

SIGNATURE

DATE

**ECO TO BE****SEP 11 1991****REVIEWED**

## REASON/SYMPOM FOR CHANGE:

This ECO is needed to pass FCC for the new Turbo  
 System.... Release date for the system is 09/01/91

ECO CHAIRPERSON

PROGRAM MGR.

DESIGN ENG.

COMPLIANCE ENG.

SECURE SYSTEMS

ORIGINATOR

ECO ANALYST

OTHER

K.C. Yang

Michael Riley

Michael Riley

8/21/91

# TSO PRODUCT SUPPORT IMPACT REVIEW CHECKLIST

WANG ECO# 59357

OEM ECO# \_\_\_\_\_

PN# \_\_\_\_\_

1. WANG MODEL #s AFFECTED: CS-D, CS-N
2. WANG FRU(s) #s AFFECTED: NONE
3. IS THERE AN IMPACT ON WANG INSTALLED BASE? (If NO, go to 7) YES \_\_\_\_\_ NO X
4. OF MODEL #s IMPACTED - UNIT FAILURES EXPECTED?: ALL UNITS \_\_\_\_\_ SOME UNITS \_\_\_\_\_
5. HOW ARE THESE UNITS IMPACTED? (Check any that apply):

|                      |                    |                     |
|----------------------|--------------------|---------------------|
| SAFETY _____         | INTERMITTENT _____ | ENHANCEMENT _____   |
| FCC COMPLIANCE _____ | HARD FAILURE _____ | RELIABILITY _____   |
| TESTEST INTEG. _____ | CATASTROPHIC _____ | OTHER (See 7) _____ |

| 6. FLR DATA:    | Product Failure Data |       |          | Parts Related To ECO/PM |           |         |
|-----------------|----------------------|-------|----------|-------------------------|-----------|---------|
| Unit Population | Total                | Total | Fails    | Total                   | Reduction | Reduced |
| last 12 mo.     | Calls                | Fails | per Year | Used                    | by ECO/PM | PPY     |
| _____           | _____                | _____ | _____    | _____                   | X         | _____   |

|                        |         |                  |   |
|------------------------|---------|------------------|---|
| 7. FIELD REQUIREMENTS: | Level A | Information only | X |
|                        | Level B | TSM required     | : |
|                        | Level C | FCO required     | : |

|                  |           |                        |  |
|------------------|-----------|------------------------|--|
| FCO requirements | Next Call | Est. installation time |  |
|                  | Immediate | Est. # of units to FCO |  |

|                                               |         |                          |   |
|-----------------------------------------------|---------|--------------------------|---|
| 8. <sup>REPAIR CENTER</sup> FSC REQUIREMENTS: | Level A | Information only         | X |
|                                               | Level B | Upgrade on failure only  | : |
|                                               | Level C | Upgrade all assy's (MUR) | : |

|                            |         |                          |   |
|----------------------------|---------|--------------------------|---|
| 9. LOGISTICS REQUIREMENTS: | Level A | Information only         |   |
|                            | Level B | Future purchases         | X |
|                            | Level C | Purge stock (FSC rework) | X |

ANY OTHER INFO TO CLARIFY IMPACT: (S/W range, documentation (i.e. Product Maintenance Manual, Service Handbook, etc.), configurations, repair/test process(es), tooling, etc.)

ALL TURBO SYSTEMS MUST GO OUT WITH NEW DOOR. IF STOCK  
IS LOW REPLACE. OTHERWISE OLD DOOR ASSEMBLIES COULD BE USED  
WITH NON-TURBO SYSTEMS SOLD.

REVIEWER'S SIGNATURE: \_\_\_\_\_

*Michael Balin*

DATE: 9 / 9 / 91

(OVER FOR DEFINITIONS)  
WRITE CLEARLY AND USE BLACK INK

IS2

WANG ECO

CONTROL NO 59351

PRIORITY 1  
PHASE-IN 2 X  
DOCUMENTATION 3

ORIGINATOR: Michael Riley DEPT: EXT: 70524 M/S: 014-690 SHEET 1 OF 3 DATE: 08/05/81

PART(S) AFFECTED: 220-0447  
P/N DESCRIPTION: 2200 Terminal Cable  
MODEL(S) AFFECTED: DWG(S) AFFECTED: C 064821603  
CS, CS-D

DESCRIPTION OF CHANGE:  
Add 2 each 410-1055 Ferrite Beads; One to each end of the cable two inches down the connector.

**PRELIMINARY**

Change 220-0447 BOM as follows:  
Add: 410-1055- FERRITE Bead - Qty. 2 - U/M - EA.

ECO TO BE

SEP 11 1991

REVIEWED

REASON/SYMPOM FOR CHANGE:  
To pass FCC for the CS, CS-D, and Turbo Systems....

DISPOSITION CODES:

1-Use As is 2-Rework

3-Scrap 4-Next Order 5-See Remarks

| Cust. | Field | Fin. | Stock | WIP | Next  |
|-------|-------|------|-------|-----|-------|
| Units | Spare | Ret. | Goods |     | Order |
| 1     | 2     | 1    | 2     | 2   | 2     |
|       |       |      |       |     | 4     |

EFFECTIVITY DATE CONFORMANCE DATE

REMARKS:

|             |    |      |    |     |
|-------------|----|------|----|-----|
| CURRENT     | PB | PKWD | ME | WPR |
| BUILD       | X  |      |    |     |
| SITE        | IR | TAI  | AU | MX  |
| INFORMATION |    |      |    |     |

APPROVALS SIGNATURE DATE

ECO CHAIRPERSON

PROGRAM MGR. William C. [Signature] 8/21/91

DESIGN ENG. Michael Riley

COMPLIANCE ENG. [Signature]

SECURE SYSTEMS

ORIGINATOR Michael Riley

ECO ANALYST E. Jorgensen 8/5/91

OTHER



DRAWING # 6482-1603

ADD 2nd 410-1055

ITEM 9

C 64821603

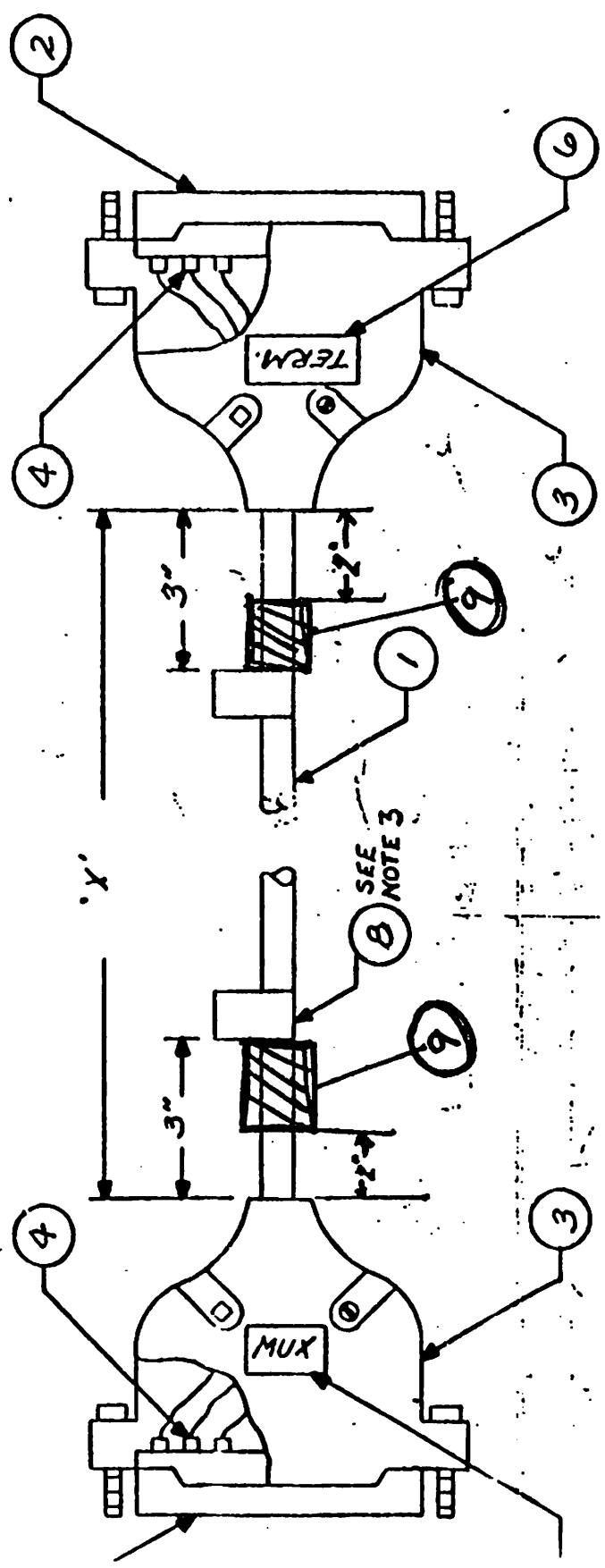
1 REV'd TO REV 1

DO NOT SCALE

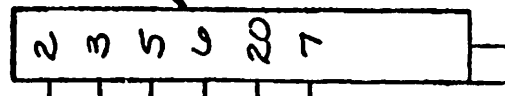
3

2

E



TERMINAL  
SEE  
NOTE  
4

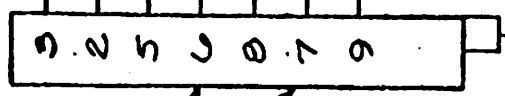


RED

WHT

GRN

BLK OF WHT-BLK



SEE  
NOTE 4

3/4"

WHT  
CO

1"

ECO NO 59351

SHT 2 OF

"1"

"5"

# TSO PRODUCT SUPPORT IMPACT REVIEW CHECKLIST

WANG ECO# 59351 OEM ECO# \_\_\_\_\_ PM# \_\_\_\_\_

1. WANG MODEL #s AFFECTED: CS, CS-D/N, TURBO SYSTEMS

2. WANG FRU(s) #s AFFECTED: 220-0447

3. IS THERE AN IMPACT ON WANG INSTALLED BASE? (If NO, go to 7) YES \_\_\_\_\_ NO ☒

4. OF MODEL #s IMPACTED - UNIT FAILURES EXPECTED?: ALL UNITS \_\_\_\_\_ SOME UNITS \_\_\_\_\_

5. HOW ARE THESE UNITS IMPACTED? (Check any that apply):

|                        |                    |                     |
|------------------------|--------------------|---------------------|
| SAFETY _____           | INTERMITTENT _____ | ENHANCEMENT _____   |
| FCC COMPLIANCE _____   | HARD FAILURE _____ | RELIABILITY _____   |
| TEST/TEST INTEG. _____ | CATASTROPHIC _____ | OTHER (See 7) _____ |

| 6. PLR DATA:<br>Unit Population | Product Failure Data |             |                | Parts Related To ECO/PM |                     |             |
|---------------------------------|----------------------|-------------|----------------|-------------------------|---------------------|-------------|
|                                 | Total Calls          | Total Fails | Fails per Year | Total Used              | Reduction by ECO/PM | Reduced FFY |
| last 12 mo. _____               | _____                | _____       | _____          | _____                   | _____               | _____       |

7. FIELD REQUIREMENTS:

|         |                  |       |
|---------|------------------|-------|
| Level A | Information only | _____ |
| Level B | TSE required     | _____ |
| Level C | FCO required     | _____ |

|                  |                 |                              |
|------------------|-----------------|------------------------------|
| FCO requirements | Next Call _____ | Est. installation time _____ |
|                  | Immediate _____ | Est. # of units to FCO _____ |

8. FSC REQUIREMENTS:

|         |                          |                                     |
|---------|--------------------------|-------------------------------------|
| Level A | Information only         | _____                               |
| Level B | Upgrade on failure only  | _____                               |
| Level C | Upgrade all assy's (MUB) | <input checked="" type="checkbox"/> |

9. LOGISTICS REQUIREMENTS:

|         |                          |                                     |
|---------|--------------------------|-------------------------------------|
| Level A | Information only         | _____                               |
| Level B | Future purchases         | <input checked="" type="checkbox"/> |
| Level C | Purge stock (FSC rework) | <input checked="" type="checkbox"/> |

ANY OTHER INFO TO CLARIFY IMPACT: (S/W range, documentation (i.e. Product Maintenance Manual, Service Handbook, etc.), configurations, repair/test process(es), tooling, etc.)

ALL CABLES GOING OUT THE DOOR MUST HAVE THIS ECO  
APPLIED TO PASS FCC.

REVIEWER'S SIGNATURE: Michael Baker DATE: 7/12/91

(OVER FOR DEFINITIONS)  
WRITE CLEARLY AND USE BLACK INK

To: Mike Bahia W0000600 6FLT3  
From: Norman V Lussier Security: Limited  
Subject: 212-9718 PRINTER/DISK CTL Date 01/03/95

---

Mike,

We are experiencing problems while testing the 212-9718. It appears that it is related to the R2 proms. During the printer test portion of the procedure the printer is outputting garbage. Any assistance you could provide would be appreciated.

Thank You  
Norman Lussier  
Logistics Test Support  
Ext. 87508

PROBLEM W/ R2 PROM RUNNING BRD REPAIR PRT TEST. DOES NOT PRINT OUT  
PROPERLY. CREATED ON-LINE TEST.

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# **WANG MULTIUSER BASIC-2/TURBO OPERATING SYSTEM REL 1.30.01 - CONTENTS**

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715-3997A

1st Edition - March 1994

## **PREFACE**

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## PREFACE

This Wang Multiuser BASIC-2/Turbo Operating System Customer Software Release Notice provides information about Release 1.30.01 of the Wang Multiuser BASIC-2/Turbo Operating System.

Intended for all users, this release notice is organized as follows:

- Chapter 1 provides an introduction to this release of the Wang Multiuser BASIC-2/Turbo Operating System software, including hardware and software requirements.
- Chapter 2 describes the enhancements added to this Wang Multiuser BASIC-2/Turbo Operating System.
- Chapter 3 describes the problems that are corrected in this release of the Wang Multiuser BASIC-2/Turbo Operating System.
- Chapter 4 discusses the special considerations needed to run this release of the software including known anomalies.
- Chapter 5 describes the contents of the media you can install on your system as part of this software release.
- Chapter 6 details how to install this operating system using 2 of the utilities included with the software.

Refer to the following documents for additional information about the Wang Multiuser BASIC-2/Turbo Operating System:

- CS-D User's Guide (715-2364A)
- BASIC-2 Utilities Reference Manual (700-3949A)
- Multiuser BASIC-2 Language Reference Manual (700-4080F)

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## CHAPTER 1 - INTRODUCTION

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### OVERVIEW

This chapter discusses the features of Release 1.30.01 of the Multiuser BASIC-2/Turbo Operating System and details the system hardware and software requirements.

### SUMMARY OF FEATURES

The Wang Multiuser BASIC-2/Turbo Operating System is designed for interactive programming and ease of use. This release, 1.30.01, is a general release replacing general release 1.10 as the operating system of choice on the CS/Turbo line of computers.

The following command calls have been enhanced or modified since the last general release of the Turbo O/S, 1.10:

|                 |                                   |
|-----------------|-----------------------------------|
| SCRATCHDISK&    | (newly supported in this release) |
| SELECT 3 ON/OFF | (newly supported in this release) |
| SELECT NEW/OLD  |                                   |
| MOVE            |                                   |

The following command calls were previously added or modified but were not documented in earlier CSRs:

\$MOVE!/\$MOVE&  
\$CLEAR xxx  
COM  
DIM  
GOSUB'/DEFFN'  
LIMITST  
PRINT # VERSION/PRINT # CPU

The following utilities have been enhanced or modified since the last general release of the Turbo O/S, rel 1.1:

BACKUP Utilities  
RESTORE Utilities  
DISK MANAGEMENT Utilities.....(previously DS Utilities)  
DOS Utilities  
FORMAT utility  
INITIALIZE DATE and TIME utility\*  
MOVE FILE utility  
MOVING a SELECTED LIST of FILES utility....(previously Make a Reference  
List of File Names)  
PARTITION GENERATOR utility  
PARTITION STATUS utility  
SYSTEM INSTALL utility

\* Minor change made to allow auto conversion to 'NEW' format. No further information is in this CSR.

## SYSTEM REQUIREMENTS

The following hardware and software requirements and concerns should be considered when changing over to Basic-2/Turbo Release 1.30.01.

### Hardware

must include:

- a Wang CS/386-400/800/1600/3200D/N or a CS-D/N, CS, or MicroVP with a Turbo upgrade (Turbo CPU board (210-9576A) and motherboard).
- Turbo CPU Board must have R3 Proms at locations L50 and L64. Place a service call and request FCO 1501, FCO Kit # 728-0443<sup>1</sup>.
- All MXF Controllers (212-9717) must have R4 proms at locations L7 and L14 of the 9579A I/O Processor Board. Place a service call and request FCO 1502, FCO Kit # 728-0444<sup>1</sup>.
- All 22C11-HS Printer/Disk Controllers (212-9718) must have R2 proms at locations L7 and L14 of the 9579-1A I/O Processor Board. Place a service call and request FCO 1503, FCO Kit # 728-0445<sup>1</sup>.
- a 2200 terminal
- a 5 1/4-inch diskette drive

<sup>1</sup> NOTE: If running O/S 1.18 or higher, proms should already be correct.

### Software

#### From Existing Turbo CPUs:

All software currently running on any supported Turbo Release is fully compatible with release 1.30.01. If using '3 Byte Addressing' (disk addresses greater than 16 Meg) please see Chapter 3, Corrected Problems.

#### From CS/386 CPUs:

All programs that run on the CS/386 should run on the Turbo without modification with the following exceptions:

- CPU Type Status Byte 9: partition status line byte 9 represents the CPU type. For the Turbo this byte is a 'T', on the CS/386 a 'W', and on the MVP/LVP/MicroVP/CS an 'M'. Programs using this byte will need to be updated to recognize the 'T'.
- Programs using the embedded CPU Prom ID Number as a security measure preventing programs from executing on other systems where the prom ID would be different.

#### From non-386 2200 CPUs (MVP, LVP, CS, etc.):

Most programs from non-386 2200 CPUs will run without modification. However, any program that makes a reference to a specific Operating System resource may require a change. These resources include:

- Imbedded CPU Prom ID Number: this number can be used by a programmer to provide security preventing programs from executing on other systems where the prom ID would be different.

- Partition Size: programs require more memory to execute on the Turbo and CS/386, approximately 80% more than on older 2200 CPUs. If a program makes a calculation based on partition size, a change may be required.
- CPU Type Status Byte 9: partition status line byte 9 represents the CPU type. For the Turbo this byte is a 'T', on the CS/386 a 'W', and on the MVP/LVP/MicroVP/CS an 'M'. Programs using this byte will need to be updated to recognize the 'T'.
- Partition Status Line Bytes 10 and 11: on the non-386 CPUs byte 10 denotes memory bank and byte 11 partition. With the Turbo there are no memory banks and both bytes are used for partition size.
- Floating Point Numbers: the 386 chip was built with 10 digit accuracy while the older CPUs provided accuracy to the 13th digit. If a program makes a decision based on the 11th to 13th digits to the right of the decimal point, a problem could occur as these numbers could be slightly different on the Turbo.
- Header Record for Programs: proper disk protocol requires the first byte of the header record for all programs in a disk catalog to be either 40, 50, 60, or 70. If the 2nd half of this byte is other than '0', an A01 error could occur loading this program even though on older systems this would not be a problem.
- 'NEW' or '386' Format: programs loaded into memory on the Turbo and CS/386 are converted into a '386' format. This conversion process can slow down load time of a program, especially when multiple program loads are occurring. Although with the speed of the Turbo this may not be that noticeable, it is recommended all programs on the system be converted to 'NEW' format for maximum performance. This can be done file by file with the SAVE command after executing a SELECT NEW command or by disk catalog using the \$MOVE! command. Unfortunately some programs containing long lines may require those lines to be split to enable conversion. The \$MOVE! will identify those lines but the actual change must be done manually. See Chapter 2, Enhancements for more information on SELECT NEW and \$MOVE!. Once converted to new format, a program will not run on the non-386 CPUs. They can be converted back if needed using the \$MOVE command with the & option.

Release 1.30.01 is user installable. Follow the instructions for installing the operating system as described in Chapter 6 or refer to the introductory or user manual supplied with your Turbo system. If your boot procedure has been customized or you are unfamiliar with the steps outlined for upgrading, you should contact your system's programmer or the Wang Regional Support Center at 1-800-247-9264.



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## CHAPTER 2 - ENHANCEMENTS

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### OVERVIEW

This chapter describes new features and enhancements provided in Release 1.30.01.

### ENHANCEMENTS OF RELEASE 1.30.01

#### Command Calls

##### **SCRATCHDISK&** (newly supported and enhanced in this release)

The '&' option has been added to the standard SCRATCHDISK command. It is used to create a 3 byte disk catalog on a DS or CS-D hard disk when used in conjunction with the DS R4 prom. It extends the allowable index size from 255 sectors to 65535 sectors and the catalog end from 65535 to 16,777,215, but not to exceed the available sectors at that address. For more information on 3 byte addressing read the write-ups in this section on the SELECT 3 ON/OFF and MOVE commands.

##### **SELECT 3 ON/OFF** (newly supported and enhanced in this release)

The SELECT 3 ON command is used with 3 byte addressing, an optional Turbo feature used in conjunction with the DS or CS-D R4 prom. It is used to tell the system to read a 3 byte field instead of 2 when using alphavariabls for addressing in disk commands. It also allows the system to accept sector addresses beyond 65535 in standard disk commands. Under the standard disk catalog method only 2 bytes are allowed for disk addresses which makes 65535 the highest address available. Three byte addressing provides 1 additional byte for each address entry in the disk catalog. This allows the user to create a disk catalog which can extend beyond 65535 sectors and/or an index greater than 256 sectors. Because alphavariabls can be used with some disk commands for sector addresses and are read from left to right, the system must know if a 2 byte field or a 3 byte field is to be read. This is the most critical purpose for this command. SELECT 3 must be set correctly if using alphavariabls for addresses in disk commands. Failure to have SELECT 3 set properly when using alphavariabls for sector addressing could corrupt your disk. If not using alphavariabls for sector addressing, SELECT 3 can be left ON. It will not otherwise affect operations with standard disk commands. New with this release, SELECT 3 ON is also used as a safety measure. It must be on to use sector addresses beyond 65535 with disk commands not using the '&' identifier to prevent accidental and inadvertent errors that could occur otherwise. The status, ON/OFF, for SELECT 3 can be checked with the LIST SELECT command.

**Note:** The DS R4 Prom upgrade can be ordered through Wang Telesales, telephone 1-800-TEL-WANG. It includes the prom, Disk Utilities Software, and documentation needed to upgrade your DS or CS-D. Model number for the upgrade: 200-DSR4UJ price: \$99.50

## **SELECT NEW/OLD** (enhancement in this release)

The SELECT NEW command causes all programs saved to disk using the SAVE or RESAVE command to be written to disk in 'NEW' or '386' format. Standard 2200 programs are normally stored on disk in a binary-coded-decimal format. On the non-386 CPUs, this was the native format used by the operating system. The 386 processor does not recognize this format and requires programs to go through a conversion process when loading into memory. This conversion can negatively affect program load performance. If stored in NEW format on disk, conversion is no longer necessary. Some programs may require certain lines to be split in order to be stored on disk in 'NEW' format. Because programs require more space in this format, long lines of 190 bytes or more could exceed the 256 byte line limit when converted which would cause an error during conversion. A new command available with the Turbo can help to automate the conversion. See the write-up in this section on the \$MOVE! command for more details. Programs in 'NEW' format can be identified with a LIST DCT command by a (') next to the 'P' in the file 'TYPE' field.

New with this release, once executed for a partition, SELECT NEW remains active until the SELECT OLD command is executed. Also with this release, all files<sup>1</sup> have been modified as necessary to convert to 'NEW' format smoothly without requiring any line splits.

- <sup>1</sup> NOTE: The boot menu program, @BOOT, must not be converted to 'NEW' format. It must be in standard 2200 format or the system will hang during the standard boot procedure used to load the O/S.

SELECT OLD causes all programs written to disk with the SAVE or RESAVE command to be stored in the original binary-coded-decimal format recognized by the non-386 CPUs. This is the default on power up.

## **MOVE** (enhancement in this release)

The MOVE command has been enhanced to dynamically allow the creation of a 3 byte index or a 2 byte index on the output disk regardless of the index type on the input disk. The syntax for this is as follows:

|                     |                                             |
|---------------------|---------------------------------------------|
| MOVET/Dxx, TO&T/Dxx | creates a 3 byte index on the output disk   |
| MOVET/Dxx, TO'T/Dxx | creates a 2 byte type 1 index on the output |

After the 2nd address, the index size (LS=#) and catalog size (END=#) can optionally be given by using a comma between each field given. If not given, the MOVE command creates the same index type on the output as found on the input. For more information on 3 byte addressing read the write-ups in this section on SELECT 3 ON and SCRATCH DISK&.

## **\$MOVE!/&** (new command with Turbo previously undocumented)

The \$MOVE!/& command was added in Turbo release 1.0 but was never documented. It provides a semi-automated process for converting standard 2200 programs to and from 'NEW' or '386' format. See the

write-up on the SELECT NEW command in this section for an explanation of 'NEW' or '386' format.

Conversion to 'NEW' format is highly recommended for maximum performance. (See note<sup>1</sup> under SELECT NEW in this section for exception.) Once in 'NEW' format, programs cannot be read on non-386 CPUs. They can be converted back to 'OLD' with \$MOVE&. Programs in new format can be identified with a LIST DCT command by a (') next to the 'P' in the file 'TYPE' field.

With this command the user can convert either an individual program or all programs on a specified disk from 'OLD' to 'NEW' format during a 'MOVE'. If for some reason a program can not be converted, the program name, an error code, and the line number if appropriate where the conversion failed will be displayed on the screen. Most errors occur because of long program lines. Programs in 'NEW' format take more memory and if an existing program line contains approximately 190 characters or more, on conversion it will likely exceed the 255 character line limit. If this is the case, the line would need to be manually split. For added convenience, this command also has an option to save the names of all files it is unable to 'MOVE' in a datafile. Once the indicated problem for these files is resolved this datafile can then be used with the \$MOVE! to try again to convert these same files. Existing files on the output disk are not affected. If the program already exists on the output disk it will not be moved. Only program files are moved with this command. The 'MOVE a SELECTED LIST of FILES' or 'MOVE FILE' utility can be used to move existing data files for the same disk. Also note that these programs will also take up more disk space after conversion. Programs in both BCD (OLD) format and '386' (NEW) format may reside on the same disk.

The syntax for this command is as follows:

```
$MOVE ! T /Dxx , "program" TO T /Dxx , "outfile"
 & #x "infile" #x
```

- ! - option to convert program/s from 'OLD' to 'NEW'
- & - option to convert program/s from 'NEW' to 'OLD'
- /Dxx - opt after 1st T, input addr; after 2nd T, output addr
- #x - opt after 1st T, input file #; after 2nd T, output file #
- "program" - option to convert only this program name given
- "infile" - optional data file on the input address consisting of the program names that failed to convert, originally created by the \$MOVE! as "outfile".
- "outfile" - optional datafile name which must be open on the output address which will store the filename, error code, and line number for each program that cannot be converted.

outfile/infile format: 16 byte entry for each program that fails to convert:

|                  |                |
|------------------|----------------|
| First 8 bytes    | - program name |
| 9th & 10th bytes | - error code   |
| Last 6 bytes     | - line number  |

**\$CLEAR xxx** (new command with Turbo previously undocumented)

The \$CLEAR command is used to clear the printer buffer on the 22C11-HS Printer/Disk Controller. xxx is the address of the printer port.

**COM** (command enhancement for Turbo previously undocumented)

The COM command has been enhanced to accept larger 2 dimensional arrays as follows:

COM A\$(65535)124 limits on all supported non-Turbo CPUs  
COM A\$(up to available memory)124 Turbo only

Note: The MATMERGE, MATSORT, MATMOVE, and MATSEARCH commands will not support array parameters beyond 255. When using these MAT commands on the Turbo, care must be taken to insure the 255 limit is not exceeded. Data integrity could be affected.

**DIM** (command enhancement for Turbo previously undocumented)

The DIM command has been enhanced to accept larger 2 dimensional arrays as follows:

DIM A\$(65535)124 limits on all non-Turbo CPUs  
DIM A\$(up to available memory)124 Turbo only

Note: The MATMERGE, MATSORT, MATMOVE, and MATSEARCH commands will not support array parameters beyond 255. When using these MAT commands on the Turbo care must be taken to insure the 255 limit is not exceeded. Data integrity could be affected.

**GOSUB'/DEFFN'** (command enhancement for Turbo previously undocumented)

The integer parameter used with marked subroutines for GOSUB'/DEFFN' has been increased from 0-255 to 0-65535 for Turbo only.

GOSUB'0-65535 (arguments)  
DEFFN'0-65535 (arguments)

**LIMITS T** (command enhancement for Turbo previously undocumented)

Two new arguments have been added to the LIMITS command now giving it 6 arguments. The 2 new fields are index sector and index type. These 2 new fields are only supported on the Turbo.

LIMITS T "filename",A,B,C,D,E,F

where: A is start sector  
B is end sector  
C is sectors used  
D is status  
E is index sector  
F is index type

## **Utilities**

### **Backup Utilities**

Backup Utilities is a new menu pick from the main menu which encompasses the available backup to disk and tape procedures that come with the Turbo operating system. It includes the 'Backup Platter' utility and DS disk to tape backup program. Backups created with these utilities must be restored with the corresponding Restore Utility program. The SCSI disk to tape program is also included for those sites using the unreleased 22C11-SCSI Controller.

### **Restore Utilities**

Restore Utilities is a new menu pick from the main menu which encompasses the available restore from disk and tape procedures that come with the Turbo operating system. It includes the 'Recover from Backup' utility and DS tape to disk restore program. These utilities are to be used specifically with the corresponding Backup Utility program. The SCSI tape to disk restore program is also included for those sites using the unreleased 22C11-SCSI Controller.

### **Format Disk Platter**

The FORMAT program has been updated to allow creation of a 3 byte index. To allow this option, remove both instances of REM% from line 935. The REM% command provides compatibility to both the CS/386 and the non-386 CPUs by hiding commands not supported on those CPUs. To set up a 3 byte address, type in 'TRI' as the index type when creating the index after formatting.

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## CHAPTER 3 - CORRECTED PROBLEMS

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### OVERVIEW

This chapter discusses the problems corrected in Release 1.30.01.

### PROBLEMS CORRECTED IN RELEASE 1.30.01

Release 1.30.01 corrects a number of reported problems to the operating system since the last general release, 1.1. In addition, it also includes corrections to problems identified with some of the utility programs.

#### Operating System

The following problems are corrected in this release. Some of the problems listed may not have been present in the previous general release, 1.1, but may have occurred due to changes made to resolve an existing problem in 1.1 or a subsequent maintenance release.

Corrects a problem with assigning Printer Drivers to address 204 for terminals beyond the first 16.

Fixes a problem where a MXE TC port might not show up in the Device Table as well as problems hogging those TC addresses.

Corrects a problem where with 3 byte addressing there could be a problem saving multiple data files with DATA SAVE DC OPEN.

Corrects a problem where math calculations resulting in an exponent greater than E99 could give an incorrect answer when they should give an error.

Resolves the terminal hang issue associated with the LINPUT and KEYIN commands where the terminal would intermittently not respond to a keyboard entry.

Corrects a problem where printer drivers would not show up for any controller following an MXE or MXD.

Corrects a problem where if using address 405 to PRINT to the screen, linefeeds would not be suppressed.

Allows the SCSI floppy to read a 256 byte 360K or 1.2M 2200 diskette.

Corrects a problem where a rewind or retension of SCSI tape would fail with a virgin tape.

Corrects a problem where if a REM% was followed by a hex 7D or hex 7E character, all subsequent commands on the same line would be ignored.

Corrects an intermittent hang which could occur when mux'ing 2 CPUs to 2 disk drives if 2 or more partitions from each CPU were hogging addresses in both disk units.

If a program was enlarged to require an additional sector and resaved within a program, the RESAVE would appear to successfully execute but the saved file would be blank.

If in immediate mode a string of 87 1s were added in a PRINT command, the O/S would blow and the system would need to be rebooted. Other long string combinations could also cause problems.

Commands on the same line as a DEFFN' command may not execute if in a Global with a higher partition # than the calling partition.

The RENAME command could corrupt data if used with a 3 byte address.

The LOADDAT and SAVEDAT commands would not work on a 3 byte address beyond 65534.

If an address with more than 65535 sectors had been scratched as a standard 2 byte catalog with less than 65535 sectors, a MOVEEND command beyond 65535 could be executed without an error and could corrupt the index. Now it correctly returns an illegal value.

If a COPY command resulted in an error, the address involved could be locked out to all other users unless that same partition issues a RESET or reaccesses that address before another partition does.

If an address with 65535 sectors or more was scratched for 65535 sectors, the End Catalog Area would show an invalid address. To set the Catalog End to 65535, a 3 byte address must be created.

The MOVE command would cause the Catalog End to be set to the Current End. It now correctly uses the Catalog End from the input address unless otherwise specified.

A SCRATCH statement with an index greater than 255 sectors or a catalog greater than 65535 would automatically create a 3 byte index. SCRATCHDISK& must now be used with any value requiring a 3 byte catalog, otherwise an error P34, illegal value will occur.

The COPY and VERIFY commands would not work with addresses of 65535 or higher with SELECT 3 ON.

File name entries saved to a 3 byte index were positioned 1 sector off on releases 1.1 and 1.15 and could not be found specifically by name with corrected releases. Sector 0 was not being used. File entries which should have been in the last sector of the index would end up in the first sector following the index if a program immediately followed the index. If a datafile followed the index, index entries could be written farther out in the catalog possibly corrupting files.

## Utilities

### Disk Management Utilities ver 1.1 (formerly DS Utilities)

The following problems were corrected in the DS Configuration program since release 1.1 of the Turbo Operating System:

The configuration program will now appropriately respond to other responses besides 'Y' when responding to the 'Apply Y or N?' prompt to partition the hard disk drives in a DS unit with an R4 prom.

Corrected the configuration utility Default option to respond correctly. Would intermittently give an 'illegal' message.

System will now warn you if a configuration filename is used which already exists and will ask to "Overwrite, Y/N?".

Several changes were made to insure proper screen display. On some screens lines could be bumped up or off the screen and on others messages were not properly cleared away.

Updated prompts that accepted alpha responses to accept both small and capital letters.

When running the configuration utility to partition the drives, entering a sector address greater than 65535 is no longer accepted with the non-Turbo CPUs.

When running the configuration utility to partition the drives, indicating yes to use the DS Defaults now correctly assigns drives on Drive Select 1 and 2 to Master addresses and drives on Drive Select 3 and 4 to Slave addresses.

If running the configuration utility to partition the drives, the program will now indicate an 'Illegal Configuration' if a drive is not connected to Drive Select 1.

### DOS Utilities

The following problem was corrected in the DOS Utilities:

If an error occurs formatting the B drive, the utility will not indicate an error with the A drive. The following error message is returned: 'Read Error or bad Write'.

### Format Disk Platter utility (ver 2.0)

The following problems have been corrected in release 2.0 of the Format Utility since release 1.1 of the Turbo Operating System:

The utility will now always recognize the 5 1/4" drive and ask if a DOS or 2200 format is to be used.

The utility will now display the format error message immediately should it occur instead of returning to the 'Mount disk' screen.



The Format Utility will now return the 'Format Completed' message after doing a DOS format to a 5 1/4" floppy.

The Format Utility now properly recognizes if a 5 1/4" floppy has an index already when choosing a DOS format and will ask if you still want to format.

The Format Utility will now recognize a Phoenix removable disk or an LVP DSDD floppy drive and format it.

Address B10 is now recognized as a removable address.

### **Move File utility**

The following problems were corrected in the Move File utility since release 1.1 of the Turbo Operating System:

Line 290 has been split to allow conversion to 'NEW' format on the fly.

If moving a file or files to a 3 byte address would come back and indicate output file full. Now returns message "3 Byte Addressing not supported".

### **Moving a Selected List of Files** (formerly Make a Reference List of File Names)

The following problems have been corrected in this utility since release 1.1 of the Turbo Operating System:

This utility will now test for a 3 byte index and if found will indicate 3 byte addressing is not supported.

This utility has been updated to properly work with a 2275 floppy when used with the Turbo. Due to an unresolved Turbo bug with the 22C11-HS Controller, when testing the floppy in a 2275 unit the system would verify the entire disk and fail with an I98 instead of verifying just the first sector as requested in the program.

### **Partition Generation program**

The following problems have been corrected in the Partition Generation program since release 1.1 of the Turbo O/S:

A configuration larger than 8 Meg can now be successfully created. Previously a 'partition too large' message would display.

A configuration with more than 16 partitions created on a Turbo can no longer be inadvertently loaded on a CS/386 CPU blowing the operating system. The message, "Invalid Configuration" is returned.

A compatibility issue with non-386 CPUs has been corrected which could cause an "invalid configuration" message when booting the same configuration for a second time.

## **Partition Status program**

The following problem has been corrected in the Partition Status program since release 1.1 of the Turbo O/S:

When running the Partition Status program from a terminal without a 'NEXT' or 'PREV' key, there was no way to tell how to display partitions beyond the first 16. A message is now displayed indicating SF'12/NEXT for next screen, SF'13/PREV for previous screen.

## **System Install utility**

The following problem has been corrected in the System Install utility since release 1.1 of the Turbo O/S:

The install program now checks for a 3 byte address at both the input and output addresses and will indicate 3 byte addresses are not supported if one is found.

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## CHAPTER 4 - SPECIAL CONDITIONS

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### OVERVIEW

This chapter discusses the special conditions for this release of the Wang Multiuser BASIC-2/Turbo Operating System software.

### SPECIAL CONDITIONS

This release of the Operating System requires:

- a CS/386-400/800/1600/3200N/D or a CS, CS-D/N, or MicroVP with a Turbo upgrade (CPU/Mbrd). The CPU board (p/n 210-9576A) must have rev R3 proms at locations L50 and L64 per FCO 1501, p/n 728-0443<sup>1</sup>.
- All 2236MXF Controllers (p/n 212-9717) must have the latest proms, revision R4 at locations L7 and L14 of the 210-9579A I/O Processor Board per FCO 1502, p/n 728-0444<sup>1</sup>.
- All 22C11-HS Printer/Disk Controllers (p/n 212-9718) must have the latest proms, revision R2 at locations L7 and L14 of the 210-9579-1A I/O Processor Board per FCO 1503, p/n 728-0445<sup>1</sup>.

The System Install utility has been specifically modified to work with this release of the Turbo O/S. Older versions are not compatible. See Chapter 6 for details on installing Release 1.30.01.

<sup>1</sup> NOTE: If running O/S 1.18 or higher, proms should already be correct.

### KNOWN ANOMALIES

The following is a list of known anomalies with Turbo release 1.30.01 as of the date of this publication.

Workstation intensive processes can be negatively impacted when upgrading from Turbo O/S 1.1 when running at the same time as certain disk processes. This problem would be completely dependent on the job mix running. If you believe you are encountering this problem or something similar, contact the Wang Regional Support Center at 1-800-247-9264. There is an alternative operating system available, release 1.25 which should resolve this condition.

Circumvention: 1) Avoid running disk intensive processes while heavy screen activity is taking place. 2) Change to release 1.25 Turbo O/S.

The High Speed printer buffer has a 1 character overflow. If the data string sent to the printer exceeds the remaining space in the buffer a hang occurs.

Circumvention: 1) Avoid big print jobs to slow printers. 2) Use a faster printer on the HS port. 3) Use a standard printer controller.

A GIO sequence which works with the 386 and on the old bus to determine if the printer is READY or NOT READY can cause the 22C11-HS disk port to hang or severely slow down.

Circumvention: 1) Do not test for READY using GIO commands when using the HS printer port. 2) Use a standard printer controller.

A special machine code command to check printer ready can cause a problem with the high-speed printer port on the 22C11-HS. This program works perfectly with the old bus indicating READY or NOT READY as applicable. On the 22C11-HS, READY is usually indicated even without a printer connected. If the command is looped on while the printer is deselected, within approximately 5-10 minutes the system is hung until the printer is selected.  
Circumvention: 1) Do not test for READY using GIO commands when using the HS printer port. 2) Use a standard printer controller.

After a warm boot, \$INIT"SYSTEM", if using a printer with a buffer such as the PM017 on the 22C11-HS, some garbage characters will print out preceding the first printed data.  
Circumvention: 1) After a warm boot run a print test to clear the printer's buffer. 2) Power the printer off and on after a warm boot.

Intermittent I90 errors occur if using the 22C11-HS Mux port. The more terminals controllers in the Turbo the more likely the problem.  
Circumvention: Use the 22C80 Disk Controller for muxing in place of the high speed Mux port.

If using the 22C11-HS Mux port to boot, all other CPUs using the common 2275MUX will be locked out of all access through that controller until @GENPART is loaded.  
Circumvention: Use the 22C80 Disk Controller for muxing in place of the high speed Mux port.

If a Turbo housing a 2275MUX is powered off and on, all access by secondary CPUs through the 2275MUX will hang until either RESET is keyed on the CPU attempting access or the Turbo accesses that address.  
Circumvention: If this situation should occur, key RESET on the hung CPU or try to boot from the mux'd drive immediately after reapplying power even if no O/S resides there.

If boot diagnostics are executed on the Turbo through a 22C80, all disk access by other CPUs through the common 2275MUX will hang until the diagnostics are exited.  
Circumvention: Do not run boot diagnostics from a mux'd drive when that drive is needed by other systems. Run on-line tests which are much more effective.

VERIFY does not work properly with the 2275 if verifying just sector 0 using the 22C11-HS. The entire disk is verified.  
Circumvention: Verify at minimum sectors 0 and 1.

The MAT MERGE/MOVE/SEARCH/SORT will accept arrays with parameters exceeding 255 rows or columns. However, the system cannot reliably handle data beyond those limits. Manipulating an array in a MATMOVE which exceeds those parameters can result in system hangs or data integrity errors.  
Circumvention: Add a program check that limits the size of any array used with MAT commands to a maximum size of 255.

The INPUT CURSOR command may intermittently hang.  
Circumvention: Avoid using this command.

LISTS & LISTSD do not work correctly to a system or terminal printer. If the printer requires a printer driver it will not linefeed. If the printout should take more than 1 screen, the 2nd screen does not occur.

Circumvention: 1) Avoid using the S option with printers which use a print driver. 2) Use line numbers to signify first and last lines to list.

If 2 partitions are constantly accessing the same DS, only 1 with SELECT H ON, the partition using SELECT H ON will hang until the 2nd partition finishes if using the 22C11-HS.

Circumvention: It is recommended not to use SELECT H if using a 22C11-HS Controllers or in a mux'd system configuration.

MXF Octopus ports will not give a DTR indication to a modem. Therefore they will not support a remote terminal. Ports 1 and 2 are OK.

Circumvention: Use the first 2 MXF ports for remote terminals or use MXE boards for remotes.

Some TC functions which run correctly on the MXE may fail with the MXF. Certain GIO commands used to 'send control vector' may hang or result in error.

Circumvention: Use the MXE board to handle these cases.

If RESET is keyed during a GIO/005 command to an MXF port, intermittently subsequent GIO commands will no longer execute or will hang the port. Must reboot to correct. Problem is more persistent with ports 2-16.

Circumvention: If this issue is a problem use the MXE board for this purpose.

The PRINT AT command does not position properly with the MXF in some cases if a HEX(0A) is part of the command.

Circumvention: Remove the HEX(0A) or change the line given in the PRINT AT command.

If using 2 22C11-HS Controllers, the 2nd 22C11-HS always fails the 'System Interface Card Test' but only on the first pass.

Circumvention: Not necessary if aware of problem. On line tests are recommended for proper testing.

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## CHAPTER 5 - MEDIA CONTENTS

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### OVERVIEW

This chapter describes the contents of this release of the Wang Multiuser BASIC-2/Turbo Operating System.

### MEDIA CONTENTS OF RELEASE 1.30.01

This section describes the diskettes included in the Wang Multiuser BASIC-2/Turbo Operating System, Release 1.30.01.

| Number of       |             |                                                                          |
|-----------------|-------------|--------------------------------------------------------------------------|
| Part Number     | Diskettes   | Comments                                                                 |
| 291-1001-C      | 4           | 3 360K & 1 1.2M 5 1/4-inch Double-Sided Double-Density 2275/DS diskettes |
| which includes: |             |                                                                          |
| 731-8026-C      | Disk 1 of 3 | Boot files only                                                          |
| 731-8027-C      | Disk 2 of 3 | @GENPART, drivers and standard utilities                                 |
| 731-8028-C      | Disk 3 of 3 | Disk and DOS utilities                                                   |
| 734-8446-C      | Disk 1 of 1 | Complete 1.30.01 O/S on 1.2M                                             |

The following 77 files are included with Release 1.30.01:

| FileName              | Type    | Disk # | Function                                |
|-----------------------|---------|--------|-----------------------------------------|
| .STARTD               | Data    | 2      | System menu support                     |
| * @.BACKUP            | Program | 3      | Backup Utilities Menu                   |
| * @.DISK              | Program | 3      | Disk Management Utilities Menu          |
| * @.RESTOR            | Program | 3      | Restore Utilities Menu                  |
| @@                    | Data    | 1      | Initial O/S boot file                   |
| @2236MXF <sup>a</sup> | Data    | 1      | MXF Terminal Controller microcode       |
| @22C11HS <sup>a</sup> | Data    | 1      | High Speed Printer/Disk Cntlr microcode |
| @22C11SS <sup>a</sup> | Data    | 1      | SCSI Controller microcode               |
| @BACKUP               | Program | 2      | BACKUP utility                          |
| @BOOT                 | Program | 1      | Menu for bootstrap                      |
| @CLOC <sup>a</sup>    | Program | 2      | Initialize date and time                |
| @DATE                 | Data    | 2      | Date file                               |
| @DG2                  | Program | 1      | Menu for system diagnostics             |
| @DM50/V0              | Data    | 2      | Printer driver                          |
| @DOS                  | Program | 3      | DOS command processor emulation         |
| @DOS.HLP              | Data    | 3      | DOS help screen data                    |
| @DOSCOPY              | Program | 3      | DOS copy command emulation              |
| @DOSCYCS              | Program | 3      | Copy DOS to/from 2200                   |
| @DOSDCPY              | Program | 3      | DOS disk copy                           |
| @DOSDEL               | Program | 3      | DOS file delete                         |
| @DOSDIRP              | Program | 3      | DOS dir command emulation               |
| @DOSDIRW              | Program | 3      | DOS dir command in widescreen format    |
| @DOSEXIT              | Program | 3      | Exit DOS                                |
| @DOSFORM <sup>a</sup> | Program | 3      | DOS format command emulation            |
| @DOSHELP              | Program | 3      | DOS help screen display program         |
| @DOSREN               | Program | 3      | DOS rename command emulation            |
| @DOSSET               | Program | 3      | DOS setup program                       |

|   |                       |         |   |                                          |
|---|-----------------------|---------|---|------------------------------------------|
|   | @DOSSTRT              | Program | 3 | DOS start program                        |
|   | @DOSTYLP              | Program | 3 | DOS file to printer via type command     |
|   | @DOSTYPE              | Program | 3 | DOS type command emulation               |
| * | @DOSUTIL              | Data    | 3 | DOS utility names data file              |
|   | @DOScfi               | Data    | 3 | DOS disk related data                    |
|   | @DOSfmt1              | Data    | 3 | Data file for DOS format                 |
|   | @DOSfmt2              | Data    | 3 | Data file for DOS format                 |
|   | @DSAPPLY              | Program | 3 | Apply hard disk config for DS w/ R4 prom |
|   | @DSCFIG <sup>a</sup>  | Program | 3 | DS configuration program                 |
|   | @DSCFIGP              | Program | 3 | DS disk protect program                  |
|   | @DSTAPEB <sup>a</sup> | Program | 3 | DS tape backup                           |
|   | @DSTAPER              | Program | 3 | DS tape restore                          |
|   | @FAST-HS <sup>a</sup> | Data    | 2 | Backup of standard @22C11HS microcode    |
|   | @FORMAT <sup>a</sup>  | Program | 2 | Format disk platter                      |
|   | @GEN.386              | Program | 2 | Memory size for 386 CPUs                 |
|   | @GENPART <sup>a</sup> | Program | 2 | Partition Generator                      |
|   | @HITRATE              | Program | 3 | DS Cache hit rate program                |
| * | @HQ300V0              | Data    | 2 | Printer driver for HQ200/HQ300           |
|   | @INSTALL <sup>a</sup> | Program | 2 | System install                           |
|   | @LASRV1               | Data    | 2 | Printer driver for Laserjet printer      |
|   | @MENU                 | Program | 2 | System menu program                      |
|   | @MODSYSF              | Program | 2 | Convert system configuration file        |
|   | @MOVE1                | Program | 2 | Overlay for @MOVEFIL and @INSTALL        |
|   | @MOVEFIL <sup>a</sup> | Program | 2 | Move file                                |
|   | @MRTIAN               | Program | 2 | Game                                     |
|   | @MVP <sup>a</sup>     | Data    | 1 | Operating System microcode               |
|   | @MXEO                 | Data    | 1 | MXE Terminal Controller microcode        |
|   | @PM010V2              | Data    | 2 | Printer driver                           |
|   | @PM016V3              | Data    | 2 | Printer driver                           |
|   | @PM017V3              | Data    | 2 | Printer driver                           |
|   | @PM018V3              | Data    | 2 | Printer driver                           |
|   | @PM060V0              | Data    | 2 | Printer driver                           |
|   | @PSTAT <sup>a</sup>   | Program | 2 | Partition status utility                 |
|   | @RAMDISK              | Program | 3 | Manage DS RAM disk size                  |
|   | @RECOVER              | Program | 2 | Recover from backup                      |
| * | @SCSICFG              | Program | 3 | SCSI configuration program               |
| * | @SCTAPEB              | Program | 3 | SCSI tape backup                         |
| * | @SCTAPER              | Program | 3 | SCSI tape restore                        |
|   | @SLOW-HS              | Data    | 2 | @22C11HS microcode for use with Phoenix  |
|   | @SYSFILE <sup>a</sup> | Data    | 2 | MVP configuration file                   |
|   | @SYSMPB <sup>a</sup>  | Program | 2 | Menu for System Utilities                |
|   | @TO.CRE0              | Program | 2 | Load or create a reference file          |
|   | @TO.CREF <sup>a</sup> | Program | 2 | Create reference file                    |
|   | @TO.DISK              | Program | 2 | Copy to disk                             |
|   | @TO.SUBS              | Program | 2 | Overlay for @TO.DISK/IMAGE               |
|   | @TOIMAGE              | Program | 2 | Copy to disk image                       |
| * | @VERCPUB              | Program | 3 | Verify CPU type for SCSI backup          |
| * | @VERCPUC              | Program | 3 | Verify CPU type for SCSI config program  |
| * | @VERCPUR              | Program | 3 | Verify CPU type for SCSI restore         |
|   | START                 | Program | 2 | Calls System Utilities menu              |

\* These files have been added since the last general release of the BASIC-2/Turbo Operating System, version 1.10.

<sup>a</sup> These files have been modified since the last general release of the BASIC-2/Turbo Operating System, version 1.10.

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## CHAPTER 6 - INSTALLATION

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### OVERVIEW

This chapter describes how to install this release of the Wang Multiuser BASIC-2/Turbo Operating System. There are several easy ways to install this new release either manually file by file or by using the utilities supplied with the operating system. In this section we will cover how to install this release including all utilities using the System Install Utility or just selected Operating System files using the Move File Utility.

### INSTALLATION PROCEDURE

#### System Install Utility

The 'System Install' Utility allows you to move all the latest operating system files and utilities from the 3 360K diskettes or the 1 1.2M included with this release to your system boot disk. The 'Install' program included with this release has been customized specifically for this release. Earlier versions will not move all files and may be unable to locate others. A listing of the files in this release along with a brief description is given in Chapter 5, Media Contents. From that list the following 3 files will not be copied if they currently reside on the output disk:

|          |          |                                  |
|----------|----------|----------------------------------|
| .STARTD  | datafile | system menu support              |
| START    | program  | used to call system utility menu |
| @SYSFILE | datafile | MVP configuration file           |

By not updating these 3 files your program start up, (LOAD RUN), will remain the same and your current system configuration as well as any additional configurations saved remain intact. One change to note. If your system currently boots automatically to a main menu or date screen, after the update it will now stop with the partition generation program screen. To complete the boot proceed as follows:

|              |                                       |
|--------------|---------------------------------------|
| key SF'15    | to load your last configuration used  |
| key Y Return | to accept & execute the configuration |
| key Return   | to accept the standard password       |

This should return you to your standard boot up screen. To reinstitute the auto boot process follow these steps once any current programs running on the terminal being used are completed:

|                                            |                                 |
|--------------------------------------------|---------------------------------|
| key Shift/RESET                            | to clear screen                 |
| key CLEAR Return                           | clear memory for this terminal  |
| LOAD DCT/Dxx,"@GENPART"                    | loads partition generation prog |
| key 100, then hit the EDIT key, then SF'15 | displays line 100 on the screen |

should read: 100 GOTO 1150: REM % Delete this GOTO for AUTO EXEC  
if correct: use left arrow or SF'13 to move cursor to 1st G after 100  
key INSERT or SF'10 4 times creates a space  
key in REM Return negates the GOTO  
RESAVE DCT/Dxx,"@GENPART" saves change on disk  
key CLEAR Return clear memory again

Reload your system programs to return to normal operation.



To run the System Install utility use the following steps:

- 1) Make a full backup of your system disk where the O/S resides.
  - 2) Insure all processes on the terminal to be used are completed:
  - 3) Key: Shift/Reset to clear the screen.
  - 4) Type in: SELECT DISK Dxx Return xx will be 10, 20, or 30, the address of your diskette drive.
  - 5) If using a 1.2M drive insert disk 4 or otherwise use diskette 2 of 3 of the release 1.30.01 Operating System.
  - 6) Key: LOAD RUN Return loads the System Utilities menu
  - 7) Use the Space Bar key to highlight 'System Install'.
  - 8) Key: RUN displays Input address screen
  - 9) Input address = D10  
Enter: D10, D20 or D30 Return usually same as step 4
  - 10) (with 360K diskettes only) Insert diskette 1 of 3 in Input Drive selected in step 9. Remove diskette 2 of 3 if same drive.
  - 11) Output address = D11  
Enter: Dxx Return enter address where O/S resides, usually D11, D21, or D31
  - 12) Input disk contains CS/Turbo O/S. Install Y/N?  
Enter: Y Return yes to install if indicates Turbo  
Begins process of moving new files to system disk.
- \*Skip to step 17 if using the 1.2M Disk 4. Use 13-16 with 360K disks.\*
- 13) When requested remove diskette 1 of 3 and insert diskette 2 of 3 in the Input drive.
  - 14) Key: Return to continue install process
  - 15) When requested remove disk 2 and insert disk 3 in the Input drive.
  - 16) Key: Return to complete the install process
- 17) 'Completed Software Installation.' will display when done.  
Reboot system to load the new operating system.

If you have questions on upgrading your operating system or the preceding procedure, contact your system's programmer or the Wang Regional Support Center at telephone number 1-800-247-9264.

## Move File Utility

The 'Move File' Utility allows you to move all or selected files from 1 disk address to another with the option of overwriting if desired. For our purposes we will limit the discussion to just the updating of the operating system microcode files, '@MVP', '@2236MXF', '@22C11HS' and '@22C11SS'. To update other selected files from the list in chapter 5 of this document, use this same utility or the 'Moving a Selected List of Files' utility. For additional information on these 2 utilities, both included with this software, refer to the Basic-2 Utilities Reference Manual, part number 715-3949A.

To update just the operating system files, '@MVP', '@2236MXF', '@22C11HS', and '@22C11SS' using the 'Move File' utility, follow these steps:

- 1) Make a full backup of your system disk where the O/S resides.

- 2) Insure all processes on the terminal to be used are completed:
- 3) Key: Shift/Reset to clear the screen.
- 4) Type in: SELECT DISK Dxx Return xx will be 10, 20, or 30, the address of your diskette drive.
- 5) Insert disk 4 if using a 1.2M drive, otherwise diskette 2 of 3 of the release 1.30.01 Operating System.
- 6) Key: LOAD RUN Return loads the System Utilities menu
- 7) Use the Space Bar key to highlight 'Move File'.
- 8) Key: RUN displays Input address screen
- 9) Input address: D11  
Enter: D10, D20 or D30 Return usually same as step 4
- 10) Input platter type: W  
Enter: Return W indicates Wang type disk
- 11) (with 360K diskettes only) Insert diskette 1 of 3 in Input Drive selected in step 9. Remove diskette 2 of 3 if same drive.
- 12) Output address: D10  
Enter: Dxx Return xx is the address where the O/S resides, usually D11, D21, or D31
- 13) Output platter type: W  
Enter: Return W indicates Wang type disk
- 14) Do you wish to move all active files? N  
Enter: Return N to selectively enter files
- 15) Input file name: @MXEO  
key in: @MVP Return to move the operating system
- 16) Extra Sectors: 00000  
key: Return to accept default
- \*17) Output file name: @MVP  
key: Return to accept default or enter new name for output file (see \* below)
- 18) If a new file name was given, the file is now copied. Otherwise, if the file name exists, will ask if you want to overwrite?  
Enter: Y Return to update operating system
- 19) Once the 'move' is completed the screen will prompt for another file.
- Repeat steps 15-17 for @2236MXF, @22C11HS, and @22C11SS. Do not rename.
- Key: Shift/Reset to end Move and clear screen
- 20) Type in: SELECT DISK Dxx xx is address where your system's programs reside
- 21) Key: LOAD RUN standard return to main menu

To use the new O/S once this procedure has completed, reboot the system.

\* The Operating System can be renamed something other than @MVP on the output disk. This would be required to have more than 1 O/S file at the same address. If this is necessary, the file name is restricted to 4 characters total and must start with @. An example would be '@TUR'. The file @BOOT must then be manually updated to include an entry with the new file name. The @BOOT file is used to provide a menu with the O/S choices and diagnostics which normally displays during the boot procedure.

**WARNING** The file @BOOT does have size restrictions that prevent the system from successfully booting if too many lines are added.

If you have questions on upgrading your O/S, contact your programmer or the Wang Regional Support Center at telephone number 1-800-247-9264.

MT-SORTC FLOPPY

MT-SORT HARD

DENIS ALLAIRE

514.861-9571 X311

1010 SELECT @PART"COMMON"

: PRINT HEX(03)

1040 DIM O\$(16)62

1070 SELECT #3/D12

30 GOSUB '46(1,0,0,HEX(0B))

1190 MAT REDIM D9\$(16)62

: D9\$()=O\$()

1200 O\$()=ALL(FF)

: STR(O\$(),992)=HEX(00)

\* 1220 DIM B\$(55)18,L\$(128)2,Z

1290 COM CLEARZ

\* 1300 DIM M\$(649,55)18,R\$(650)1,W\$(649)2

1380 B\$()=ALL(FF)

\* 1390 FOR X=1 TO 649

: GOSUB '53(11,X," ")

: GOSUB '54(B9(4),3,0,0,4)

: STR(M\$( ),990\*(X-1)+1,990)=D9\$()

: NEXT X

: Y=0

1400 R\$()=ALL(01)

A : R\$(650)=HEX(00)

-1410 L\$()=ALL(FF)

k : MAT MERGE M\$( ),(1,18) TO R\$( ),W\$( ),L\$( )

k : MAT SEARCHL\$( ),=HEX(0000) TO M9\$( ) STEP 2

: IF M9\$(1)=HEX(00 00) THEN E6=128

: ELSE E6=INT((VAL(M9\$( ),2)-1)/2)

: IF E6=0 THEN 1410

-1420 E7=E6

k : MAT MOVE M\$( ),L\$( ),E7 TO B\$(E3+1)

: F=5+G

: PRINT AT(F,H); "E7="; E7, "E3="; E3,

: H=H+25

: IF H=75 THEN G=G+1

: IF H=75 THEN H=0

: GOSUB 1430

: E6=E6-E7

: IF E6&lt;1 THEN 1410

k : L\$( )=STR(L\$( ),E7\*2+1)

: GOTO 1420

-1430 MAT SEARCHB\$( ),=HEX(FF FF) TO M9\$( ) STEP 18

: E3=INT((VAL(M9\$( ),2)-1)/18)

: IF E3&lt;0 THEN E3=55

: IF E3&gt;=55 THEN GOSUB 1580

: RETURN

-1580 STR(D9\$( ),E3\*18+1)=ALL(FF)

: STR(D9\$( ),992)=HEX(00)

: STR(D9\$( ),1,E3\*18)=B\$( )

1590 Y=Y+1

: PRINT HEX(01 0A); Y

A : GOSUB '54(40296,3,1,0,4)

: B\$()=ALL(FF)

: E3=0

: RETURN

PTR C41-7495 VECTROCOM

M2/21541 ALFA COLOR

! 4 BYTE LENGTH LOCATOR ARRAY

! 4 BYTE LENGTH LOCATOR ARRAY

PG 14-14 MOVE ARRAY CANNOT EXCEED 255 ON

EITHER DIMENSION

M\$(649,55)

11/1/94 WHEN \* CHANGES MADE:

1410 MAT MERGE R\$( ) P51 VAR TOO SHORT

1300 R\$(650)2

1410 MAT MERGE L\$( ) P53 OUT OF RANGE

1220 L\$(649)4

MT-SORT!

1410 MAT MERGE L\$( ) P56 OUT OF RANGE

1220 L\$(35645)4

MT-SORT!

1300 DIM M\$(649,55)18 A02 NOT ENUF MEM

MBM TO 1750

1410 MAT MERGE L\$( ) P56 SUBSCRIPT OUT OF RANGE

|        |   |      |      |      |      |      |      |
|--------|---|------|------|------|------|------|------|
| B\$ (  | - | 1220 | 1380 | 1420 | 1430 | 1580 | 1590 |
| B9 (   | - | 1390 |      |      |      |      |      |
| D9\$ ( | - | 1190 | 1390 | 1580 |      |      |      |
|        | - | 1420 | 1430 | 1580 | 1590 |      |      |
|        | - | 1410 | 1420 |      |      |      |      |
| E7     | - | 1420 |      |      |      |      |      |
| F      | - | 1420 |      |      |      |      |      |
| G      | - | 1420 |      |      |      |      |      |
| H      | - | 1420 |      |      |      |      |      |
| L\$ (  | - | 1220 | 1410 | 1420 |      |      |      |
| M\$ (  | - | 1300 | 1390 | 1410 | 1420 |      |      |
| M9\$ ( | - | 1410 | 1430 |      |      |      |      |
| O\$ (  | - | 1040 | 1190 | 1200 |      |      |      |
| R\$ (  | - | 1300 | 1400 | 1410 |      |      |      |
| W\$ (  | - | 1300 | 1410 |      |      |      |      |
| X      | - | 1390 |      |      |      |      |      |
| Y      | - | 1390 | 1590 |      |      |      |      |
| Z      | - | 1220 | 1290 |      |      |      |      |

1410 LA=ALL (FF): STOP: MATMERGE: HEXPRINT

# 1.15 SCRATCHDISK 8T/D16, LS=4, END=38000

| MOVED 10 FILES FROM 340 |               | D16 |     | OLD INDEX |      |
|-------------------------|---------------|-----|-----|-----------|------|
| INDEX                   | SECTOR        |     |     |           |      |
| ✓ 5                     | 1. C22C11HS D |     |     | 340       | 4 22 |
| 3                       | ✓ 2. CC       | 23  | 78  | 23        | 78   |
| 1                       | ✓ 3. CMXEØ    | 79  | 158 | 79        | 158  |
| ✓ 6                     | 4. CMRTIAN P  | 159 | 230 | 159       | 230  |
| 3                       | ✓ 5. CPMOIOVZ | 231 | 239 | 231       | 239  |
| 1                       | ✓ 6. CSYSMVPE | 240 | 245 | 240       | 245  |
| ✓ 7                     | 7. CDOSTYPE P | 246 | 259 | 246       | 259  |
| 1                       | ✓ 8. CSCSICFG | 260 | 313 | 260       | 313  |
| 3                       | ✓ 9. CFORMAT  | 314 | 366 | 314       | 366  |
| ✓ 8                     | 10. CPSTAT P  | 367 | 387 | 367       | 387  |

[ ] NOT LISTING ON 1.15

$$\begin{matrix} \text{D16} & & \text{340} \\ 4 & = & 4 \end{matrix}$$

|   |             |          |       |     |                     |
|---|-------------|----------|-------|-----|---------------------|
| 5 | 17-32 DIF   | C22C11HS | ENTRY | 340 | 0006 F206 0706 A008 |
| 6 | 17-32 DIF   | CMRTIAN  | ENTRY | 340 | 00E9 F9FE 3E8B 4603 |
| 7 | 161-176 DIF | CDOSTYPE | ENTRY | 340 | 0000 3EC6 4602 00BB |
| 8 | 65-80 DIF   | CPSTAT   | ENTRY | 340 | 0001 B00D E606 3EF6 |

## D18 SCRATCHDISK 8T/D18, LS=4, END=38000

| INDEX | SECTOR        |  |
|-------|---------------|--|
| ✓ 4   | 1. CMRTIAN    |  |
| 4     | 2. C22C11HS   |  |
| 3     | ✓ 3. CC       |  |
| 1     | ✓ 4. CMXEØ    |  |
| 3     | ✓ 5. CPMOIOVZ |  |
| 1     | ✓ 6. CSYSMVPE |  |
| ✓ 4   | 7. CDOSTYPE   |  |
| 1     | ✓ 8. CSCSICFG |  |
| 3     | ✓ 9. CFORMAT  |  |
| ✓ 4   | 10. CPSTAT    |  |

D16 + D18 LABATED ON OTHERSIDE w/ 1.15

LOAD 1.30.01

LISTDCT/D16

C-MXEØ

C-SYS MVPB

C-SCSICFG

C-C

C-PMOIOV2

C-FORMAT D82 ON LOAD

FILE STATUS

10 ACTIVE

21 RE-USED SCRATCH ENTRY

00 DATA FILE

80 PROG OLD FORMAT

40 PROG NEW FORMAT

PF10 FIND HEX STRING 1000 ACTIVE DATAFILE

5 1000 0000 0400 0016 4032 3243 3131 4853

KEY EDIT TO ENTER DISPLAY MODE

PF10 FIND HEX STRING 1000

HALTS IF FINDS MATCH

EDIT PF10 HEX STRG START SECTOR END SECTOR RET

TO RESTART

FIND HEXSTRING 2100

FIND HEXSTRING 1080

6 1080 0000 9F00 00E6 4040 5254 4941 4E20

7 1080 0000 F600 0103 4044 4F53 5459 5045

8 1080 0001 6F00 0183 4050 5354 4154 2020

MOVE FILES FOUND TO INDEX using  
TOOLBOX EDIT

MOVET/D16, TO 8T/340, LS=4, END=4000

C-FORMAT ✓

C-MRTIAN D82

C-SCSICFG ✓

159

C-PMSTAT ✓

LOAD DAT/D16, (159)

C-SYS MVPB ✓

C-DOSTYPE ✓

LIST DCT/D18

C-MXEØ

C-SYS MVPB

C-SCSICFG

C-C

C-PMOIOV2

C-FORMAT D82 ON LOAD

SCRATCHDISK 8T/340, LS=4, END=4000

MOVET/D18, TOT/340, I98 END ON D18=38000

MOVET/D18, TO 8T/340, LS=4, END=4000

C-MXE 4 83

C-SYS MVPB 84 89

C-SCSICFG 90 143

C-C 144 199

C-PMOIOV2 200 208

C-FORMAT 209 261

LOAD TOOLBOX

CHANGE INDEX SIZE FROM 0200 04  
TO 0200 05

LISTDCT/D18

ALL 10 FILES LIST

C-MRTIAN 4 75

MOVET/D18, TO 8T/340, LS=4, END=4000

LISTDCT/340

ALL 10 FILES THERE

C-MRTIAN ✓

C-FORMAT ✓

C-SCSICFG ✓

C-PMSTAT ✓

C-SYS MVPB ✓

C-DOSTYPE ✓

WORKS IF PROGRAM FIRST

October 27, 1993  
Wang Laboratories, Inc.  
1 Industrial Avenue  
Lowell, MA 01851 USA

Release Notes  
for  
CS/386 TURBO Maintenance Release 1.30.01  
for beta test

This Turbo Maintenance Release, 1.30.01, represents the latest Turbo Operating System software now available for beta test. The @MVP microcode file has been modified to correct a number of unique problems. The release number was bumped from 1.18 to 1.29 and then to 1.30 to prevent any confusion with existing test, beta, and older pre-releases of the Turbo Operating Systems.

- Note 1: Use of maintenance release 1.18 and above requires new prompts on the CPU board at locations L50 and L64, and on all Turbo Controllers (MXF, 22C11-HS, and 22C11-SCSI) at locations L7 and L14 of the 210-9579 I/O Processor. These prompts are only available from R&D and/or Product Support at this time.
- Note 2: If upgrading from Turbo General Release 1.10 or Turbo Maintenance Release 1.15 and using Three Byte Addressing, a compatibility problem exists with O/S 1.18 and higher. A bug exists on 1.1 and 1.15 which moves the index up 1 sector but only on a 3 byte address. It may also result in index entries which normally should be in the last index sector being written out in the catalog area. A 3 byte address can easily be identified on a LIST of a disk by the & sign immediately following the the right most digit of the 'INDEX SECTORS =' entry. On 1.1 or 1.15, any file entries that the system tries to place in the last sector of the index could be a problem. If the first file was a program, this problem could be harmless because the first sector of a program contains just the filename and the index can work around it. If the first file following the index is a data file, a data integrity problem could exist. Writing to that data file could overwrite index entries that should be in the last sector of the index. Adding files to that address could result in the index entry be written out in the catalog area. Although filenames which should be located in the last sector can be loaded if programs or read or written to if data, they will not show up on a LIST.

On 1.18 and higher, 3 Byte indices have been corrected to start at sector 0. This results in an inability of the O/S to locate a file explicitly by name if on a 3 byte address created by 1.1 or 1.15. A D82, 'File not Found', is issued even though the file may show on a standard LIST. This is also the case if the 3 byte address was created on 1.18 or higher and the system was downgraded to 1.1 or 1.15. Explicit reference to a filename will fail because in each case the O/S is looking 1 sector off and not finding the file. Special care will need to be taken when upgrading to 1.30.01 from 1.1 or 1.15 to insure no files are lost. If a MOVE disk command is used with 1.18 or above to MOVE a 3 byte address created with 1.1 or 1.15, filenames in the last sector of the index (actually last sector + 1) will not be moved. If you are using 3 byte addressing on 1.15 or 1.1 please contact Product Support before upgrading to insure this problem is properly addressed. Failure to fully comprehend the situation could result in a number of files being lost. Release 1.30.01 is the minimum release recommended for 3 Byte Addressing. See also 'Clarification' for additional related information.

The following list highlights in brief the problems fixed and modifications made to the operating system since the last General Release of the Operating System, release 1.10:

- corrects problem with assigning Printer Drivers to address 204 for terminals beyond the first 16. (1.16)
- fixes problem where a MXE TC port might not show up in the Device Table as well as problems hogging those TC addresses. (1.16)
- corrects problem where with 3 byte addressing selected there could be a problem saving multiple data files with DATA SAVE DC OPEN. (1.16)
- corrects problem where calculations greater than E99 could give an incorrect answer, should give an error. (1.17)
- resolves the terminal hang issue associated with the LINPUT and KEYIN commands where the terminal would intermittently not respond to a keyboard entry. (1.18)
- corrects a problem where printer drivers would not show up for any controller following an MXE or MXD. (1.18)
- corrects a problem where if using address 405 to PRINT to the screen, linefeeds would not be suppressed. (1.18)
- allows the SCSI floppy to read a 256 byte 360K or 1.2M 2200 diskette. (1.18)
- corrects problem where a rewind or retension of SCSI tape would fail with a virgin tape. (1.18)
- corrects problem where if a REM% was followed by a hex 7D or hex 7E character, all subsequent commands on the same line would be ignored. (1.18Q)
- corrects an intermittent hang which could occur when mux'ing 2 CPUs to 2 disk drives if 2 or more partitions from each CPU were hogging both mux'd units. (1.18Q)
- if a program was enlarged to require an additional sector and resaved within a program, the RESAVE would appear to successfully execute but the saved file would be blank. (1.29.00)
- if in immediate mode a string of 87 1s were added in a PRINT command, the O/S would blow and the system would need to be rebooted. Other long string combinations could also cause problems. (1.29.00)
- SELECT NEW would default to OLD after a CLEAR or LOADRUN. Now, the only way to change the NEW/OLD default is with the SELECT command. SELECT OLD is still the default on power up. (1.29.00)
- a line with a DEFFN' statement may not execute any command following it on the same line if in a Global with a higher partition #. (1.29.00)
- the RENAME command could corrupt the disk if renaming a program on a 3 byte address. (1.30.00)
- the LOADDAT and SAVEDAT commands would not work on a 3 byte address beyond 65534. (1.30.00)
- if an address with more than 65534 sectors had been scratched as a 2 byte catalog with less than 65535 sectors, a MOVEEND command beyond 65535 could be executed without an error and could corrupt the index. Now it correctly returns an illegal value for any number beyond 65534. (1.30.00)
- if a COPY command resulted in an error, the address involved could be locked out to all other users unless that same partition issues a RESET or reaccesses that address before another partition does. (1.30.00)
- If an address with 65535 sectors or more was scratched for 65535 sectors, the End Catalog Area would show an illegal address. To set the Catalog End to 65535, a 3 byte address must be created. (1.30.00)
- the MOVE command would cause the Catalog End to be set to the Current End. It now correctly uses the Catalog End from the input address unless otherwise specified. (1.30.00)



- COPY command would not work with an address of 65535 or higher with SELECT 3 ON with Rel 1.30.00. (1.30.01)
- VERIFY would not work with an address of 65535 or higher with SELECT 3 ON with Rel 1.30.00. (1.30.01)

#### Enhancements:

The MOVE command has been enhanced to dynamically allow the creation of a 3 byte index or a 2 byte index on the output disk regardless of the index type on the input disk. The syntax for this is as follows:

```

MOVET/Dxx,TO&T/Dxx creates a 3 byte index on the output disk
MOVET/Dxx,TO'T/Dxx creates a 2 byte Type 1 index on the output

```

After the 2nd address, the index size (LS = #) and catalog size (END = #) can optionally be given by using a comma after the last address and after the index size if both options are used. If not specified the MOVE command will create the same type index on the output disk as existed on the input disk. As previously defined, specifying the index size or catalog end without the ' or & will cause a default to a type 1 index. Without the & an index size greater than 256 or a catalog end greater than 65534 will cause an error.

#### Clarification:

SELECT 3 ON/OFF - is used in conjunction with 3 byte addressing, an optional Turbo feature with the new DS or CS-D R4 prom. Three Byte Addressing provides 1 additional byte for each address entry when creating a disk catalog. This enables the user to create a disk catalog which can extend beyond 65534 sectors and/or an index greater than 256 sectors. Because alphavariabls can be used within certain disk commands to specify the sector address, the system must now be able to identify whether the alphavariabls is 2 or 3 bytes long. This is the main purpose of the SELECT 3 command. SELECT 3 must be on to read a 3 byte address when using an alphavariabls for a sector address in a DATLOAD or DATASAVE command. Subsequently, a SELECT 3 OFF command must be issued from the same partition if switching back to a 2 byte address in an alphavariabls. Failure to set SELECT 3 ON and OFF appropriately when using alphavariabls for sector addresses will likely corrupt your disk. Additionally, unless explicitly identified as a 3 byte command (use of & in a SCRATCH or MOVE), SELECT 3 is required for the system to accept an address beyond sector 65534 in a disk command.

#### Known anomalies:

##### PERFORMANCE:

1. CPU intensive processes can be negatively impacted when upgrading from Turbo O/S 1.1 to O/S 1.18 or higher when running at the same time as certain disk processes. CPU intensive processes seem to have priority on 1.1 where disk I/O seems to have priority on 1.18 and above.

##### 22C11-HS HIGH SPEED PRINTER PORT:

2. The High Speed printer buffer has a 1 character overflow. If the data string sent to the printer exceeds the remaining space in the buffer a hang occurs.

3. A special machine code command to check printer ready can cause a problem with the high-speed printer port on the 22C11-HS. This program works perfectly with the old bus indicating READY or NOT READY if you deselect the printer. On the 22C11-HS, READY is usually indicated even without a printer connected. If the command is looped on while the printer is deselected, within approximately 5-10 minutes the system is hung until the printer is selected.
4. A GIO sequence which works with the 386 and on the old bus to determine if the printer is READY or NOT READY if used with the 22C11-HS can cause the disk port on that board to hang or severely slow down.
5. After a warm boot, \$INIT"SYSTEM", if using a printer with a buffer such as the PM017 on the 22C11-HS, some garbage characters will print out preceding the first printed data.

#### MUXing DISKS:

6. Intermittent I90 errors occur if using the 22C11-HS Mux port. The more terminals controllers in the Turbo the more likely the problem.
7. If using the 22C11-HS Mux port to boot, all other CPUs using the common 2275MUX will be locked out of all access through that controller until @GENPART is loaded.
8. If a Turbo housing a 2275MUX is powered off and on, all access by secondary CPUs through the 2275MUX will hang until either RESET is keyed on the CPU attempting access or the Turbo accesses that address.
9. If boot diagnostics are executed on the Turbo through a 22C80, all disk access by other CPUs through the common 2275MUX will hang until the diagnostics are exited.

#### DISK RELATED:

10. VERIFY does not work properly with the 2275 if verifying just sector 0 on the 22C11-HS. The entire disk is verified.

#### SPECIFIC COMMAND RELATED:

11. The INPUT CURSOR command may intermittently hang.
12. LISTS & LISTSD do not work correctly to a system or terminal printer. If the printer requires a printer driver it will not linefeed. If the printout should take more than 1 screen, the 2nd screen does not occur.

#### SELECT H:

13. If 2 partitions are constantly accessing the same DS, only 1 with SELECT H ON, the partition using SELECT H ON will hang until the 2nd partition finishes if using the 22C11-HS.

#### MXF:

14. MXF Octopus ports will not give a DTR indication to a modem. Therefore they will not support a remote terminal. Ports 1 and 2 are OK.
15. If RESET is keyed during a GIO/005 command to an MXF port, intermittently subsequent GIO commands will no longer execute or will hang the port. Must reboot to correct. Problem is more persistent with ports 2-16.
16. The PRINT AT command does not position properly with the MXF in some cases.

OTHER:

17. If using the Make a Reference List of File Names Utility (Moving a Selected List of Files on newer releases) and after selecting your files, option 4 is used to save the list in a program file, an error A02 occurs on line 30, which is a COM statement.

18. If using 2 22C11-HS Controllers, the 2nd 22C11-HS always fails the 'System Interface Card Test on the first pass only.

Included with the enclosed software is a TEST SITE Agreement to be signed and returned to Wang. Please notify me of any problems which may occur or for any questions.

Sincerely,

Mike Bahia  
2200 Product Support  
M/S 019-690  
Tel: 508-656-0256

0116D

TURBO REL 1.30.01 TESTING PRE-RELEASE

SYSTEM TEST  
10/26/93

RILEY'S TURBO MXF/MXE/MXE

D30  
SCSI

D10  
CS-D DPU-2275MUX

24 TERMINALS

4 RUNNING INSTRUCTION EXERCISER

2 RUNNING "WRD35D37"

1 DISK TEST "BRIAN"

1 2236DE DEMO

1 DISK BENCHMARK

2 BENCHMARK

24 HOURS →

10/27/93

GLOBAL BUG AS / BUG LISTING 9/1/93, #1. M8/22721, M5/17018

RENAME

w/ 3 BYTE. M2/20153

LOADDAT

w/ 3 BYTE

\$M Z!T/D<sup>36</sup>xx, TOT/D<sup>3E</sup>xx, w/ 3 BYTE

\$MOVE!/D36, "Z" TOT/D3F, Z IN 70000, BOTH ADDRESS USE 3 BYTE INDEX

RENAME w/ FILE ABOVE 65534

COPY

BEYOND END OF DISK CAUSING HANG.

MOVE

CAUSING CATALOG END TO = CURRENT END ON OUTPUT DISK

MOVET/D<sup>16</sup>xx, TO ~~8~~ D<sup>340</sup>xx, LS=4, END=4000

SCRATCHDISKT/, END=65535 ON SCSI CORRUPTING INDEX

SELECT NEW

PRINT 1+1+1 IN IMMEDIATE MODE.

MOVET<sup>END</sup>/D38=65535 - MUST BE 3 BYTE INDEX TO ACCEPT 65535 & ABOVE OR ERR P34.

Handwritten notes in the top section of the page, including the word "SOLUTION" and various illegible phrases.

Handwritten notes in the middle section of the page, including the word "SOLUTION" and various illegible phrases.

Handwritten notes in the bottom section of the page, including the word "SOLUTION" and various illegible phrases.

October 7, 1993  
Wang Laboratories, Inc.  
1 Industrial Avenue  
Lowell, MA 01851 USA

Release Notes  
for  
CS/386 TURBO Maintenance Release 1.30.00  
for beta test

This Turbo Maintenance Release, 1.30.00, represents the latest Turbo Operating System software now available for beta test. The @MVP microcode file has been modified to correct a number of unique problems. The release number was bumped from 1.18 to 1.29 and then to 1.30 to prevent any confusion with existing test, beta, and older pre-releases of the Turbo Operating Systems.

- Note 1: Use of maintenance release 1.18 and above requires new prompts on the CPU board at locations L50 and L64, and on all Turbo Controllers (MXF, 22C11-HS, and 22C11-SCSI) at locations L7 and L14 of the 210-9579 I/O Processor. These prompts are only available from R&D and/or Product Support at this time.
- Note 2: If upgrading from Turbo General Release 1.10 or Turbo Maintenance Release 1.15 and using Three Byte Addressing, a compatibility problem exists with O/S 1.18 and higher. A bug exists on 1.1 and 1.15 which moves the index up 1 sector but only on a 3 byte address. A 3 byte address can easily be identified on a LIST of a disk by the & sign immediately following the the right most digit of the 'INDEX SECTORS =' entry. On 1.1 or 1.15, any file entries that are placed in the last sector of the index would actually be in the first sector of the first file of the catalog. If the first file was a program, this problem could be harmless because the first sector of a program contains just the filename and the index can work around it. If the first file following the index is a data file, a data integrity problem could exist. Writing to that data file could overwrite index entries in the last sector of the index. Adding files to that address could result in an entry in the last sector of the index which would overwrite data in that file. Additionally, although filenames located in the last sector can be loaded if programs or read or written to if data, they will not show up on a LIST.

On 1.18 and higher, 3 Byte indices have been corrected to start at sector 0. This results in an inability of the O/S to locate a file explicitly by name if on a 3 byte address created by 1.1 or 1.15. A D82, 'File not Found', is issued even though the file may show on a standard LIST. This is also the case if the 3 byte address was created on 1.18 or higher and the system was downgraded to 1.1 or 1.15. Explicit reference to a filename will fail because in each case the O/S is looking 1 sector off and not finding the file. Special care will need to be taken when upgrading to 1.30 from 1.1 or 1.15 to insure no files are lost. If a MOVE disk command is used with 1.18 or above to MOVE a 3 byte address created with 1.1 or 1.15, filenames in the last sector of the index (actually last sector + 1) will not be moved. If you are using 3 byte addressing on 1.15 or 1.1 please contact Product Support before upgrading to insure this problem is properly addressed. Failure to fully comprehend the situation could result in a number of files being lost. Release 1.30 is the minimum release recommended for 3 Byte Addressing. It includes fixes for a number of 3 byte problems. See also 'Clarification' for additional related information.

The following list highlights in brief the problems fixed and modifications made to the operating system since the last General Release of the Operating System, release 1.10:

- corrects problem with assigning Printer Drivers to address 204 for terminals beyond the first 16. (1.16)
- fixes problem where a MXE TC port might not show up in the Device Table as well as problems hogging those TC addresses. (1.16)
- corrects problem where with 3 byte addressing selected there could be a problem saving multiple data files with DATA SAVE DC OPEN. (1.16)
- corrects problem where calculations greater than E99 could give an incorrect answer, should give an error. (1.17)
- resolves the terminal hang issue associated with the LINPUT and KEYIN commands where the terminal would intermittently not respond to a keyboard entry. (1.18)
- corrects a problem where printer drivers would not show up for any controller following an MXE or MXD. (1.18)
- corrects a problem where if using address 405 to PRINT to the screen, linefeeds would not be suppressed. (1.18)
- allows the SCSI floppy to read a 256 byte 360K or 1.2M 2200 diskette. (1.18)
- corrects problem where a rewind or retension of SCSI tape would fail with a virgin tape. (1.18)
- corrects problem where if a REM% was followed by a hex 7D or hex 7E character, all subsequent commands on the same line would be ignored. (1.18Q)
- corrects an intermittent hang which could occur when mux'ing 2 CPUs to 2 disk drives if 2 or more partitions from each CPU were hogging both mux'd units. (1.18Q)
- if a program was enlarged to require an additional sector and resaved within a program, the RESAVE would appear to successfully execute but the saved file would be blank. (1.29.00)
- if in immediate mode a string of 87 ls were added in a PRINT command, the O/S would blow and the system would need to be rebooted. Other long string combinations could also cause problems. (1.29.00)
- SELECT NEW would default to OLD after a CLEAR or LOADRUN. Now, the only way to change the NEW/OLD default is with the SELECT command. SELECT OLD is still the default on power up. (1.29.00)
- a line with a DEFFN' statement may not execute any command following it on the same line if in a Global with a higher partition #. (1.29.00)
- the RENAME command could corrupt the disk if renaming a program on a 3 byte address. (1.30.00)
- the LOADDAT and SAVDAT commands would not work on a 3 byte address beyond 65534. (1.30.00)
- if an address with more than 65534 sectors had been scratched as a 2 byte catalog with less than 65535 sectors, a MOVEEND command beyond 65535 could be executed without an error and could corrupt the index. Now it correctly returns an illegal value for any number beyond 65534. (1.30.00)
- if a COPY command resulted in an error, the address involved could be locked out to all other users unless that same partition issues a RESET or reaccesses that address before another partition does. (1.30.00)
- If an address with 65535 sectors or more was scratched for 65535 sectors, the End Catalog Area would show an illegal address. To set the Catalog End to 65535, a 3 byte address must be created. (1.30.00)
- the MOVE command would cause the Catalog End to be set to the Current End. It now correctly uses the Catalog End from the input address unless otherwise specified.

## Enhancements:

The MOVE command has been enhanced to dynamically allow the creation of a 3 byte index or a 2 byte index on the output disk regardless of the index type on the input disk. The syntax for this is as follows:

|                    |                                             |
|--------------------|---------------------------------------------|
| MOVET/Dxx,TO&T/Dxx | creates a 3 byte index on the output disk   |
| MOVET/Dxx,TO'T/Dxx | creates a 2 byte Type 1 index on the output |

After the 2nd address, the index size (LS = #) and catalog size (END = #) can optionally be given by using a comma after the last address and after the index size if both options are used. If not specified the MOVE command will create the same type index on the output disk as existed on the input disk. As previously defined, specifying the index size or catalog end without the ' or & will cause a default to a type 1 index. Without the & an index size greater than 256 or a catalog end greater than 65534 will cause an error.

## Clarification:

SELECT 3 ON/OFF - is used in conjunction with 3 byte addressing, an optional Turbo feature with the new DS or CS-D R4 prom. Three Byte Addressing provides 1 additional byte for each address entry when creating a disk catalog. This enables the user to create a disk catalog which can extend beyond 65534 sectors and/or an index greater than 256 sectors. Because alphavariabls can be used within certain disk commands to specify the sector address, the system must now be able to identify whether the alphavariabls is 2 or 3 bytes long. This is the main purpose of the SELECT 3 command. SELECT 3 must be on to read a 3 byte address when using an alphavariabls for a sector address in a DATALOAD or DATASAVE command. Subsequently, a SELECT 3 OFF command must be issued from the same partition if switching back to a 2 byte address in an alphavariabls. Failure to set SELECT 3 ON and OFF appropriately when using alphavariabls for sector addresses will likely corrupt your disk. Additionally, unless explicitly identified as a 3 byte command (use of & in a SCRATCH or MOVE), SELECT 3 is required for the system to accept an address beyond sector 65534 in a disk command.

## Known anomalies:

### PERFORMANCE:

1. CPU intensive processes can be negatively impacted when upgrading from Turbo O/S 1.1 to O/S 1.18 or higher when running at the same time as certain disk processes. CPU intensive processes seem to have priority on 1.1 where disk I/O seems to have priority on 1.18 and above.

### 22C11-HS HIGH SPEED PRINTER PORT:

2. The High Speed printer buffer has a 1 character overflow. If the data string sent to the printer exceeds the remaining space in the buffer a hang occurs.



3. A special machine code command to check printer ready can cause a problem with the high-speed printer port on the 22C11-HS. This program works perfectly with the old bus indicating READY or NOT READY if you deselect the printer. On the 22C11-HS, READY is usually indicated even without a printer connected. If the command is looped on while the printer is deselected, within approximately 5-10 minutes the system is hung until the printer is selected.

4. A GIO sequence which works with the 386 and on the old bus to determine if the printer is READY or NOT READY if used with the 22C11-HS can cause the disk port on that board to hang or severely slow down.

5. After a warm boot, \$INIT"SYSTEM", if using a printer with a buffer such as the PM017 on the 22C11-HS, some garbage characters will print out preceding the first printed data.

#### MUXing DISKS:

6. Intermittent I90 errors occur if using the 22C11-HS Mux port. The more terminals controllers in the Turbo the more likely the problem.

7. If using the 22C11-HS Mux port to boot, all other CPUs using the common 2275MUX will be locked out of all access through that controller until @GENPART is loaded.

8. If a Turbo housing a 2275MUX is powered off and on, all access by secondary CPUs through the 2275MUX will hang until either RESET is keyed on the CPU attempting access or the Turbo accesses that address.

9. If boot diagnostics are executed on the Turbo through a 22C80, all disk access by other CPUs through the common 2275MUX will hang until the diagnostics are exited.

#### DISK RELATED:

10. VERIFY does not work properly with the 2275 if verifying just sector 0 on the 22C11-HS.

#### SPECIFIC COMMAND RELATED:

11. The INPUT CURSOR command may intermittently hang.

12. LISTS & LISTSD do not work correctly to a system or terminal printer. If the printer requires a printer driver it will not linefeed. If the printout should take more than 1 screen, the 2nd screen does not occur.

#### SELECT H:

13. If 2 partitions are constantly accessing the same DS, only 1 with SELECT H ON, the partition using SELECT H ON will hang until the 2nd partition finishes if using the 22C11-HS.

#### MXF:

14. MXF Octopus ports will not give a DTR indication to a modem. Therefore they will not support a remote terminal. Ports 1 and 2 are OK.

15. If RESET is keyed during a GIO/005 command to an MXF port, intermittently subsequent GIO commands will no longer execute or will hang the port. Must reboot to correct. Problem is more persistent with ports 2-16.

16. The PRINT AT command does not position properly with the MXF in some cases.

OTHER:

17. If using the Make a Reference List of File Names Utility (Moving a Selected List of Files on newer releases) and after selecting your files, option 4 is used to save the list in a program file, an error A02 occurs on line 30, which is a COM statement.

18. If using 2 22C11-HS Controllers, the 2nd 22C11-HS always fails the 'System Interface Card Test on the first pass only.

Included with the enclosed software is a TEST SITE Agreement to be signed and returned to Wang. Please notify me of any problems which may occur or for any questions.

Sincerely,

Mike Bahia  
2200 Product Support  
M/S 019-690  
Tel: 508-656-0256

0116D

# TARBO MAINT REL 1.30 TESTING

- MOVET/D10,TOST/340 ✓
- MOVET/340,TOST/D36 ✓ FILEZAP 0 02 0018 000AF 000500 ✓
- MOVET/340,TO'T/D37 ✓ " 0 01 18 DIAF 0500 ✓
2. RENAMED 7 PRG6 & 1 DATA FILE & NIPMB. ON 340 IN 3 BYTE FORMAT ✓
- MOVEENDT/D37=74999 P34 ILLEGAL TYPE 1 INDEX ON SCSI (100000 SECTORS) ✓
- LISTDCT/D37 ✓
- MOVEENDT/D36=74999 ✓
- LISTDCT/D36 ✓
- LIMITS ON 3 BYTE FILES BEYOND 65535 PRG6 & DATAFILE ✓
3. LOADDAT/D36,(70431) LOAD60 SETUP ✓
11. SCRATCHDISKT/D37,END=65535: LISTDCT/D37 P34 ILLEGAL VALUE 75000 SECTORS ✓
- SCRATCHDISKT/D37,END=65534: LISTDCT/D37 ✓
- SCRATCHDISKT/D37,END=65535 ✓
- COPYT/D36,(0,1000)TOT/D37,(74500) <sup>100000</sup> ✓
- COPYT/D36,(0,1000)TOT/D37,(99500) <sup>99100</sup> P34 ILLEGAL VALUE } SCSI NOT LOCKED OUT
- 99000 65535
- 90000
- 80000
- 70000
- 60000 ✓
- 65534 ✓
- 65000 ✓
- 66000 P34
- CANNOT DO A COPY WITH A DESTINATION SECTOR > 65534 ERROR P34 ILLEGAL VALUE
- NO VALUE IN A COPY STATEMENT CAN EXCEED 65534
- COPYT/D11,(0,1000)TOT/D12,(38000) I98 DOES NOT LOCK OUT D11,D12 ✓
- TESTED BIN & VAL ✓
- SAVED PROGRAMS BEYOND 10010, RENAMED & EXECUTED CMRTIAN-2 D36 ✓
- LOADDAT(71446) CMRTIAN ✓
- RAN ALPHA COLOR S/W FOR PRG6 M2/17446 (OLD S/W) ✓
- (NEW C/W) ✓

CREATED DATAFILE "AY.NCMQD" w/ 1000 SECTORS ON D36 AT 70446.  
RENAMED TO X & OK.

September 15, 1993  
Wang Laboratories, Inc.  
1 Industrial Avenue  
Lowell, MA 01851 USA

Release Notes  
for  
CS/386 TURBO Maintenance Release 1.29.00  
for beta test

This Turbo Maintenance Release, 1.29.00, represents the latest Turbo Operating System software now available for beta test. The @MVP microcode file has been modified to correct a number of unique problems. Release 1.29 follows release 1.18Q. The release number was bumped to 1.29.00 to prevent any confusion with existing test, beta, and older pre-releases of the Turbo Operating Systems.

The following list highlights in brief the problems fixed and modifications made to the operating system since the last General Release of the Operating System, release 1.10:

Note: Use of maintenance release 1.18 and above requires new proms on the CPU board at locations L50 and L64, and on all Turbo Controllers (MXF, 22C11-HS, and 22C11-SCSI) at locations L7 and L14 of the 210-9579 I/O Processor. These proms are only available from R&D and/or Product Support at this time.

- corrects problem with assigning Printer Drivers to address 204 for terminals beyond the first 16. (1.16)
- fixes problem where a MXE TC port might not show up in the Device Table as well as problems hogging those TC addresses. (1.16)
- corrects problem where with 3 byte addressing selected there could be a problem saving multiple data files with DATA SAVE DC OPEN. (1.16)
- corrects problem where calculations greater than E99 could give an incorrect answer, should give an error. (1.17)
- resolves the terminal hang issue associated with the LINPUT and KEYIN commands where the terminal would intermittently not respond to a keyboard entry. (1.18)
- corrects a problem where printer drivers would not show up for any controller following an MXE or MKD. (1.18)
- corrects a problem where if using address 405 to PRINT to the screen, linefeeds would not be suppressed. (1.18)
- allows the SCSI floppy to read a 256 byte 360K or 1.2M 2200 diskette. (1.18)
- corrects problem where a rewind or retension of SCSI tape would fail with a virgin tape. (1.18)
- corrects problem where if a REM% was followed by a hex 7D or hex 7E character, all subsequent commands on the same line would be ignored. (1.18Q)
- corrects an intermittent hang which could occur when mux'ing 2 CPUs to 2 disk drives if 2 or more partitions from each CPU were hogging both mux'd units. (1.18Q)
- if a program was enlarged to require an additional sector and resaved within a program, the saved file could have appeared blank. (1.29.00)
- if in immediate mode a string of 87 ls were added in a PRINT command, the O/S would blow and the system would need to be rebooted. Other long string combinations could also cause problems. (1.29.00)
- SELECT NEW would default to OLD after a CLEAR or LOADRUN. Now, the only way to change the NEW/OLD default is with the SELECT command. SELECT OLD is still the default on power up. (1.29.00)

- a line with a DEFFN' statement may not execute any command following it on the same line if in a background task. (1.29.00)

#### Known anomalies:

##### PERFORMANCE:

1. CPU intensive processes can be negatively impacted when upgrading from Turbo O/S 1.1 to O/S 1.18 or higher when running at the same time as certain disk processes. CPU intensive processes seem to have priority on 1.1 where disk I/O seems to have priority on 1.18 and above.

##### 22C11-HS HIGH SPEED PRINTER PORT:

2. The High Speed printer buffer has a 1 character overflow. If the data string sent to the printer exceeds the remaining space in the buffer a hang occurs.
3. A special machine code command to check printer ready can cause a problem with the high-speed printer port on the 22C11-HS. This program works perfectly with the old bus indicating READY or NOT READY if you deselect the printer. On the 22C11-HS, READY is usually indicated even with no printer connected. If the command is looped on while the printer is deselected within approximately 5-10 minutes the system is hung until the printer is selected.
4. A GIO sequence which works with the 386 and on the old bus to determine if the printer is READY or NOT READY if used with the 22C11-HS can cause the disk port on that board to hang or severely slow down.
5. After a warm boot, \$INIT"SYSTEM", if using a printer with a buffer such as the PM017 on the 22C11-HS, some garbage characters will print out preceding the first printed data.

##### MUXing DISKS:

6. Intermittent I90 errors occur if using the 22C11-HS Mux port. The more terminals controllers in the Turbo the more likely the problem.
7. If using the 22C11-HS Mux port to boot, all other CPUs using the common 2275MUX will be locked out of all access through that controller until @GENPART is loaded.
8. If a Turbo housing a 2275MUX is powered off and on, all access by secondary CPUs through the 2275MUX will hang until either RESET is keyed on the CPU attempting access or the Turbo accesses that address.
9. If boot diagnostics are executed on the Turbo through a 22C80, all disk access by other CPUs through the common 2275MUX will hang until the diagnostics are exited.

##### THREE BYTE ADDRESSING:

10. For Index type 2 (3 byte), the system shows 1 sector off when compared to standard 2200 indices.
11. The RENAME command may corrupt a disk index on a 3 byte surface.
12. The LOADDAT command does not work properly with an address beyond 16 meg.
13. VERIFY does not respond properly when verifying 65534 to 65536.
14. Cannot boot from a 3 byte surface if the O/S is beyond 16 meg.

##### DISK RELATED:

15. If a COPY is done from disk A to disk B and the last sector on B is reached before the COPY is complete, an error I98 occurs which is normal. However, address B is now hung to all other users until you key RESET from the partition that did the COPY.

16. VERIFY does not work properly with the 2275 if verifying just sector 0.
17. The MOVE command causes the Catalog END to become the Current END on the output disk. The MOVE command should not change the Catalog END on the output disk and did not in the past.
18. If a DS with an R4 prom is scratched with END to 65535, the END CATALOG AREA shown with LIST is 94967295.

**SPECIFIC COMMAND RELATED:**

19. The INPUT CURSOR command may intermittently hang.
20. LISTS & LISTSD do not work correctly to a system or terminal printer. If the printer requires a printer driver it will not linefeed. If the printout should take more than 1 screen, the 2nd screen does not occur.

**SELECT H:**

21. If 2 partitions are constantly accessing the same DS, only 1 with SELECT H ON, the partition using SELECT H ON will hang until the 2nd partition finishes if using the 22C11-HS.

**MXF:**

22. MXF Octopus ports will not give a DTR indication to a modem. Therefore they will not support a remote terminal. Ports 1 and 2 are OK.
23. If RESET is keyed during a GIO/005 command to an MXF port, intermittently subsequent GIO commands will no longer execute or will hang the port. Must reboot to correct. Problem is more persistent with ports 2-16.
24. The PRINT AT command does not position properly with the MXF in some cases.

**OTHER:**

25. If using the Make a Reference List of File Names Utility (Moving a Selected List of Files on newer releases) and after selecting your files, option 4 is used to save the list in a program file, an error A02 occurs on line 30, which is a COM statement.
26. If using 2 22C11-HS Controllers, the 2nd 22C11-HS always fails the 'System Interface Card Test on the first pass only.

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Sincerely,

Mike Bahia  
2200 Product Support  
M/S 019-690  
Tel: 508-656-0256

Release Note  
for  
CS/386 TURBO Maintenance Release  
1.18Q

The aforementioned maintenance release represents the latest CS/386 Turbo Operating System software. The microcode files for the O/S and the new Turbo Controllers have been modified to correct a number of unique problems as applicable. The following list highlights in brief the problems fixed and modifications made to the operating system since the last General Release of the Operating System, release 1.10:

Note: Use of maintenance release 1.18 and above requires new prompts on the CPU board at locations L50 and L64, and on all Turbo Controllers (MXF, 22C11-HS, and 22C11-SCSI) at locations L7 and L14 of the 210-9579 I/O Processor. These prompts are only available from R&D and/or Product Support at this time.

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Known anomalies:

BACKGROUND TASKS:

1. A line with a DEFFN' statement may not execute any command following it on the same line if in a background task.



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2. The High Speed printer buffer has a 1 character overflow. If the data string sent to the printer exceeds the remaining space in the buffer a hang occurs.
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#### PERFORMANCE:

15. CPU intensive processes can be negatively impacted when upgrading from Turbo O/S 1.1 to O/S 1.18 when running at the same time as certain disk processes. CPU intensive processes seem to have priority on 1.1 where disk I/O seems to have priority on 1.18.

#### DISK RELATED:

16. When a program is renamed and a new program requiring more disk space using the old name is saved within a program, the program executes, but an error A01 (not enough memory) occurs if you try to load the program.
17. If a COPY is done from disk A to disk B and the last sector on B is reached before the COPY is complete, an error I98 occurs which is normal. However, address B is now hung to all other users until you key RESET from the partition that did the COPY.

18. VERIFY does not work properly with the 2275 if verifying just sector 0.
19. The MOVE command causes the Catalog END to become the Current END on the output disk. The MOVE command should not change the Catalog END on the output disk and did not in the past.
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SPECIFIC COMMAND RELATED:

21. The INPUT CURSOR command may intermittently hang.
22. LISTS & LISTSD do not work correctly to a system or terminal printer. If the printer requires a printer driver it will not linefeed. If the printout should take more than 1 screen, the 2nd screen does not occur.
23. If doing a PRINT 1+1+1+1+1+1 etc. with exactly 87 + 1s, the O/S blows. Should give an error and not blow the O/S.

SELECT H:

24. If 2 partitions are constantly accessing the same DS, only 1 with SELECT H ON, the partition using SELECT H ON will hang until the 2nd partition finishes if using the 22C11-HS.

MXF:

25. MXF Octopus ports will not give a DTR indication to a modem. Therefore they will not support a remote terminal. Ports 1 and 2 are OK.
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OTHER:

28. If using the Make a Reference List of File Names Utility (Moving a Selected List of Files on newer releases) and after selecting your files, option 4 is used to save the list in a program file, an error A02 occurs on line 30, which is a COM statement.
29. If using 2 22C11-HS Controllers, the 2nd 22C11-HS always fails the 'System Interface Card Test on the first pass only.

Many of the problems corrected may only pertain to certain previous releases. Problems with the latest release are currently being addressed by R&D. Should you come across any undocumented errors, please notify me. Wang Laboratories thanks you for your continuing support.

Sincerely,

Mike Bahia  
2200 Product Support  
M/S 019-690  
Tel: 508-656-0256

Intended For:

This Item is In Progress

Author: Mike Bahia

Subject: Turbo O/S 1.15

-----

This is to acknowledge that CS/386 Turbo Release 1.1 has been tested as 1.15 in the field and does represent a significant improvement over existing operating system (1.0) shipped with the system currently. There is a problem with this release that may result in intermittent terminal hangs but it does not occur at every site. The hangs can be circumvented sometimes by keying Halt/Step and stepping through or by a RESET and does not affect other users. Other than this problem, the O/S seems to provide a reasonable base from which most customers should be able to work.

Mike Bahia  
2200 Product Support

Package Subject: turbo

Item Title: Additional Info

When copying the O/S off the 360K diskettes you must first format the diskettes using the Format Utility found on the main menu when a LOAD RUN "START" is done from the O/S. This utility allows you to select a PC/DOS format instead of standard 2200. Select PC/DOS as this gives you more sectors, 1439 as opposed to 1279. This is needed to enable enough space to get all initial boot files on the 1st disk of the O/S. 1279 is not big enough. Once formatted you can do a standard COPY. The DOS format will not make any difference in being able to read the disks on a 386 or Turbo. Not sure if the older CPU's would have a problem. If there are any questions give me a call.

Regards, Mike  
508-656-0256/0105

## FIXES

- 1.03 FIXES DS TAPE BACKUP PROBLEM (1.0)  
PRINTUSING BUG FIXED (1.0)
- 1.04 PC2200 FILE XFER FIXED (1.0)  
7715 NO LONGER BLOWING AT RADER C<sub>6</sub> (1.03)  
103 HARD HANGS AT WOLLASTON 6116  
NEW CDG2 DIAG FILE CORRECTS PROBLEM CREATED BY  
R2 PROM ON CPU WHEN PERIPH CARD INTERRUPT TEST  
FAILS + SCREEN DOES NOT SCROLL PROPERLY.
- 1.05 PRINT # TERM CORRECTED (1.04)  
GLOBAL PARTITIONS BEYOND 32 FIXED (1.04)  
SELECT TC AXx FIXED (1.04)  
INCLUDES FIX FOR DS UTIL 3.0 RESTORE PROBLEM 45M
- 1.06 HS DISK SCHEDULER PROBLEM FIXED. IF DO RANDOM R/W  
ON H/B BUS, OTHER USERS TO SAME DISK UNIT WILL  
HANG IF TRY TO ACCESS.
- 1.07 HANGS JUST BEFORE LOADING CGENPART IF BOOT OFF  
(1.10) 22C11-HS<sup>②</sup>, HAVE BOTH AN MXF + MXE OR MXD, AND  
<sup>③</sup> LET POWER UP DIAGNOSTICS COMPLETE.  
MXF DTR PROBLEM, COULD NOT GET DTR ON MODEM  
PORTS 1 & 2 ONLY.
- 1.11 DS TAPE BACKUP/RESTORE W/ 22C11-HS W/ 64 PARTITIONS (1.07)  
DATA LOAD DC OPEN FOR 3 BYTE ADDRESSING  
\$BREAK + \$BREAK X (WHERE X = 1 TO 255) (SWEDEN)

## BUGS

- DS TAPE BACKUP FAILS INT. W/ TAPE CMD ERROR  
PC/2200 FILE XFER HANGS SYSTEM  
PRINTUSING MAY INCORRECTLY SUPPRESS SPACE ON HARD COPY  
3 BYTE ADDR GETS WRING END OF CATALOG W/ DATA LOAD DC START  
SELECT H ON IN MIX CONFIG IS SUSCEPTIBLE TO HANGS  
IF A USER HOGS A PLATION + KEYS RESET & SYS CANNOT CLEAR HOG  
FAILS PERIPH INTERRUPT TEST W/ CPU R2 PROMS  
PROBLEMS W/ 7715 AT ADDRESS D30 W/ NED'S RAMDISK  
7715 WOULD BLOW ON COLD BOOT RADER  
SYSTEM HANGS AT WOLLASTON
- INT PERFORMANCE PROB WAREL ONCE OR TWICE A DAY  
1 USER SEEMS TO HAVE DISK HOGGED + OTHERS WAIT 1-2  
MINUTES. HS BUS DISK SCHED PROB. FIXED W/ 1.06  
HANGS LOADING CGENPART IF GO THROUGH 7715?  
PRINT # TERM WILL NOT RETURN THE CORRECT TERM  
# FOR ANY BOARD THAT FOLLOWS AN MXE OR MXD  
A GLOBAL PARTITION WILL NOT WORK BEYOND PART 32  
SELECT TC AXx DOES NOT WORK W/ SOME PARTS, MXFZ + MXE4  
REMOTE SCREEN DUMP FROM BACKGROUND DOESN'T WORK  
PROTECTED 1.2 DISK RETURNS I93 ON FORMAT
- MULTI-SECTOR WRITE W/ DATASAVE BM MAY WRITE INCORRECTLY  
ON EDIT/RECALL DELETE COULD HANG SYSTEM INT.  
AFTER EXITING MXF CODE, SYSTEM WILL NOT RESPOND TO  
1<sup>ST</sup> COMMAND  
WITH > 16 PARTITIONS ACTIVE DS TAPE BACKUP  
MAY INTERMITTENTLY FAIL.  
TERM HANGS IF TRY TO PRINT TO Z04 + PRINTER OFF.  
MUST POWER OFF PRINTER OR DISCONNECT TO CLEAR.  
3 BYTE ADDR BUG. IF DSKIP = 65535 (FF) WILL GET D87  
& CURRENT END IF LIST DISK WILL = 1.  
BIF ON 004 WILL NOT RESPOND TO SF KEYS

#DISCONNECT ON X (SWEDEN)

GENPART WILL NOT COME UP IN NEW FORMAT

- 1.12 RIF ON 004 WILL NOT RESPOND TO SF KEYS (1.11)  
SCSI CONTROLLER REQUIRES NEW PROMS

- 1.13 \$ OPEN TO 3 ADDRESSES W/ SELECT H ON FIXED (1.12)  
\$DISCONNECT REPORTED BY SWEDEN FIXED  
INPUT CURSOR PROBLEM FIXED (SWEDEN)  
SPACES PROBLEM FIXED (SWEDEN)  
SCRATCHDISK PROBLEM (SWEDEN)  
TERMINAL WILL HANG IF TRY TO PRINT TO Z04 & PRINTED  
OFF. (1.07)

- 1.14 LIST SELECT, LIST # FIXED, BLEW OK (1.13)  
EDIT/RECALL BUG RESOLVED (1.13)  
LINPUT BUG FIXED?

- 1.15 MULTI-SECTOR WRITE W/ DATASAVE BM FIXED (1.07)  
NEW SCSI MICROCODE REQUIRING NEW PROMS  
UPDATED GENPART TO CORRECT HANDLING OF PRINTER  
DRIVER W/ PART 17 > & ALLOWING SAVING VLSI CONFIGS.

- 1.16 PRINTER DRIVERS FOR Z04 WORK W/ TERMINAL BEYOND 16 (1.15)  
PROBLEM HODGING MXE TC PORT & SHOWING UP IN DT (1.15)  
W/ SELECT 3 ON, SOMETIMES A FILE WOULD NOT BE OPENED OR A  
D83 COULD OCCUR (1.15)  
MULTI-SECTOR WRITE W/ DATASAVE BM W/ 16 SECTORS

INDIVIDUAL TERMINALS HANG ON LINPUT &  
KEYIN COMMANDS. CAN HALT/STEP BY OR RESET  
& THEN OK. INTERMITTENT.

W/ SELECT H ON A \$OPEN TO 3 ADDRESSES  
MAY BLOW O/S (JOSTMAN)

PRINTER DRIVERS WON'T LOAD WITH > 16 PARTITIONS

EDIT/RECALL MAY ADD A : IF JOIN 2 LINES (SWEDEN)  
LISTSELECT & LIST # BLOW O/S

PRINT 1+1+1 ETC 87 TIMES BLOWS O/S.

MOVET/ TOT/ CHANGES CATALOG END TO CURRENT END ON OUTPUT DISK

IF REM% FOLLOWED BY HEX 1D OR TE, ALL SUBSEQUENT LINES IGNORED

RENAME COULD DAMAGE INDEX ON 3 BYTE SURFACE

CANNOT HUG MXE TC PORT A17-20

SCSI TO DS BACKUP VERY SLOW, 40 SEC FOR 32 SECTORS

SELECT DRIVER Z04 OFF MAY GIVE P48 W/ SOME TERMINALS

PRINTER DRIVERS W/ ADDRESS Z04 WILL NOT SHOW UP OR  
MAY GET P48 IF TRY TO SHUT OFF, ESP W/ TERM > 16

W/ SELECT 3 ON, IF OPEN MULTIPLE DATA FILES W/

DATASAVEDC OPEN, A FILE IS NOT ALWAYS OPENED FOR EA

W/ SELECT 3 ON, MAY GET A D83 IF SCRATCHDISK &  
DATASAVEDC OPEN TO OPEN A FILE THAT DID EXIST  
BEFORE THE SCRATCHDISK

PRINTAT MAY NOT POSITION PROPERLY

PRINTER DRIVERS FOR Z04 DO NOT WORK ON MXE/MXD/TEP FOLLOWING  
AN MXE OR MXD

CALCULATION > E99 SOMETIMES DOES NOT ERROR (SWEDEN BUG 20)

INPUT CURSOR INTERMITTENTLY HANGS ON TURBO

LISTS & LISTSD DO NOT WORK PROPERLY TO A PRINTER.

## FIXES

## BUGS

1.17 PRINT AT NOT POSITIONING CORRECTLY W/ MXF FIXED (1.15)  
CALCULATIONS > E99 GIVING INCORRECT ANSWER FIXED (1.16)

1.18 FIX TO TERM HANG ON LINPUT COMMAND (1.12)

PRINTER DRIVERS FOR TERMINALS ON A CONTROLLER  
FOLLOWING AN MXE OR MXD WOULD NOT SHOW UP. (1.15)

A PRINT TO THE SCREEN USING ADDRESS 405 WOULD  
NOT SUPPRESS LINEFEEDS. FIXED P2/17456.

~~RENAME COULD OVERWRITE PART OF INDEX CAUSING  
AN ERROR WHEN LISTING WITH 3 BYTE SURFACE.~~ (1.15)

ALLOWS SCSI FLOPPY TO READ A 256 BYTE 360K  
OR 1.2M 2200 FLOPPY DISK.

CORRECTS PROBLEM WHERE REWIND & RETENSION  
MAY FAIL WITH A SCSI TAPE DRIVE, ESPECIALLY  
IF USING A VIRGIN TAPE.

1.18k INTERMITTENT TERMINAL HANGS (C9/6979) ?

1.18g REM% FOLLOWED BY HAX 70 OR 7F CAUSED SUBSEQUENT COMMANDS  
TO BE IGNORED. (1.15)

FIXES HANG PROBLEM WHICH OCCURS WHEN 2 SYSTEMS ARE  
MUX'D, & BOTH SYSTEMS HAVE MORE THAN 1 PARTITION  
HOGGING 2 DIFFERENT DISK ADDRESSES. (P2/17629)

1.29.00 IF PROGRAM ENLARGED TO REQUIRE AN ADDED SECTOR & RESAVE,  
WITHIN A PROGRAM, THE FILE WOULD APPEAR BLANK WHEN LOADED.

IF IN IMMEDIATE MADE A STRING OF 87 1s ARE ADDED IN A  
PRINT COMMAND, O/S WOULD SLOW. (1.15)

SELECT NEW WOULD DEFAULT TO OLD W/ CLEAR OR LOADRUN.

COMMANDS FOLLOWING A DEFFN IN A GLOBAL WILL NOT EXECUTE  
IF THE GLOBAL IS A HIGHER PARTITION #. (1.18)

HALT/STOP WOULD FAIL ON MULTI-COMMAND LINES IN A  
GLOBAL IF GLOBAL HAS HIGHER PARTITION #.

1.30.00 RENAME OF A PROGRAM ON A 3 BYTE INDEX WOULD  
CORRUPT THE DISK. (1.15)

LOADPA & SAVEDA WOULD NOT WORK BEYOND  
65534.

PRINT AT STILL DOES NOT POSITION CORRECTLY W/ MXF  
IN SOME CASES

VERIFYT(DIO, (0,0) A0 DOES NOT WORK CORRECTLY  
W/ 2275 FLOPPY. VERIFYs MORE THAN 8 & GETS 128 TO A0.

CANNOT BOOT FROM A 512 BYTE 1.2M FLOPPY W/ SCSI  
I90 ERRORS THROUGH 22C11-HS MUX PORT TO DS, ESPECIALLY  
WITH MULTIPLE TERMINAL CONTROLLERS

TURBO DOES NOT TALK TO 2275 FLOPPY PROPERLY. P2/17596  
VERY SLOW BOOTING FROM SCSI FLOPPY.

SCSI FLOPPY DOES NOT RECOGNIZE A DOOR OPEN & WILL  
READ WHAT WAS LAST IN CACHE.

DEFFN MAY NOT WORK IN A BACKGROUND PARTITION. STEVE SHOESMITH

NO DTR TO MODEM WITH MXF OCTOPUS PORTS  
SEE BUG LIST, 0109D.

COPY WILL NOT WORK WITH ANY ADDR > 65534  
VERIFY WILL NOT WORK WITH ANY ADDR > 65534

MOVEEND WOULD ALLOW A 3 BYTE ADDRESS > 65534 IF THE ADDRESS HAD THE STAGE, EVEN IF A TYPE 0 OR TYPE 1 INDEX WHICH SHOULD OF & NOW DOES GIVE AN ERROR, P34 ILLEGAL VALUE.

COPY HAS BEEN FIXED TO PREVENT A HANG CONDITION SHOULD AN ERROR OCCUR DURING COPY.

A SCRATCHDISK/Dxx, END = 65535 WOULD CREATE AN ERRONEOUS END CATALOG AREA, THIS HAS BEEN COLLECTED & REQUIRES A 3 BYTE SCRATCH.

MOVE COMMAND WOULD MAKE THE CATALOG END = TO CURRENT ENP. (1.15)

ADDED NEW MOVE OPTIONS, MOVET/Dxx TO ST/Dxx.

1.30.01 FIXES COPY PROBLEM W/ ADDR > 65534. SELECT 3 MUST BE ON (1.30)  
FIXES VERIFY PROBLEM W/ ADDR > 65534. SELECT 3 MUST BE ON (1.30)

DATA ENTERED W/ INPUT IN A GLOBAL PARTITION WHEN CALL W FROM A PARTITION W/ HIGHER PART # IS LOST. PTR M2/22389  
IF SF KEY 9 USED TO DELETE WHILE EDITING A LONG LINE & REPEATEDLY HIT NEAR BEGINNING OF LINE WHEN USING MXF, WILL HAVE NEW BUS. PTR M2/22705



**Release Note  
for  
CS/386 TURBO Maintenance Release  
1.18**

The aforementioned maintenance release represents the latest CS/386 Turbo Operating System software. The microcode files for the O/S and the new Turbo Controllers have been modified to correct a number of unique problems as applicable. The following list highlights in brief the problems fixed and modifications made to the operating system since the last General Release of the Operating System, release 1.10:

**Note:** Use of maintenance release 1.18 requires new prompts on the CPU board at locations L50 and L64, and on all Turbo Controllers (MXF, 22C11-HS, and 22C11-SCSI) at locations L7 and L14 of the 210-9579 I/O Processor. These prompts are only available from R&D and/or Product Support at this time.

- corrects problem with assigning Printer Drivers to address 204 for terminals beyond the first 16. (1.16)
- fixes problem where a MXE TC port might not show up in the Device Table as well as problems hogging those TC addresses. (1.16)
- corrects problem where with 3 byte addressing selected there could be a problem saving multiple data files with DATA SAVE DC OPEN. (1.16)
- corrects problem where calculations greater than E99 could give an incorrect answer, should give an error. (1.17)
- resolves the terminal hang issue associated with the LINPUT and KEYIN commands where the terminal would intermittently not respond to a keyboard entry. (1.18)
- corrects a problem where printer drivers would not show up any controller following an MXE or MXD. (1.18)
- corrects a problem where if using address 405 to PRINT to the screen, linefeeds would not be suppressed. (1.18)
- corrects a problem where RENAME could cause an error with a 3 byte disk catalog by writing over a part of the index. (1.18)
- allows the SCSI floppy to read a 256 byte 360K or 1.2M 2200 diskette. (1.18)
- corrects problem where a rewind or retension of SCSI tape would fail with a virgin tape. (1.18)

Many of the problems above may only pertain to certain previous releases. Problems with the latest release are currently undetermined. Please notify me of any problems you may find. Wang Laboratories thanks you for your continuing support.

Sincerely,

Mike Bahia  
2200 Support  
M/S 019-690  
Tel: 508-656-0256

Release Note  
for  
CS/386 TURBO Maintenance Release  
1.16

The aforementioned maintenance release represents the latest CS/386 Turbo Operating System software. The microcode files for the O/S and the new Turbo Controllers have been modified to correct a number of unique problems as applicable. The following list highlights in brief the problems fixed and modifications made to the operating system since the last General Release of the Operating System, release 1.00:

- corrects problem where DS Tape Backup intermittently may fail. (1.03)
- corrects a problem with PRINTUSING where on a printout of a line where a single character is continuously repeated part of the line could be left out. (1.03)
- corrects problem with PC2200 where file transfer would not work. (1.04)
- updated @DG2 file corrects the Customer Level diagnostics where the Peripheral Card Interrupt Test would fail and screen scrolling problems when testing with multiple controllers. (1.04)
- fixes problem where PRINT # TERM would not return the correct terminal # for any terminal connected after the 1st MXE or MXD. (1.05)
- corrects problem where a Global partition will not work in partition 32 or higher. (1.05)
- corrects a problem where SELECT TC Axx would not work with some MXF and MXE terminal ports. (1.05)
- DS Utility program @DSTAPEB corrected to work properly with the 45 Meg Tape Drive. Problem restoring if multiple addresses saved. (1.05)
- High-Speed Bus problem corrected where intermittently if a user was heavily accessing disk other users could hang waiting to access. (1.06)
- corrects a hang condition that could occur on boot just before loading @GENPART if self-test diagnostics complete, booting off a 22C11-HS, and have both an MXF and MXE or MXD installed. (1.07)
- corrects a problem where DTR would not be present on a modem if attached to ports 1 or 2 of an MXF. (1.07)
- corrects a problem where the DS Tape Backup Utility may fail if run with a configuration with a large number of partitions. (1.11)
- corrects problem using 3 byte addressing where a DATA LOAD DC command could return the wrong end of catalog. (1.11)
- corrects possible problem using the \$BREAK command. (1.11)
- fixes problem where the system would hang on boot loading @GENPART if @GENPART was in 'NEW' format. (1.11)
- corrects problem where \$IF ON 001 may not respond to some Special Function keys. (1.12)
- corrects a problem where if SELECT H ON is used, a \$OPEN to multiple addresses could take the system down. (1.13)
- corrects possible problem using \$DISCONNECT ON X. (1.13)
- corrects a possible problem if entering a cursor in response to an INPUT command. (1.13)
- corrects a problem where the SPACE S command may fail. (1.13)
- corrects a problem where in some instances SCRATCH DISK may fail. (1.13)

- fixes a hang condition that could occur if trying to print to address 204 and the printer is off or disconnected. (1.13)
- fixes problem with the LIST # and LIST SELECT commands which could bring the system down. (1.14)
- corrects problem with EDIT/RECALL where if joining 2 lines a double colon (:) could appear. (1.14)
- corrects problem where a multi-sector write with a DATA SAVE BM may incorrectly write to disk. (1.15)
- @GENPART updated to correct handling of printer drivers in partitions beyond the first 16 and to allow saving non-386 configurations. (1.15)
- corrects problem with assigning Printer Drivers to address 204 for terminals beyond the first 16. (1.16) A problem does still exist if using more than 1 MXE or MXD Controller. Drivers will not show up on MXE, MXD, and Triple Controller ports on boards following an MXE or MXD.
- fixes problem where a MXE TC port might not show up in the Device Table as well as problems hogging those TC addresses. (1.16)
- corrects problem where with 3 byte addressing selected there could be a problem saving multiple data files with DATA SAVE DC OPEN. (1.16)

Many of the problems above may only pertain to certain previous releases. Problems with the latest release are currently undetermined. Please notify me of any problems you may find. Wang Laboratories thanks you for your continuing support.

Sincerely,

Mike Bahla  
2200 Support  
M/S 019-690  
Tel: 508-656-0256

0101D

**TECHNICAL SERVICE BULLETIN**  
**SECTION: SoftWare Technical**

NUMBER: SWT 9351      REPLACES: \_\_\_\_\_      DATE: 05/<sup>12</sup>~~05~~/92      PAGE 1 OF 2

MATRIX ID. 4302      PRODUCT/RELEASE# CS/386 TURBO

TITLE: TURBO Operating System Status: General Release 1.10.00

**PURPOSE:**

To provide information on the current status of the operating system and General Release 1.10.00 now being shipped with Turbo orders.

**EXPLANATION:**

Currently all existing Turbo sites should be running with either Maintenance Release 1.07 or 1.15. The operating system shipped with orders up until May 1st, General Release 1.0 had several problems, the most notable of which affected DS Tape backup. It should not be used. Up until now we have been tracking all shipments and forwarding either Maintenance Release 1.07 or 1.15 to the technical support people for that site. As the number of orders has increased, it has become difficult to continue doing this. To alleviate the problem, Release 1.15 has been packaged with all new orders as Turbo General Rel 1.10.00. As of May 5, 1992, all Turbo orders will ship with this release.

The following is a brief overview of releases 1.07 and 1.15 (1.10):

Rel 1.07 - most sites are currently running error free with this release.

There are problems reported against it but most would not affect a standard end-user operation. The most critical issue is the possibility of a data integrity error under certain instances with a multi-sector write DATASAVE BM command. This has not been a problem for most customers. The problem has occurred with AIMS Software and those customers with AIMS Software should use 1.15 (General Rel 1.1).

Rel 1.15 (Turbo General Release 1.1) - this release corrects the multi-sector write problem found with release 1.07 when running AIMS Software. It also seems to provide improved overall performance over 1.07. However, some users on this O/S have had a problem where intermittently an individual terminal may hang on a LINPUT or KEYIN (keyboard entry to screen) command. If this occurs, the user may be able to HALT/STEP through and CONTINUE or may have to key RESET. This does not affect other users. Because of this issue, those customers now running error free on 1.07 have not been updated.

A new bug has just been identified with both these releases involving SELECT H ON (platter hog). When used with the Turbo 22C11-HS Controller, disk access can be erratic and the system may appear to momentarily hang

GROUP: 2200 Basic 2 Platform Group      MAIL STOP: 019-690

C O M P A N Y   C O N F I D E N T I A L  
WANG Laboratories, Inc.

**TECHNICAL SERVICE BULLETIN**  
**SECTION: SoftWare Technical**

NUMBER: SWT 9351 REPLACES: \_\_\_\_\_ DATE: 05/05/92 PAGE 2 OF 2

MATRIX ID. 4302 PRODUCT/RELEASE# CS/386 TURBO

TITLE: TURBO Operating System Status: General Release 1.10.00

at times. With an old style disk controller, SELECT H appears to work properly. Until a fix is available, it is suggested SELECT H not be used if using a 22C11-HS for disk access.

**CORRECTIVE ACTION:**

R&D is working both of these issues. Once a fix can be verified, it will be made available as a general release and announced via a TSB.

It is important to continue to insure all customers are on either Maintenance Release 1.07 or 1.15 (General Release 1.1). If currently running error free on 1.07, it is suggested to remain there until we have a resolution for the terminal hang bug. If for some reason General Release 1.1 is needed, it can be ordered through Wang Office from:

Software Distribution and Control 508-656-4300

Wang Office ID: SDC Customer Service

Supply them with: Your Name, RDB, Ship to Address, & Part #

734-8446A - Turbo General Rel 1.10.00 (1.2M 5 1/4" disk)

731-8026A/27A/28A - Turbo General Rel 1.10.00 (3 360K disks)

291-1001-A - Turbo Rel 1.10.00 package (includes both above)

(If needed quickly please indicate, otherwise 1-2 week delivery)

Any problems found with release 1.1 should be escalated via PTR to RDB 8760 as a customer call. If you have problems or questions concerning the Turbo Operating System or any other 2200 related problem please contact:

Mike Bahia, 2200 Product Support 508-656-0256

**ADDITIONAL INFORMATION:**

If upgrading the Turbo O/S, all files should be overwritten to insure all are at the latest rev. On Rel 1.0, the following 3 files had problems:

1. DS Utility 'Backup Disk to Tape' program '@DSTAPEB' had a problem with multiple address backups to a 45M Tape Drive. (fixed on 1.07 & higher)
2. Customer level diagnostic file "@DG2" had a display problem and would fail the 'Peripheral Card Interrupt Test' with R2 proms currently used on the CPU board. (fixed on 1.07 and higher)
3. '@GENPART' has been updated to correctly handle print drivers assigned to partitions 17 and higher and to be downward compatible to non-386 systems (MVP, LVP, VLSI, etc.). (fixed on 1.15)

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 019-690

C O M P A N Y C O N F I D E N T I A L  
WANG Laboratories, Inc.

Release Note  
for  
CS/386 TURBO Maintenance Release  
1.15

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- corrects a problem where in some instances SCRATCH DISK may fail. (1.13)

- fixes a hang condition that could occur if trying to print to address 204 and the printer is off or disconnected. (1.13)
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- corrects problem where a multi-sector write with a DATA SAVE BM may incorrectly write to disk. (1.15)
- @GENPART updated to correct handling of printer drivers in partitions beyond the first 16 and to allow saving non-386 configurations. (1.15)

Many of the problems above may only pertain to certain previous releases. Problems with the latest release are currently undetermined. Please notify me of any problems you may find. Wang Laboratories thanks you for your continuing support.

Sincerely,

Mike Bahia  
2200 Support  
M/S 019-690  
Tel: 508-656-0256

0103D

March 23, 1992  
Wang Laboratories, Inc.  
1 Industrial Avenue  
Lowell, MA 01851 USA

Release Note  
for  
CS/386 TURBO Maintenance Release  
1.07

The aforementioned maintenance release represents the latest CS/386 Turbo Operating System software. The microcode files for the O/S and the new Turbo Controllers have been modified to correct a number of unique problems as applicable. The following list highlights in brief the problems fixed and modifications made to the operating system since the last General Release of the Operating System, release 1.00:

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- corrects a problem where DTR would not be present on a modem if attached to ports 1 or 2 of an MXF. (1.07)

Many of the problems above may only pertain to certain previous releases. Release 1.07 should allow most users to run error-free. The bugs reported against it are somewhat unique and would not affect most applications run by the majority of end users. Please notify me of any problems you may find. Wang Laboratories thanks you for your continuing support.

Sincerely,

Mike Bahia  
2200 Support  
M/S 019-690  
Tel: 508-656-0256



- corrects a problem where the DS Tape Backup Utility may fail if run with a configuration with a large number of partitions. (1.11)
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Sincerely,

Mike Bahia  
2200 Support  
M/S 019-690  
Tel: 508-656-0256

0101D

VS OFFICE

Monday

03/09/92 08:28 am

To: Michael Riley  
From: Kirit Baxi  
Subject: Print Driver bug

W0000600 6FLT3  
Security: Limited  
Date Received: 03/09/92

-----  
ALLWS PRINTER DRIVERS W/ PARTITIONS > 16

Mike

Change line 5120 of @GENPART as follows:

5120 IF STR(Q2\$(I),2,2)=HEX(00)THEN STR(Q2\$(I),2,2)=HEX(30 30)

: HEXPACK STR(T2\$(I),9,1)FROMSTR(Q2\$(I),2,2)

:IF Q3\$(I)=" "OR Q3\$(I)=HEX(00 00)THEN Q3\$(I)="00" DELETED EVERY AFTER THIS

ADD :CONVERT Q3\$(I)TOA9

:STR(T2\$(I),10,1)=BIN(A9)

Still no ECO' for the MB!

Regards

John Baxi

FIXES  
INCLUDED IN  
1.15

CORRECTS GENPART TO WORK W/ NON-386 CPU'S

@genpart

2790 IF C08='M' THEN V8='Δ':

20 BIN(V08)=0: IF C08<>'M'  
then C08='W'

FROM 20 BIN(V08)=0: C08='W'

TO 20 BIN(V08)=0: IF C08<>'M' THEN C08='W'

→ 2790 IF C08='M' THEN V8=' ': DATA SAVE.....

NEW, ADDED IN

Package Subject: Rev 1.15 of Turbo

Item Title: Rev 1.15 of Turbo

Mike,

I did not have the new @GENPART that fixed printer driver problem, therefore please me the new @GENPART and then I can fix your problem.

REgards

Duncan Chou

----- Original Memo -----  
To: Duncan Chou From: Michael Riley  
Subject: Rev 1.15 of Turbo Date Sent: 03/16/92

Duncan

★ We have fixed the GENPART problem with printer drivers grater then 16 ....

But the printer driver do NOT work !!!!

SETUP: At Genpart put printer driver @PM017V3 on terminal 1, 16, 32, 48, 64,  
Put a terminal on 16,32,48,64 and do a LISTDT, Check that 204 driver is ON...  
NOW, On Terminal 16 do a SELECT DRIVER 204 OFF , I get a P48 error !!!

We are still seeing Terminal hangs, On one customer locations, he noted that when a terminal hangs and PSTAT has a 01 for I/O he can do a HULT/STEP to get the terminal to run again... But if the I/O is a 00 then only RESET will start the terminal up again....

Can you duplicate anything like what we are seeing in the feild ????

Do you have any ideas on this problem ??? It sounds like a terminal port flag is being reset before it should... What if you get a terminal buffer full, and the buffer is being emptied some one types in the keyboard, as the full flag is being reset could it reset the other flages ?????

HELP !!!! Time is startting to get short !!!!!

Michael Riley

P.S. As it looks, you have one major bug waiting to get fixed beside the bugs Swenden came up with... (4 )

SET UP TERMINAL PRINTERS<sup>DRIVERS</sup> ON TERMINALS 1,17,21,25

TERM 1 OK

TERM 17 - DRIVER IS ON AS SEEN WITH LIST DT, BUT GET P48 IF DO A SELECT DRIVER 204 OFF

TERM 21,25 - DRIVER NOT SHOWN

9/10 PARTIALLY FIXED

NOW ON 1.16

PRINTER DRIVERS FOR 204 WILL NOT SHOW UP ON CONTROLLERS FOLLOWING AN  
MXE OR MXD.

Package Subject: turbo bug

Item Title: turbo bug

Make,

Fixed and will put into Rev 1.16

Regards

Duncan Chou

----- Original Memo -----

To: Duncan Chou

From: Michael Riley

Subject: turbo bug

Date Sent: 03/16/92

Duncan

The TC bug in the MXE is still there !!!!

SETUP: one MXF & one MXE ... Genpart 20 Parts. and 16 terminals... 17-20  
terminal 0 ....

Do a SELECT TC /A18... Now do a LISTDT, the TC is not listed...

Now Do a 10 \$OPEN/A18

20 KEYIN A\$

On another terminal do a LISTDT, A18 dose not have a O beside it !!!!

Michael Riley

CANNOT HO6 MX6 TC  
PORT 17-20

FIXED IN 1.16

4/16/92

Package Subject: Turbo bug

Item Title: Turbo bug

3/17/92

Mike,

Fixed and will put into Rev 1.16

Regards

Duncan Chou

----- Original Memo -----

To: Duncan Chou  
Subject: Turbo bug rev 1.15

From: Michael Riley  
Date Sent: 03/11/92

Duncan

This is a Turbo Bug

10 SELECT 3 ON

20 FOR A = 3 TO 15

30 SELECT #5/DXX

40 SCRATCH DISK T#5, LS=30, END=1000

50 SCRATCH DISK&T#5, LS=A, END=12500 3 BYTE INDEX

60 DATA SAVE DC OPEN T#5, (1000) "TESTA"

70 DATA SAVE DC OPEN T#5, (1000) "TESTB"

80 DATA SAVE DC OPEN T#5, (1000) "TESTC"

90 DATA SAVE DC OPEN T#5, (1000) "TESTD"

100 LIST S DCT#5

110 NEXY A

FOR EACH PASS OF THE list you should get 4 items in the Index....

TESTA, TESTB, TESTC, TESTD in that order.....

... stills fails if SELECT 3 in ON or OFF !!!!

Michael Riley

INTERMITTENTLY 1 OF THE DATA FILES IS NOT OPENED.  
OR MAY GET DB3 FILE ALREADY EXISTS.

VS OFFICE

Friday

03/06/92 08:27 am

1

Package Subject: Turbo os 1.13 report

Item Title: Följebrev: memo

Hi Mike,

Can you have a look into this.

I got OS version 1.13 from Taiwan this morning local time and it looks good, they have fixed all the major bugs that has been reported, but also created a new one.

If do a LIST SELECT and press ENTER, the listing stops in third line and the system hang, RESET will not work, system is completly dead you have to reboot the system to get it up again. (power down/up)

You have contact with MXF board with the LOAD LOAD LOAD command but nothing else. It seams to me that the os goes out in an endles loop.

I have attached os 1.13 to this memo if you don't got it from Taiwan

Best reg.

Torbjorn

VS OFFICE

Friday

03/06/92 08:28 am

1

Package Subject: Turbo os 1.13 report 2

Item Title: Turbo os 1.13 report 2

Hi Mike,

EDIT RECALL funktion does not work OK, it gives you an extra colon ":" when pick up a line.

Exampel:

Load program START

Do an EDIT RECALL on line 10 (10 COM CLEAR:\$PSTAT=" ")

Add a colon ":" and line number 20 press RECALL (10 COM CLEAR:\$PSTAT=" ":20)

The system will give you the following

10 COM CLEAR:\$PSTAT=" "::LOAD RUN" MENU"

note the double colon sign!!!

When press enter on this line you get error S24

The problem is the extra colon.

Regards/Torbjorn

VS OFFICE

Friday

03/06/92 08:28 am

1

Package Subject: Turbo os1.13 report 3

Item Title: Turbo os1.13 report 3

Mike,

One more bug how will make a totaly CPU hang!!!

LIST# command stops after line 10 (or first line) then the system is completly hanged. A rebooty of the system is the only way to get again. Same situation as after LIST SELECT.

Reg

Torbjorn

Package Subject: Rev 1.13

Item Title: Rev 1.13

Mike,

For problem 1 : @GENPART problem !!!  
For problem 2 : We try to fixed  
For problem 3 : Need more information to duplicate

I run TTSTART with or without \$FORMAT DISK on 22c11 have same performance !!  
Please check your system !!! (I set up 16 partition and part 2 run \$format  
disk for D20 (old 22c11) and part 1 run TTSTART for D11 (SCSI) and have same  
performance (10 sec with 2636DW)

Regards  
Duncan Chou

----- Original Memo -----

To: Duncan Chou                      From: Michael Riley  
Subject: Rev 1.13                      Date Sent: 03/03/92

Duncan

We are still haveing problems with the MXF.. Two problems..

1. PRINTER DRIVERS will not LOAD on to anything grater than 16 Parts... We  
had this problem before, It is Back !!!!  
SETUP in GENPART put a printer driver 204 on terminals 1,8,16,25,32,40,64  
also 215, I used @PM017V3, goto each of these terminals and do a LISTDT...  
On my system, only the first MXF's terminals had 204 printer drivers, 215 OK..  
2. EVERY Customer that I sent O.S.1.12 out to has this problem... It started  
Rev. 1.12...

Have three to four people in WP doing Doc. updates and paging in four  
different Doc. all at the same time... The problem is that the terminal port  
will hand and the keyboard is dead... Only RESET works.. Most of the customers  
see this 10 to 12 times a Hr...

Some has seen the hang after a LENPUT,, But not all...

On that terminal printer port problem; You fixed that problem Bug 6

I have a customer that when MUXed with a CS386 system... about two times a day  
the Turbo system will HANG... All terminals are dead, IPL is the only way to  
get it startin again...Can I have a Turbo O.S. that put in the MXF command  
file a program counter so when the system hangs, I can goto the MXF file and  
ask it what it was doing before it died !!!! Also the same customer, When they  
do a sort 4, the MXF seems to luse most of its time slice and everone go slow  
but the sort 4 and any background task....That is all I have on this problem  
today....

Michael Riley

Package Subject: Rev 1.13

Item Title: Notes

NAME,

This is Rev 1.13 O.S. and have following problem fixed:

1. \$DISCONNECT problem (Reported by Sweden)
2. Input CURSOR problem (Reported by Sweden)
3. Edit Recal problem (Reported by Sweden)
4. SPACES problem (Reported by Sweden)
5. SCRATCH DISK & problem (Reported by Sweden)

Regards

Duncan Chou



To: Michael Riley  
From: Duncan Chou  
Subject: Turbo Bugs

W0000600 6FLT3  
Security: Confidential  
Date Received: 02/19/92

-----  
Mike,

1.11  
for bug 1: Have fixed on Rev 1.11  
bug 2: Have fixed on Rev 1.11  
bug 3: TC function on MXF still under testing (User can use MXE ???)  
bug 4: Have fixed on Rev 1.11  
bug 5: Have fixed on Rev 1.11  
bug 6: We can not duplicate (Need more information ???)  
bug 7: Is working on my system (1.10) ???  
bug 8 to 12 will reconfirm to Sweden (some have fixed but some can not reproduce ???)  
bug 13: Have fixed on Rev 1.11

On last year July: Mr. Shen fix the problem about VLSI on 9578 and the problem is someone does not layout some line for VLSI reset signal on 9578 !!!!! Please check !!!!

Regards  
Duncan

----- Original Memo -----

To: Duncan Chou  
Subject: Turbo Bugs

From: Michael Riley  
Date Sent: 02/06/92

Duncan

This is the list of Turbo O.S. Bugs in order of priority...

- 1.11 1. DS Tape Backup & Restore Utility working on 22C11HS with 64 Parts.Genpart..
- 1.11 2. DATA LOAD DC OPEN (Three Byte addressing)Dose not work...
3. SELECT TC/A02 Takes out the O.S. & Get MXF Port 1 & 2 to work in TC mode...
- 1.11 4. \$BREAK !, & \$BREAK X Where X=1 to 255 (Sweden Bug 10 & 11) Dose not work..
- 1.11 5. \$Disconnect On X (Sweden Bug 9)
6. Printing to Terminal 204 with out a printer on, Hangs Terminal...
7. Remote Screen Dump on a MXF.
8. LOADRUN "Filename" (Sweden Bug 14)
9. Type 2 Disk Header (Sweden Bug 1, 15)
10. Limits T/X,"Filename" ,A,B,C,D (Sweden Bug 2)
11. MXF Bugs,(Sweden Bug, 4,5,6)
12. Input Cursor A\$(Sweden Bug 7)
- 1.11 13. @GENPART in NEW Format will not come up...

I have one MAJOR problem with the Hardware:

1. The 9578 Mother Board will not work with the VLSI CPU.... Something has changed over the year.. At one time it did work !!!! ALL CS-N/D Boxes will have the new motherboard in it and we are still shipping VLSI CPUs... I need a fix quickly!!!

Michael Riley

1.12

\$1F/001 BUG

WOULD NOT TALK TO KY BRO

Intended For:

This Item is In Progress

Author: Mike Bahia

Subject: Turbo Maint Rel 1.07

-----

Turbo Maint Rel 1.07 is enclosed. It includes fixes for the following problems:

1. DS Utility 'Backup Disk to Tape' fails intermittently with Tape Command Error. Reported against Turbo O/S 1.0.
2. PC/2200 File Transfer hangs reported against Turbo O/S 1.0.
3. PRINTUSING command may suppress certain repeated characters in a hardcopy printout. Reported in 1.0.
4. Heavy disk usage by 1 partition using the new 22C11-HS Disk ports may cause a temporary hang condition to other partition trying to access disk using that same port. Reported against Maint Rel 1.04.
5. The PRINT # TERM would not return the correct terminal number for any terminal connected to a board following an MXE or MXD. Reported against 1.04.
6. A global partition would not work in a partition beyond 32. Reported against 1.04.
7. DS Utility 3.0 when used with a 45 Meg Tape Drive would fail trying to restore from tape to disk if more than 1 entry was saved on that tape.
8. The 1st 2 ports of the MXF would not set DTR if connected to a modem.
9. SELECT TC Axx would not work correctly in some instances.
10. If booting off the 22C11-HS controller with both an MXF and either a MXE or MXD installed, and the power up CPU diagnostics were allowed to complete, the system would hang just before loading @GENPART with a blank screen. Reported against 1.04.

Please make sure this Maint Rel is brought out to your respective sites as soon as possible. Please let me know of any problems you may find with this release.

Best Regards,  
Mike Bahia

## CS/386 TURBO

## Status Update

IMPORTANT NOTE: The information provided in this document is Company Confidential and is intended for internal Wang use only. It is being distributed to only those people currently supporting existing sites. It provides a list of the known issues as well as circumventions. All problems listed if not fixed already are in the process of being resolved and should have fixes shortly. Any new problems that should be found should be reported immediately. Please see the closing paragraph for additional information on reporting problems.

## Operating System:

Currently there are only 2 Operating Systems that should be in use.  
The 2 are:

Basic-2/Turbo Operating System Revision 1.0  
Turbo Maintenance Release Revision 1.04

Both Operating Systems are summarized below.

Basic-2/Turbo Operating System Revision 1.0:

- 1 This operating system will run most software without a problem. It has been tested for many hours at several beta sites. The problems open against this O/S are:
  - P1 1. The DS Utility 'Backup Disk to Tape' fails intermittently with a Tape Command Error. This problem seems to occur more frequently on the high-speed bus.  
Current Circumvention: a. Do backups to disk.  
b. Use Maint Rel 1.04 to do backups. (see notes on maint rel 1.04 and software issues, DS Utility 3.0, for additional info)
  - P1 2. PC/2200 File Transfer Utility hangs system.  
Current Circumvention: Corrected on Maint Rel 1.04. (see notes on 1.04 before upgrading)
  - P2 3. SELECT H ON in a multi-CPU environment may experience a hang if a user has hogged an address and keys RESET and the system cannot access the disk to clear the hog due to another user hogging the disk for an extended period.  
Current Circumvention: Do not key RESET on a partition which has a platter address hogged in a multi-CPU environment until the hogged address is released with a \$CLOSE unless the partition can readily address the disk. This problem is a limitation on the hardware design but will be corrected to come up with an error A00 (System Error) without hanging the system. The amount of time given to the CPU to access disk and clear the hog will also be increased to 5 seconds from 30 mil seconds to limit the likelihood of getting an A00 error.
  - P2 4. In some instances the PRINTUSING command may suppress certain characters that are repeated on a hardcopy printout. In most cases PRINTUSING appears to work properly.  
Current Circumvention: Corrected on Maint Rel 1.04. (see notes on 1.04 before upgrading)

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#### Turbo Maintenance Release Revision 1.04:

This operating system is being used at some installations but has a problem using the High-Speed Disk Controller. Existing problems open against this O/S are:

- P1 1. Performance problem on the new 22C11-HS Disk Controller. Intermittently a user with a heavy disk usage will cause other partitions to hang waiting for disk access. Other users will appear hung but will eventually resume activity on their own or when the partition using the disk completes. If RESET is keyed the partition will return 'READY (BASIC-2) PARTITION xx'.  
Current Circumvention: a. Do not use the 22C11-HS Disk ports. Use an old style Disk Controller.  
b. Use O/S 1.0. (see notes on O/S Rel 1.0 before downgrading)
- P2 2. SELECT H ON in a multi-CPU environment may experience a hang if a user has hogged an address and keys RESET and the system cannot access the disk to clear the hog due to another user hogging the disk for an extended period. This problem is still existing from O/S Rel 1.0.  
Current Circumvention: Do not key RESET on a partition which has a platter address hogged in a multi-CPU environment until the hogged address is released with a \$CLOSE unless the partition can readily address the disk. This problem is a limitation on the hardware design but will be corrected to come up with an error A00 (System Error) without hanging the system. The amount of time given to the CPU to access disk and clear the hog will also be increased to 5 seconds from 30 mil seconds to limit the likelihood of this problem.
- P2 3. The PRINT # TERM command will not return the correct terminal number for terminals used with any board after a MXE or MXD is used. The O/S incorrectly assigns 16 ports to every board except possibly the last board. This problem may also exist on version 1.0 of the O/S.  
Current Circumvention: If using the PRINT # TERM command on a system with a MXE or MXD as the 1st board be aware of the problem. It should not be a problem to work around this issue.
- P3 4. A 'global partition' will not work in a partition beyond partition 32. This problem is also likely to exist on 1.0 O/S.  
Current Circumvention: Insure all global partitions are created within the first 32 partitions.

#### Software Issues:

1. DS Utility 3.0. If used with a 45 Meg Tape Drive, addresses stored on tape via the 'Backup Disk to Tape' function which begin beyond track 1 on the tape will not be recoverable. This problem does not occur with the 150 Meg Tape Drive. This utility is included with the current Turbo Operating Systems.  
Current Circumvention: a. Use DS Utilities version 2.0.  
b. Make the following change to program '@DSTAPEB'. Change line 1035 as follows:

```
from 1035 GOSUB 372: C$=STR(X1$(),4)
to 1035 GOSUB 372: C$=STR(X1$(),4): IF M9=45 THEN C$=C$
 AND HEX(OF FF FF)
```

1.12 IF BACKING UP TO <sup>TAPE</sup>DISK 3 SURFACES MAY GET T14 (UNRECOVERABLE DATA ERROR) UNLESS THIS CHANGE IS MADE WITH 45 MEG TAPE.

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2. D.A.T.A. 3500 TOM WP Release 2.2. In several areas this software checks for the CPU type which is an O/S status byte. The CPU type for the Turbo is 'T'. Without the necessary changes there will be problems using this software including editing documents. This software is running properly at the sites where the changes have been made. This issue is also discussed in TSB HWT 9640, CS/386 TURBO Announcement from 11/5/91, item 9.

Current Circumvention: a. Have the customer or there programmer contact Northwest Source Group for the needed changes.

b. Contact Mike Bahia, Product Support in Lowell, if there is a problem contacting Northwest Source Group. Tel # (508)656-0256.

3. Some TC Software may not run using the MXF Controller. Several problems in this area have been identified and are being addressed.

Current Circumvention: Use the old bus controllers for running TC Software. In most cases, this would be the same board/s used before upgrading to the Turbo. Fixes for many of the problems reported in this area are currently being tested.

4. Please see TSB HWT 9640, CS/386 Turbo Announcement from 11/5/91 for additional information to be aware of if not read already.

In closing, please contact Mike Bahia at 508-656-0256 on any other issues or for assistance if help is not available locally concerning hardware or software with the Turbo. Any problems that cannot be corrected should be escalated through the proper channels. PTR calls should be opened on these issues to provide well documented two-way communication between the field and support groups. Please use the PTR call to document all related communications with the customer concerning the problem as well as any information that may be helpful in resolving or troubleshooting the issues being addressed. All software issues should be escalated through the RSC's. If a problem cannot be resolved by the standard support groups, RSC's and Product Specialists, the PTR call should be escalated by that group to RDB 8760.

WP+ #2

VS OFFICE

Friday

01/03/92 05:00 pm

Package Subject: Rev 1.04 of Turbo

Item Title: Rev 1.04 of Turbo

Mike,

I can not duplicate your problem !!!  
Do not forget, 22c80 should be connected to 2275MUX then to DS !!!  
Please check your system !!!

Regards  
Duncan Chou

----- Original Memo -----  
To: Duncan Chou  
From: Mike Riley  
Subject: Rev 1.04 of Turbo  
Date Sent: 12/16/91

Duncan

I have a problem That I need you to fix!!!  
Turbo system with a 22C80 (7715) connected to the DS....  
Try to bring it the system from the floppy or the hard disk through the 22C80  
board....

my system, It hangs after loading the O.S. but before it loads @GENPART...  
Have fun !!

Michael Riley

VS OFFICE

Friday

01/03/92 04:42 pm

1

Package Subject: Rev 1.04 of Turbo

Item Title: Notes

Mike,

This is Rev 1.04 of Turbo O.S. and have PC2200 file transfer bug fixed.

a new @DG2 for interrupt testing problem fixed. (just remove this item testing that never be used in O.S.)

Please update all files that on this diskette !!!

Regards

Duncan Chou

CC: Michael Bahia  
From: Michael Bahia  
Subject: Turbo Installation  
MS014-A3A/LOWELL  
Security: General  
Date Received: 12/17/91

Last week I sent Turbo Maintenance Release 1.03 out. It should fix the DS Tape Backup problem and has tested fine in house. However, at the 2 beta sites at which it was installed some strange errors or hangs occurred with disk. We think these may be due to early version boards at these sites but have not verified that yet. If you install the Turbo system in your area please use the Operating System shipped with the system, 1.0 to verify the system is running properly. This O/S has been running & been tested for many hours & except for the known problems with DS Tape Backup, PC/2200 File Xfer, and a few other minor problems should get you started. There is also a problem with Data 3500 WP (TOM WP) just reported that we are working on.

At this time we are testing Maint Rel 1.04. It fixes the problems reported against 1.0. It may also fix the TOM WP problem which we still need to test. We should have a better handle on the 1.03 status in a day or 2 and 1.04 if all tests ok should be available in the next few days. Please contact me before installing 1.03 or to find out about 1.04. Sorry for any problems this may cause

Regards,  
Mike Bahia  
2200 Support  
508-656-0256/0105

DS TAPE BACKUP - FAILS INTERMITTENTLY WITH T14 ERRORS.

FIXED w/ 1.04

PC/2200 File Xfer

FIXED w/ 1.04

DATA 3500 WP Bug - Not O/S

CHANGE PAGE WP 425 3

LINE 4870

CHANGE IF STMT 6L ADD

STL(Q\$9,1)='T' THEN

CHANGE PAGE WP 307 1

LINE 250

REM IF STMT



VS OFFICE

Friday

01/03/92 05:01 pm

Package Subject: Turbo Bug

Item Title: Turbo Bug

Mike,

Tell me more !!! I can not duplicate your problem by use DATA SAVE DC OPEN and DATA SAVE DC statements. What's your means about end catalog value ??? I use LISTDC to check end of catalog after DATA SAVE DC CLOSE.

Regards

Duncan Chou

----- Original Memo -----

To: Duncan Chou

From: Mike Riley

Subject: Turbo Bug

Date Sent: 12/16/91

Duncan

I have a problem with three byte address...

Set up a platter with 100000 sector... With a Turbo, go in th three byte addressing for that Part... Scratch the platter with a END=950000 (type 2 index)... Put some data out there... Use a DATA SAVE DC OPEN to open the file and a DATA LOAD DC to get the data out of the file...

The problem is that either the DC OPEN or the DATA LOAD DC is getting the end of catalog value from the index byte 4 & 5 But should get it from bytes 5 to 7 ...

How fast can this bug get fix!!!

Michael Riley

VS OFFICE

Tuesday

12/17/91 02:33 pm

1

Package Subject: Turbo Information

Item Title: Turbo Information

Enclosed is most of the documentation available on the Turbo. If you have any questions or problems please let me know. Also, I will be mailing you some documentation which includes pictures. Some of the information such as the Maintenance Plan & The Turbo Card Set Document have been updated. If you have earlier copies please replace them with the documentation within. The following are known problems with the Turbo for which fixes are expected very shortly. The VAR ordering the product has requested we shipped the product knowing the problems exist with the feeling they can work around the problem or will not be using that function anyway.

1. The DS Utility Tape Backup routine will not work with the O/S being shipped with the system using the 22C11-HS Controller. It is also likely it may fail intermittently with the existing disk controllers. 1.03

2. If 2 22C11-HS Printer/Disk Controllers are installed in the same CPU and 1 is address 320, the boards will fail to pass power on self-test. A PAL chip will be shipped when available to fix this problem. R2. PROM

3. If using PC/2200 emulation, the file transfer utility between the PC & Turbo will not work. This is an O/S bug. 1.04

4. There is also a bug with PRINTUSING in some circumstances which could cause a hard copy printout to be altered. With the problem that was reported, it appeared that some blank spaces were suppressed. 1.04

If there are any questions or problems please do not hesitate to call me.

Regards,

Mike Bahia

2200 Support

508-656-0256/0105

To: Gene Schulz

From: Michael Riley

Date: August 14, 1991

Subj: BASIC-2 Enhancements

Enhancements of Release 2.0 for CS/386 & TURBO 1.0

1. GOSUB' integer ..... DEFFN' integer .....

Change integer Range (0 -- 255) to Range (0 -- 65535)

2. LIMITS T(file#,) filename, start, end, used (,status)

Change to LIMITS T (file#,) filename, start, end, used, (,status)  
(,hash-sector) (,index-type)

3. COM and DIM

Change 1-dimension arrays from Range (1 -- 65535) to (1 -- 65535\*65535)  
Change 2-dimension arrays from Range (1 -- 255) to (1 -- 65535)

4. MAT MERGE ..... for two byte length Locator-Array.  
MAT SORT ..... (Dimensions under 65535) (255 \* 255)  
MAT MOVE .....

MAT MERGE ! ... for four byte length Locator-Array.  
MAT SORT ! .... (Dimensions under 65535\*65535)  
MAT MOVE ! ....

MAT SEARCH ..... for two byte length pointer-variable.  
(Dimensions under 65535)

MAT SEARCH ! .. for four byte length pointer-variable.  
(Dimensions under 65535\*65535)

5. LIST SELECT... for listing all the SELECT variables

6. SCRATCH DISK ' ... for index type 1

SCRATCH DISK & ... for index type 2 (Three byte addressing)  
(Change index size from Range (1 -- 255) to (1 -- 65535) and sector from Range (1 -- 65535) to (1 -- 65535\*256))

## New Functions of Release 2.0

1. SELECT H ON                      for platter hog switch on  
SELECT H OFF                      for platter hog switch off)
2. SELECT 3 ON                      for three byte addressing switch on  
SELECT 3 OFF                      for three byte addressing switch off
3. SELECT T ON                      for Date and Time put on File switch on  
SELECT T OFF                      for Date and Time put on File switch off
4. PRINT #CPU                      CPU number printout that got from @GENPART  
PRINT # VERSION                      OF VERSION
5. \$ROTATE (alpha-variable, numeric-1, numeric-2, (-)numeric-3)

FOR SORTING

Where:

|                |                                               |
|----------------|-----------------------------------------------|
| Alpha-variable | = String that to be byte rotated              |
| numeric-1      | = Starting pointer of Rotated Range of string |
| numeric-2      | = Ending pointer of Rotated Range of string   |
| (-)            | = Right rotate and none for Left rotate       |
| numeric-3      | = Rotate count                                |

6. \$MOVE (! &) T (file#,) (filename i) TO T (file#,) (filename o)  
disk, disk,

Where

! is move to new file program format  
& is move to old file program format

filename i = 8 character program to be converted  
or

8 character data file name with program name in it ON INPUT DISK  
filename o = 8 character data file name that will store program names  
that have failed the \$MOV command.

The data file MUST have all ready been opened before executing the  
\$MOVE command or a error D80 will accure.

The data file format is 8 bytes for program name. BYTES 1-8

SELECT #1/Dxx 6 bytes for line number. BYTES 10-15

DATA\$AVG DC ORGNT #1, (10) 2 bytes for error type. BYTES 9

\$MOVE !T/340, TO T/D36, "NEWADVE1"

7. \$COPY Alpha-1 (num-1,num2,num3) TO alpha-2 (num-4,num-5,num-6) REPEAT num-7

Where:

Alpha-1 = Alpha variable for string of COPY from  
Num-1 = Numeric variable for start position  
Num-2 = Numeric variable for field length  
Num-3 = Numeric variable for skip length  
Alpha-2 = Alpha variable for string of COPY to  
Num-4 = Numeric variable for start position  
Num-5 = Numeric variable for field length  
Num-6 = Numeric variable for skip length  
Num-7 = Numeric variable for repeat count(OPTION)

\* WILL REQUIRE UPDATED PC2200 EMULATOR OR 2636DW

\* 8. SCREEN READ (T#) alpha-variable For Turbo high speed reading from  
a Terminal port.

Where:

If T# is entered, then the alpha-variable is the name of a opened data  
file at device address T# that the data will go.  
If T# is not entered, then the alpha-variable is an array to where  
the data is sent.

\* 9. SCREEN WRITE (T#) alpha-variable For Turbo high speed writting  
to a terminal port.

Where:

If T# is entered, then the alpha-variable is an opened disk file at  
T# from where the data will be transferred to the terminal port..  
If T# is not entered, then the alpha-variable is an array that will  
be transferred to the terminal port.

\* 10. SCREEN STATUS alpha-variable For Turbo Screen status from a  
2636DW or PC2200 emulation.

Where:

aa= Row offset  
bb= Column offset  
cc= Total window rows  
dd= Total window columns  
ee= Cursor row count  
ff= Cursor column count  
gg= Cursor attribute  
hh= Page number

\* 11. SELECT WIDTH xx For setting MXF width count for windowing.

\* 12. Windowing and paging commands for the 2636DW Terminal (When released) and  
the new PC2200 emulation.

SET WINDOW  
JUMP TO PAGE (1 to 4)  
COPY TO PAGE  
CLOSE WINDOW

\$CLEAR21x CLEARS PRINTER BUFFER ON 22C11-H5.

REM %% - ALLOWS YOU TO EXECUTE FOLLOWING COMMAND ON 386 CPU'S BUT IGNORE  
ON NON-386 CPU'S.

Package Subject: Turbo O/S label

Item Title: Read Me (release #)

Cecile,

On the current label it reads 1.10 as the release # which we prefer to use. In my attached memo it say 1.01.00 which is how it reads on AMAPS. It should read 1.1 as you have it currently labeled. Sorry for any confusion.

Regards, Mike

----- Next Memo -----

Item Title: Turbo O/S label

Cecile,

Cheryl from SDC gave me your name. I handle 2200 Product Support. We just came out with a new O/S for the CS/386 Turbo, Revision 1.01.00. It comes on either 1 1.2 Meg Floppy or 3 360K Floppys. As of now the 1.2 Meg version is labeled as disk 4. It should be 1 of 1. This could lead to confusion as it would make one think they are missing 3 diskettes when that is not the case.

The entire O/S comes on a 1.2 Meg but for those customers who only have a 360K drive, a 1.2M won't work. This why we need the 3 360Ks. The label which I have not seen for the 1.2 Meg should read something like the following:

CS/386 Turbo General Release 1.01.00, Disk 1 of 1, Part # 734-8446A

For the 360k set I believe the label is ok but to verify they should read:

CS/386 Turbo General Release 1.01.00, Disk 1 of 3, Part # 731-8026A

" " , Disk 2 of 3, Part # 731-8027A

" " , Disk 3 of 3, Part # 731-8028A

Thanks for your help on this matter.

Regards,

Mike Bahia

2200 Product Support

60256/60105

VS OFFICE

Thursday 05/14/92 10:15 am Page:

1

To: Mike Bahia

W0000600 6FLT3

From: Cecile M. McKinney

Security: General

Subject: Turbo O/S label

Date Received: 05/08/92

Mike

I will make all necessary changes today. I will also contact Ireland and Australia to make their changes.

Regards

Cecile

To: Mike Bahia W0000600 6FLT3  
From: Todd Marshall Security: Limited  
Subject: Turbo O/S AMAPS listing Date Received: 05/08/92

---

Mike,

I originally put the description Mike Riley asked for. We do not put S/W version numbers on individual diskettes. The version is on the 291. I have changed the diskette descriptions as follows.

|            |        |       |      |   |    |   |
|------------|--------|-------|------|---|----|---|
| 734-8446-A | CS/386 | TURBO | DISK | 1 | OF | 1 |
| 731-8026-A | "      | "     | "    | 1 | OF | 3 |
| 731-8027-A | "      | "     | "    | 2 | OF | 3 |
| 731-8028-A | "      | "     | "    | 3 | OF | 3 |

291-1001-A Line 2 has been changed to S/W VER 1.10.00

Regards, Todd

## Diagnostic Program Document

Documentation Release:  
Documentation Part No.:  
Package Number:

Software Release:  
ECO Number:

Program Name : CS386 TURBO SYSTEM DIAGNOSTICS

Originator : Milton Chen

Date : March 4, 1991

### Table of Contents

- 1.0 Reference Documentation
- 2.0 Configuration Requirements
- 3.0 Program Description
- 4.0 Load Procedure
- 5.0 Operating Instruction
- 6.0 Miscellaneous
- 7.0 Program Revision History

Appendix A: Test Description  
Appendix B: Program Listing

Engineering Service Department  
Wang Computer (Taiwan) Ltd.  
2, Science-Based Industrial Park  
Hsinchu, Taiwan, R.O.C



## 1.0 REFERENCE DOCUMENTATION

CS386/II Hardware Specification  
Intel 82385 cache controller data sheet  
Real-Time Clock 146818 data sheet  
CS386 CPU TURBO BIT

## 2.0 CONFIGURATION REQUIREMENTS

### 2.1 Hardware

Minimum required configuration for the system diagnostic @DG1 is CS386 TURBO CPU BOARD, 2236 MXE or MXF, terminal 2426DW, 2536DW 2636DW and download by 22C11 disk control card.

### 2.2 Software

The diagnostics @DG1 is resident in the floppy of 2200 formatter or 2200 Winchester disk, download by CS386 PROM loader.

## 3.0 PROGRAM DESCRIPTION

### 3.1 Applications

To test CS386 TURBO CPU SYSTEM include Turbo CPU board ,2236 MXF and 22C11-HS disk control board. There is a system repair and Diag test. It provided QC pretest of Manufacturing production and CE field troubleshooting.

### 3.2 User interface

The user interface in the customer environment is through the use of 2200 terminal. Any test error message will display on the terminal.

### 3.3 Hardware tested

The hardware on the board consists of CPU 80386, RTC chip. 146818, INTEL 82385 cache controller , DRAM test and interface control card 22C11-HS, 2236MXF diagnostic status.

### 3.4 Tests in The Program

| Name of Test                     | Hardware Tested                 |
|----------------------------------|---------------------------------|
| 1. Interface control card        | Interface card exist & status   |
| 2. System Interrupt test         | Test 386 & 286 mutual interrupt |
| 3. Parity check & NMI test       | Parity check & NMI test         |
| 4. DRAM data bus test            | DRAM data bus test              |
| 5. DRAM double word pattern test | DRAM test                       |
| 6. DRAM word pattern test        | DRAM test                       |
| 7. DRAM byte pattern test        | DRAM detect bad SIMM.           |

### 4.0 LOAD PROCEDURES

After CS386 Turbo system completed bootstrap, and show "MOUNT SYSTEM PLATTER" & "PRESS RESET", then press "SHIFT+RESET". When it displays "KEY SF'?", key in "@DG1" and depress the special function key which corresponds to the drive containing the @DG1 file.

Another load @DG1 file method is that screen displays "KEY SF'?", it depressed the special function key which corresponds to the drive containing OPERATION SYSTEM file.

Screen should display

— BASIC-2  
— Diagnostics

Space down to Diagnostic and key RUN. and execute @DG1 file..

### 5.0 OPERATING INSTRUCTIONS

It is looping test, executing counter is to be displayed. Any terminate diagnostic test if depress " SHIFT+RESET ", will return to the " MOUNT SYSTEM PLATTER " screen.

6.0 MISCELLANEOUS

7.0 PROGRAM REVISION HISTORY

10A0 Initial Release

APPENDIX A  
TEST DISCRIPTION AND ERROR TABLE

## A.1 TEST DESCRIPTION

[ TEST-1 ] System interface card exist and diagnostic status

Purpose: detect interface control card exist in the Turbo system and each card of diagnostic test status.

[ TEST-2 ] System Interrupt test result

Purpose: To show CS386 CPU Turbo control card and interface control card mutual interrupt test result.

[ TEST-3 ] Parity check and NMI test result

Purpose: To display Parity check and NMI test result

[ TEST-4 ] DRAM Data Bus Test

Purpose: To check data bus short or open.

```
BEGIN
 FOR current bank 64K of 1st addr.
 FOR pattern = FFFFFFFF, 01, 02, 04,...80000000,
 0, 7FFFFFFF, BFFFFFFD,...,FFFFFFFE
 write current pattern to current address
 read/verify current address
 NEXT pattern
 NEXT bank
END
```

[ TEST-5 ] DRAM Double Word Pattern Test

Purpose: Double word pattern write/read test

```
BEGIN
 FOR I= (last addr.- first addr.)/4
 Verify Pattern 55AAAA55
 WRITE PATTERN/ READ VERIFY
 NEXT I
END
```

[ TEST-6 ] DRAM Word Pattern Test

Purpose: Word pattern write/read test

```
BEGIN
 FOR I= (last addr.- first addr.)/2
 Verify Pattern 3CC3
 WRITE PATTERN/ READ VERIFY
 NEXT I
END
```

[ TEST-7 ] DRAM Byte Pattern Test

Purpose: Byte pattern write/read test

```
BEGIN
 FOR I= first addr.to last addr
 Flood 16K bytes of each bank
 XCHG read 'FF' write '00'
 Verify data and INC ESI
 Update memory each 16K bytes unit
 NEXT I
END
```

## A.2 ERROR MESSAGE

Interface control board 2236 MXF or 22C11-HS test error definition is as following:

### 2236 MXF control board Error code :

- ERROR - 1 : first 4K bytes test error result from memory test fail.
- ERROR - 2 : CPU contional jmp, general regs. and segment defact.
- ERROR - 3 : SRAM Write/Read test error.
- ERROR - 4 : SRAM data bus error.
- ERROR - 5 : UART 2698 chip local loopback test failure at L:37  
on the MXF daughter board ( 210-9580 ).
- ERROR - 6 : UART 2698 chip local loopback test failure at L:38  
on the MXF daughter board ( 210-9580 ).

### 22C11-HS control board Error code :

- ERROR - 1 : first 4K bytes test error result from memory test fail.
- ERROR - 2 : CPU contional jmp, general regs. and segment defact.
- ERROR - 3 : SRAM Write/Read test error.
- ERROR - 4 : SRAM data bus error.

Others test fail will display error message from 2200 terminal.  
If press "SHIFT+RESET" key, it will terminate diagntic test program  
enter system loader mode.

APPENDIX B  
PROGRAM LISTING



## Diagnostic Program Document

|                         |                   |
|-------------------------|-------------------|
| Documentation Release:  | Software Release: |
| Documentation Part No.: | ECO Number:       |
| Package Number:         |                   |

PROM Part Numbers: 378-9508 and 378-9509

Program Name : CS386 CPU Turbo BIT

Originator : Milton Chen

Date : March 4, 1991

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- 1.0 Reference Documentation
- 2.0 Configuration Requirements
- 3.0 Program Description
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- 7.0 Program Revision History

Appendix A: Test Description and Error Table  
Appendix B: Program Listing

Engineering Service Department  
Wang Computer (Taiwan) Ltd.  
2, Science-Based Industrial Park  
Hsinchu, Taiwan, R.O.C

## 1.0 REFERENCE DOCUMENTATION

CS386 CPU Turbo Hardware Specification  
Intel 82385 cache controller data sheet  
Real-Time Clock 146818 data sheet  
CS386 CPU BIT

## 2.0 CONFIGURATION REQUIREMENTS

### 2.1 Hardware

Minimum required configuration for the BIT diagnostic must reside at CS386 CPU Turbo control board (210-9576 and 210-9577) and insert in the high speed channel board (210-9578).  
2200 terminal - 2435DW, 2536DW, 2636DW...

### 2.2 Software

Two 64K PROMs loaded with the latest release of the firmware located at L64 (odd) and L50 (even) on the CPU Turbo control board.

## 3.0 PROGRAM DESCRIPTION

### 3.1 Applications

To test hardware located on the CS386 CPU Turbo controller board (210-9576 and 210-9577) and clear a path for the boot and loader. There is also a board repair diagnostic included in the the PROM code, It provided QC pretest of Manufacturing production and CE field repair.

### 3.2 User interface

The user interface in the customer environment is through the use of 2200 terminal and LED. If LED is flashing, meaning the diagnostic test fatal error, system will be hung. The ICE may be halted on an error and viewing of registers will contain specific fault isolation information.

The others test fail will display error message on the 2200 terminal.

### 3.3 Hardware tested

The hardware on the board consists of CPU 80386, RTC chip. 146818, INTEL 82385 cache controller and DRAM test.

### 3.4 Tests in The Program

| Name of Test                    | Hardware Tested           |
|---------------------------------|---------------------------|
| 1. 80386 CPU test               | Check 80386 CPU           |
| 2. 256K DRAM test               | Check 256k byte for table |
| 3. DRAM data bus test           | DRAM data bus test        |
| 4. DRAM address line test       | DRAM address line test    |
| 5. RTC user ram test            | Check RTC Chip            |
| 6. Parity check & NMI test      | Parity & NMI circuit test |
| 7. Detect system interface card | MXF/22C11 common memory   |
| 8. System interrupt test        | Interrupt circuit test    |
| 9. Memory size test             | Detect memory size        |
| A. Data fast exchange test      | DRAM exchange test        |
| B. Bad SIMM location test       | Detect bad SIMM location  |
| C. 2-Way associative cache test | Cache controller test     |
| D. Memory test with cache       | DRAM with cache test      |

### 4.0 LOAD PROCEDURES

Upon power on the program is automatically running.

### 5.0 OPERATING INSTRUCTIONS

There is two types of diagnostic employed by the PROM:  
Normal power-up mode and Run-in mode.

When power is applied to the unit, Normal power-up mode will be entered.

Using MXE or MXF channel-1 to connect 2200 terminal, will show diagnostic program execution message.

Most of important is that MXF board ID must set "1st" board. The MXF board ID setting refer to 2200/II MXF BIT - MISCELLANEOUS and 1st MXF board can not set run-in mode itself, otherwise it can not display CS386/II diagnostic execution message and cause MXF run-in test error.

If 1st MXF is not exit, it will display via MXE,

#### 5.1 Run-in mode

Short the jumper JP3 on daughter board 210-9577 will execute run-in test. At this mode CS386 will skip system interrupt test. From the terminal will show diagnostic run-in loopcounter.

#### 5.2 Normal power-up mode

After power-up, if diagnostic test no fatal error the 2200 terminal will display:

Copyright, Wang Laboratories, Inc., 1990 CS386/II Rev 50A0

DRAM ...KB

And then display system configuration of interface control card MXF/22C11 and each card of diagnostic test result.

At last enable cache controller, move PROM memory test program to DRAM, and then test memory with cache.

After diagnostic test pass, jump to boot loader.

## 6.0 MISCELLANEOUS

## 7.0 PROGRAM REVISION HISTORY

50A0 Initial Release

APPENDIX A  
TEST DISCRIPTION AND ERROR TABLE

## A.1 TEST DESCRIPTION

### [ TEST-1 ] 80386 CPU TEST

Purpose: Verify flags reg ,conditional jmp and read/write general and segment register.

### [ TEST-2 ] 256K DRAM MEMORY TEST

Purpose: To test DRAM write/read at first 256k byte to set up table area.

### [ TEST-3 ] DRAM DATA BUS TEST

Purpose: To check data bus short or open.

BEGIN

FOR current bank 64K of 1st addr.

FOR pattern = FFFFFFFF, 01, 02, 04,...80000000,  
0, 7FFFFFFF, BFFFFFFD,...,FFFFFFFE

write current pattern to current address

read/verify current address

NEXT pattern

NEXT bank

FOR current bank of 1st addr.

FOR pattern = 03, 06, 0C, 18, 30, ..., C0000000,  
80000001

write current pattern to current address

read/verify current address

NEXT pattern

NEXT bank

END

### [ TEST-4 ] DRAM ADDRESS LINE TEST

Purpose: To test address line short or open

At first, write a pattern 'FF' to address 0, i.e. A0=1, now set address ON only that line is to be test, i.e. addr. 01H, 02H, 04H, 08H, .... write another pattern '00', if change addr.0 content, that is meaning that address line is error occurence.

[ TEST-5 ] RTC USER RAM TESTST

Purpose: Initial RTC and USER RAM test.

RTC address map :

addr. 0E : the DRAM memory size, MB unit  
0F : boot ID high byte  
10 : boot ID low byte  
11 : interface card configuration  
12 : system interrupt test result  
13 : NMI test result  
1E : memory size low byte, 64K unit  
1F : memory size high byte, 64K unit  
20 : loop count low byte  
21 : loop count high byte

[ TEST-6 ] NMI & PARITY CHECK TEST

Purpose: To check NMI and parity circuit test.

Force generate parity bit and clear parity error and then enable NMI, read memory operate will enter NMI service routine.

[ TEST-7 ] DETECT INTERFACE CARD EXIST AND STATUS

Purpose: Detect MXF/22C11 control card and diagnostic status.

Using W/R interface card and CS386 common memory to sense MXF and 22C11 exit.

RTC at addr.11H :

|     |     |     |     |       |       |       |         |
|-----|-----|-----|-----|-------|-------|-------|---------|
| D7  | D6  | D5  | D4  | D3    | D2    | D1    | D0      |
| 4th | 3rd | 2nd | 1st | 3rd   | 2nd   | 1st   | -       |
| MXF | MXF | MXF | MXF | 22C11 | 22C11 | 22C11 | reserve |

[ TEST-8 ] SYSTEM INTERRUPT TEST

Purpose: To check interrupt circuit test between CS386/II and interfcae card MXF/22C11-286.

First from CS386 interrupt MXF/22C11-286, at 286 execute interrupt service routine, interrupt CS/386-II, if CS386/II receive interrupt from MXF/22C11 of 286 that meaning test ok and then set bit on.

[ TEST-9 ] MEMORY SIZE TEST

Purpose: To test CS386 on the mother board populate memory size. There are two kinds of memory configuration:

1M SIMM : \*4 = 4M bytes, \*8 = 8M bytes.

4M SIMM : \*4 = 16M bytes, \*8 = 32M bytes.

[ TEST-A ] DRAM DATA FAST EXCHANGE TEST

Purpose: To test ability of DRAM memory cells to hold '0' or '1' and detect dynamic data/address faults.

BEGIN

FOR ESI:1st addr. (4000H) to last address (EDX)

flood 64K bytes

XCHG read 'FF' write '00'

Verify data and inc ESI

update memory each 64K unit byte

NEXT ESI

END.

[ TEST-B ] BAD SIMM DETECT TEST

Purpose: Using LSB of address which is error occurrence to detect bad SIMM Location, EDX regs. store memory size, ESI point to error byte.

| PCB SIMM    | LSB (A0,A1) | MEMORY SIZE COMBINATION |    |     |     |
|-------------|-------------|-------------------------|----|-----|-----|
| L3          | 0 0         | *                       | *  | @   | @   |
| L5          | 0 0         |                         | *  |     | @   |
| L10         | 0 1         | *                       | *  | @   | @   |
| L15         | 0 1         |                         | *  |     | @   |
| L18         | 1 0         | *                       | *  | @   | @   |
| L24         | 1 0         |                         | *  |     | @   |
| L29         | 1 1         | *                       | *  | @   | @   |
| L35         | 1 1         |                         | *  |     | @   |
|             |             | 4M                      | 8M | 16M | 32M |
| * : 1M SIMM |             | @ : 4M SIMM             |    |     |     |

[ TEST-C ] CACHE CONTROLLER TEST

Using 82385 cache controller two way associate mode, first fill 64K bytes of two way associative cache memory, write four patterns of 4K double words, then set 2M memory is non-cache, others memory is enable cache.

Verify Write/read first two pattern and test last two pattern again. If test fail will display error message.



## [ TEST-D ] DRAM TEST WITH CACHE

Move EPROM DRAM test program to DRAM ,enable all cache memory and then executing.

### A.2 ERROR TABLE

When LED flashing meaning to Fatal error is occurrence, the system is hung. It can be using ICE ( In Circuit Emulator ) to find which test is failure. The register BP will save error code, it aids manufacturing field to isolate fault information.

#### [ Error code 01 ]

Definition: CPU 80386 contional jmp, general register and segment error.

#### [ Error code 02 ]

Definition: DRAM memory cell defect cause read/write error. of first 256K bytes bank.

#### [ Error code 03 ]

Definition: DRAM data bus error, may be result from data bus short or open.

#### [ Error code 04 ]

Definition: DRAM invalid memory address line, cause memory addressing error.

Others test fail will display error message from 2200 terminal. If press "SHIFT+RESET" key, it will terminate diagnstic test program enter system loader mode.

APPENDIX B  
PROGRAM LISTING

## Diagnostic Program Document

Documentation Release: R 0.01  
Documentation Part No.:  
Package Number:

Software Release:  
ECO Number:

PROM Part Numbers: 378-9512 and 378-9513

Program Name : 22C11-HS Disk Controller BIT

Originator : Milton Chen

Date : August 12, 1991

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Appendix A: Test Description and Error Table  
Appendix B: Program Listing

Engineering Service Department  
Wang Computer (Taiwan) Ltd.  
2, Science-Based Industrial Park  
Hsinchu, Taiwan, R.O.C

## 1.0 REFERENCE DOCUMENTATION

22C11-HS Disk Interface Hardware Design Specification  
High Speed I/O Controller Hardware Design Specification  
8255 Programmable Peripheral Interface Data Sheet

## 2.0 CONFIGURATION REQUIREMENTS

### 2.1 Hardware

Minimum required configuration for the BIT diagnostic must reside at 22C11-HS mother board (210-9579-1A).and insert in the high speed channel board.

Printer - if burn-in mode printer test is to be performed.

### 2.2 Software

Two 64K PROMs loaded with the latest release of the firmware located at L07(even) and L14(odd) on the 210-9579-1A 22C11-HS mother board.

## 3.0 PROGRAM DESCRIPTION

### 3.1 Applications

To test hardware located on the 22C11-HS board and clear a path for the 2200 Operating System. There is also a board repair diagnostic included in the PROM code, it provided QC pretest of Manufacturing production and CE field repair.

### 3.2 User interface

The user interface in the customer environment is through the use of LED that is located on the daughter board. Build In Test is in operation, LED will be turned on. Upon completion of BIT the LED is turned off. The test PCA 210-9579 error, the LED always ON, can not be turn off. If looping ( Run-in test ) is a function selected then upon completion of diagnostic test pass the LED will turn off about one second and then turned on again as the next times of test begins.

The ICE286 (In Circuit Emulator) may be halted on an error and viewing of registers will contain specific fault isolation information.

### 3.3 Hardware tested

The hardware on the board consists of 80286 CPU, two 64K PROMs, 256K SRAM, 8255 PPI.

### 3.4 Tests in The Program

| Name of Test                    | Hardware Tested            |
|---------------------------------|----------------------------|
| 1. LED test                     | LED on/off test            |
| 2. 80286 CPU test               | Test 80286 CPU             |
| 3. SRAM Size Test               | detect SRAM size           |
| 4. 4K Bytes Semaphore Area Test | First 4K memory test       |
| 5. SRAM Data Bus Test           | SRAM data bus test         |
| 6. SRAM IMA Test                | SRAM address line test     |
| 7. SRAM Write/Read Test         | Test SRAM W/R              |
| 8. Printer Test                 | 8255 PPI port test         |
| 9. MUX/DPU Loopback Test        | 8255 relative circuit test |

### 4.0 LOAD PROCEDURES

Upon power on the program is automatically running.

### 5.0 OPERATING INSTRUCTIONS

There is two types of diagnostic employed by the 22C11-HS PROM: Normal power-up mode and Burn-in mode.

When power is applied to the unit, Normal power-up mode will be entered.

#### 5.1 Normal power-up

After power-up the LED located on the 22C11-HS daughter board, will be turn on. Until had finished diagnostic test program. LED will be turned off.

PCA 210-9579 test fail, the LED is keep ON.

#### 5.2 Burn-in mode

In order to perform the Run-in test, the 22C11-HS daughter board of DIP switch (SW2), must set OFF ('00').

Printer test will be performed in the Run-in mode. If connect printer, it will print following message:

Copyright, Wang Laboratories, Inc . 1991 Rev.5180

DISK/MUX Loop Back Test: PASS LOOP CONUT: 0 ERROR COUNT:0

Upon completion of diagnostic test pass, the LED will be turned off and turned on again as the next times diagnostic test begins.

DISK or MUX port loop test DEPENDS ON 210-9581 SW1 setting. It is tested individually. The MUX and DISK loopback connector wire weld see Miscellaneous 6.2.

## 6.0 MISCELLANEOUS

### 6.1 Switch Setting

The SWITCH on the 22C11-HS mother board (210-9579-1A) is setting ID control card. If DIP switch setting is as follows:

| SW bit No. | 1   | 2   | 3  | 4  |                       |
|------------|-----|-----|----|----|-----------------------|
|            | OFF | ON  | ON | ON | -- 1st 22C11-HS board |
|            | ON  | OFF | ON | ON | -- 2nd 22C11-HS board |
|            | OFF | OFF | ON | ON | -- 3rd 22C11-HS board |

The SWITCH on the 22C11-HS daughter board (210-9581) L:SW1 is MUX and DISK switch.

| SW bit No. | 1   | 2   |                     |
|------------|-----|-----|---------------------|
|            | OFF | OFF | -- select DISK port |
|            | ON  | OFF | -- select DISK port |
|            | ON  | ON  | -- select MUX port  |
|            | OFF | ON  | -- select MUX port  |

The L:SW2 is printer address port. For example printer port address setting 51H, the switch must set as followings:

| SW bit No. | 1   | 2   | 3   | 4   | 5  | 6   | 7  | 8   |       |
|------------|-----|-----|-----|-----|----|-----|----|-----|-------|
|            | ON  | OFF | OFF | OFF | ON | OFF | ON | OFF |       |
|            | ( 1 | 0   | 0   | 0   | 1  | 0   | 1  | 0 ) | = 51H |

If this switch set all of bits 'OFF' that is Diagnostics " RUN-IN " mode.

### 6.2 DISK/DPU Loopback Test Connector

DPU loopback connector:

|         |    |          |    |
|---------|----|----------|----|
| 1 ----- | 24 | 2 -----  | 25 |
| 3 ----- | 26 | 4 -----  | 27 |
| 5 ----- | 20 | 6 -----  | 21 |
| 7 ----- | 22 | 8 -----  | 23 |
| 9 ----- | 31 | 11 ----- | 36 |

MUX loopback connector:

|          |    |          |    |
|----------|----|----------|----|
| 1 -----  | 18 | 2 -----  | 17 |
| 3 -----  | 16 | 4 -----  | 15 |
| 19 ----- | 36 | 20 ----- | 35 |
| 21 ----- | 34 | 22 ----- | 33 |
| 6 -----  | 7  | 7 -----  | 13 |
| 24 ----- | 25 | 25 ----- | 31 |

The DPU and MUX loopback test CAN NOT be tested at the same time  
It tests ONE PORT at ONE TIME.

#### 7.0 PROGRAM REVISION HISTORY

5180 Initial Release

APPENDIX A  
TEST DISCRIPTION AND ERROR TABLE



## A.1 TEST DESCRIPTION

### [ TEST-1 ] LED Test

Purpose: LED turn on/off to indicate diagnostic test condition.

### [ TEST-2 ] 80286 CPU Test

Purpose: Verify flags reg ,conditional jmp and read/write general and segment register.

### [ TEST-3 ] SRAM Size Test

Purpose: To detect memory size.

```
BEGIN
 FOR DX = 0000 TO 4000H (DX:Seg.)
 FOR DI = 0 TO FFFFH (DI:offset)
 WRITE memory flood 4K byte
 READ verify content data
 IF equal THEN next bank
 ELSE detect memory size
 ENDIF
 NEXT DI (next 4K unit)
 NEXT DX (next bank)
END (BP regs. save memory size)
```

### [ TEST-4 ] First 4K Semaphore Area Test

Purpose: First 4K bytes test for system semaphore area.

```
BEGIN
 FOR J=3 (three patterns: 55AA,AA55,0000)
 WRITE memory flood 2K words
 READ verify content data
 NEXT J (next pattern)
END.
```

[ TEST-5 ] SRAM Data Bus Test

Purpose: Data bus short or open test

```
BEGIN
 FOR DX:= Memory size seg.
 FOR I:= 2 (two pattern: 0000-8000, FFFF-7FFF)
 FOR SI:=0001
 FOR CX:=16 times
 BX: current test pattern, AX: next pattern
 XCHG DS:SI, test pattern
 NEXT CX (next pattern)
 NEXT SI (next address)
 NEXT I
 NEXT DX (next 64K bank)
END.
```

[ TEST-6 ] SRAM Invalid Memory Address ( IMA ) Detection

Purpose: Check SRAM address bus

```
BEGIN
 FOR I=4k bank
 Flood background data '55' to bank
 write a data 'C3' at address (0100:003C)
 FOR J=11 (100:0001, 100:0002, 0004, 0008 ..
 4000, 8000)
 read/verify content of current address
 if not equal 55H then occur error
 NEXT J (next addrs.)
 NEXT I (next bank)
END
```

[ TEST-7 ] SRAM Write/Read TEST

Purpose: SRAM write and read diverse pattern test.

```
BEGIN
 FOR I (4K bytes bank)
 FOR J=3 (three patterns : AA55,55AA,0000)
 WRITE memory flood 2K words
 READ verify content data
 NEXT J (next pattern)
 NEXT I (next bank)
END.
```

[ TEST-8 ] Printer Test

Purpose: This test is performed under Run-in mode. If test ok, will print five lines of following message:

Copyright, Wang Laboratories, Inc. 1991      Rev. 5170  
DISK/MUX Loop Back test : PASS      LOOP COUNT: 0      ERROR COUNT:0

[ TEST-9 ] DISK/MUX Loop Back Test

Purpose: This test is performed under Run-in mode. If you insert DISK loopback connector or MUX loopback connector the test DISK or MUX depends on your setting switch on the 210-9581 SW1.

If test result will print via printer. DISK and MUX can not be tested simultaneously.

## A.2 ERROR TABLE

When LED is always ON, can not be turn off, that is hanged.  
Using ICE ( In Circuit Emulator ) to find which test is failure.

The register BP will save error code, it aids manufacturing field to isolate fault information.

Besides, CS386 TUBRO CPU board can diplay ERROR CODE on the terminal.

[ Error code 01 ]

Definition: CPU 80286 contional jmp, general register and segment error.

[ Error code 02 ]

Definition: First 4K byte test error result from memory fail.

[ Error code 03 ]

Definition: SRAM data bus error, cause memory data bus error.

[ Error code 04 ]

Definition: SRAM Invalid Memory Address line, cause memory addressing error.

[ Error code 05 ]

Definition: SRAM memory cell defect cause write/read error.

APPENDIX B  
PROGRAM LISTING

# MEMORANDUM

SUBJECT: 22C11-HS DISK/MUX LOOP BACK TEST

TO : Michael Riley, Michael Colley

FROM : Milton Chen

C.C.: C.C. Mao, Dancun Chou, K.C. Chen

Date: 08/12/1991

This memo tell you how to do DUP and MUX loop back test.  
First of all, you must do males connector weld wire as following :

DPU loopback connector :

|         |    |          |    |
|---------|----|----------|----|
| 1 ----- | 24 | 2 -----  | 25 |
| 3 ----- | 26 | 4 -----  | 27 |
| 5 ----- | 20 | 6 -----  | 21 |
| 7 ----- | 22 | 8 -----  | 23 |
| 9 ----- | 31 | 11 ----- | 36 |

MUX loopback connector :

|          |    |          |    |
|----------|----|----------|----|
| 1 -----  | 18 | 2 -----  | 17 |
| 3 -----  | 16 | 4 -----  | 15 |
| 19 ----- | 36 | 20 ----- | 35 |
| 21 ----- | 34 | 22 ----- | 33 |
| 6 -----  | 7  | 7 -----  | 13 |
| 24 ----- | 25 | 25 ----- | 31 |

- 1.The DPU and MUX loopback test is performed in the RUN-IN mode.
- 2.The DPU and MUX loopback test CAN NOT be tested at the same time.  
It tests ONE PORT at ONE TIME.
- 3.On the board 210-9581, SW1 is selected MUX and DPU position :

| port | DISK |   | DISK |   | MUX |   | MUX |   |
|------|------|---|------|---|-----|---|-----|---|
| bit  | 1    | 2 | 1    | 2 | 1   | 2 | 1   | 2 |
| on   |      |   | @    |   | @   | @ |     | @ |
| off  | @    | @ |      | @ |     |   | @   |   |

@:position setting

- 4.This switch port CAN NOT read by software, so MUX or DUP loopback test is depend on user switch setting. If you set DPU port that is DPU loopback test, and another set MUX port that is MUX loopback test.
- 5.In the run-in mode, if you connect printer, it will print as following:

Copyright, Wang Laboratories, Inc., 1991      Rev. 5180  
DISK/MUX Loop Back Test : PASS      LOOP COUNT: 0    ERROR COUNT:0  
or      (FAIL)      (1)

6. DISK or MUX port loopback test DEPENDS ON 9581 SW1 setting. It is tested individually.

To : Gene Schulz  
Duncan Chou  
Mike Riley

cc : Bill Hsien  
A. J. Huang

Fm : Mawzan Jau

Date: Dec. 9 1991

Subj: A Proposal for the CS/486

---

A 486 proposal for the CS product is being presented to you.  
Please evaluate it based on your knowledge and the market demands.  
Your input will be greatly appreciated and crucial to the success  
of CS/486.

Proposal for the CS/486

Rev. 0.00

Dec. 7 1991

Mawzan Jau



To keep with the fast pace of the modern technology and fill the customers' demand for higher performance CS products, we are proposing a 80486 CPU board

### CS/486-33

The CS/486-33 will be a next generation CPU board for CS product. The incorporation of the Intel 80486-33 CPU and the external secondary cache on board will promote the computing power of CS/486-33 to 2-3 times of that of CS/386-II. The on board memory can be added up to 256M, which is 8 times of that of CS/386-II. To maximize 486 CPU's high speed devotion to the CS/486-33 system performance, we plan to free the 486 from the 2200 I/O burden. But this will not be implemented in this phase. However the 2200 I/O bus circuits will be modulized so that they can be easily taken out from the CS/486 board in the next phase. Of course this needs an 2200 I/O Bus coprocessor controller in the next phase to ensure downward compatibility and protect customers' investments. This coprocessor is to be configured as a High Speed Bus I/O controller.

### Configuration

1. 33MHz 80486 CPU. Easily upgrade to 66 MHz.
2. 128K zero wait state 2nd cache memory
3. 16-byte burst cache fill.
4. Support up to 256M on board DRAM w/ 16M SIMM.
5. Surface Mount Device used for higher component density

### Cost estimation:

|                          |               |   |   |
|--------------------------|---------------|---|---|
| Intel 80486-33           | 596           |   |   |
| Cache-Tag Ram IDT71B74   | 17            | X | 2 |
| Cache Ram                | 18            | X | 4 |
| DRAM controller 74F1766  | 11            |   |   |
| EPROM                    | 4             | X | 2 |
| Socket                   | 30            |   |   |
| PCB                      | 100           |   |   |
| PAL, Glue Logic, Misc    | 120           |   |   |
| <u>Total (0MB DRAM.)</u> | <u>\$ 970</u> |   |   |

note : Cost of CS/386 Turbo 0MB is \$ 921.  
(W/O 9577 Daughter Board)

### Manpower

|            |   |     |           |
|------------|---|-----|-----------|
| H/W        | : | 8   | man-month |
| S/W        | : | 2   | man-month |
| Diagnostic | : | 1.5 | man-month |
| Mechanical | : | 2   | man-month |

### Performance

2-3 times performance of that of CS/386-II

## CS/486-33 vs CS/386-II-486 Upgrade Kit

There was a proposal for a Upgrade Kit w/ 2nd cache for CS/386-II. Why do we jump over that upgrade kit and walk directly to CS/486-33? The reasons are:

1. The cost of CS/486-33 is only approximately 10%-15% more than that of the UK.
2. The development cost of CS/486-33 is just 25% more than that of UK.
3. UK sacrifices the burst mode of 486 CPU, which is an important factor for performance.
4. CS/486-33 will have higher performance and support larger memory.
5. The development period difference is 2-3 months. This is not that crucial to the time-to-market.
6. UK will never free 486 from the burden of 2200 I/O bus. But it is possible for the CS/486-33 if needed.

## CS/486-33 vs CS/Turbo-486 Uppgrade Kit

There was a proposal for a Upgrade Kit w/ 2nd cache for CS/Turbo. Why do we jump over that upgrade kit and walk directly to CS/486-33 ?

The reasons are:

1. The cost of CS/486-33 is only approximately 10%-15% more than that of the UK.
2. The development cost of CS/486-33 is just 25% more than that of UK.
3. UK sacrifices the burst mode of 486 CPU, which is an important factor for performance.
4. CS/486-33 will have higher performance and support larger memory.
5. The development period difference is 2-3 months. This is not that crucial to the time-to-market.

CC: Michael Bahia  
From: Michael Bahia  
Subject: CS/486 Proposal

MS014-A3A/LOWELL  
Security: General  
Date Received: 12/11/91

Gene,

1. What impact will the new 486 CPU have on I/O performance?
2. When will the TC issues be resolved?  
MXF updated to perform TC functions not present now?  
Are we building a TC Board for Germany?  
Fixing TC problems existing on the 386 (Northwest Mutual 3270 emulation)?

Mike B

VS OFFICE

Thursday

12/12/91 09:47 am

1

Package Subject: CS/486 Proposal

Item Title: CS/486 Proposal

As mentioned in the proposal, a 2200I/O old bus coprocessor controller is being planned next phase to free 486 of the I/O burden. This bus controller does need a lot of S/W effort to implement. After this is done, the 9577 daughter board and the old bus related circuits which exist on the 486 mother board are no longer needed. To upgrade to this 2200I/O bus controller, the customer only buy one controller, take 9577 away, take out related components(on the sockets) and update 486 EPROMs.

----- Original Memo -----

To: Mawzan Jau

Subject: CS/486 Proposal

From: Eugene Schulz

Date Sent: 12/09/91

What do you mean by "The 2200I/O bus circuits can be taken out easily?"

MEMO

TO: H.L. Lee - project review committee  
CC: Bill Hsien  
Eugene Schulz  
Mike Riley  
W.C. Shen  
Ducan Chou  
K.C. Chen  
FM: Eric Chen  
DT: April 2, 1991  
SB: Proposed models for 486 upgrade kits for CS/386s CPU board  
PEP#: T1050W

---

The development period can be shorten if we can provide the CS/386 customers with 486 CPU upgrade kits instead of a new 486 CPU board. And this can also provide the customers a better choice based on their performance/price benefits.

Here we proposed four 486 upgrade kits for CS/386s CPU board to meet the different segments of market. Two kits for each CS/386 model, the first one is a low cost moderate performance model, the second one is a high performance model. The configurations, cost, man month, status, performance and projected market are listed in the following. For the limited resources we have, please base on your knowledge and marketing demands to evaluate and approve which models we need to develop.

I. CS/486KU-IL: Low cost 486 CPU adapter for CS/386

Configurations:

1. 33MHz 486 CPU or 25MHz 486 CPU
2. 3.5" x 4.5" 6-layer PCB

Cost:

1. CPU: USD 1300 (33MHZ), USD 650 (25MHZ)
  2. EPROM (to replace the originals on CPU board): USD 8
  3. PCB: USD 16
  4. LOGIC, PAL, socket, misc:  $3 * 7.5 + 4 * 1.5 + 15 = \text{USD } 43.5$
- Total: USD 1367.5 (33MHZ), USD 717.5 (25MHZ)

Man Month:

H/W: 2.5 MM  
S/W: 1.5 MM  
Diag.: 1.0 MM  
Mech: 0.25 MM

Status:

Schematics is ready. Layout is going to be processed.

Performance:

Estimated to be 1.5 to 2.5 times of the computing power of 33MHz 386 using 25MHz 486. Estimated to be 2.1 to 3.2 times of the computing power of 33MHz 386 using 33MHz 486.

Projected Market:

Need moderate computing performance upgrade but are not willing to move to CS/386-II or do not need memory upgrade.

II. CS/486KU-IIL: Low cost 486 CPU adapter for CS/386-II

Configurations:

1. 33MHz 486 CPU
2. 3.5" x 4.5" 6-layer PCB

Cost:

1. CPU: USD 1300
2. EPROM (to replace the originals on CPU board): USD 8
3. PCB: USD 16
4. LOGIC, PAL, socket, misc:  $3 * 7.5 + 4 * 1.5 + 15 = \text{USD } 43.5$
- Total: USD 1367.5

Man Month:

H/W: 2.5 MM  
S/W: 1.5 MM  
Diag.: 1.0 MM  
Mech: 0.25 MM

Status:

Schematics is ready. Layout is going to be processed.

Performance:

Estimated to be 2.5 to 3.3 times of the computing power of 33MHz 386.

Projected Market:

Need moderate computing performance upgrade on existing CS/386-II system.

III. CS/486KU-I: High performance 486 CPU upgrade kit with 2nd cache memory and 16MB memory for CS/386

Configurations:

1. 33MHz 486 CPU
2. 256KB zero wait state 2nd cache memory
3. 64K x16 Boot and diagnostics EPROM
4. 4 DRAM sockets, support upto 16MB memory upgrade
5. 6" x 12" 6-layer PCB

Cost:

1. CPU: USD 1300
2. Cache:  $30 * 8 + 6 * 2 = \text{USD } 252$
3. EPROM: USD 8
4. PCB: USD 72
5. LOGIC, PAL, socket, misc:  $12 * 7.5 + 18 * 1.5 + 19 = \text{USD } 136$
- Total: USD 1768

Man Month:

H/W: 5.5 MM  
S/W: 1.5 MM  
Diag.: 1.5 MM  
Mech: 2.0 MM

Status:

Schematics is under design.

Performance:

Estimated to be 2.6 to 3.6 times of that of 33MHz 386. Competable performance and memory upgrade as comparison with 486 CS/486KU-II on CS/386-II CPU board.

Projected Market:

Need high computing performance and large memory space upgrade but are not willing to move to CS/386-II.

IV. CS/486KU-II: High performance 486 CPU upgrade kit with 2nd cache memory and 16MB memory for CS/386-II

Configurations:

1. 33MHz 486 CPU
2. 256KB zero wait state 2nd cache memory
3. 64K x16 Boot and diagnostics EPROM
4. 4" x 12" 6-layer PCB

Cost:

1. CPU: USD 1300
  2. Cache:  $30 \times 8 + 6 \times 2 = \text{USD } 252$
  3. EPROM: USD 8
  4. PCB: USD 48
  5. LOGIC, PAL, socket, misc:  $10 \times 7.5 + 12 \times 1.5 + 15 = \text{USD } 108$
- Total: USD 1716

Man Month:

H/W: 5.5 MM  
S/W: 1.5 MM  
Diag.: 1.5 MM  
Mech: 2.0 MM

Status:

Schematics is under design

Performance:

Highest performance of the 4 proposed models. Estimated to be 3 to 4 times of the computing power of 33MHz 386.

Projected Market:

Need high computing performance upgrade on existing CS/386-II system.



To: Mike Bahia  
From: Torbjorn Sagner  
Subject: Turbo bug20

W0000600 6FLT3  
Security: General  
Date Received: 04/16/92

Hi,  
Next bug we found is mathematic related.

A calaculation bigger then E99 should give Error C61 Overflow and that is not true for all cases.

Example: 1. Print -1.00000000E+24 (exp) 4.16  
                  -6.91830970E+99

OK! not bigger then E99

2. Print -1.00000000E+24 (exp) 4.17  
Error C61: Overflow

Ok! bigger then E99

3. Print -1.00000000E+24 (exp) 4.18  
          -2.08929613E+:0

Fault: should have given C61

4. Print -1.00000000E+24 (exp) 4.19  
          -3.63078054E+:0

Fault: should have given C61

5. Print -1.00000000E+24 (exp) 4.20  
          -6.30957344E+:0

Fault: should have given C61

6. Print -1.00000000E+24 (exp) 4.21  
Error C61: Overflow

OK!

Best regards and Happy easter  
Torbjorn

FIXED on 1.17 / DUNCAN

Hi Mike,

I have found someting interesting info around the hanging problem.

When do following from a 2536dw terminal as terminal 1.

 boot system

-clear partition

CPU =1

numb term =5

numb part =5

Pf2 - Divide mem evenly

Pf7 - Select printer driver

Select printerdriver PM017v3 for port 717 and 704 (term1)

Pf15 - execute

Yes Return and Return NOW SYSTEM HANG!!!!!!!!!!

When do exectly the same operation using a 2436dw termianl as term 1

it works perfect. And my 2536DW works good as terminal two.

Now to the interesting, Lars are only using 2536 terminals on his site!!

Lars will this weekend again try to install Turbo board on his live system

and i have asked him to if he got hangings connect an OLD terminal as

termianl one to se if it has any inpact.

An other thing is that Lars use the \$DISCONNECT command.

Can you please check that the bootstrap proms that we are using

are the same as you us in the lab, Rev1. Thanks

 Have nice weekend

Torbjorn

Item Title: Unable to reproduce

Torbjorn,

Unable to reproduce the hang problem you had with the attached configuration with 1.15 or 1.16. @GENPART would not allow me to execute the configuration with address 717 used with the driver unless 717 was in the device table. Would not work with 217 in the device table. Would get message, "address 717 not in device table." Never did hang. Did you ever find the cause of this problem? We do have a couple of changes to @GENPART which we are using. They are as follows:

1. To allow @GENPART to work with non-386 CPUs:

change line 20 to:

20 BIN (U0\$)=0:IF C0\$<>"M"THEN C0\$="W"

at the beginning of line 2790 insert:

2790 IF C0\$="M" THEN V\$=" ": DATASAVE.....

2. To allow printer drivers beyond partition 16:

change line 5120 as follows:

5120 IF STR(Q2\$(I),2,2)=HEX(00) THEN STR(Q2\$(I),2,2)=HEX(30 30)

:HEXPACK STR(T2\$(I),9,1)FROM STR(Q2\$(I),2,2)

:IF Q3\$(I)=" "OR Q3\$(I)=HEX(00 00) THEN Q3\$(I)="00"

:CONVERT Q3\$(I) TO A9

:STR(T2\$(I),10,1)=BIN(A9)

Regards, Mike

To: Mike Bahia W0000600 6FLT3  
From: Torbjorn Sagner Security: General  
Subject: New hot info Turbo bug! Date Received: 05/11/92

---

Mike,

Problem solved whith new MXF proms, it could also be hw problem  
whith my terminal, because my 2536 terminal brook down just after  
i sent you the office, now the terminal is fixed and proms are changed.

Best reg.

Torbjorn

Ps. Have you heard anything from Taiwan about the progress?

Package Subject: New hot info Turbo bug!

Item Title: Solution?

Torbjorn,

Did you ever resolve this problem? We could not duplicate it here.

Mike

----- Next Memo -----

17 December 1991

**MEMORANDUM**

TO: Mike Bahia  
Wang Labs  
1 Industrial Ave.  
Lowell, MA 01851

Mail Stop #01A-A3A

FROM: Bill Chapin

RE: Turbo/386 and DATA3500

Dear Mike,

Per your request please find attached a fairly complete copy of DATA3500 word processing software.

Inasmuch as Rader is concerned with getting the Turbo/386 up to speed, we are sending you a copy of this software to assist you in accelerating the resolution of the \$GIO conflicts on our behalf.

This is not a copyright violation nor is it a breach of trust with *'The Office Manager'* nor with *'Kennedy & Assoc.'* This software is on loan to assist you in resolving our problems.

Many thanks and with best regards,

RADER COMPANIES

  
Bill Chapin

BC/jt

attachment

To Operate D.A.T.A. 3500

Since this is a minimal version of D.A.T.A. 3500 there are a few things that the program will expect.

- 1 - You are at terminal #1
- 2 - You are using a 'DE' type terminal
- 3 - Wang 2235 or similar printer at 204 or 215
- 4 - The floppy is at address D10

To start the program:

```
SELECT DISK D10
LOAD RUN
```

I have included two documents in the volume named TEST. The documents are LETTER 1 and LETTER 2.

There are two GIO's we have found that do not work. The simplest one involves testing printer ready. If you go into #3 - PRINT DOCUMENT, and try to print one of the letters, the system will tell you that the printer is not ready even when it is.

The second bad GIO is in #2 - EDIT DOCUMENT. Enter #2 and either LETTER 1 or LETTER 2. When the document is displayed press FN'9 to delete. The message DELETE WHAT will appear in the upper right corner. Press FN'12 to advance the cursor to the right. As you advance the cursor the characters will become bright to show you what is going to be deleted. Now press FN'31 to move the cursor down the screen. Entire lines should become bright as you move down the page. On the TURBO the lines will not become bright.

Screen output is handled with GIO's in D.A.T.A. 3500 and for some reason the GIO that they are using when you move down the page is not causing the bright attribute to happen.

If you do not know the meanings of the function keys in D.A.T.A. 3500 press the CONTINUE key while in a document to display their meanings. Press EDIT to escape.

If you need any additional help feel free to give us a call.

Regards,



Jim Symington  
(503) 255-5330 X-323

FIX : PROGRAM WP 425 3

LINE 4870 CHANGE IF STATEMENT OR ADD

STR(Q#,9,1)='T' THEN

PROGRAM WP 307 1

LINE 250 REM IF STATEMENT



# Roy Jones DOG SHOWS, INC.

A.K.A. Kenneth Sleeper Dog Shows



POST OFFICE BOX 828•AUBURN, IN 46706•PHONE 219-925-0525

KILLS PERFORMANCE IF  
> 1 USER ACTIVE

Quick Judge

MENU 1 SFK 13

SFK 1 INPUT MENU  
SFK 13 QUICK JUDGE

DO YOU WANT TO SORT THE FILE FIRST Y/N ANSWER Y  
WHICH SHOW NUMBER? (1 thru 30) 10 return  
WHICH CATALOG NUMBER? (1-6) 1

Sort, Internal, Merge, Output

Which catalog number (1-6) 1 return  
Which show number (1-30) 10 return  
Name of show (Goldcoast) return  
Which printer? return

It will then ask if you want to Type or Display or Add (T/D/A)  
D-Display  
D-Display  
After all sorts are finished it will print.

1/2 ONLY OCCURS w/ NEW 22411-HS.  
INSTALLED O/S DISK CONTROLLER + OK.

MIKE RILEY

Any Problems or Questions  
call

219-925-0525 8-5  
- 925-1805 after 5pm.



# Roy Jones DOG SHOWS, INC.

A.K.A. Kenneth Sleeper Dog Shows



POST OFFICE BOX 828•AUBURN, IN 46706•PHONE 219-925-0525

## RUNNING CATALOG

SFK 2 PRINT MENU 1  
SFK 3 PRINT CATALOG

Q. CATALOG # 1  
CATALOG MENU

SORT CATALOG #1 (DO NOT HIT RETURN)

Q. SHOW # 10  
Q. WHICH CATALOG, 1

SORT, INTERNAL, MERGE, OUTPUT

PRINT SHOW CATALOG MENU

Q. ARE PEKINGESE SEPERATED BY COLOR ANSWER N  
Q. ARE DANES SEPARATED BY COLOR ANSWER Y  
Q. CLASS 11 TYPE, RETURN  
Q. PARADE OF CHAMPIONS, RETURN  
Q. SWEEPS, RETURN  
Q. SKC CATALOG, RETURN  
Q. INDEX, N

1ST RUN N, 2ND RUN Y IF LAST YEARS CATALOG CALLS FOR AN  
INDEX

Q. DO YOU WANT CONTINUOUS ARMBANDS #'S? N  
Q. HARD COPY? Y  
Q. PRINTER 2  
Q. NAME OF CATALOG (USE) GOLDCOAST

## CATALOG MENU

SORT OBEDIENCE # 2 (DO NOT HIT RETURN)

(1) SORT BY DATE  
Q. HAS INDEX? N  
Q. WHICH PRINTER? 2  
Q. WHICH CATALOG? 1

## CATALOG MENU

SORT JR. SHOW # 3 (DO NOT HIT RETURN)

Q. PARADE OF CHAMPIONS? N  
Q. CATALOG? # 1  
Q. PRINTER # 2

AFTER YOU HAVE SORTED JR. SHOW, SFK 31 TO RETURN TO MENU



# Roy Jones DOG SHOWS, INC.

A.K.A. *Kenneth Sleeper Dog Shows*



POST OFFICE BOX 828•AUBURN, IN 46706•PHONE 219-925-0525

## CATALOG REPORTS

### MAIN MENU

\*MUST BE DONE AFTER EACH RUN

SKF 2 - PRINT MENU 1

SKF 9 - CATALOG REPORTS

Q. PRINTER? 2

Q. NAME OF SHOW? GOLDCOAST

Q. CATALOG? 1

Q. DO YOU WANT TO PRINT THE INDEX?

1ST RUN = N      2ND RUN = Y

SORT, INTERNAL, MERGE, OUTPUT

Q. SELECT PRINTER? 2

Q. NAME OF SHOW? GOLDCOAST



2500 ① Yorkville  
2800 2 catalog - 2  
2000 3  
2100 4  
2100 5  
2100 6  
2100 7  
2000 8  
2000 9

3000 ⑩ Gold Coast  
1500 11 catalog - 1  
1500 12  
1500 13  
1500 14  
3300 15  
1000 16  
2500 17  
2500 18  
1500 19  
1500 20  
1500 21  
1500 22  
1500 23  
1200 24  
2300 25  
2000 26  
2000 27  
1500 28  
1600 29  
1700 30

SHOWF11E D34  
SHOWF12E D34  
SHOWF13E D34  
SHOWF14E D34  
SHOWF15E D34  
SHOWF16E D34  
SHOWF17E D34  
SHOWF18E D34  
SHOWF19E D34  
SHOWF10E D34  
SHOWF113 D33  
SHOWF123 D33  
SHOWF133 D33  
SHOWF134 D33  
SHOWF135 D33  
SHOWF15E D34  
SHOWF11A D72  
SHOWF12A D72  
SHOWF13A D72  
SHOWF14A D72  
SHOWF15A D72  
SHOWF16A D72  
SHOWF17A D72  
SHOWF18A D72  
SHOWF19A D72  
SHOWF163 D33  
SHOWF173 D33  
SHOWF1AE D34  
SHOWF1BE D34  
SHOWF1CE D34

CC: Michael Bahia  
From: Michael Bahia  
Subject: TURBO update

MS014-A3A/LOWELL  
Security: General  
Date Received: 11/20/91

Torbjorn, Sounds good. There are a few bugs you may run into which we are in the process of trying to clean up. You are probably on rel .20.

1. There is a problem printing where if 2 jobs are sent at the same time, pages could be intermixed. A fix is being tested at this time.
2. PC/2200 File Transfer is not working properly. Rel .21 is better but intermittently it still fails.
3. There is a problem that could occur with the PRINTUSING command where sometimes spacing may be incorrect. Waiting on fix.
4. DS Utility BACKUP program intermittently fails with "Tape Command Error". This problem should be reported today to Taiwan.
5. There is a Communication bug using a MXF port for TC reported by John Baxi. Waiting for fix.
6. With some configurations, the MXF will not pass self-test after a power on without either removing the terminal 1 cable or the MXF board. Turbo orders have a 4 week lead time as of today. Some orders may be hand picked to be shipped if absolutely necessary. International orders should also go in 4 weeks. We are trying to resolve the more serious problems, power up, backup, and print merge before shipping orders.

Regards,  
Mike Bahia

----- Original Memo -----  
To: Michael Bahia  
Subject: TURBO update  
From: Torbjorn Sagner  
Date Sent: 11/20/91

Hi Mike,  
I have now got the "stuff" from John Baxi.

I have not yet tested every thing but the R3F prom is working and looking good. I think I have solve the "hanging" problem that I got on my Turbo, it was the floppy that not contain any terminator. Now have the system run error free for one week. After some inhouse testing we will put the system into a beta site for some more testing, I will update you with result.

Just one question, when can we expect to see the first international ship for Turbo?

Reg. Torbjorn

VS OFFICE

Monday 11/11/91 09:22 am Page:

CC: Michael Bahia

From: Kirit Baxi

Subject: Communication bugs

MS014-A3A/LOWELL

Security: Limited

Date Received: 11/11/91

Duncan/Mike

The following bug exists on Turbo only. If the user is using MXE as async IC controller and enables byte six of arg3 status register that to terminate on EOR character the system ignores this fact. come to the point I am using the similar feature in the dos utilities as well.

And problem is that if you halt step a program once you pass a \$GIO statement the system just continues rather then stopping at the next basic statement.

I need the fix for the first one urgently. I also understand from mike bahia that there is a bug controlling the printers on the new bus.

Duncan have you the latest code for SCSI for me!

Regards

John Baxi

Item Title: Cover Memo

Mike,

Attached document is for New SCSI2 Controller of Turbo and Khan Tsai will help you to install and use. I need your performance and reliability report after use.

We need two AP to do SCSI Configure and Tape Utility by use my new statement and May be need Tylor to help us by contract. (What do you think ??)

I Can not make sure I will be H/O on next week, because H.K. have 20 Million NT\$ busiess to wait me to fix Select H ON problem.

About Turbo Problem, We need to discuss each other to clarify:

1. LIST' Problem --- Can not reproduce by use 0.19 (Khan Tsai will bring to)
2. RAM Dis Problem --- Have been fixed on 0.19
3. CANCEL KEY Problem --- Can not reproduce by use 0.19
4. 2275 Disk Unit Problem --- What is 2275 ??? is 2275A or other ???
5. Tape Backup Problem --- Please change @22C11HS and @MVP for me to identify OS or MicroCode problem (I can Get Error but I can not get error again if I do restore sucess)

Other problem for printer, I need time to verify what is problem ???

I Wish Your Guy on H/O will like the new SCSI Controller ????

Regards  
Duncan Chou

2 MXF, 1 MXE, SCSI, 22C1148, DRU 3 MANY TERMS RUNNING

6TH FLOOR  
ON/OFF PROBLEM W/  
MXF & 2536 & 2636

|                     |            |             |       |   |
|---------------------|------------|-------------|-------|---|
| 2536DW <sup>2</sup> | FAILS<br>Ø | TRIES<br>13 | 19200 | ① |
| 2636DW <sup>1</sup> |            | 11          |       | ② |
| 2536DW <sup>2</sup> | 0          | 10          | 2400  | ① |
| 2536DW <sup>2</sup> | 0          | 10          | 360   | ① |

NO TERMS RUNNING

|                     |   |   |       |   |
|---------------------|---|---|-------|---|
| 2536DW <sup>2</sup> | 0 | 5 | 19200 | ① |
|---------------------|---|---|-------|---|

REMOVED MXE (33-36)  
BRING UP 36 TERM CONFIG

|                     |   |   |  |   |
|---------------------|---|---|--|---|
| 2536DW <sup>2</sup> | 3 | 3 |  | ① |
|---------------------|---|---|--|---|

32 PARTITIONS

|                     |   |    |  |                        |
|---------------------|---|----|--|------------------------|
| 2536DW <sup>2</sup> | 4 | 4  |  | 1 <sup>ST</sup> MXF    |
| 2536DW <sup>2</sup> | 0 | 10 |  | 2 <sup>ND</sup> MXF ①7 |
| 2636DW <sup>1</sup> | 0 | 5  |  | ②                      |

32 PARTITIONS

|                     |   |   |  |   |
|---------------------|---|---|--|---|
| 2636DW <sup>1</sup> | 3 | 3 |  | ① |
| 2536DW <sup>2</sup> | 0 | 5 |  | ② |
| 2336D <sup>a</sup>  | 0 | 5 |  | ① |
| 2236DE <sup>s</sup> | 0 | 5 |  | ① |

SWAPPED I/O CABLE BETWEEN 2536DW<sup>2</sup> & 2236DE

|                     |   |   |  |   |
|---------------------|---|---|--|---|
| 2536DW <sup>2</sup> | 2 | 2 |  | ① |
| 2236DE <sup>s</sup> | 0 | 5 |  | ① |

REMOVED 2<sup>ND</sup> MXF  
32 TERM CONFIG

|        |   |   |  |  |
|--------|---|---|--|--|
| 2536DW | L | 1 |  |  |
|--------|---|---|--|--|

16 TERM CONFIG

|                     |   |   |  |   |
|---------------------|---|---|--|---|
| 2536DW <sup>2</sup> | 2 | 2 |  | ① |
| 2236DE <sup>s</sup> | 0 | 5 |  | ① |
| 2536DW <sup>2</sup> | 0 | 5 |  | ② |

3<sup>RD</sup> MXF REMOVED, 2<sup>ND</sup> MXF NOW 1<sup>ST</sup>

|        |   |   |  |  |
|--------|---|---|--|--|
| 2536DW | 0 | 5 |  |  |
| 2636DW | 0 | 5 |  |  |

0216 1<sup>st</sup> MXP AD030 AS 2<sup>nd</sup> MXP  
32 PARTS

|                     |   |   |   |
|---------------------|---|---|---|
| 2636DW <sup>①</sup> | 0 | 5 | ① |
| 2636DW              | 0 | 5 | ① |
| 2536DW              | 0 | 5 | ① |
| 2536DW              | 0 | 5 | ① |

# FAX COVER SHEET

DATE:

SEPT 25, 1991

TO:

DUNCAN CHOU

FROM:

MIKE BGAIA

SUBJECT:

TURBO MOTHERBOARD PROBLEMS

PAGES INCLUDING COVER SHEET:

4

NOTE:

DUNCAN,

GENE HAS ASKED ME TO SEND YOU A COPY OF THE  
ATTACHED MEMO BECAUSE WE ARE UNSURE IF YOU ARE  
RECEIVING WANG OFFICES AT THIS TIME.

REGARDS,

Mike B

MEMO

To: Gene Schulz  
From: Mike Bahia  
Subject: TURBO Motherboard Problem and Related Concerns  
Date: September 24, 1991

---

In testing done in the lab and at Wollaston Alloys in Braintree, a Turbo beta site, problems have been found with the current versions of the Turbo motherboards.

With the latest version of the 210-9583 Motherboard, rev 0, (made in Lowell, 34-91) there are problems with the screw holes lining up. This problem does not appear to be critical but should be corrected before going into mass production with the board. With a MicroVP the screws can be lined up for the CPU board but you then find the holes on either end of the I/O section are off toward the middle. Holes do line up in the middle of the I/O section & gradually go out of alignment toward each end. However, you can get screws in at I/O connectors up to 2 to 3 slots from either end and in the MicroVP this appears to provide adequate support. As the screw holes are off, the I/O boards toward each end begin to seat at slight angles to the motherboard. The screw holes are about a 3rd off, that is only the outer 2/3rds of the screw holes in the end I/O slots can be seen looking in through the holes of the connectors.

Using the same motherboard in a CS, the problem was slightly different. The CS has a limited number of holes where the MicroVP has them for every I/O connector. Of the 8 screws pulled out from the existing motherboard only 5 could be put back in. Six are used with the I/O section, at the top and bottom connectors of the 1st, last, and middle I/O slots. We were able to get the screws in for the 1st and middle I/O slots but the holes do not line up for the furthest I/O slot from the CPU board. The other 2 screws are used in the bottom connector for the CPU board and above the CPU board in the top right corner. The bottom screw is ok but the top right corner screw is not even close. The board however did appear to be secure enough, but obviously a correction needs to be made. On this particular chassis the frame to which the motherboard screws is too close to the lip where the I/O boards screw down. This resulted in the I/O boards, both old & new being 1/4" above the lip to which they should screw. The result being none of the boards we tried had long enough screws to bolt in. This needs to be checked on other chassis' & could likely happen to a customer upgrading a CS. If a customer does have this problem will we replace the chassis for them with a CS-N chassis?

These new motherboards have the 90 ohm resistor at R17 replacing a 180 ohm resistor. This change was done to correct a problem where there appeared to be a loss in signal with I/O boards in slots farthest from the CPU slot or when heavily loading the I/O section. This was most apparent when the terminal 1 controller was used in the last I/O slot and characters would be missing or changed in 'Mount System Platter, Press Reset' or during the boot procedure resulting in failure during boot. In the lab, 4 new 9583 motherboards were tested and problems were found on power up. When using the Turbo CPU with the MXF the problems were usually of 2 types; either the MXF LED failed to go out or most frequently went out after 5 to 10 seconds with the terminal 1 screen showing just a cursor. The following page represents my findings in the lab:

MORE



| <u>Mbrd</u> | <u>* CPU Brd</u> | <u>* W/S 1 Brd (I/O slot)</u> | <u>* other I/O Brds</u> | <u>PASSED</u>  | <u>FAILED</u> |    |
|-------------|------------------|-------------------------------|-------------------------|----------------|---------------|----|
| A           | Turbo            | MXF                           | 1                       | none           | 0             | 10 |
| "           | "                | "                             | 5                       | "              | 0             | 5  |
| "           | "                | "                             | 7                       | "              | 0             | 5  |
| "           | "                | "                             | 9                       | "              | 0             | 5  |
|             |                  |                               | TOTALS                  | 100% failures  | 0             | 25 |
| A           | Turbo            | MXD                           | 1                       | none           | 10            | 0  |
| "           | "                | "                             | 2                       | "              | 10            | 0  |
| "           | "                | "                             | 9                       | "              | 10            | 0  |
|             |                  |                               | TOTALS                  | 0% failures    | 30            | 0  |
| A           | VLSI             | MXD                           | 1                       | none           | 6             | 4  |
| "           | "                | "                             | 7                       | "              | 3             | 7  |
| "           | "                | "                             | 8                       | "              | 7             | 3  |
| "           | "                | "                             | 9                       | "              | 5             | 5  |
|             |                  |                               | TOTALS                  | 47.7% failures | 21            | 19 |
| B           | Turbo            | MXF                           | 2                       | none           | 0             | 3  |
| "           | "                | MXD                           | 8                       | none           | 3             | 0  |
| C           | Turbo            | MXF                           | 3                       | none           | 0             | 3  |
| X           | VLSI             | Triple Cont                   | 1                       | none           | 10            | 0  |
| "           | "                | "                             | 2                       | "              | 10            | 0  |
| "           | "                | "                             | 3                       | "              | 8             | 2  |
| "           | "                | "                             | 4                       | "              | 10            | 0  |
| "           | "                | "                             | 5                       | "              | 10            | 0  |
| "           | "                | "                             | 6                       | "              | 9             | 1  |
| "           | "                | "                             | 7                       | "              | 6             | 4  |
| "           | "                | "                             | 8                       | "              | 6             | 4  |
| "           | "                | "                             | 9                       | "              | 10            | 0  |
|             |                  |                               | TOTALS                  | 12.2% failures | 79            | 11 |
| X           | VLSI             | Triple #2                     | 1                       | none           | 9             | 1  |
| "           | "                | "                             | 2                       | "              | 10            | 0  |
| "           | "                | "                             | 3                       | "              | 7             | 3  |
| "           | "                | "                             | 4                       | "              | 6             | 4  |
| "           | "                | "                             | 5                       | "              | 8             | 2  |
| "           | "                | "                             | 6                       | "              | 8             | 2  |
| "           | "                | "                             | 7                       | "              | 8             | 2  |
| "           | "                | "                             | 8                       | "              | 9             | 1  |
| "           | "                | "                             | 9                       | "              | 7             | 3  |
|             |                  |                               | TOTALS                  | 20% failures   | 72            | 18 |
| X           | VLSI #2          | Triple #2                     | 2                       | none           | 6             | 4  |
| "           | "                | "                             | 3                       | "              | 8             | 2  |
| "           | "                | "                             | 8                       | "              | 8             | 2  |
| "           | "                | "                             | 9                       | "              | 9             | 1  |
|             |                  |                               | TOTALS                  | 22.5% failures | 31            | 9  |
| X           | VLSI             | MXE                           | 1                       | none           | 5             | 0  |
| "           | "                | "                             | 2                       | "              | 5             | 0  |
| "           | "                | "                             | 3                       | "              | 5             | 0  |
| "           | "                | "                             | 4                       | "              | 5             | 0  |
| "           | "                | "                             | 5                       | "              | 5             | 0  |
| "           | "                | "                             | 6                       | "              | 10            | 0  |
| "           | "                | "                             | 7                       | "              | 10            | 0  |
| "           | "                | "                             | 8                       | "              | 10            | 0  |
| "           | "                | "                             | 9                       | "              | 10            | 0  |
|             |                  |                               | TOTALS                  | 0% failures    | 65            | 0  |
|             |                  |                               | MORE                    |                |               |    |

|   |         |           |   |        |              |       |
|---|---------|-----------|---|--------|--------------|-------|
| X | VLSI    | MXD       | 1 | none   | 5            | 5     |
| " | "       | "         | 2 | "      | 3            | 7     |
| " | "       | "         | 3 | "      | 5            | 5     |
| " | "       | "         | 4 | "      | 6            | 4     |
| " | "       | "         | 5 | "      | 9            | 1     |
| " | "       | "         | 6 | "      | 7            | 3     |
| " | "       | "         | 7 | "      | 8            | 2     |
| " | "       | "         | 8 | "      | 4            | 6     |
| " | "       | "         | 9 | "      | 7            | 3     |
|   |         |           |   | TOTALS | 40% failures | 54 36 |
| X | VLSI #2 | MXD       | 2 | none   | 10           | 0     |
| " | "       | "         | 3 | "      | 8            | 2     |
| " | "       | "         | 8 | "      | 8            | 2     |
| " | "       | "         | 9 | "      | 7            | 3     |
|   |         |           |   | TOTALS | 20% failures | 32 8  |
| X | TURBO   | MXD       | 2 | none   | 10           | 0     |
| " | "       | "         | 3 | "      | 10           | 0     |
| " | "       | "         | 4 | "      | 10           | 0     |
| " | "       | "         | 8 | "      | 10           | 0     |
| " | "       | "         | 9 | "      | 10           | 0     |
|   |         |           |   | TOTALS | 0% failures  | 50 0  |
| X | TURBO   | Triple #2 | 2 | none   | 10           | 0     |
| " | "       | "         | 3 | "      | 10           | 0     |
| " | "       | "         | 8 | "      | 10           | 0     |
| " | "       | "         | 9 | "      | 10           | 0     |
|   |         |           |   | TOTALS | 0% failures  | 40 0  |

#### Test Conclusions:

1. MXF will not work with this motherboard. The board appears caught in self-test too long, 5-10 seconds, where when working it normally goes out in 3 seconds.
2. MXEs seem to power up ok with either the Turbo or VLSI.
3. MXDs & Triple Controllers work ok with Turbo CPUs but fail intermittently with a VLSI CPU board.

Testing still needs to be done under heavy I/O load conditions.

It is too early to tell at this time but a similar problem may exist with the 210-9578 Motherboard. Mike Riley has an updated board in his Turbo in the 6th floor lab which seems to power up fine under any load condition. However, an updated board with the 90 ohm resistor at R17 was brought out to Wollaston Alloys and problems existed at power up similar to those found in the lab. Intermittently the LED on the MXF would stay on from 5 to 9 seconds instead of 3 and when it did diagnostics would not start on the screen. All I/O boards were removed except the CPU and the MXF and the problem still existed. Fifty per cent of the time at least power up would fail. No problems using an MXD. The problem could be the MXF but 2 were tried and both showed similar results. At this time we are planning to update a 3rd motherboard and test for the problem in the lab with a known good MXF. If successful these boards will be brought out to the customer & tested on site.

Lastly, the test points for the voltages need to have dimples or holes so that a pointed test lead for measuring voltages can be held against the test point with 1 hand. Otherwise many CEs will have the same problem I had in the lab trying to adjust the voltages when only these type leads are available. This may seem very minor but can be critical to preventing shorts when leads slip and will also save a lot of frustration.

END

To: Michael Bahia  
From: Kirit Baxi  
Subject: TURBO List dct w bug  
MS014-A3A/LOWELL  
Date: 06/17/91

Distribution:

Not Requested

---

Hi Folks  
Yet another problem!  
List dctw"@DOS\*" does not work  
list dctw works  
listdct"@DOS\*" WORKS  
have fun  
Regards  
John Baxi

To: Michael Bahia  
From: Kirit Baxi  
Subject: Turbo 0.8 feedback  
MS014-A3A/LOWELL  
Date: 04/26/91

Distribution:

Not Requested

---

Mike  
ADEC have tested the above for the \$G10 problems with their 2228B operation  
and am very pleased to inform you that they have not encountered any problems.  
All their software works correctly with turbo now.

Regards  
John Baxi

To: Michael Bahia MS014-A3A/LOWELL  
From: Torbjorn Sagner  
Subject: 1 status from TURBO test Date: 05/16/91

Distribution:

Not Requested

---

Hi Mike, John

I have now received and installed the TURBO boards in a CS!!!, with some modifications on the CS it works fine. It works very well so far have only tested with smaller programs and utilities the bugs i have seen so far is:

1. ~~SELECT IC~~ command on the MXF gives error P48 also when a ~~RELEASE PART~~ is done.
2. In EGENPART when give one part X kb mem and devide the rest evenly, the program NOT reduce the remaining mem with X kb and you can't execute the configuration.
3. The END statement and PRINT SPACE diff in mem space. (only cosmetic)
4. In EGENPART if generating one terminal and one partition it gives you two partitions (1 and 2) but you can only modify one; you can execute the config but not use the second part.

Thats all "bugs" for now

Questions:

- 1 Can you mix MXE's and MXF's in the Turbo ? if so how?
- 2 Is there any monitor program in pipline for the TURBO how can, "LOGOFF" terminals send messages, it would be useful when to service a system with 64 users
- 3 What is restriction of system printers? How meny?

Next week we are going test the TURBO on a live customer system  
then i hope to update you with more details.

Best reg.  
lorbjorn Sagner

Item Subject: CS TURBO OS Problems

Duncan

The following severe bugs have been highlighted by the VAR ALEC in Germany who is trying to show the turbo at the Industrial Hanover fair next week.  
1) \$G10set ccv /O1C (4402 A000.... for 2228B does not work (this is on old bus. OS 0.3 worked OK.

2) looping on A\$=time the clock slows down after about 1/2 hr or an hour then time increments every 2 mins by one second.

After a while get error P34 and then time ticks OK.  
3) \$if on and \$if off does not work on MXF

4) The \$break time interval seems very erratic.  
We need the time problem and \$G10 problem resolved before the show starts on Wed morning. Because of the time zones it is going to be very difficult. Any software can be sent via Office to Erwin Findt in Frankfurt. He will then pass the software to me at the show.

It is important we fix this problem. Alec is a potential customer for about 500 systems over next three years. If we can demonstrate to him that wang is serious in resolving problems it will be well worth for him and Wang If you need to contact me at the show my number is (49) 511 8941742.

Regards  
John Baxi

VS OFFICE Electronic Mail Friday 04/05/91 03:11 pm Page: 2

Item Subject: Last Chance

We must, I repeat, "WE MUST FIX THESE BUGS VERY QUICKLY, THERE WILL BE NO SECOND CHANCE FROM THE GERMANS. IN FACT, AFTER THE POOR EXPERIENCE THEY HAD WITH THE CS/386, I'M SURPRISED WE GOT THIS ONE."

VS OFFICE Electronic Mail Friday 04/05/91 03:11 pm Page: 3

----- Mailing History -----

Date: 04/05/91  
Time: 04:51 pm  
Subject: CS TURBO OS Problems  
From: Kirit Baxi  
Distribution:  
Duncan Chou  
cc Mike Riley  
cc Eugene S. Schulz  
cc William Hsien

# DS UTILITY VER 3.0

BUG IF BACKUP MORE THAN 1 ADDRESS TO A 45 M TAPE (150 M TAPE OK), CANNOT RESTORE FROM TAPE ANY ADDRESS THAN BEGINS BEYOND TRACK 1.

REASON IS THERE ARE SOME STATUS BYTES THAT ARE DIFFERENT BETWEEN THE 45M & 150M TAPE DRIVE. ONE IS USED HERE THAT CREATES AN ADDRESSING PROBLEM RETRIEVING DATA THAT BEGINS BEYOND TRACK 1.

FIX PROGRAM @DSTAPEB  
CHANGE LINE 1035 AS FOLLOWS:  
1035 GOSUB 312: C# = STR(X1#( ), 4)  
1035 " : " : IF M9=45 THEN C# = C#  
AND HEX(0F FF FF)

DS UTILITY 3.0

CANNOT RESTORE A

BACKUP IF IT STARTS AFTER

TRACK 1. ON 45 MEG.

FIX

IN @DSTAPEB

LINE 1035

NEEDS CHANGE

FROM C

|     |    |     |    |
|-----|----|-----|----|
| 340 | 24 | 108 | 85 |
|     | 24 | 107 | 84 |

PS OUTLINE VER 3.0

806 IF BACKUP FILE NAME / APPEND TO A FILE (150M)  
TAPE 01, CANNOT REMOVE FROM TAPE AND ADDRESS FROM  
RECORD NUMBER 1.

Reason is there are some errors that are present between  
the 4500 & 1500 tape drive. One is used here and the other  
in the 4500 tape drive. DATA UNIT ERROR MESSAGE  
TAPES 1.

FIX: REFORMAT DISKETTES

CHANGE THE LOSS IN FORMATS

1035 COSMETIC 32-00 (XTR) (A)

1035 : IF 003-45 1035 003-45  
1035-HEX(00 00 00)



TOM WP

FIX FOR TURBO

PROGRAM WP 425 3

CHANGE LINE 4870

EITHER CHANGE IF STMT OR ADD STR(Q\$,9,1)="T" THEN

PROGRAM WP 307 1

CHANGE LINE 250

PLACE REM BEFORE IF STMT

PRG WP 425 3

LINE 4870

CHANGE IF STMT OR

ADD

STR(Q\$,9,1)="T" THEN

WP 307 1

LINE 250

REM IF STMT

0074. 007 27

63490

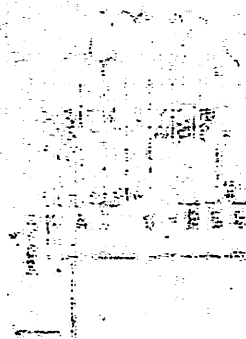
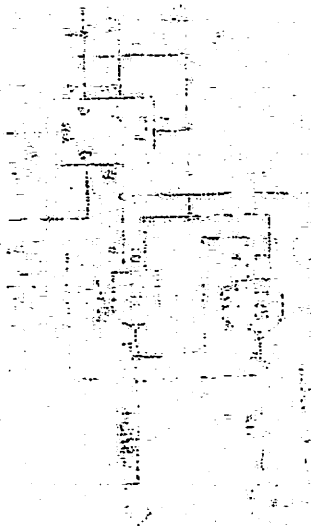
OPEN - 10-11-60

[illegible]

1068 900

100-443686-10

Page 4 of 4



|                    |      |             |     |
|--------------------|------|-------------|-----|
| ADDRESS            | DATE | DESCRIPTION | STA |
| 0293               | 11   | 0293        | 0   |
| 36E-11 MONTHS BORN |      |             |     |

## CS/386 Turbo Course Outline

April 24, 1991

1. CS/386 Turbo Overview.
2. Service Policy/Business Support Plan
3. Standard System Configurations - outline of the H/W & S/W configurations concentrating on the differences with existing configurations and the changes allowed/required with the Turbo.
4. Detailed Board Specifics.
  - Boards required.
  - Switch & jumper settings for each board.
  - Memory & PAL loading.
5. Installation Considerations.
  - Environment.
  - Installing the Turbo Card Set.
6. Loading the Operating System Software.
  - Changes to the O/S.
7. Testing.
  - Off-line Diagnostics.
  - On-Line Diagnostics.
8. Troubleshooting hardware & software problems.
9. Known problems and potential problems. Things to beware of.
10. Review of changes and pitfalls with the CS/386.
11. What's new with BASIC-2.
  - New BASIC-2 commands introduced on the 386.
  - New commands being introduced & planned for with forthcoming releases of the operating system.
  - DOS Utilities
12. Addressing Disk Performance and Restrictions.
  - 3 Byte Addressing.
  - New DS R4 Prom (Configuring the Winchester Drives).
  - General discussion on ways to improve disk performance.
13. SCSI on 2200. SCSI MUST BE ON BEFORE CPU POWERED UP.
  - The 22C03-SCSI Controller.. 30 ADDRESSES AVAILABLE PER CONTROL
  - Supported units and drives. D40 + D5F
  - Sw, jumpering, & termination of each drive. D6F
  - Cabling. D7F
  - SCSI-II Controller.
14. The 2636DW Workstation.
  - Configuring switch settings & setup information.
  - New features.
15. Escalating Problems and Obtaining Home Office assistance.

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INTERNAT PRODUCT BOOKINGS FOR SPECIFIC TURBO MODELS

\*\*\* COMPANY CONFIDENTIAL \*\*\*

Report developed by: Diane Halligan  
Generated June 3, 1992 at 8:04 PM

| <u>W/O #</u>        | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                                         | <u>BK DATE</u>   | <u>CURR ESD</u> |
|---------------------|------------|---------------------------------------------------------------------|------------------|-----------------|
| JE1TM               | 5114       | A F YANES SL<br>TENERIFE<br>CANARY ISLANDS                          | 92/03/18         | 92/04/15        |
| Model: CS/386-1600N |            | Qty: 2 List: \$13,860.00                                            | Net: \$13,860.00 |                 |
| Model: CS-N-TURBO   |            | Qty: 1 List: \$3,300.00                                             | Net: \$3,300.00  |                 |
|                     |            | Totals for JE1TM                                                    | \$17,160.00      | \$17,160.00     |
| JD6YX               | 5034       | PACIFIC DATA SYSTEMS<br>AGANA 96910<br>GUAM                         | 92/04/08         | 92/04/24        |
| Model: CS-TURBO     |            | Qty: 1 List: \$2,900.00                                             | Net: \$2,900.00  |                 |
|                     |            | Totals for JD6YX                                                    | \$2,900.00       | \$2,900.00      |
| JD5RU               | 9903       | WANG (UK) LIMITED<br>ISLEWORTH, MIDDLESEX TW7 4EH<br>UNITED KINGDOM | 92/02/03         | 92/02/28        |
| Model: CS-D-TURBO   |            | Qty: 3 List: \$8,700.00                                             | Net: \$8,700.00  |                 |
|                     |            | Totals for JD5RU                                                    | \$8,700.00       | \$8,700.00      |
| JD8KE               | 9943       | WANG AUSTRALIA PTY LTD<br>RYDALMERE NSW<br>AUSTRALIA                | 92/02/25         | 92/03/20        |
| Model: CS-TURBO     |            | Qty: 1 List: \$2,900.00                                             | Net: \$2,900.00  |                 |
|                     |            | Totals for JD8KE                                                    | \$2,900.00       | \$2,900.00      |
| JE2KL               | 9943       | WANG AUSTRALIA PTY LTD<br>RYDALMERE NSW<br>AUSTRALIA                | 92/03/24         | 92/04/14        |
| Model: CS/386-400N  |            | Qty: 2 List: \$8,700.00                                             | Net: \$8,700.00  |                 |
| Model: CS-D-TURBO   |            | Qty: 1 List: \$2,900.00                                             | Net: \$2,900.00  |                 |
|                     |            | Totals for JE2KL                                                    | \$11,600.00      | \$11,600.00     |

INTERNAT PRODUCT BOOKINGS FOR SPECIFIC TURBO MODELS

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Report developed by: Diane Halligan  
Generated June 3, 1992 at 8:04 PM

| <u>W/O #</u>       | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                                                           | <u>BK DATE</u> | <u>CURR ESD</u> |
|--------------------|------------|---------------------------------------------------------------------------------------|----------------|-----------------|
| JE8DP              | 9901       | WANG CANADA LIMITED<br>ONTARIO, L4P 1J9 ON 99999<br>CANADA                            | 92/05/11       | 92/05/27        |
| Model: CS/386-400N |            | Qty: 3 List: \$13,050.00 Net: \$13,050.00<br>Totals for JE8DP \$13,050.00 \$13,050.00 |                |                 |
| JE2HI              | 9919       | WANG COMPUTER LTD<br>MINATO-KU TOKYO 107<br>JAPAN                                     | 92/03/25       | 92/04/17        |
| Model: CS/386-400N |            | Qty: 1 List: \$4,350.00 Net: \$4,350.00<br>Totals for JE2HI \$4,350.00 \$4,350.00     |                |                 |
| JE4ME              | 9919       | WANG COMPUTER LTD<br>MINATO-KU TOKYO 107<br>JAPAN                                     | 92/04/13       | 92/05/15        |
| Model: CS/386-800N |            | Qty: 2 List: \$9,860.00 Net: \$9,860.00<br>Totals for JE4ME \$9,860.00 \$9,860.00     |                |                 |
| JE8OI              | 9919       | WANG COMPUTER LTD<br>MINATO-KU TOKYO 107<br>JAPAN                                     | 92/05/15       | 92/06/25        |
| Model: CS/386-800N |            | Qty: 3 List: \$14,790.00 Net: \$14,790.00<br>Totals for JE8OI \$14,790.00 \$14,790.00 |                |                 |
| JD6RL              | 9905       | WANG DEUTSCHLAND GMBH<br>6078 NEU-ISENBURG<br>GERMANY                                 | 92/02/11       | 92/03/13        |
| Model: CS/386-400N |            | Qty: 1 List: \$4,350.00 Net: \$4,350.00<br>Totals for JD6RL \$4,350.00 \$4,350.00     |                |                 |
| JF0MY              | 9905       | WANG DEUTSCHLAND GMBH<br>6078 NEU-ISENBURG<br>GERMANY                                 | 92/06/01       | 92/06/17        |
| Model: CS/386-400N |            | Qty: 3 List: \$13,050.00 Net: \$13,050.00                                             |                |                 |

INTERNAT PRODUCT BOOKINGS FOR SPECIFIC TURBO MODELS

\*\*\* COMPANY CONFIDENTIAL \*\*\*

Report developed by: Diane Halligan  
Generated June 3, 1992 at 8:04 PM

| <u>W/O #</u>        | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                                                       | <u>BK DATE</u> | <u>CURR ESD</u> |
|---------------------|------------|-----------------------------------------------------------------------------------|----------------|-----------------|
|                     |            | Totals for JF0MY                                                                  | \$13,050.00    | \$13,050.00     |
| JD1FO               | 9908       | WANG INDUSTRIAL CO LTD<br>TAIPEI<br>TAIWAN                                        | 92/01/03       | 92/02/28        |
| Model: CS-N-TURBO   |            | Qty: 2 List: \$5,800.00 Net: \$5,800.00<br>Totals for JD1FO \$5,800.00 \$5,800.00 |                |                 |
| JD4YV               | 9908       | WANG INDUSTRIAL CO LTD<br>TAIPEI<br>TAIWAN                                        | 92/01/31       | 92/02/28        |
| Model: CS/386-1600N |            | Qty: 1 List: \$6,090.00 Net: \$6,090.00<br>Totals for JD4YV \$6,090.00 \$6,090.00 |                |                 |
| JD4YW               | 9908       | WANG INDUSTRIAL CO LTD<br>TAIPEI<br>TAIWAN                                        | 92/01/31       | 92/03/13        |
| Model: CS/386-800N  |            | Qty: 1 List: \$4,930.00 Net: \$4,930.00<br>Totals for JD4YW \$4,930.00 \$4,930.00 |                |                 |
| JE5XH               | 9908       | WANG INDUSTRIAL CO LTD<br>TAIPEI<br>TAIWAN                                        | 92/04/28       | 92/05/20        |
| Model: CS-D-TURBO   |            | Qty: 1 List: \$2,900.00 Net: \$2,900.00<br>Totals for JE5XH \$2,900.00 \$2,900.00 |                |                 |
| JD4HZ               | 9907       | WANG NETHERLANDS BV<br>4104 AJ CULEMBORG<br>NETHERLANDS                           | 92/01/24       | 92/03/13        |
| Model: CS/386-800N  |            | Qty: 1 List: \$4,930.00 Net: \$4,930.00<br>Totals for JD4HZ \$4,930.00 \$4,930.00 |                |                 |

INTERNAT PRODUCT BOOKINGS FOR SPECIFIC TURBO MODELS

\*\*\* COMPANY CONFIDENTIAL \*\*\*

Report developed by: Diane Halligan  
Generated June 3, 1992 at 8:04 PM

| <u>W/O #</u>         | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                             | <u>BK DATE</u>  | <u>CURR ESD</u> |
|----------------------|------------|---------------------------------------------------------|-----------------|-----------------|
| JE4NZ                | 9907       | WANG NETHERLANDS BV<br>4104 AJ CULEMBORG<br>NETHERLANDS | 92/04/09        | 92/04/24        |
| Model: CS-N-TURBO    |            | Qty: 1 List: \$2,900.00<br>Totals for JE4NZ \$2,900.00  | Net: \$2,900.00 | \$2,900.00      |
| JE7ZO                | 9907       | WANG NETHERLANDS BV<br>4104 AJ CULEMBORG<br>NETHERLANDS | 92/05/08        | 92/06/25        |
| Model: CS-TURBO      |            | Qty: 1 List: \$2,900.00<br>Totals for JE7ZO \$2,900.00  | Net: \$2,900.00 | \$2,900.00      |
| JE9FN                | 9907       | WANG NETHERLANDS BV<br>4104 AJ CULEMBORG<br>NETHERLANDS | 92/05/20        | 92/06/04        |
| Model: CS-TURBO      |            | Qty: 1 List: \$2,900.00<br>Totals for JE9FN \$2,900.00  | Net: \$2,900.00 | \$2,900.00      |
| JE9FO                | 9907       | WANG NETHERLANDS BV<br>4104 AJ CULEMBORG<br>NETHERLANDS | 92/05/20        | 92/06/04        |
| Model: MICROVP-TURBO |            | Qty: 1 List: \$2,900.00<br>Totals for JE9FO \$2,900.00  | Net: \$2,900.00 | \$2,900.00      |
| JF0DS                | 9907       | WANG NETHERLANDS BV<br>4104 AJ CULEMBORG<br>NETHERLANDS | 92/05/28        | 92/06/12        |
| Model: CS-TURBO      |            | Qty: 3 List: \$8,700.00<br>Totals for JF0DS \$8,700.00  | Net: \$8,700.00 | \$8,700.00      |
| JE2PM                | 9906       | WANG PACIFIC LTD<br>500 HENNESSEY RD<br>HONG KONG       | 92/03/25        | 92/04/17        |
| Model: CS/386-800N   |            | Qty: 2 List: \$9,860.00                                 | Net: \$9,860.00 | \$9,860.00      |



INTERNAT PRODUCT BOOKINGS FOR SPECIFIC TURBO MODELS

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Report developed by: Diane Halligan  
Generated June 3, 1992 at 8:04 PM

| <u>W/O #</u>       | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                                                       | <u>BK DATE</u> | <u>CURR ESD</u> |
|--------------------|------------|-----------------------------------------------------------------------------------|----------------|-----------------|
|                    |            | Totals for JE2PM                                                                  | \$9,860.00     | \$9,860.00      |
| JE2PN              | 9906       | WANG PACIFIC LTD<br>500 HENNESSEY RD<br>HONG KONG                                 | 92/03/25       | 92/04/17        |
| Model: CS/386-400N |            | Qty: 2 List: \$8,700.00 Net: \$8,700.00<br>Totals for JE2PN \$8,700.00 \$8,700.00 |                |                 |
| JE3PD              | 9906       | WANG PACIFIC LTD<br>500 HENNESSEY RD<br>HONG KONG                                 | 92/04/01       | 92/05/08        |
| Model: CS/386-800N |            | Qty: 2 List: \$9,860.00 Net: \$9,860.00<br>Totals for JE3PD \$9,860.00 \$9,860.00 |                |                 |
| JE3PE              | 9906       | WANG PACIFIC LTD<br>500 HENNESSEY RD<br>HONG KONG                                 | 92/04/01       | 92/05/08        |
| Model: CS/386-800N |            | Qty: 2 List: \$9,860.00 Net: \$9,860.00<br>Totals for JE3PE \$9,860.00 \$9,860.00 |                |                 |
| JD1WH              | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN                                       | 92/01/08       | 92/02/21        |
| Model: CS-D-TURBO  |            | Qty: 2 List: \$5,800.00 Net: \$5,800.00<br>Totals for JD1WH \$5,800.00 \$5,800.00 |                |                 |
| JD2QI              | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN                                       | 92/01/13       | 92/03/17        |
| Model: CS-D-TURBO  |            | Qty: 1 List: \$2,900.00 Net: \$2,900.00<br>Totals for JD2QI \$2,900.00 \$2,900.00 |                |                 |

INTERNAT PRODUCT BOOKINGS FOR SPECIFIC TURBO MODELS

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Report developed by: Diane Halligan  
Generated June 3, 1992 at 8:04 PM

| <u>W/O #</u>         | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                                                       | <u>BK DATE</u> | <u>CURR ESD</u> |
|----------------------|------------|-----------------------------------------------------------------------------------|----------------|-----------------|
| JD3EK                | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN                                       | 92/01/16       | 92/03/12        |
| Model: CS-D-TURBO    |            | Qty: 1 List: \$2,900.00 Net: \$2,900.00<br>Totals for JD3EK \$2,900.00 \$2,900.00 |                |                 |
| JD7QB                | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN                                       | 92/02/18       | 92/03/24        |
| Model: CS-D-TURBO    |            | Qty: 1 List: \$2,900.00 Net: \$2,900.00<br>Totals for JD7QB \$2,900.00 \$2,900.00 |                |                 |
| JD8NY                | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN                                       | 92/02/25       | 92/03/20        |
| Model: CS-D-TURBO    |            | Qty: 1 List: \$2,900.00 Net: \$2,900.00<br>Totals for JD8NY \$2,900.00 \$2,900.00 |                |                 |
| JE4XM                | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN                                       | 92/04/13       | 92/04/24        |
| Model: CS-TURBO      |            | Qty: 1 List: \$2,900.00 Net: \$2,900.00<br>Totals for JE4XM \$2,900.00 \$2,900.00 |                |                 |
| JE8FB                | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN                                       | 92/05/12       | 92/05/29        |
| Model: CS-TURBO      |            | Qty: 1 List: \$2,900.00 Net: \$2,900.00<br>Totals for JE8FB \$2,900.00 \$2,900.00 |                |                 |
| JE8RD                | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN                                       | 92/05/14       | 92/05/29        |
| Model: MICROVP-TURBO |            | Qty: 1 List: \$2,900.00 Net: \$2,900.00                                           |                |                 |

INTERNAT PRODUCT BOOKINGS FOR SPECIFIC TURBO MODELS

\*\*\* COMPANY CONFIDENTIAL \*\*\*

Report developed by: Diane Halligan  
Generated June 3, 1992 at 8:04 PM

| <u>W/O #</u>         | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                 | <u>BK DATE</u>  | <u>CURR ESD</u> |
|----------------------|------------|---------------------------------------------|-----------------|-----------------|
|                      |            | Totals for JE8RD                            | \$2,900.00      | \$2,900.00      |
| JE8RE                | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN | 92/05/14        | 92/06/03        |
| Model: MICROVP-TURBO |            | Qty: 1 List: \$2,900.00                     | Net: \$2,900.00 |                 |
|                      |            | Totals for JE8RE                            | \$2,900.00      | \$2,900.00      |
| JE8RF                | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN | 92/05/14        | 92/06/02        |
| Model: MICROVP-TURBO |            | Qty: 1 List: \$2,900.00                     | Net: \$2,900.00 |                 |
|                      |            | Totals for JE8RF                            | \$2,900.00      | \$2,900.00      |
| JE8RG                | 9910       | WANG SVENSKA AB<br>S-171 23 SOLNA<br>SWEDEN | 92/05/14        | 92/06/02        |
| Model: MICROVP-TURBO |            | Qty: 1 List: \$2,900.00                     | Net: \$2,900.00 |                 |
|                      |            | Totals for JE8RG                            | \$2,900.00      | \$2,900.00      |
|                      |            | GRAND TOTALS                                | \$220,740.00    | \$220,740.00    |

DOMESTIC PRODUCT BOOKINGS FOR SPECIFIC TURBO MODELS

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Report developed by: Diane Halligan  
Generated June 3, 1992 at 1:35 AM

| <u>W/O #</u>         | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                                                       | <u>BK DATE</u> | <u>CURR ESD</u> |
|----------------------|------------|-----------------------------------------------------------------------------------|----------------|-----------------|
| SI6AO                | 2503       | BAY CITIES METAL PRODUCTS<br>233 E MANVILLE ST<br>COMPTON CA 90220                | 92/05/14       | 92/06/05        |
| Model: CS/386-400N   |            | Qty: 1 List: \$7,500.00 Net: \$4,875.00<br>Totals for SI6AO \$7,500.00 \$4,875.00 |                |                 |
| SI6GC                | 2006       | CITY OF BEVERLY<br>191 CABOT ST<br>BEVERLY MA 01915                               | 92/05/18       | 92/06/04        |
| Model: CS-TURBO      |            | Qty: 1 List: \$5,000.00 Net: \$4,250.00<br>Totals for SI6GC \$5,000.00 \$4,250.00 |                |                 |
| SI2BG                | 2005       | EQUITY INDUSTRIES CORP<br>5721 BAYSIDE RD<br>VIRGINIA BEACH VA 23455              | 92/02/27       | 92/03/17        |
| Model: MICROVP-TURBO |            | Qty: 1 List: \$5,000.00 Net: \$3,000.00<br>Totals for SI2BG \$5,000.00 \$3,000.00 |                |                 |
| SI2VM                | 2005       | PANNEBAKER & JONES PC<br>4000 VINE ST<br>MIDDLETOWN PA 17057                      | 92/03/11       | 92/03/27        |
| Model: CS-D-TURBO    |            | Qty: 1 List: \$5,000.00 Net: \$3,000.00<br>Totals for SI2VM \$5,000.00 \$3,000.00 |                |                 |
| SI6HX                | 2210       | SELECT MAILING LIST INC<br>45 LEGION DR<br>CRESSKILL NJ 07626                     | 92/05/22       | 92/06/09        |
| Model: CS-N-TURBO    |            | Qty: 1 List: \$5,000.00 Net: \$5,000.00<br>Totals for SI6HX \$5,000.00 \$5,000.00 |                |                 |
| SI4XT                | 2005       | SPRINGFIELD COMPUTER SYS INC<br>1721 PEARL ST<br>JACKSONVILLE FL 32206            | 92/04/21       | 92/05/08        |
| Model: MICROVP-TURBO |            | Qty: 1 List: \$5,000.00 Net: \$3,000.00<br>Totals for SI4XT \$5,000.00 \$3,000.00 |                |                 |
| SH9LF                | 2000       | TRIESTE CORPORATION<br>3501 N CAUSEWAY BLVD<br>METAIRIE LA 70002                  | 92/01/07       | 92/03/24        |
| Model: CS-TURBO      |            | Qty: 1 List: \$5,000.00 Net: \$3,500.00<br>Totals for SH9LF \$5,000.00 \$3,500.00 |                |                 |

SI0II 2005 WESTLAND INCORPORATED 92/01/22 92/02/28  
7900 E GREENWAY RD STE 107  
SCOTTSDALE AZ 85260

Model: CS-N-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00  
Totals for SI0II \$5,000.00 \$3,000.00

SI3ZP 2007 WESTLAND INCORPORATED 92/03/31 92/04/17  
7900 E GREENWAY RD STE 107  
SCOTTSDALE AZ 85260

Model: CS-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00  
Totals for SI3ZP \$5,000.00 \$3,000.00

SH9YN 3469 WILSON PHARMACY INC 92/01/17 92/03/12  
525 NORTH STATE OF FRANKLIN RD  
JOHNSON CITY TN 37604

Model: CS-TURBO Qty: 1 List: \$5,000.00 Net: \$5,000.00  
Totals for SH9YN \$5,000.00 \$5,000.00

GRAND TOTALS \$52,500.00 \$37,625.00

DOMESTIC PRODUCT BOOKINGS FOR SPECIFIC TURBO MODELS

26 BOOKINGS

\*\*\* COMPANY CONFIDENTIAL \*\*\*  
 Report developed by: Diane Halligan  
 Generated April 28, 1992 at 1:47 PM

| <u>W/O #</u>         | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                                                       | <u>BK DATE</u> | <u>CURR ESD</u> |
|----------------------|------------|-----------------------------------------------------------------------------------|----------------|-----------------|
| SG5LP                | 2000       | A & L EASTERN AGRICULTURAL LAB<br>7621 WHITE FINE RD<br>RICHMOND VA 23234         | 91/10/28       | 91/11/27        |
| Model: CS-TURBO      |            | Qty: 1 List: \$5,000.00 Net: \$3,000.00<br>Totals for SG5LP \$5,000.00 \$3,000.00 |                |                 |
| SH5RP                | 2000       | ADREA & RUBIN MARKETING INC<br>441 LEXINGTON AVE STE 805<br>NEW YORK NY 10017     | 91/10/31       | 92/01/17        |
| Model: CS-N-TURBO    |            | Qty: 1 List: \$5,000.00 Net: \$3,250.00<br>Totals for SH5RP \$5,000.00 \$3,250.00 |                |                 |
| SH5TI                | 2500       | ALFA COLOR INC<br>535 W 135 ST<br>GARDENA CA 90248                                | 91/10/30       | 92/01/29        |
| Model: CS-TURBO      |            | Qty: 1 List: \$5,000.00 Net: \$3,250.00<br>Totals for SH5TI \$5,000.00 \$3,250.00 |                |                 |
| SH6LS                | 2016       | ALLIED EXTRUDERS INC<br>36-08 REVIEW AVE<br>LONG ISLAND CITY NY 11101             | 91/11/19       | 92/02/04        |
| Model: MICROVP-TURBO |            | Qty: 1 List: \$5,000.00 Net: \$4,370.00<br>Totals for SH6LS \$5,000.00 \$4,370.00 |                |                 |
| SH8KA                | 2005       | BEFCO INC<br>HWY 301 S<br>ROCKY MOUNT NC 27801                                    | 91/12/16       | 92/02/12        |
| Model: CS-TURBO      |            | Qty: 1 List: \$5,000.00 Net: \$3,200.00<br>Totals for SH8KA \$5,000.00 \$3,200.00 |                |                 |
| SH5OY                | 2000       | BOORUM & PEASE CO INC<br>129 SEENCER ST<br>SYRACUSE NY 13204                      | 91/10/31       | 91/12/05        |
| Model: CS-N-TURBO    |            | Qty: 1 List: \$5,000.00 Net: \$3,000.00<br>Totals for SH5OY \$5,000.00 \$3,000.00 |                |                 |
| SH8PM                | 2007       | BROWN MANAGEMENT SYSTEMS<br>1210 E 23RD<br>CARSON CA 90745                        | 91/12/18       | 92/03/11        |
| Model: MICROVP-TURBO |            | Qty: 1 List: \$5,000.00 Net: \$3,000.00<br>Totals for SH8PM \$5,000.00 \$3,000.00 |                |                 |

|                      |                  |                                                                          |                  |          |
|----------------------|------------------|--------------------------------------------------------------------------|------------------|----------|
| SH9BT                | 2503             | BROWN MANAGEMENT SYSTEMS<br>1210 E 23RD<br>CARSON CA 90745               | 91/12/27         | 92/02/14 |
| Model: MICROVP-TURBO | Qty:             | 1 List: \$5,000.00                                                       | Net: \$3,000.00  |          |
|                      | Totals for SH9BT | \$5,000.00                                                               | \$3,000.00       |          |
| SG2UJ                | 2000             | COMPUTER MAINTENANCE<br>9414 INTERLINE AVE<br>BATON ROUGE LA 70809       | 91/10/28         | 92/01/14 |
| Model: CS-N-TURBO    | Qty:             | 1 List: \$5,000.00                                                       | Net: \$3,000.00  |          |
| Model: CS/386-400N   | Qty:             | 1 List: \$7,500.00                                                       | Net: \$4,500.00  |          |
|                      | Totals for SG2UJ | \$12,500.00                                                              | \$7,500.00       |          |
| SH6OA                | 2000             | CONSTRUCTION DATA CORPORATION<br>1911 PRINCETON AVE<br>LAWRENCE NJ 08648 | 91/11/13         | 92/02/28 |
| Model: CS-TURBO      | Qty:             | 1 List: \$5,000.00                                                       | Net: \$3,000.00  |          |
|                      | Totals for SH6OA | \$5,000.00                                                               | \$3,000.00       |          |
| SI2BG                | 2005             | EQUITY INDUSTRIES CORP<br>5721 BAYSIDE RD<br>VIRGINIA BEACH VA 23455     | 92/02/27         | 92/03/17 |
| Model: MICROVP-TURBO | Qty:             | 1 List: \$5,000.00                                                       | Net: \$3,000.00  |          |
|                      | Totals for SI2BG | \$5,000.00                                                               | \$3,000.00       |          |
| SH8KD                | 2508             | FORTRESS MANUFACTURING<br>2175 S 170TH ST<br>NEW BERLIN WI 53151         | 91/12/17         | 92/02/11 |
| Model: CS/386-3200N  | Qty:             | 1 List: \$13,500.00                                                      | Net: \$10,800.00 |          |
|                      | Totals for SH8KD | \$13,500.00                                                              | \$10,800.00      |          |
| SH4HI                | 2003             | JGB ENTERPRISES INC<br>115 METROPOLITAN DR<br>LIVERPOOL NY 13088         | 91/10/29         | 91/11/26 |
| Model: CS-TURBO      | Qty:             | 1 List: \$5,000.00                                                       | Net: \$3,850.00  |          |
|                      | Totals for SH4HI | \$5,000.00                                                               | \$3,850.00       |          |
| SH9AK                | 2507             | MEADOWS FOUNDATION INC<br>2922 SWISS AVE<br>DALLAS TX 75204              | 91/12/31         | 92/02/25 |
| Model: CS-TURBO      | Qty:             | 1 List: \$5,000.00                                                       | Net: \$3,250.00  |          |
|                      | Totals for SH9AK | \$5,000.00                                                               | \$3,250.00       |          |
| SH7QJ                | 2000             | N E D SERVICE<br>267 GREEN DR<br>CHURCHVILLE PA 18966                    | 91/12/02         | 92/03/04 |
| Model: CS-TURBO      | Qty:             | 2 List: \$10,000.00                                                      | Net: \$6,000.00  |          |

Totals for SH7QJ \$10,000.00 \$6,000.00

SI2VM 2005 PANNEBAKER & JONES PC 92/03/11 92/03/27  
4000 VINE ST  
MIDDLETOWN PA 17057

Model: CS-D-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00  
Totals for SI2VM \$5,000.00 \$3,000.00

SH5OX 2000 ROY JONES DOG SHOWS INC 91/10/31 91/12/05  
1105 W AUBURN DR  
AUBURN IN 46706

Model: CS-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00  
Totals for SH5OX \$5,000.00 \$3,000.00

SH6FB 2000 SPECIALTY PROGRAMS SERVS INC 91/11/06 92/01/29  
3685 ROGER B CHAFFEE MEM DR  
GRAND RAPIDS MI 49548

Model: CS-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00  
Totals for SH6FB \$5,000.00 \$3,000.00

SI4XT 2005 SPRINGFIELD COMPUTER SYS INC 92/04/21 92/05/08  
1721 PEARL ST  
JACKSONVILLE FL 32206

Model: MICROVP-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00  
Totals for SI4XT \$5,000.00 \$3,000.00

SH9LF 2000 TRIESTE CORPORATION 92/01/07 92/03/24  
3501 N CAUSEWAY BLVD  
METAIRIE LA 70002

Model: CS-TURBO Qty: 1 List: \$5,000.00 Net: \$3,500.00  
Totals for SH9LF \$5,000.00 \$3,500.00

SH7UE 2005 WESTLAND INCORPORATED 91/12/05 92/02/28  
7900 E GREENWAY RD STE 107  
SCOTTSDALE AZ 85260

Model: CS-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00  
Totals for SH7UE \$5,000.00 \$3,000.00

SI0II 2005 WESTLAND INCORPORATED 92/01/22 92/02/28  
7900 E GREENWAY RD STE 107  
SCOTTSDALE AZ 85260

Model: CS-N-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00  
Totals for SI0II \$5,000.00 \$3,000.00

SI3ZP 2007 WESTLAND INCORPORATED 92/03/31 92/04/17  
7900 E GREENWAY RD STE 107  
SCOTTSDALE AZ 85260

Model: CS-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00



Totals for SI32P \$5,000.00 \$3,000.00

SH9YN 3469 WILSON PHARMACY INC 92/01/17 92/03/12  
525 NORTH STATE OF FRANKLIN RD  
JOHNSON CITY TN 37604

Model: CS-TURBO Qty: 1 List: \$5,000.00 Net: \$5,000.00  
Totals for SH9YN \$5,000.00 \$5,000.00

GRAND TOTALS \$141,000.00 \$92,970.00

DOMESTIC PRODUCT OPEN BACKLOG FOR SPECIFIC TURBO MODELS

\*\*\* COMPANY CONFIDENTIAL \*\*\*  
 Report developed by: Diane Halligan  
 Generated April 28, 1992 at 12:29 PM

| <u>W/O #</u>                                                 | <u>RDB</u> | <u>CUSTOMER INFORMATION</u>                                            | <u>BK DATE</u> | <u>CURR ESD</u> |
|--------------------------------------------------------------|------------|------------------------------------------------------------------------|----------------|-----------------|
| SI4XT                                                        | 2005       | SPRINGFIELD COMPUTER SYS INC<br>1721 PEARL ST<br>JACKSONVILLE FL 32206 | 92/04/21       | 92/05/08        |
| Model: MICROVP-TURBO Qty: 1 List: \$5,000.00 Net: \$3,000.00 |            |                                                                        |                |                 |
| Totals for SI4XT \$5,000.00 \$3,000.00                       |            |                                                                        |                |                 |
| GRAND TOTALS \$5,000.00 \$3,000.00                           |            |                                                                        |                |                 |

Package Subject: Sintra

Item Title: Sintra

Hi Mike. actually nothing has happened cause at the time, we got thrown into to Bull amalgamation. Mark indicated client was awaiting a response from me as to what I planned on doing about 2 previous letters he had addressed to Wang field locations indicating he wanted to be refunded maint. dollars based on fact "THIS NEVER WORKED"

I told Mark I didn't have a problem responding when I got some time but that it would state something along the lines of the relationship was between Wang and Mark and that if client had issue with non-performance he would be best advised to take that up with Mark who could then feel free to take it up with Wang. (indicating I wasn't about to let Mark off the hook for this dragging on so long.

Clent had already dropped his contracts and went T+M so basically they have nothing to hold over us.

If I get a chance to dig up all the info and address the clients letters I will but he won't like the response anyway so, as long as sleeping dog's ...  
..... well you get the picture. Its been this many months now and I have not heard anything and doubt if I ever will.

Russ

c.c. Donna - Donna when you get a spare hour I should explain all this to you before I loose the records totally. Before Frank left I had indicated that this has the potential of turning into a legal battle. When you have a spare minute come see me and I'll pull out the file okay?



Package Subject: Sintra

Item Title: Sintra

Mark indicates client doesn't want to proceed with this. Is adamant they want to recoup maint cost. I'll address letter back to client and to Mark and turn over to legal from there.

Russ

----- Reply -----

To: Russ Brown                      From: Mike Bahia  
Subject: Sintra                      Date Sent: 09/22/95

Russ,

In the memo you indicated FCO 1503 which is for the 22C11-HS Controller. I believe we need FCO 1502, p/n 728-0444, which is for the MXF. And as to prevent confusion concerning the SCSI Caching SW. It is not in the wrong position, but it is ON & with the working site the caching is set to OFF. If that sw position makes a difference then there is a bug in the caching process. Normally you would want to have it on for maximum performance.

Regards, Mike

----- Original Memo -----

To: Mike Bahia                      From: Russ Brown  
Subject: Sintra                      Date Sent: 09/22/95

Gentlemen: I spoke to Mark Degagne this morning and told him that we (Wang Canada) owe his client a response to his request for return of maintenance dollars for past two years. I informed him the reason there was no on-site activity all this time is because the client contracted for depot return. Although it took two years, as soon as one came available I requested it be sent to me so we could investigate the circumstances of the X75 errors since Mark's involvement with O'Riely and Mike Bahia never resulted in anyone being able to reproduce the problem.

I also made it clear that contrary to the latest letter from the client demanding return of maintenance dollars, Toronto did NOT find the problem and re-iterated we simply discovered items that could be problematic, like the caching switch being on when it should be off.

Mark being sympathetic to the client having lived with sporadic X75 problems at various locations since the install of the CS turbo boxes explained that this has been more of an issue of circumstance surrounding Wang restructuring more than an inability to isolate and repair the problem.

To re-iterate there are two issues still outstanding that we need to clear the air on prior to replacing the box in the clients Head office with his known good working unit.

1) Lee indicated the Micropolis drives that are in the box that was shipped to

Package Subject: Sintra

Toronto are not on the supported list? We need to know what model of drive is actually in the box currently running at the clients office. Hoping Denis can ascertain this information (remove front panel should expose it) Again, don't want to suggest it is a problem but if different drives are in the working unit it would be good to know that prior to swapping out a production box for one that we know was failing.

- 2) Also there is a question surrounding the prom level of the turbo controller. According to HWT 9889 the 210-9579 brd, the same O/I board as that used with the Turbo/MXF controller and the 22C11-HS Print/Disk contr. requires a prom change at locations L7 and L14 to facilitate operating systems 1.18 and greater. We should install this on the box. Although there is no reason to believe we have a problem in this area we are assured that adding new proms will not add problems. Denis you should immediately get hold of FCO 1503 to install on the box sent back to Montreal recently.

Aside from that, I'm awaiting word back from Mark Degagne who said he'd call me on Monday to see if he's going to get the go ahead from the client to proceed.

I'll let everyone know next week if we are going to proceed or not.

Thankyou

Russ

p.s. Mike/Lee

if there is any mistake in the technical part of my memo please don't be shy to point it out. (particularly with the prom change in SCSI)

Package Subject: SINTRA

Item Title: SINTRA

Russ or Lee,

Any progress on getting the system in the office installed at the working site we the changes we identified?

Mike

----- Reply -----  
To: Mike Bahia From: Russ Brown  
Subject: SINTRA Date Sent: 08/24/95

Mike

I investigated the circumstances surrounding his "Beta" agreements and here is what we find.

1) all the disk controllers belong to Wang and were signed out under Beta agreement to Vectrcom for which we have signed copies.

2) the disks attached to these controllers are not certified wang drives and as a result we do not guarantee outcome.

3) we know the error they experience is data corruption related which points to possible combination of having cache turned on and/or unsupported drives.

4) we know they have refused to install some software upgrade that they feel fixes only related to print controller BUT we know the mother board of the mother/daughter board combination of the MXF is identical to the print contr. motherboard therefore we will probably insist they upgrade this code.

5) We know they are running boxes with the caching set to on, and that was part of the plan to restage and change this. Perron doesn't like the plan so we called Vectrcom to discuss and he has not returned call. The idea behind discussing with Marc at Vectracom was cause he is the one that configured and sold this to Sintra. Sintra is probably not even aware that the beta controllers don't belong to them or that the drive config is not supported. Prior to terminating with Sintra I thought it only appropriate to try to come up with a working plan through Vectracom but I see that Mark is now employed at Sintra so not sure if there is a conflict there or not.

6) I suggest that we call Sintra manager and basically say that we are willing to continue to investigate what the problem is - by first re-installing the box we shipped back as per previous discussions and failing that please ship us back the disk controllers (which we never sold to them) and we will terminate the Beta.

----- Reply -----  
To: Russ Brown From: Mike Di Palma  
Subject: SINTRA Date Sent: 08/24/95

Package Subject: SINTRA

HI RUSS

I WANTED TO KNOW IF GERMAIN PERRON HAS CONTACTED YOU ON THE SUBJECT OF HIS SYSTEM. HIS RENEWAL OF CONTRACT IS PASSED DUE ON THE 1ST OF JUNE. BEFORE I CONTACT HIM I NEED TO KNOW IF YOU SPOKEN TO HIM BECAUSE THIS CONTRACT IS IN JEOPARDY. I WILL CONTACT HIM AS SOON AS YOU WILL REPLY TO ME TO GET A STATUS OF HIS RENEWAL.

MIKE DI PALMA



Package Subject: Sintra CS/386 Turbo issue

Item Title: Sintra CS/386 Turbo issue

Russ & Lee,

Have you made any headway on this problem w/ Sintra?

Mike

----- Original Memo -----

To: Mike Bahia From: Russ Brown  
Subject: Sintra CS/386 Turbo issue Date Sent: 07/12/95

Mike, I know you responded to me when I sent you the findings of the Box that the CE investigated but coincidentally Lee put together this comparison list to show you how that compared to a box that doesn't work.

Lee sent this info to you right around the time you responded to me and when I noted in your memo that there was confusion as to which box worked I figured I'd wait till you saw Lee's comparison stuff.

The stuff he sent you looks like this;

CUSTOMER MACHINE THAT WORKS

MACHINE IN OUR LAB THAT FAILS

CPU B ard = 210-9576-1-A rev3

Rev 3

CPU Chip = INTEL 386DX 33

Intel 33M

L50 378-9509 rev2

Rev 3

L64 378-9508 rev2

Rev 3

All other chip rev00

Rev 0

Jumper J8 out

out

J7 in

in

J6 in

in

J5 1-2 in

2-3 if pin 1 is closest to simms

J4 out

out

CPU board 210-9577-A-2 rev1

rev 1

FROMS rev00

rev 0

Other Board = 210-9578

same

2236MXE 212-3032

same

board 210-7874-A rev1

Package Subject: Sintra CS/386 Turbo issue

board 210-7973-A rev0

L18 = 378-9001

L19 = 378-9000

-----  
Printer contrl = 210-7079 rev00

same  
-----

SCSI II Controller

Board 210-9582-C

L12 RDY

L15 INT.

SW1 = All ON

1,2,3,6,8 on 4,5,7 off

Jumper J7 out

in

J8 in

in

J9 in

in

L18 and L21 = MCM91000L 70ns

board 210-9579-0

L21, L22, L30, L31, L42, L43, L49, L50 = NEC D43256C-10L

L19 = 7121 R2

L25 = 3777124 R0

rev 1

L18 = 3777122 R0

1

L24 = 3777120 R0

1

L34 = 3777123 R0

1

L33 = 3777126 R0

1

L38 = 3777128 R0

1

L45 = 3777119 R0

1

L23 = 3777127 R0

1

L27 = 3777125 R0

1

L14 = SSG 0 7/7

7/7

L7 = SSG E 7/7

7/7

Jumper J7 in

SW1 1= off

2-3-4 = on

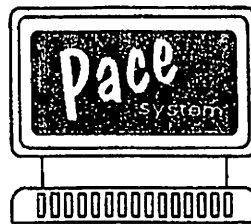
1=on 2-3-4=off

I did speak to the vendor and basically he has not been troubleshooting this box for some time. Says complaints are sporadic and he is selling his own solution.

Customer has sent letter wanting refund but I told field that he's been using these boxes despite the fact he has errors when he runs reports at month end so 100% refund aint going to happen. Told then we'd start by comparing these boxes then go from there.

Any suggestion? If we could maybe affect changes to this box that apparently has failed then ship it back this would put the onus on the customer to re-install the box at an office to use it. (basically he has replaced this box with something else so not likely he's going to do that anyway)

Russ



THE KEY TO  
PROFITABILITY

## MEMO

**Date:** 06/22/92

**To :** Dave Bormay, Applied Business Computers  
Mike Bahia, Wang Labs  
Mike Riley, Wang Labs

**From:** Tom Farr, Pres.  
Springfield Computer Systems

**Re :** Wang 2200 CS - Turbo with SCSI drive.  
Unsatisfactory results have resulted in de-installation.

### SITE INFORMATION:

1. The 386 Turbo was ordered to be installed at Kmart, international headquarters, Detroit, Mich. where it was to replace:

(3) - 2200Micro VP's

DS cabinet with two 64 meg drives and 150 Meg tape

(33) workstations, mostly 2336DE's and 2336DW's, and 4 PC2200's

2. The above installation has been operating successfully for about 3 years.

3. Kmart wants to add several additional workstations.

### BACKGROUND:

1. The system was initially set up for testing at our facilities in Jacksonville, FL by Wang tech. reps. There were numerous problems with drive which was DOA. Unit shipped back to Wang, repaired, then returned to Jacksonville. After about 10 days, the unit appeared to be working and was shipped to Detroit.

2. Upon arrival in Detroit, the system initially worked, but then experienced a variety of

unexplainable problems.

When powered down, it could not be rebooted.

Although the CPU Diagnostics showed everything OK, the disk drives would not communicate with the CPU. At different times with no obvious connections, with MXF controllers, high speed disk controller and SCSI controller seemed to cause the problem.

For no apparent reason, after several hours of swapping every component, the system booted up and appeared to operate correctly.

Then, after about one hour, the same rash of problems reappeared.

Working for several additional hours with both Mike Riley and Mike Bahia at Wang resulted in electrically insulating the back of the mother board (from the chassis).

Since this was done, the major problems have not reappeared.

3. In retrospect, the initial DOA problems in Jacksonville (which resulted in swapping drives, controllers and power supply) had similar characteristics.

4. On the third day, the system was installed and began being used.

5. Several problems occurred immediately and forced us to de-install the system and ship it back to Jacksonville.

#### **PROBLEMS:**

**1. The MXF doesn't support T/C configuration.** Our application requires a port to be configured as a T/C port for real-time data collection.

This was temporarily overcome by installing an MXE.

★ **2. The MXF doesn't operate terminal printers properly.** Our application requires terminal printers to print Bar Code and certain graphics. Although this works properly with an MXD or an MXE, it doesn't work with the MXF.

**3. Resaving programs in NEW format causes the CPU to shut down.** With the CS/386 cpu, saving a program in the NEW format causes occasional A05 errors when line length is too long (although they save OK on the MVP). With the Turbo, this situation displays "A05 7" (this appears to be the first digit of the line number), then the CPU shuts down and must be rebooted.

This problem prevents conversion from an MVP to the Turbo. It can be worked around if a CS/386 is available to save the programs in NEW format, then transferring files.

★ **4. SCSI controller problems.** This was experienced as mysterious problems with data integrity after copying data from one file to another. Eg. sorts would work only intermittently. COPYING data from one location to another resulted in differences in the data.

When the CPU and drive were powered down, the problem seemed to disappear for a while.

## CONCLUSION:

1. After the two lost days, then installation resulting in discovering problems #2 and #4, above, we were instructed to remove the system and reinstall the old hardware.

2. We must make a final decision by 06/30/92 whether to recommend a Novell Network (in lieu of the Turbo 386).

To: Mike Bahia  
From: Linda Cover  
Subject: Pannebaker's Turbo

W0000600 6FLT3  
Security: Limited  
Date Received: 04/08/92

---

Mike,

The install at Pannebaker's went very well. We had no problems with the hardware installation. The programmer took care of loading the software and the customer is pleased with the improved performance. They could see a noticeable difference with the speed of the system. Thank you for all the help you gave us with this. It made all the difference in the world to be prepared for it ahead of time. If you wanted to talk to the customer about the system at all, the contact is Maryann Rosenberry at 717 944-1333.

Thanks again,

Linda Cover

Package Subject: CS/386 TURBO Prod. Report

Item Title: CONGRATULATIONS

Gene, You have done an excellent job in turning Jim and the others around AND in managing the BASIC 2 product line.

I hope whoever you are reporting to now is making sure that you are getting the exposure and recognition for these efforts that you justly deserve.

At any rate I AM IMPRESSED! Congratulations.

Don Gangemi

WANG

# ESO

## NEW PRODUCT ENGINEERING TRANSFER PACKAGE

PRODUCT NAME: 2200 CS TURBO PROJECT # 601

TRANSFER DATE: 1/31/92 John R. Lytle

FROM: PRODUCT ENGINEER(S): Charles E. Smith Alexander Glenverkey  
PROGRAM MANAGER: S. Smith CSO Michael Balmer  
PRODUCT ENG. MGR. Michael Smith

TO: MANUFACTURING SITES: Plantville Bldg 1  
SITE NEW PRODUCT ENG. MGR. PAUL WESSCH R.G. C. Leach - 13th 2/3/92  
SITE DOCUMENTATION MGR.: Michael Ross Harlan Mass 2/3/92  
LINE ENG. MGR. BOB DILARD  
PLANNING & SCHEDULING: Lois WESSCH

Transfered with 90 DAY WARRANTY



04-02-1972

28 HED/MSA AT/ROVAD/MSA  
 27 HED/MSA AT/ROVAD/MSA  
 26 HED/MSA AT/ROVAD/MSA  
 25 HED/MSA AT/ROVAD/MSA  
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 7 HED/MSA AT/ROVAD/MSA  
 6 HED/MSA AT/ROVAD/MSA  
 5 HED/MSA AT/ROVAD/MSA  
 4 HED/MSA AT/ROVAD/MSA  
 3 HED/MSA AT/ROVAD/MSA  
 2 HED/MSA AT/ROVAD/MSA  
 1 HED/MSA AT/ROVAD/MSA

# HARDWARE PRODUCT RELEASE (TOLLGATE 6) CHECKLIST

PRODUCT NAME: 2200 CS TURBO PROJECT NO.: 601 DATE: 1/29/92  
 PRODUCT MANAGER: MIKE RILEY  
 PRODUCT ENGINEER(S): CHARLIE FUNK

| #  | CONFIGURATION MGMT. ACTIVITY     | Y | N | N/A | COMMENTS                                                 |
|----|----------------------------------|---|---|-----|----------------------------------------------------------|
| 1  | FAMILY TREE COMPLETED            | ✓ |   |     | REV I                                                    |
| 2  | HARDWARE BOM'S AT I/S=2          | ✓ |   |     | DCO IN PROCESS                                           |
| 3  | SOFTWARE BOM'S AT I/S=2          | ✓ |   |     |                                                          |
| 4  | AUTO ENCLOSURE BOM'S AT I/S=2    | ✓ |   |     |                                                          |
| 5  | MODELS RELEASED                  | ✓ |   |     |                                                          |
| 6  | PRICING & LEAD TIMES RELEASED    | ✓ |   |     |                                                          |
| #  | ENGINEERING ACTIVITY             |   |   |     |                                                          |
| 1  | TEST & REPAIR PLAN COMPLETE      | ✓ |   |     |                                                          |
| 2  | TEST PROCEDURES RELEASED         | ✓ |   |     |                                                          |
| 3  | PROCESS SHEETS RELEASED          | ✓ |   |     |                                                          |
| 4  | PCB MFG REVIEW CHANGES INCORP.   | ✓ |   |     |                                                          |
| 5  | DESIGN REVIEW CHANGES INCORP.    | ✓ |   |     |                                                          |
| 6  | SITE TEST EQUIPMENT AVAILABLE    | ✓ |   |     | DELIVERED TO P.B. BY 2/7                                 |
| 7  | SITE TECH TRAINED                | ✓ |   |     |                                                          |
| 8  | ASS'Y FIXTURES AVAILABLE         | ✓ |   |     | DELIVERED TO P.B. BY 2/7                                 |
| 9  | SPS PROGRAMS/CABLES AVAILABLE    | ✓ |   |     |                                                          |
| 10 | SMT STENCILS AVAILABLE           |   |   | ✓   |                                                          |
| 11 | ATE FIXT/PROGRAM AVAILABLE       | ✓ |   |     | BACKPLANE TEST DUE 2/15 - ALL OTHER ATE DELIVERED BY 2/7 |
| 12 | CTE EQUIPMENT AVAILABLE          |   |   | ✓   |                                                          |
| 13 | EMULATION PROGRAM AVAILABLE      | ✓ |   |     |                                                          |
| 14 | PARTS ON QVL - SPECS AVAILABLE   | ✓ |   |     |                                                          |
| 15 | SOLDER FIXT/CARRIERS AVAILABLE   | ✓ |   |     |                                                          |
| 16 | MFG. DIAGNOSTICS RELEASED        |   | ✓ |     | IN PRE-RELEASE - DUE 2/15 295-8036-9                     |
| 17 | ALL SOFTWARE RELEASED            | ✓ |   |     | REV 1.1 IN PROCESS                                       |
| 18 | FIRMWARE RELEASED                | ✓ |   |     |                                                          |
| 19 | OEM'S APPROVED                   |   |   | ✓   |                                                          |
| 20 | OEM PRODUCT SPEC'S RELEASED      |   |   | ✓   |                                                          |
| 21 | TEMPEST VERIFICATION COMPLETED   |   |   | ✓   |                                                          |
| 22 | TEMPEST CRITICAL FEATURES COMPL. |   |   | ✓   |                                                          |
| 23 | FCC/VDE APPROVAL MEMO COMPLETE   | ✓ |   |     |                                                          |
| 24 | UL/CSA/IEC APPROVAL MEMO COMPL.  | ✓ |   |     |                                                          |
| 25 | ESD/EMS APPROVAL MEMO COMPLETE   | ✓ |   |     |                                                          |

12/20/77  
 11/11/77  
 11/11/77  
 11/11/77  
 11/11/77

12/20/77 11/11/77 11/11/77 11/11/77 11/11/77

# HARDWARE PRODUCT RELEASE (TOLLGATE 6) CHECKLIST

| #    | ENGINEERING ACTIVITY (CON'T)                                                                | Y | N | N/A | COMMENTS           |
|------|---------------------------------------------------------------------------------------------|---|---|-----|--------------------|
| 26   | RAD HAZ APPROVAL MEMO COMPLETE                                                              |   |   | ✓   |                    |
| 27   | PKG DATA ANNOUNCEMENT COMPLETE                                                              | ✓ |   |     |                    |
| 28   | ACCOUST APPROVAL MEMO COMPLETE                                                              |   |   | ✓   |                    |
| 29   | THERMAL APPROVAL MEMO COMPLETE                                                              |   | ✓ |     | DUE 2/3 - WEN SHUI |
| 30   | DRAWINGS RELEASED ON MICROFILM                                                              | ✓ |   |     |                    |
| 31   | VENDOR TOOLING APPROVED                                                                     |   |   | ✓   |                    |
| 32   | LABEL DWG'S RELEASED ON MICROFILM                                                           | ✓ |   |     |                    |
| 33   | ALPHA/BETA TEST RESULTS COMPLETE                                                            | ✓ |   |     |                    |
| 34   | PCB SCHEM/DRILL/ASS'Y DWG'S<br>RELEASED ON MICROFILM                                        | ✓ |   |     |                    |
| 35   | SITE ENG. REVIEW COMPLETE                                                                   | ✓ |   |     |                    |
| 36   | CUST SIMULATION TEST COMPLETE                                                               | ✓ |   |     |                    |
| 37   | PRODUCT CONFIG TESTS COMPLETE                                                               | ✓ |   |     |                    |
| 38   | LABOR STD'S COMPLETE                                                                        | ✓ |   |     |                    |
| 39   | PCB YIELD REPORTS COMPLETE                                                                  | ✓ |   |     |                    |
| 40   | WEIGHTS & MEASURES COMPLETE                                                                 | ✓ |   |     |                    |
| 41   | SAMPLE PCB AVAILABLE                                                                        | ✓ |   |     |                    |
| 42   | PRODUCT COST REVIEWED                                                                       | ✓ |   |     |                    |
| <br> |                                                                                             |   |   |     |                    |
| #    | PRODUCT PLANNING ACTIVITY                                                                   |   |   |     |                    |
| 1    | BUSINESS PLAN FINALIZED                                                                     | ✓ |   |     |                    |
| 2    | FIELD SUPPORT PLAN FINALIZED                                                                | ✓ |   |     |                    |
| 3    | CSO TRAINING PLAN FINALIZED                                                                 | ✓ |   |     |                    |
| 4    | SALES & MKTG PLAN FINALIZED                                                                 | ✓ |   |     |                    |
| 5    | SOURCING IDENTIFIED                                                                         | ✓ |   |     | PANTUCKET BLVD.    |
| 6    | SITE RECEIPT OF 2 WKS FINISHED<br>GOODS, 4 WKS INV., 13 WKS OPEN<br>PO'S, & THRU LEAD TIMES |   | ✓ |     | IN PROCESS         |
| 7    | FCS DATE IDENTIFIED                                                                         | ✓ |   |     | 9/15/91            |
| 8    | VOLUME SHIP DATE IDENTIFIED                                                                 | ✓ |   |     | 2/14/92            |
| 9    | TRANSFER DATE IDENTIFIED                                                                    | ✓ |   |     | 1/31/92            |
| 10   | SCHEDULE LOADED INTO SITE PSS                                                               |   | ✓ |     | IN PROCESS         |

ATTACH REASONS FOR INCOMPLETE ACTIVITIES AND SUBSEQUENT ACTION ITEMS:

Original photo  
\*\* JPC 11024 076 170-2211 Cbf



# 2200 TURBO 386 SYSTEMS

CS/386-400N  
157/177-3548  
212-9719  
CS/386-400N CPU W/8MBG  
210-9575A\*\*  
CS386 CPU TURBO  
377-4535(4)  
SIMM 1MBX CMOS DRAM

CS/386-300N  
157/177-3549  
212-9720  
CS/386-300N CPU W/8MBG  
210-9576A\*\*  
CS386 CPU TURBO  
377-4535(6)  
SIMM 1MBX CMOS DRAM

CS/386-1600N  
157/177-3550  
212-9721  
CS/386-1600N CPU W/16MBG  
210-9576A\*\*  
CS386 CPU TURBO  
377-4535(6)  
SIMM 4MBX CMOS DRAM

CS/386-3200N  
157/177-3551  
212-9722  
CS/386-3200N CPU W/32MBG  
210-9576A\*\*  
CS386 CPU TURBO  
377-4535(8)  
SIMM 4MBX CMOS DRAM

\*\* Includes the 210-9577 CPU daughter board

EXISTING ITEMS COMMON TO ALL MODELS  
# contains new mother board 210-9578

#2790873  
CABINET ASSY CS-DIN  
2900685  
SHPG PKG BOM: CS-D-2200-  
290068502  
SHPG PKG BOM, MFG  
4490702  
HANDLE CHASSIS  
4585026  
COVER, PANEL, REAR (WELD)  
6152029  
LABEL WARNING VOLTAGE SET  
6152265  
LBL DOCK MERGE ID 8X3  
6153872  
CORP SERIAL NO  
615-4282  
LABEL, MODEL NO.  
615-5051  
LABEL, CS/ND CONFIGURATION  
6303200  
SCR 6-32 5/8L PAN PHL SST  
6504120  
SCR 8-32 3/8L PAN PHL SEM  
6560145  
SHLD GSKT RECT .13 X .19

CS/TURBO-CK-XX  
COUNTRY KIT  
200-5265-XX  
XX= AE, AG, AS, AU, AZ,  
BF, CA, CF, DA, FI, FL, GE,  
HK, IC, IT, NL, NO, PO, SF,  
SG, SL, SP, SW, TU, UK,  
US, UV

- 291-1001  
A.E. BASIC-2/TURBO O.S.  
420-XXXX  
POWER CORD#

# Power cords used in the various country kits:  
420-1122 PWR CD U.K. 2.5M  
UK  
420-2026 PWR CD GEN EUR 2.5M  
AE  
420-2027 PWR CD GEN EUR 2.5M  
AU AZ BF FI FL GE IC IT NL NO PO SP SW  
420-2028 PWR CD AUSTRALIA 2.5M  
AS  
420-3033 PWR CD DENMARK 2.5M  
DA  
420-2034 PWR CD SWITZERLAND 2.5M  
SF SG SI  
420-2035 PWR CD UNIVERSAL 2.5M  
SL TU UV  
420-2040 PWR CD U.S. 8FT  
AG CA CF US  
420-2049 PWR CD U.K. 2.5M  
HK

## LEGEND

DASHED LEADER LINES REPRESENT  
CUSTOMER ORDERABLE ITEMS.  
SOLID LEADER LINES IDENTIFY  
PARENT/CHILD RELATIONSHIPS.  
SHADDED BOXES REPRESENT ITEMS TO BE  
PILOTTED.  
BREAK LINE BOXES REPRESENT  
UNRELEASED (ITEM STATUS 1) ITEMS.  
SOLID LINE BOXES REPRESENT RELEASED  
(ITEM STATUS 2) ITEMS.  
RADIUS CORNER BOXES REPRESENT  
CUSTOMER INSTALLABLE ITEMS.  
ITALICS IDENTIFY MANUFACTURING  
MIN/MAX INVENTORY ITEMS.  
\*\* IDENTIFY'S FIELD REPLACEMENT  
UNITS (FRLU).

PAGE 1

| NAME         | EXT   | REV DATE       | REV |
|--------------|-------|----------------|-----|
| CHARLES FUNK | 78349 | 12/20/91       | I   |
| TITLE        |       | 2200 TURBO 386 |     |

# 2200 TURBO 386

## MEMORY UPGRADES

### LEGEND

DASHED LEADER LINES REPRESENT CUSTOMER ORDERABLE ITEMS.

SOLID LEADER LINES IDENTIFY PARENT/CHILD RELATIONSHIPS.

SHADED BOXES REPRESENT ITEMS TO BE PILOTTED.

BREAK LINE BOXES REPRESENT UNRELEASED (ITEM STATUS 1) ITEMS.

SOLID LINE BOXES REPRESENT RELEASED (ITEM STATUS 2) ITEMS.

RADIUS CORNER BOXES REPRESENT CUSTOMER INSTALLABLE ITEMS.

ITALICS IDENTIFY MANUFACTURING MIN/MAX INVENTORY ITEMS.

\* - IDENTIFY'S FIELD REPLACABLE UNITS (FRU's).

205/206-6069  
UJ-6069 4MB TO 32MB MEM

205/206-6071  
UJ-6071 8MB TO 32MB MEM

205/206-6067  
UJ-6067 4MB TO 8MB MEM

205/206-6059  
UJ-6059 4MB TO 8MB MEM

205/206-6060  
UJ-6060 4MB TO 16MB MEM

290-0828  
SHPG PKG BOM:IC PKG-MINI-  
377-4533 (4)  
SIMM 1MX9 CMOS DRAM  
615-2265  
LBL DOCK MERGE ID 8X3  
698-0082  
LABEL, CONTENTS

290-0828  
SHPG PKG BOM:IC PKG-MINI-  
377-4535 (8)  
SIMM 4MX9 CMOS DRAM  
615-2265  
LBL DOCK MERGE ID 8X3  
698-0082  
LABEL, CONTENTS

205/206-6068  
UJ-6068 4MB TO 16MB MEM

205/206-6070  
UJ-6070 8MB TO 16MB MEM

205/206-6072  
UJ-6072 16MB TO 32MB

290-0828  
SHPG PKG BOM:IC PKG-MINI-  
377-4535 (4)  
SIMM 4MX9 CMOS DRAM  
615-2265  
LBL DOCK MERGE ID 8X3  
698-0082  
LABEL, CONTENTS

PAGE 2

NAME CHARLES FUNK EXT 78349 REV DATE 12/20/91

TITLE 2200 TURBO 386 REV I

# 2200 TURBO 386 SYSTEM UPGRADES

## 200-6006 MICROVP-TURBO TURBO UPG FOR MICROVP SYSTEM

- 210-9583  
 CS TURBO I/O MOTHER BD  
 - 212-9719  
 CS/386-400N CPU W/4MEG  
 - 290-0892  
 SHPG PKG BOM:UPGRADE-2200  
 - 451-2781  
 RAIL, TOP & BOTTOM  
 - 451-2782  
 RAIL, MOUNTING  
 - 452-0830  
 PLATE, SHIELD  
 - 455-0290  
 BRACKET, SIDE  
 - 615-2265  
 LBL DOCK MERGE ID 8X3  
 - 615-5051  
 LABEL, CS/ND CONFIGURATION  
 - 698-0082  
 LABEL, CONTENTS

## 200-6009 CS-TURBO TURBO UPGRADE FOR CS SYSTEM

- 210-9583  
 CS TURBO I/O MOTHER BD  
 - 212-9719  
 CS/386-400N CPU W/4MEG  
 - 290-0892  
 SHPG PKG BOM:UPGRADE-2200  
 - 451-2782  
 RAIL, MOUNTING  
 - 452-0830  
 PLATE, SHIELD  
 - 458-5194  
 COVER, PANEL, REAR  
 - 615-2265  
 LBL DOCK MERGE ID 8X3  
 - 615-5051  
 LABEL, CS/ND CONFIGURATION  
 - 698-0082  
 LABEL, CONTENTS

## 200-6007 CS-D-TURBO TURBO UPGRADE FOR CS-D SYSTEM

- 210-9578  
 CS386 II MOTHER BOARD  
 - 212-9719  
 CS/386-400N CPU W/4MEG  
 - 290-0892  
 SHPG PKG BOM:UPGRADE-2200  
 - 458-5026  
 COVER, PANEL, REAR (WELD)  
 - 615-2265  
 LBL DOCK MERGE ID 8X3  
 - 615-5051  
 LABEL, CS/ND CONFIGURATION  
 - 698-0082  
 LABEL, CONTENTS

## 200-6008 CS-N-TURBO TURBO UPGRADE FOR CS-N SYSTEM

- 210-9578  
 CS386 II MOTHER BOARD  
 - 212-9719  
 CS/386-400N CPU W/4MEG  
 - 290-0892  
 SHPG PKG BOM:UPGRADE-2200  
 - 458-5026  
 COVER, PANEL, REAR (WELD)  
 - 615-2265  
 LBL DOCK MERGE ID 8X3  
 - 615-5051  
 LABEL, CS/ND CONFIGURATION  
 - 698-0082  
 LABEL, CONTENTS

### LEGEND

DASHED LEADER LINES REPRESENT  
CUSTOMER ORDERABLE ITEMS.

SOLID LEADER LINES IDENTIFY  
PARENT/CHILD RELATIONSHIPS.

SHADED BOXES REPRESENT ITEMS TO BE  
PILOTTED.

BREAK LINE BOXES REPRESENT  
UNRELEASED (ITEM STATUS 1) ITEMS.

SOLID LINE BOXES REPRESENT RELEASED  
(ITEM STATUS 2) ITEMS.

RADIUS CORNER BOXES REPRESENT  
CUSTOMER INSTALLABLE ITEMS.

ITALICS IDENTIFY MANUFACTURING  
MIN/MAX INVENTORY ITEMS.

\* \* \* IDENTIFY'S FIELD REPLACEABLE  
UNITS (FRU).

PAGE 3

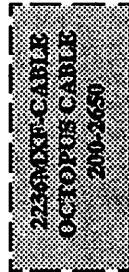
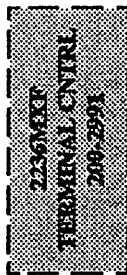
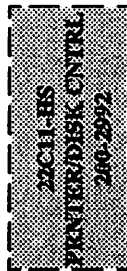
NAME CHARLES FUNK EXT 78349  
REV DATE 12/20/91

TITLE 2200 TURBO 386  
REV I



# 2200 TURBO 386

## BOARD OPTIONS



### LEGEND

DASHED LEADER LINES REPRESENT CUSTOMER ORDERABLE ITEMS.  
SOLID LEADER LINES IDENTIFY PARENT/CHILD RELATIONSHIPS.  
SHADED BOXES REPRESENT ITEMS TO BE PILOTTED.  
BREAK LINE BOXES REPRESENT UNRELEASED (ITEM STATUS 1) ITEMS.  
SOLID LINE BOXES REPRESENT RELEASED (ITEM STATUS 2) ITEMS.  
RADIUS CORNER BOXES REPRESENT CUSTOMER INSTALLABLE ITEMS.  
ITALICS IDENTIFY MANUFACTURING MIN/MAX INVENTORY ITEMS.  
" \* " IDENTIFY FIELD REPLACABLE UNITS (FRU).

PAGE 4

| NAME         | EXT            | REV DATE | REV |
|--------------|----------------|----------|-----|
| CHARLES FUNK | 78349          | 12/20/91 | I   |
| TITLE        | 2200 TURBO 386 |          |     |

069-610  
~~014-130~~ m/s  
Mike — 04408

TO: MIKE BAHIA

FROM: DIANE D. HALLIGAN

SUBJECT: WORDS II QUERY/REPORT INSTRUCTIONS

DATE: MAY 13, 1992

---

The names of your Queries/Reports are TURBOBK, TURBOSHP & TURBOBL.

Select PF Key for WORDSII.

To Edit/Validate Queries:

PF 3 Adhoc Query

PF 3 Edit Query

A.Type in the name of the Query to be edited: TURBOBK (ENTER).

PF12 Manage Questions

Shift PF 4 Return to the First Question

PF16 Return

Position cursor on the SUMMARY Table. Tab to WS-ORDER-BOOKED field.

PF 3 Go right to fully display WS-ORDER-BOOKED field.

Enter Date parameters in a YMMDD:YMMDD format on both lines.

Shift PF10 Replace Query (ENTER).

Shift PF16 End Query

PF 5 Validate Query

Type in the Query name to be validated: TURBOBK (ENTER).

PF 3 Edit Query

B.Select next Query to be edited: TURBOSHP (ENTER).

PF12 Manage Questions

Shift PF 4 Return to the First Question

PF16 Return

Position cursor on the SHIPMENTS Table. Tab to SH-ACT-SHIP-DATE field. Enter Date parameters in a YMMDD:YMMDD format on both lines.

Shift PF10 Replace Query (ENTER).

Shift PF16 End Query

PF 5 Validate Query

Type in the Query name to be validated: TURBOSHP (ENTER).

Please note that there are no date parameters required of TURBOBL.

To Run Reports:

Select PF Key for Report Generator.

Type in the name of the report to be run: TURBOBK (ENTER) (ENTER).

Report has been submitted for background execution.

PF16 Twice to select next report to be run : TURBOSHP (ENTER) (ENTER).

Report has been submitted for background execution.

PF16 Twice to select final report to be run : TURBOBL (ENTER) (ENTER).

Report has been submitted for background execution.

Print Management:

Sometime later on, Print files will appear in your Print Management indicating the reports have finished. To verify, select PF Key for Print Management.

PF 5 Display record files

Once you see that that they have completed, exit out and use Wang

Office to send these file names as DP files in library #MEBPRT, on volume W0023A to yourself on your Host system.

ARTS - CLASS ROSTER

CLASS: HWI310CS386 91001 CS/386 TURBO SEMINAR  
CLASS MAX: 16 ENROLLED TO DATE: 17 AVAILABLE: 1- SIT INS: 0 ATTND: 17  
START DATE: 21MAY91 TUESDAY END DATE: 24MAY91 FRIDAY  
ENROLLMENT DEADLINE: 10MAY91 HOUSED AT: HADLEY/WESTFORD APTS, LOWELL M  
LOCATION: INTERSTATE II, 2 EXECUTIVE DR.CHELMSFORD  
PREREQ HWI3002200 TITLE:  
COURSES: LAST CLASS: 0 MOS.  
INSTRUCTORS: J, WENTWORTH

9/20/91

| NAME                     | STUDENT<br>I D#          | AR<br>CD | RPT<br>RDB | S SPEC<br>T NOTES | H T<br>S P | APT F<br>CDE L | TITL | S S<br>M X     |
|--------------------------|--------------------------|----------|------------|-------------------|------------|----------------|------|----------------|
| ✓ PINCEK                 | RALPH 23023              | CE       | 3314       | E                 | * Y Y      | N              | ATS  | N              |
| ✓ CHEATHAM               | STEVE 04006              | CE       | 3605       | E                 | * Y Y      | N              | ATS  | N              |
| GRIFFIN                  | BARRY 23044              | CE       | 3681       | E                 | Y Y        | N              | ACE  | N CHICAGO      |
| RETTIG                   | MICHAEL 06225            | FC       | 3410       | E                 | Y Y        | N              | DTS  | N BETHESDA, MD |
| TAYLOR ✓ 11/0            | TIMOTHY 23526            | FC       | 3414       | E                 | Y Y        | N              | CE   | N              |
| ✓ AMINI w/b 1.03 12/1/91 | DAVID 202-582-2663 12959 | FC       | 3470       | E                 | Y Y        | N              | ATS  | N              |
| ✓ FORBES                 | JOHN 03549               | EA       | 3120       | E                 | N N        | N              | SSS  | N              |
| ✓ WEIR                   | BRIAN 20038              | EA       | 3125       | E                 | N N        | N              | SCE  |                |
| ✓ WONG                   | THIK-FONG 01695          | EA       | 3235       | E                 | Y Y        | N              | ATS  | N              |
| ✓ KELCH                  | DIETER 03768             | EA       | 3245       | E                 | Y Y        | N              | ATS  |                |
| ✓ RATKA                  | EDWARD 37172             | EA       | 3425       | E                 | Y Y        | N              | CE   | N              |
| ✓ SCHUSTER               | STEVEN 06298             | WS       | 3561       | E                 | Y Y        | N              | SCE  | DENVER         |
| ✓ LIAO NEW DEC 1.03      | DAVID 213-968-2959 42860 | WS       | 3862       | F                 | Y Y        | N              | ATS  | N CAL          |
| ✓ STIEGER NEW NOV        | PAUL 04537               | WS       | 3895       | E                 | Y Y        | N              | ATS  | N              |
| DAMIANO                  | ALEX 80628               | CA       | 3727       | E                 | Y Y        | N              | CE   | N              |
| ✓ DUCLOS NEW AUG         | WAYNE 81818              | CA       | 3896       | E                 | * Y Y      | N              | CE   | N              |
| ✓ HAMER                  | ERNIE SEL00001           | VN       | VEND       | E                 | N N        | N              |      | N              |

SPEC. NOTES: STATUS CODES:  
P = PARTIAL ENROLLMENT A = ALTERNATE  
V = VERBAL WAIVER D = DISMISSED  
W = WRITTEN WAIVER IN FILE E = ENROLLED  
N = NO SHOW  
S = SIT IN  
W = WITHDRAWN

|         |         |       |    |      |   |     |   |     |   |
|---------|---------|-------|----|------|---|-----|---|-----|---|
| ELFRANK | JOHN    | 11112 | CE | 3541 | W | Y Y | N | SCE | N |
| RYE     | ANTHONY | 14597 | WS | 3561 | W | Y Y | N | SCE | N |

STUDENT ID  
04006 COMMENTS: CHARGES/SKILLS RDB# 3670  
23023 COMMENTS: CHARGES/SKILLS RDB# 3310  
81818 COMMENTS: 3195

PAGE 315-433-6392  
JOHN SNOW, UPSTATE NY 1.03 12/1/91  
JERRY STEPHENSON, FT WAYNE, IN 1.03 12/1/91  
✓ ROBERT RAINES, RICHMOND, VA  
JOE DIAZ, NYC CE  
PAGE 212-461-9244  
✓ CHRIS WATSON, SYOSSET, NY  
JIM SWENTIK, BROOKFIELD, WI  
✓ MARTY SCHARR, GRAND RAPIDS, MI  
✓ RICK GUNDORF, BATON ROUGE  
GLEN HEBERT, TOM, BATON ROUGE  
BOB KUPESKY, Bm, RICHMOND  
LES KISH, TOM, NYC 1.03 12/1/91  
FRANK LOCURDO, LONG ISLAND  
JACK TOKARCZYK  
✓ WILLIAM GODSEY, KINGSPRAT, TN  
✓ TORBJORN SAGNER, SWEDEN  
✓ JOHN MAETENS, BELGIUM

## Location d'autos et camions Budget du Québec

680, Michel Jamin

Dorval, Québec H7P 1C5

Tel (514) 636-0743 • Fax (514) 636-9505

**SEARS**Location de voitures  
et camions

*Multi-Character \$GIO (A000)*  
*Output*

-4730 \$GIO(4007)

: GOTO 4720

4760 Q=POS(STR(Q\$,1,3)=Q\$)

: IF Q=1 THEN 4770

: IF Q=2 OR Q=3 THEN GOSUB '143(Q)

: \$GIO(4007)

: RETURN

4860 DEFFN'145

: IF S\$(19)()="M" THEN RETURN

: Q\$=""

: Q\$=HEX(00 01)

: Q\$=HEX(00 01)

: STR(Q\$,3)=STR(Q\$,1)

: \$GIO#15, (HEX(12 12 A0 00), Q\$) Q\$()

: FOR Q=1 TO 2000

: NEXT Q

: Q=0

-4870 Q\$=HEX(00 FF)

→ : \$GIO#15, (HEX(10 10 E0 07 12 12 40 00 D0 07 20 20 D0 08 08 10 20 20), Q\$) ←

: IF STR(Q\$,8,1)()=HEX(00) THEN 4880

: GOSUB 4910

: GOSUB '144

: RETURN

-4900 GOSUB '171

: IF W=WITHEN RETURN

: GOSUB '70(HEX(00))

: IF Q\$=HEX(96) THEN GOSUB '143(1)

: \$GIO(4007)

: GOTO 4900

4920 DEFFN'146(Q)

: PRINT HEX(02 1D 41 40);

: FOR Q0=1 TO Q-3

: \$GIO#15, (40404040)

: NEXT Q0

: \$GIO#15, (4043404040414040401E400E) ←

: RETURN

7010 DEFFN'70(Q\$)

*Single Character Output.*  
*The 25 space is for the*  
*Hex Value of the Character*  
*to Output.*

→ *Return Value from This \$GIO*

*I Think This Checks*  
*Output Device Status.*

10. .18 & .20 VICTOR, WOLLASTON - SOMETIMES SYSTEM FAILS TO REFILL SCREEN ON RETURN AFTER LISTS. KEY RETURN AGAIN & 2 SCREENS GO BY.
11. LAB - SEVERE PERFORMANCE DEGRADATION WHEN VERIFYING A FLOPPY & RAM DISK A SECTOR AT A TIME? OLD I/O?
12. BAXI - .02? COMMUNICATION BUG REPORTED BY WANG OFFICE USING MXF.  
GAVE TO MR 11/11/91.
13. SCREWS TOO SHORT ON OCTOPUS 36 PIN CABLE.  
SCREWS  $\frac{1}{16}$  -  $\frac{1}{8}$  TOO SHORT ON RS232 END
14. DATA 3500 WP DOESN'T WORK GIOs
15. CDISCONNECT DOESN'T WORK / CANADA
16. PROB w/ SELECT H ON w/ 1.00. HANGS SYSTEM IF KEY RESET & SYS CANT CLEAR PLATTER HDG IN 5 SEC.
17. 386 DOES NOT RECOGNIZE SCRATCH BY TURBO. UNABLE TO DUPE CANADA
18. PROB w/ DATA/TIME IN BACKGROUND, SOMETIMES RETURNS GARBAGE. CANADA
19. I94 ON 386 w/ 1.03 IN TURBO WOLLASTON
20. 1.03 BROWING 7715 BROS RADEL

# TURBO BUGS

1. .20 + .21 WOLLASTON ALLOYS - PRINT JOBS MERGED BETWEEN 2 JOBS OR JOB PRINTS TWICE. OK ON .18.
2. PC/2200 .18 + .20 WOLLASTON ALLOYS, RADER INC. - FILE XFER BETWEEN PC & 2200 DOES NOT WORK. FIXED W/ .21?
3. PROBLEM PRINTING WITH OLD CONTROLLERS ON .18. FIXED W/ .20 OR .21? WOLLASTON HANGS
4. SELECT H ?
5. .20 RADER - PRINT USING BUG
6. .18 WOLLASTON - DS UTILITIES - HANGS ON BACKUP, DISK TO TAPE. FIXED WITH .20 OR .21?
7. .18 + .20 VICTOR - KEYING RECALL WHILE DOING A RECALL/EDIT CAN CAUSE EDIT PROBLEM, ESPECIALLY IF ON LAST CHAR.
8. MAX ARRAY SIZE ? LAB
9. WOLLASTON - POWER UP PROBLEM - SELF-TEST LED ON MXF WON'T GO OUT

Intended For: DUNCAN CHOU

This Item is In Progress

Author: Mike Riley

Subject: Big PROBLEM

-----  
Duncan

The PAL change we did to the 9579 has couse a CPU power up problem...  
Take two 22C11HS that has both PAL changes on them (L19 on both are Rev.2)  
Set one controller to 310 and the other to 320...  
Have a MXF in that its 9579 board has been updated for terminal 1  
A TURBO CPU with Rev. 1 PROMs...  
Power up the system... On my system when 310 and 320 22C11HS are on the CPU  
will NOT start Power Up !!!! CPU will Power Up if 310 or 320 or 330 by them  
self or 310 and 330 or 320 and 330 are together....  
We can NOT change the PALs again !!!! IF We must make a change, then it has to  
be on the CPU PROMs....

The \$OPEN problem turned out to be a 22C11HS Printer Buffer problem !!!!

10 SELECT #2/215

20 SELECT PRINT215(132)

30 \$OPEN #2

35 FOR B=1 TO 10

36 PRINT"

Pages";B

40 FOR A=1 TO 10

50 PRINT"ABCD...&lt; 132 CHARACTERS &gt;...ABC"

60 PRINT:PRINT:PRINT :PRINT"

Lines ";A

70 NEXT A

75 PRINT HEX(0C)

80 NEXT B

90 \$CLOSE#2

Run this on two terminals several times... look at printout to verify that  
the printer buffer is not re printting what is all ready printed once...  
You may want to change line 50 characters to tell what terminal is printting...

Michael Riley

USE @FAST-HS and 1.0 TURBO O.S.  
Rev C.18 Works OK.

ALSO 1.12 in Canada is working!!! When can  
you send me a clean copy of 1.2 for  
the CS 386 ??

TO: DUNCAN CHOU  
FROM: Michael Riley  
DATE: 11/18/91



2011-11-11 11:11:11  
 2011-11-11 11:11:11  
 2011-11-11 11:11:11

WORKSTATION 236 - USER MEB - Michael Bahia X60256

9:28:49 am Monday November 11, 1991

```

**** 1 2 3 4 5 6 7 8 ****
**** 123456789012345678901234567890123456789012345678901234567890 ****

* *
* 1* View Package Monday 11/11/91 09:28 am * 1*
* 2* * 2*
* 3* CC: Michael Bahia From: Michael Bahia * 3*
* 4* Subject: CS/386 Turbo Training Date: 10/10/91 * 4*
* 5* * 5*
* 6* Title Content * 6*
* 7* _____ _____ * 7*
* 8* - CS/386 Turbo Training Memo * 8*
* 9* - CS/386 Turbo Pricing Memo * 9*
10 - CS/386 Turbo Pricing WP Document *10*
* 1* - Maintenance Plan for the WP Plus Document * 1*
* 2* - CS/386-400 - 3200 B. Plan WP Document * 2*
* 3* - CS/386 Turbo Training Memo * 3*
* 4* * 4*
* 5* * 5*

```

WORKSTATION 236 - USER MEB - Michael Bahia X60256

9:29:08 am Monday November 11, 1991

```

**** 1 2 3 4 5 6 7 8 ****
**** 123456789012345678901234567890123456789012345678901234567890 ****

* *
* 1* Electronic Mail - View Recipients Monday 11/11/91 09:29 am * 1*
* 2* * 2*
* 3* * 3*
* 4* * 4*
* 5* * 5*
* 6* Recipients Recipients * 6*
* 7* _____ _____ * 7*
* 8* Dale C. Johnson Jim Wentworth * 8*
* 9* cc William Hsien cc Eugene Schulz * 9*
10 cc Ajibola A. Osinubi cc Michael Bahia *10*
* 1* cc Mike Riley cc Mike Runge * 1*
* 2* cc Kirit Baxi * 2*
* 3* * 3*
* 4* * 4*
* 5* * 5*
* 6* * 6*
* 7* * 7*
* 8* * 8*
* 9* * 9*
20 _____ (-End-) *20*
* 1* (13) Instructions * 1*
* 2* * 2*
* 3* * 3*
* 4* (16) Exit * 4*
* 5* * 5*

```

```

**** 1 2 3 4 5 6 7 8 ****
**** 123456789012345678901234567890123456789012345678901234567890 ****

```

Package Subject: CS/386 Turbo Training

Item Title: CS/386 Turbo Training

Jim, Attached is the pricing proposal, the maintenance plan, and the original business plan for the CS/386 Turbo. At this time expectations are the Turbo will start shipping in September. From feedback from our customers and VARs the sales estimates in these documents are on the conservative side. Originally when we talked back in April you indicated we may be able to get a video done but as of this time nothing has been started. In the short term our group could hold some additional seminars, but in the long term a plan needs to be formalized. We may be able to do a train-the-trainer program, but I am not sure with the dismantling of the Districts in the field if this can be carried through. What is important is providing trained personnel to our customers who can support the product and strengthen our relationship to insure future business. If there is anything my group can do or any criteria to be met to solidify a commitment from Training please let me know.

Regards,  
Mike

VS OFFICE      Monday      11/11/91      09:29 am      Page: 1  
CC: Michael Bahia      MS014-A3A/LOWELL  
From: Michael Bahia      Security: General  
Subject: CS/386 Turbo Training      Date Received: 10/10/91

Recipients:

Dale C. Johnson  
CC: William Hsien  
CC: Ajibola A. Osinubi  
CC: Michael Bahia  
CC: Mike Runge  
CC: Kirit Baxi

VS OFFICE      Monday      11/11/91      09:30 am      Page: 1  
To: Michael Bahia      MS014-A3A/LOWELL  
From: Jim Wentworth      Security: Limited  
Subject: CS/386 Turbo Training      Date Received: 10/11/91

Mike,

Thanks for sending over the package of information on the 2200 Turbo. The Corporation no longer has in house video capabilities. Outside sourcing of video would cost between 12 and 17 thousand dollars. In addition, current resources cannot be committed to this project. The train the trainer approach may be the best option. If you would like to proceed with this option, please contact Dave Daly for logistic support in setting up this class.

Regards,

Jim Wentworth

Package Subject: CS/386 Turbo Training

Item Title: Turbo Training

Dale, Apparently we will not be getting any support from Training. Can the field support a 'train the trainer' program. It cannot be stressed enough how important it is to improve our 2200 support. We have lost many of our 2200 maintenance contracts to 3rd Party because we cost more and often know less. With this new product we have an excellent chance to recapture these customers, but if the support is not there, they will leave again in a year or 2 when the Turbo boards become available to these 3rd party groups. Please get back to me on whether this is an acceptable and plausible alternative now that the districts have been dissolved. Hardware will also be needed to support these classes of which R&D has very limited resources. What alternatives are available to the field to obtain the needed hardware. If there are any questions please do not hesitate to call.

Regards,  
Mike Bahia  
2200/Basic-2 Support  
60256/60105

----- Next Memo -----  
Item Title: CS/386 Turbo Training  
Mike,

Thanks for sending over the package of information on the 2200 Turbo. The Corporation no longer has in house video capabilities. Outside sourcing of video would cost between 12 and 17 thousand dollars. In addition, current resources cannot be committed to this project. The train the trainer approach may be the best option. If you would like to proceed with this option, please contact Dave Daly for logistic support in setting up this class.

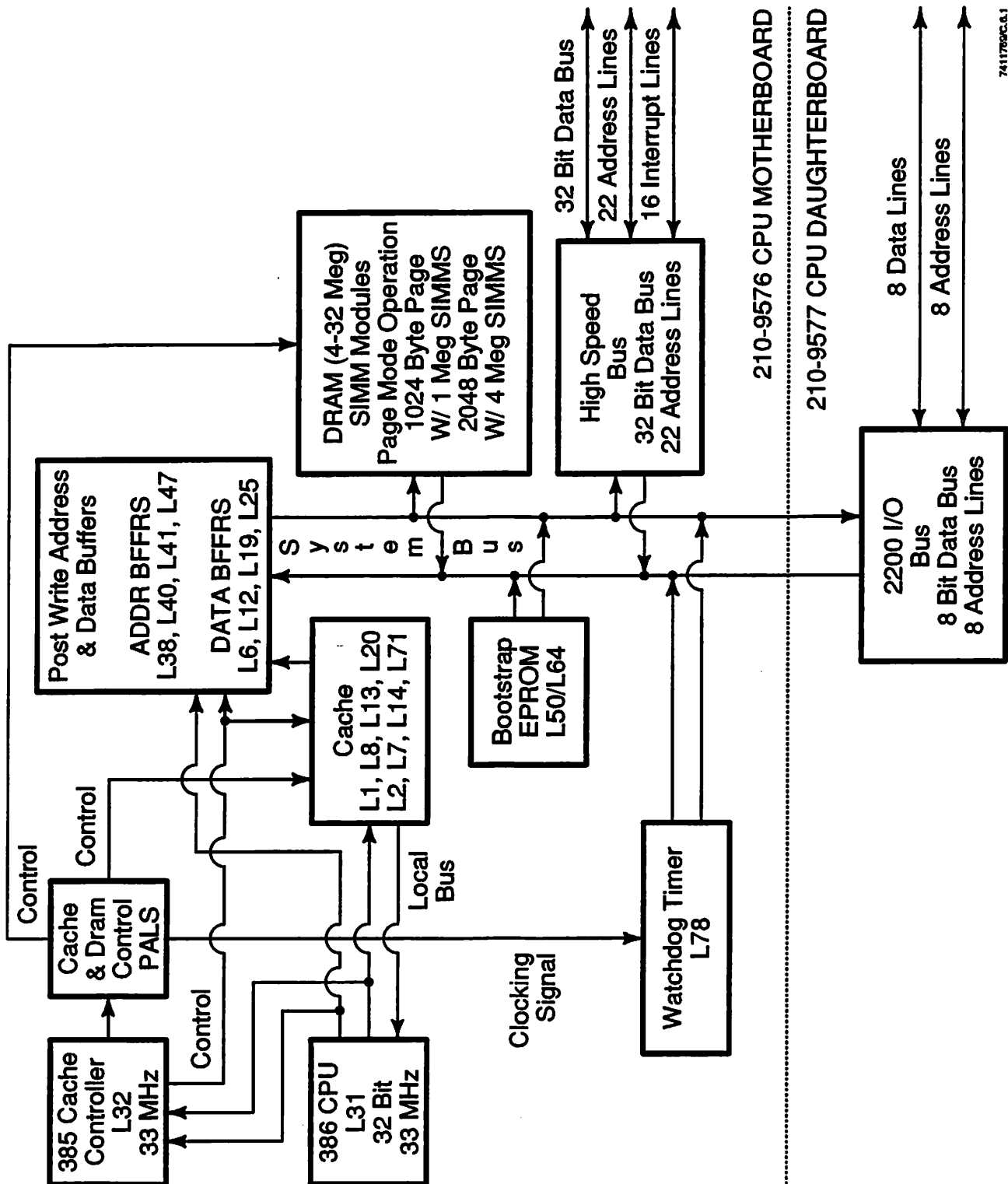
Regards,

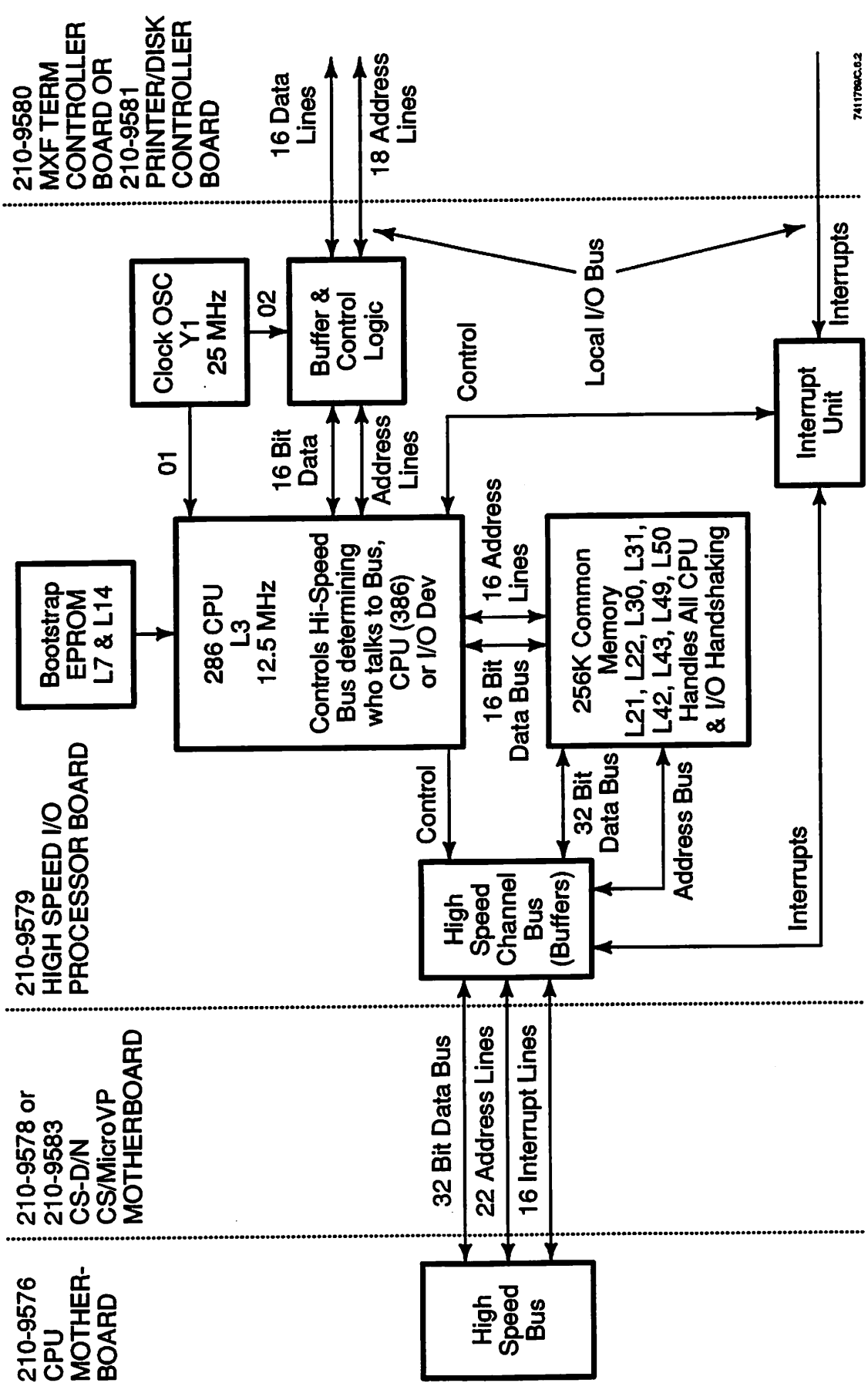
VS OFFICE      Monday      11/11/91      09:31 am      Page: 1  
From: Jim Wentworth  
Subject: CS/386 Turbo Training

CC: Michael Bahia      MS014-A3A/LOWELL  
From: Michael Bahia      Security: General  
Subject: CS/386 Turbo Training      Date Received: 10/14/91

Recipients:

Dale C. Johnson  
CC: Eugene Schulz  
CC: Michael Bahia  
CC: Mike Runge  
CC: Ajibola A. Osinubi  
CC: William Hsien  
CC: Mike Riley  
CC: Kirit Baxi







by Tyler B. Olsen

**T**he Wang Data Storage cabinet (DS or CS-D) will soon have some new features. These features will be useful whether you are running a DS cabinet with a CS, CS-D, MicroVP or Wang 2200-MVP.

New DS-DPU PROM microcode and related DS utilities will provide enhancements that include the ability to configure platters of varying sizes and have improved tape utilities.

*With CS/386 Operating System Release 2, three byte addressing will be added, allowing the ability to address surfaces and files greater than 65,024 sectors.*

#### Improved Tape Utilities

There have been significant changes made to three of the DS cabinet Utilities: DS Configuration, Backup Disk Platters to Tape Cassette and Restore Disk Platters from Tape Cassette.

Within all three utilities, a display is shown of the tape drive type (45 or 150 MB) and the cassette type and status mounted. Progress displays have been added to the backup and restore utilities.

Performance within the tape backup and restore utilities has been improved. Backup from a disk surface external to the DS cabinet has been speeded up by reading 32 sectors at a time from the disk before writing to the tape buffers.

Similar concepts were incorporated into tape restore. Surface transfers within the DS cabinet are handled in 128 blocks, i.e., 256 sector chunks.

The restore utility now provides a rapid display of the index data written on a cassette before tape retensioning. Within a single prompt sequence several surfaces can be called for restoration; restoration of all surfaces specified for restoration occurs on a single tape pass.

# Wang DS Cabinet Enhancements

#### Reorganization of Platters

Until DPU PROM Release 4, DS Winchester drives have always been configured in a rigid way. A 64 MB drive was 4 surfaces of 16 MB; a 32 MB drive was 2 surfaces of 16 MB; a 20 MB drive was two surfaces of 10 MB; a 140 MB drive was 14 10 MB surfaces and a 112 MB has been 7 surfaces of 16 MB.

With Release 4 the disk address orientation will become vertical, addressed in a cylinder format. The first track; first cylinder will contain parameters for the entire drive. A single addressed surface will occupy sequentially all the sectors in a track under a read head and then jump within the same vertical cylinder to the next read head.

With this implementation there should be less mechanical movement of the read heads within a specified surface address. A "DS Configuration" utility can be run where a system administrator will be able to reconfigure the Winchester drives into varying platter sizes based on his systems needs. Using "Default" values you can reconfigure to the original disk surface sizes and surface designations.

#### DS Configuration Utility

The DS Configuration utility has been enhanced with a capability to "Setup DS Surface Assignments". This menu will allow you to configure or reconfigure the Winchester surfaces within a DS or CS-D cabinet to new surface assignments and sizes. Now, a single Winchester drive can be reconfigured to be a single large surface or subdivided into as many as fourteen surfaces. Access to a sector address greater than 65,024 on a single surface will require the CS/386 operating system Release 2 and access via a new index type.

To illustrate how you can take advantage of this feature, we will use a typical system like a CS/386, CS or MicroVP using a DS Cabinet with a 1.2 MB diskette, a 150 MB tape streamer for backup; two 64 MB drives and a one 20 MB hard disk drive.

The following table shows how those three hard drives had to be configured before, along with a sample of just one of the many possible ways you can now configure those same three Winchester hard disk drives.

With DPU PROM Release 4, instead of just 10 surfaces only using configurations of 65,024 or 38,912 sectors, our example has reconfigured the same three drives to use 22 surfaces varying in size from 1,280 sectors to 100,000 sectors.

| Typical Hard Disk<br>Previous DPU PROM | Typical Hard Disk<br>Release 4 DPU PROM |
|----------------------------------------|-----------------------------------------|
| — 1st 64 MB Disk —                     | — 1st 64 MB Disk —                      |
| D21 - 65,024 sectors                   | D21 - 38,912 sectors                    |
| D22 - 65,024 sectors                   | D22 - 4,160 sectors                     |
| D23 - 65,024 sectors                   | D23 - 4,160 sectors                     |
| D24 - 65,024 sectors                   | D24 - 65,024 sectors                    |
|                                        | D25 - 65,024 sectors                    |
|                                        | D26 - 12,000 sectors                    |
|                                        | D27 - 12,000 sectors                    |
|                                        | D28 - 12,000 sectors                    |
|                                        | D29 - 12,000 sectors                    |
|                                        | D2A - 12,000 sectors                    |
|                                        | D2B - 22,816 sectors                    |
| - 2nd 64 MB Disk —                     | - 2nd 64 MB Disk —                      |
| D25 - 65,024 sectors                   | D61 - 100,000 sectors                   |
| D26 - 65,024 sectors                   | D62 - 38,912 sectors                    |
| D27 - 65,024 sectors                   | D63 - 38,912 sectors                    |
| D28 - 65,024 sectors                   | D64 - 38,912 sectors                    |
|                                        | D65 - 38,912 sectors                    |
|                                        | D66 - 4,448 sectors                     |
| — 20 MB Disk —                         | — 20 MB Disk —                          |
| D61 - 38,912 sectors                   | D67 - 62,912 sectors                    |
| D62 - 38,912 sectors                   | D68 - 1,280 sectors                     |
|                                        | D69 - 1,280 sectors                     |
|                                        | D6A - 8,000 sectors                     |
|                                        | D6B - 4,352 sectors                     |

#### Conclusion

With the new DPU PROM level 4, the user has the ability to size disk surface requirements to his own needs isolating selected software and data files to unique surfaces. The rev 4 DPU PROM, DS Utilities Release 3, and the CS/386 Release 2.0 should be available by June 30, 1991. In my next article I will discuss the implementation of 3 byte addressing. B2R

*Tyler B. Olsen is a principal software engineer for the Wang Laboratories CS/2200 Product Group. Tyler can be reached at m/s: 014-890, One Industrial Ave, Lowell, MA 01851 (508) 967-0339.*

WANG LAG & SON  
731 McCloud Rd  
Greenville, NC 27409  
Attn: George Smith

## MAJOR FUNCTIONS

### 210-9576A/B/C/D TURBO CPU Board

#### 9576 Motherboard:

- Intel 80386 33 Meg Hz Microprocessor
- Intel 82385 33 Meg Hz Cache Controller
- 64 KB 2 way Cache RAM
- 4, 8, 16, or 32 Meg Data Memory
- 32 Bit High Speed Bus to interface with new Turbo Controllers
- Bootstrap Proms for initial boot of CPU and for Power-Up Diags
- 66.67 MHZ Oscillator which generates all necessary clocks for CPU

#### 9577 Daughterboard.

- interfaces with standard 8 bit 2200 I/O Bus
- Real-Time Clock chip with built-in Battery

### 212-9717 MXF 16 Port Terminal Controller

#### 210-9579 High Speed I/O Processor Board

- 80286 12.5 Meg Hz Microprocessor
- controls all communication between CPU and Devices on High Speed Bus
- controls all communication with Devices on the High Speed Bus independently from the CPU Board
- controls and acknowledges interrupts from both the CPU and all devices connected to the Controller
- 256K Common Memory
- Bootstrap Proms for built-in testing & device specific coding
- 32 Bit High Speed Data Bus for communicating with CPU
- 16 Bit Data Bus for communicating with Peripheral Controller Board
- 25 MHz Clock providing timing for controller

#### 210-9580 Terminal Controller Board

- Compatible with all existing 2200 Terminals supported by the MVP/LVP and all newer 2200 systems
- interfaces with all attached terminals
- contains Baud Rate Switches
- communicates with I/O Processor Board via 16 Bit Data Bus

### 212-9718 22C11-HS High Speed Printer/Disk Controller

#### 210-9579 High Speed I/O Processor Board

- same as 210-9579 for the MXF Board above

#### 210-9581 Peripheral Controller Board

- uses standard 2200 Centronics Interface supporting all existing 2200 printers
- uses standard 2200 Disk Interface which supports the DS and the 2275
- contains Mux Port for connection to 2275MUX Board or MUX Extender
- communicates with I/O Processor Board via 16 Bit Data Bus



## NEW COMMANDS

DATASAVE AC  
DATALOAD AC

USED TO OPEN A DOS DATA FILE

WORKS IN 512 BYTE BLOCKS.

PRINT # CPU - GIVES CPU # SELECTED IN GENPART

10 \$PSTAT = " 8 SPACES "

Requirements for Maintenance Pricing

Model numbers should be structured on the work-in-process "Image File" by Configuration Management prior to submitting your Pricing Proposal to CSO Business Planning. Please WANGOFFICE your Proposal (the Final version only) to Bob Eastman or John Picard even if you are also providing a hardcopy. When occasional changes are necessary, communicate these changes far enough in advance for us to be able to react. PROPOSALS NEED TO BE SUBMITTED TO US NO LATER THAN 2 WEEKS PRIOR TO THE TIME THAT THE MAINTENANCE PRICING IS NEEDED. Include the following information in your Proposal:

I. DESCRIPTION:

List each model number and the function it performs.  
Can any of the model numbers be configured with other WANG products?  
What is each model number's warranty?  
Will each model number be serialized or unserialized?  
List all component model number/explosions under model numbers in the Proposal.  
Is each model number WANG-installable or customer-installable?

II. BUSINESS OBJECTIVE:

What market need does this product satisfy?

III. INTERNAL PRICING POSITIONING / WANG PRODUCT INTERACTIONS:

What other WANG model numbers are affected by the anticipated introduction of this new product, and how are they affected?  
Will this new model number's List Pricing cause migration to, or away from, any existing WANG model numbers?  
How is the proposed pricing of this new model number(s) related to the pricing of any other WANG model numbers?

IV. PROPOSED PRODUCT PRICING:

How was the proposed List Price for each model number arrived at?

V. PRICE CHANGES TO CURRENT PRODUCTS:

What is the current List Price of each model number?  
What is the new, proposed List Price for each model number?  
Why is the List Price being changed to the new, proposed List Price?  
Please submit a Proposal to CSO Business Planning any time List Prices are being changed, so that implications to maintenance and/or support pricing can be assessed.

Requirements for Maintenance Pricing

VI.

EXTERNAL PRICE POSITIONING versus other vendors' products:

What competitors does this new product have?  
What are the model numbers of these competitive products?  
What are the List Prices for each of these competitive model numbers?  
How does the functionality of the WANG product compare to the functionality of each of the competitive products?  
What is the nature of the market/competition for these products?

VII.

BOOKING/REVENUE FORECAST:

What is the booking/revenue forecast for this new WANG product?

VIII.

PRODUCT SUPPORT PLAN:

How is this product going to be supported? (Support Plan ?)  
Can each model number be repaired on-site to the FRU level, or will the model number be whole-unit-swapped without any attempt to repair?  
Are there any special service and/or support considerations for any of the model numbers?

IX.

RELIABILITY:

What are the projected failures per year, calls per year, and Mean Time to Repair for each model number in the Proposal ?

X.

ROLL-OUI SCHEDULE:

By what specific date is maintenance and/or support pricing needed for each of the model numbers?

XI.

TEMPEST:

For Tempest products: what is/are the corresponding commercial WANG model number(s) and their commercial List Prices?  
What is the Tempest List Price premium relative to the corresponding commercial model numbers?

UJ-5059 thru UJ-6062 are for CS and CS/386  
UJ-6063 thru UJ-6066 are for MICROVP and CS  
UJ-6067 thru UJ-6072 are CS/386 Memory Upgrades

Donna

----- Reply -----

To: Donna Santeufemio From: Eugene S. Schulz  
Subject: CS/386 TURBO MODELS/PARTS Date Sent: 04/18/91

Is 5059 through 6062 MICROVP and CS Board Upgrade, 6067 through 6072 memory upgrades?

----- Original Memo -----

To: Eugene S. Schulz From: Donna Santeufemio  
Subject: CS/386 TURBO MODELS/PARTS Date Sent: 04/17/91

Gene,

Listed below are the model/part numbers you requested:

|                        | MODEL #      | CEI #        | ITEM STATUS |
|------------------------|--------------|--------------|-------------|
|                        | CS/386-400N  | 157/177-3548 | 0           |
|                        | CS/386-800N  | 157/177-3549 | 0           |
|                        | CS/386-1600N | 157/177-3550 | 0           |
|                        | CS/386-3200N | 157/177-3551 | 0           |
|                        | 2236MXF      | 200-2991     | 0           |
|                        | 22C11-HS     | 200-2992     | 0           |
| CS-D/IN<br>UPGRADES    | UJ-6059      | 205/206-6059 | 0           |
|                        | UJ-6060      | 205/206-6060 | 0           |
|                        | UJ-6061      | 205/206-6061 | 0           |
|                        | UJ-6062      | 205/206-6062 | 0           |
| CS & MICRO<br>UPGRADES | UJ-6063      | 205/206-6063 | 0           |
|                        | UJ-6064      | 205/206-6064 | 0           |
|                        | UJ-6065      | 205/206-6065 | 0           |
|                        | UJ-6066      | 205/206-6066 | 0           |
|                        | UJ-6067      | 205/206-6067 | 0           |
| MEM<br>UPGRADES        | UJ-6068      | 205/206-6068 | 0           |
|                        | UJ-6069      | 205/206-6069 | 0           |
|                        | UJ-6070      | 205/206-6070 | 0           |
|                        | UJ-6071      | 205/206-6071 | 0           |
|                        | UJ-6072      | 205/206-6072 | 0           |

The above part numbers are at Item Status "0" so your engineer can structure the bills of materials on the workbench system.

Any questions, please feel free to contact me.

Donna Santeufemio

NEW FCC WORDING ↓ PUT ON LABEL

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:  
(1) this device may not cause harmful interference,  
and (2) this device must accept any interference received, including interference that may cause undesired operation.

NEW LABEL

Drawing # 615-5051

Label, CS-N/D Configuration

| CS-N/D CONFIGURATION |                                                             |                             |                             |                          |
|----------------------|-------------------------------------------------------------|-----------------------------|-----------------------------|--------------------------|
| CPU TYPE             | 386 <input type="checkbox"/> TURBO <input type="checkbox"/> |                             |                             |                          |
| MEMORY               | <input type="checkbox"/>                                    | <input type="checkbox"/>    | <input type="checkbox"/>    | <input type="checkbox"/> |
| SIZE                 | 8 <input type="checkbox"/>                                  | 16 <input type="checkbox"/> | 32 <input type="checkbox"/> |                          |

Requirements for Maintenance Pricing

Model numbers should be structured on the work-in-process "Image File" by Configuration Management prior to submitting your Pricing Proposal to CSO Business Planning. Please WANGOFFICE your Proposal (the Final version only) to Bob Eastman or John Picard even if you are also providing a hardcopy. When occasional changes are necessary, communicate these changes far enough in advance for us to be able to react. PROPOSALS NEED TO BE SUBMITTED TO US NO LATER THAN 2 WEEKS PRIOR TO THE TIME THAT THE MAINTENANCE PRICING IS NEEDED. Include the following information in your Proposal:

I. DESCRIPTION:

- List each model number and the function it performs. PP (3)
- Can any of the model numbers be configured with other WANG products? Y
- What is each model number's warranty? STANBARD 90 DAY MP
- Will each model number be serialized or unserialized? CFU's serialized only VIII.
- List all component model number/explosions under model numbers in the Proposal.
- Is each model number WANG-installable or customer-installable? WANG

II. BUSINESS OBJECTIVE:

What market need does this product satisfy? (1)

III. INTERNAL PRICING POSITIONING / WANG PRODUCT INTERACTIONS: MODEL #

What other WANG model numbers are affected by the anticipated introduction of this new product, and how are they affected? Will this new model number's List Pricing cause migration to, or away from, any existing WANG model numbers? How is the proposed pricing of this new model number(s) related to the pricing of any other WANG model numbers?

IV. PROPOSED PRODUCT PRICING:

— How was the proposed List Price for each model number arrived at?

V. PRICE CHANGES TO CURRENT PRODUCTS:

What is the current List Price of each model number? ✓ MODEL #  
What is the new, proposed List Price for each model number? MODEL #  
Why is the List Price being changed to the new, proposed List Price?

Please submit a Proposal to CSO Business Planning any time List Prices are being changed, so that implications to maintenance and/or support pricing can be assessed.

BREAKDOWN OF US\$

Requirements for Maintenance Pricing

VI. EXTERNAL PRICE POSITIONING versus other vendors' products:

- What competitors does this new product have? (2)
- What are the model numbers of these competitive products?
- What are the List Prices for each of these competitive model numbers? (2)
- How does the functionality of the WANG product compare to the functionality of each of the competitive products?
- What is the nature of the market/competition for these products?

VII. BOOKING/REVENUE FORECAST: (6)

What is the booking/revenue forecast for this new WANG product?

PRODUCT SUPPORT PLAN:

How is this product going to be supported? (Support Plan ?) MP  
Can each model number be repaired on-site to the FRU level, or will the model number be whole-unit-swapped without any attempt to repair?  
Are there any special service and/or support considerations for any of the model numbers?

RELIABILITY:

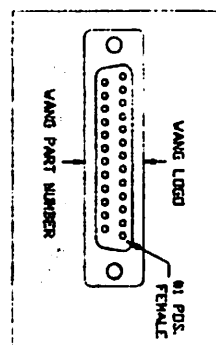
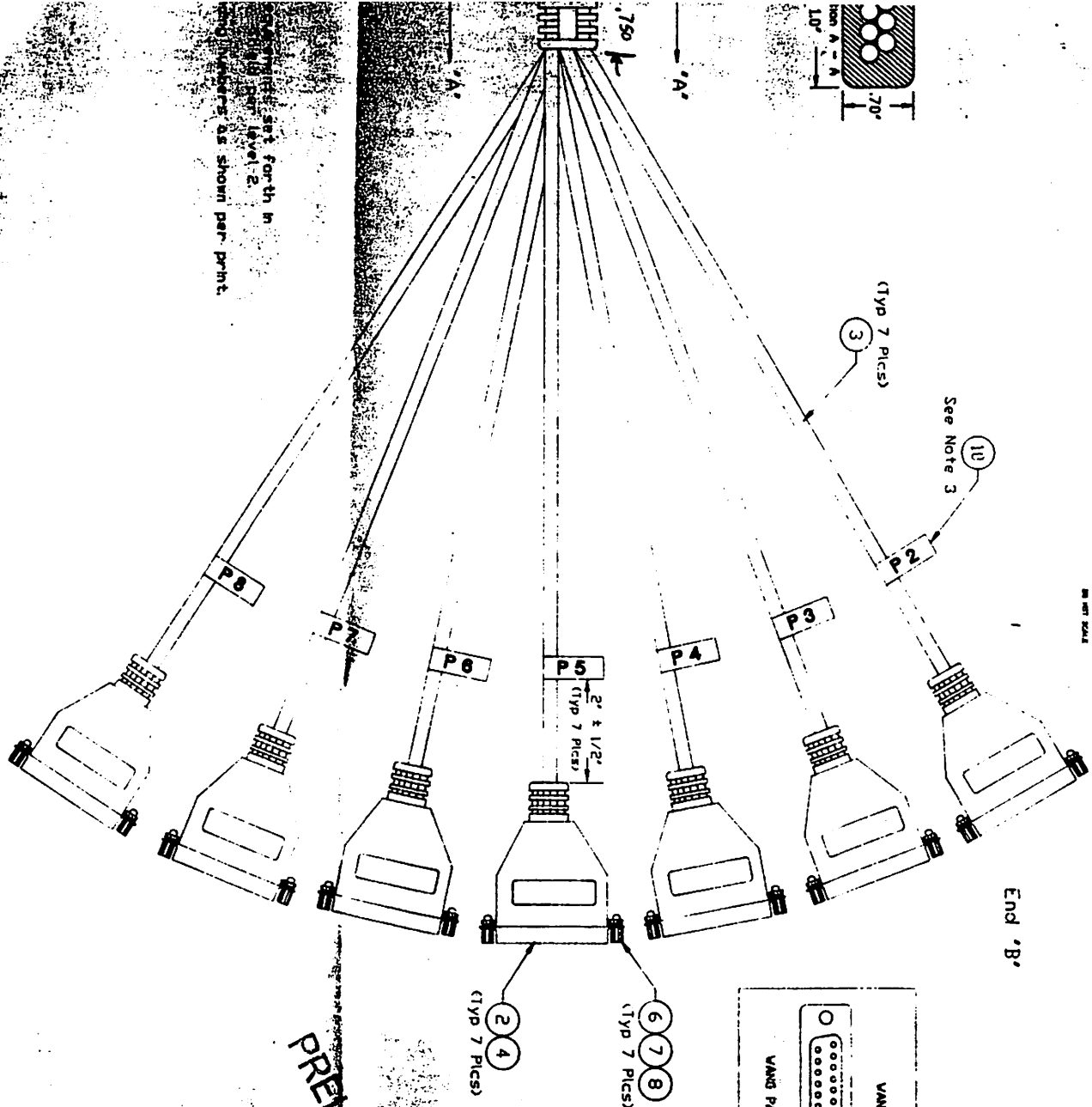
What are the projected failures per year, calls per year, and Mean Time to Repair for each model number in the Proposal ? MP

ROLL-OUT SCHEDULE: (7)

By what specific date is maintenance and/or support pricing needed for each of the model numbers?

XI. TEMPEST:

For Tempest products: what is/are the corresponding commercial WANG model number(s) and their commercial List Prices?  
What is the Tempest List Price premium relative to the corresponding commercial model numbers?



PRELIMINARY

| End No. | Wire Color | Twisted Pair | Signal Name | End No. |
|---------|------------|--------------|-------------|---------|
| 1       | White      | PAIRS        | IP-A        | PE-9    |
| 19      | Yellow     | PAIRS        | IP-B        | PE-7    |
| 2       | Green      | PAIRS        | IP-C        | PE-5    |
| 20      | Red        | PAIRS        | IP-D        | PE-3    |
| 3       | Black      | PAIRS        | IP-E        | PE-1    |
| 21      | White      | PAIRS        | IP-F        | PE-9    |
| 4       | Yellow     | PAIRS        | IP-G        | PE-7    |
| 22      | Green      | PAIRS        | IP-H        | PE-5    |
| 5       | Red        | PAIRS        | IP-I        | PE-3    |
| 23      | Black      | PAIRS        | IP-J        | PE-1    |
| 6       | White      | PAIRS        | IP-K        | PE-9    |
| 24      | Yellow     | PAIRS        | IP-L        | PE-7    |
| 7       | Green      | PAIRS        | IP-M        | PE-5    |
| 25      | Red        | PAIRS        | IP-N        | PE-3    |
| 8       | Black      | PAIRS        | IP-O        | PE-1    |
| 26      | White      | PAIRS        | IP-P        | PE-9    |
| 9       | Yellow     | PAIRS        | IP-Q        | PE-7    |
| 10      | Green      | PAIRS        | IP-R        | PE-5    |
| 27      | Red        | PAIRS        | IP-S        | PE-3    |
| 11      | White      | PAIRS        | IP-T        | PE-1    |
| 28      | Yellow     | PAIRS        | IP-U        | PE-9    |
| 12      | Green      | PAIRS        | IP-V        | PE-7    |
| 29      | Red        | PAIRS        | IP-W        | PE-5    |
| 13      | Black      | PAIRS        | IP-X        | PE-3    |
| 30      | White      | PAIRS        | IP-Y        | PE-1    |
| 14      | Yellow     | PAIRS        | IP-Z        | PE-9    |
| 31      | Green      | PAIRS        | IP-AA       | PE-7    |
| 15      | Red        | PAIRS        | IP-AB       | PE-5    |
| 32      | Black      | PAIRS        | IP-AC       | PE-3    |
| 16      | White      | PAIRS        | IP-AD       | PE-1    |
| 33      | Yellow     | PAIRS        | IP-AE       | PE-9    |
| 17      | Green      | PAIRS        | IP-AF       | PE-7    |
| 34      | Red        | PAIRS        | IP-AG       | PE-5    |
| 18      | Black      | PAIRS        | IP-AH       | PE-3    |
| 35      | White      | PAIRS        | IP-AI       | PE-1    |
| 19      | Yellow     | PAIRS        | IP-AJ       | PE-9    |
| 36      | Green      | PAIRS        | IP-AK       | PE-7    |

| ITEM | QTY | WAVE PART NO. | DESCRIPTION                            |
|------|-----|---------------|----------------------------------------|
| 10   | 6   | 615-1665      | 10 Meters Label Imprint (See Note 3)   |
| 9    | 2   | 651-1762      | Retaining Ring                         |
| 8    | 14  | 653-2007      | Lockwasher Split #4                    |
| 7    | 14  | 652-2004      | Hex Nut #4-40                          |
| 6    | 14  | 462-0548      | Standoff #4-40 W/F                     |
| 5    | 2   | 350-4250      | Screw #4-40 250 Long W/O Clamp         |
| 4    | 36  | 654-3005R     | Chip Contact Socket #28-24 Ga.         |
| 3    | A/R | 420-0254      | Chip Round 5 Cond #28 Ga. Braid Shield |
| 2    | 2   | 350-1075      | Conn. D-Sub 25 Position (Female)       |
| 1    | 1   | 350-8178      | Conn. D-Sub 36 Pos (Male)              |

FINISH

2200 System

2200 Octopus Cable Assembly

DATE: 4-21-01

BY: [Signature]

APPROVED BY: [Signature]

BCC: Michael Bahia  
From: Eugene S. Schulz  
Subject: 2236MXF

MS014-A3A/LOWELL

Date: 06/10/91

## Distribution:

Not Requested

The 2236MXF has 4 ports. Two are regular RS-232 ports and two are 50-pin that require a 7-port octopus cable. Mike Riley has the Vendor name and part number. What we want to do is include 1 octopus cable with each 2236MXF. If the user needs two, than they must order as part # xxx-xxxx. How do we set up as Wang part number for cable that can be ordered from Wang direct or in price book?

cc : Mike Riley

# CS/386 TURBO CLASS

1. MXF - WHEN 1<sup>ST</sup> POWER ON LOAD LOAD LOAD DOES NOT WORK W/ R1 PROM  
RØ FROM WORKS.

2. \$ RELEASE PART  
1<sup>ST</sup> TIME NO EFFECT  
2<sup>ND</sup> TIME KILLED SYSTEM. PRESS RESET GET CURSOR.

3. 10 DIMA\$(16)  
20 X=X+1: PRINT X;  
30 DATA LOAD BAT/D11, (X,L)A\$( )  
40 GOTO 20  
SYSTEM HUNG WHEN GOT TO  
1068 APPROX

4. SCSI BUG  
LOAD DCT/D35, "TT4KEYIN"  
SAVE DCT/D35, "TEST2"  
WRITES 43434343..... IN BLOCK 178

5. WHEN ACCESSING FLOPPY FROM KEY SF DOES NOT RETURN CORRECT ERRORS  
FOR NO DISKETTE. SHOULD BE I98  
OR FOR PROGRAM NOT ON CURRENT DISKETTE. SHOULD BE D82.



1. How can you determine if the Printer Driver is on for a 204 Printer?
2. If a system hangs and your screen blanks when RESET is keyed what are the most likely causes?
3. Using the R4 PROM, give 2 ways to determine <sup>ON</sup> what <sup>DRIVE</sup> address resides on?
4. Customer has a Turbo, a standard CS/386, and a CS that he is considering MUXing but wants to use SELECT H ON. What can he do & still use SELECT H ON.
5. With 2 MXF boards, how many more MXE/MXD boards could be legally installed in the same CPU?
6. What are the only disk related addresses that should be found in GENPART with a 386 type CPU?
7. What is the purpose of the SELECT H command?
8. If a customer is upgrading to a 386 CPU from a MVP, what general rule of thumb should be used to set up partition size.
9. If using the MUX port on a hi-speed disk controller, where would the cable from this port normally be cabled to?
10. How could you upgrade a 1 Meg Turbo Brd to an 8 Meg Brd?
11. In GENPART what is the significance of the CPU # & when is it critical?
12. You're on site and one of the users had an error but was able to continue on without RESET. How can you find out what error occurred if the user does not remember.
13. Customer is complaining of disk performance problems since move to the 386. How would you determine if there programs are in NEW format.

14. WHY DO PROGRAMS IN OLD FORMAT LOAD SLOWER WITH THE 386?
15. ~~THE~~ GIVE 3 DIFFERENT DIAGNOSTIC CHECKS THAT CAN BE <sup>USED TO</sup> ~~PROB~~ ~~IDENTIFY~~ IDENTIFY PROBLEMS WITH THE MXF?
16. ~~Q~~ SYSTEM KEEPS HANGING, BUT SO FAR THE CUSTOMER HAS JUST SHUT OFF THE SYSTEM & RESTARTED IT. ~~WHAT~~ ~~STEPS~~ YOU CANNOT REPRODUCE THE PROBLEM. WHAT STEPS SHOULD BE TAKEN TO HELP ISOLATE THE PROBLEM?
17. WHAT ARE THE MAXIMUM & MINIMUM # OF ADDRESSES THAT CAN BE ASSIGNED TO A 64 MEG DRIVE? WHAT IS THE MAXIMUM # OF FIXED WIND <sup>ADDRESSES</sup> ~~DRIVES~~ IN 1 <sup>PS</sup> CABINET?
18. WHY DO WE NEED PRINT DRIVERS?
19. WHAT ~~SIGNIFICANCE~~ DOES 3 BYTE ADDRESSING ALLOW US TO DO THAT WAS NOT POSSIBLE BEFORE?
20. WHEN UPGRADING TO A 386 BMD OR A TURBO WHAT 2 BOARDS ARE MOST CRITICAL TO BE AT THE LATEST E-REV?

- How can you determine if the Printer Driver is on for a 204 printer?
- If a system hangs and your screen blanks when RESET is keyed what are the most likely causes?
- Using the R4 PROM, give 2 ways to determine <sup>on</sup> what <sup>drive</sup> address resides on?
- Customer has a Turbo, a standard CS/386, and a CS that he is considering MUXing but wants to use SELECT H ON. What can he do & still use SELECT H ON.
- With 2 MXF boards, how many more MXE/MXD boards could be legally installed in the same CPU?
- What are the only disk related addresses that should be found in GENPART with a 386 type CPU?
- What is the purpose of the SELECT H command?
- If a customer is upgrading to a 386 CPU from a MIP, what general rule of thumb should be used to set up partition size.
- If using the MUX port on a hi-speed disk controller, where would the cable from this port normally be cabled to?
- How could you upgrade a 1 Meg Turbo Bro to an 8 Meg Bro?
- In GENPART what is the significance of the CPU # & when is it critical?
- You're on site and one of the users had an error but was able to continue on without RESET. How can you find out what error occurred if the user does not remember.
- Customer is complaining of disk performance problems since move to the 386. How would you determine if there programs are in NEW format.

14. WHY DO PROGRAMS IN OLD FORMAT LOAD SLOWER WITH THE 386?
15. ~~THE~~ GIVE 3 DIFFERENT DIAGNOSTIC CHECKS THAT CAN BE <sup>USED TO</sup> ~~FROM DATA~~ IDENTIFY PROBLEMS WITH THE MXF?
16. ~~Q~~ SYSTEM KEEPS HANGING, BUT SO FAR THE CUSTOMER HAS JUST SHUT OFF THE SYSTEM & RESTARTED IT. ~~WHAT~~ ~~STAY~~ YOU CANNOT REPRODUCE THE PROBLEM. WHAT STEPS SHOULD BE TAKEN TO HELP ISOLATE THE PROBLEM?
1. WHAT ARE THE MAXIMUM & MINIMUM # OF ADDRESSES THAT CAN BE ASSIGNED TO A 64 MEG DRIVE? WHAT IS THE MAXIMUM # OF FIXED WING <sup>ADDRESSES</sup> ~~DRIVES~~ IN 1 <sup>PS</sup> CABINET?
3. WHY DO WE NEED PRINT DRIVERS?
2. WHAT ~~SIGNIFICANCE~~ DOES 3 BYTE ADDRESSING ALLOW US TO DO THAT WAS NOT POSSIBLE BEFORE?
0. WHEN UPGRADING TO A 386 BRO OR A TURBO WHAT 2 BOARDS ARE MOST CRITICAL TO BE AT THE LATEST E-REV?

To: John Anderson

cc: Vern Dykema  
Gary Daichendt  
Gene Schulz  
Drew West  
John McCarron  
Ira Steinberg  
Bob Deichler

From: Scott Marshall

Re: Alternate Channels and the 2200 Program

Date: 9/18/91

---

Alternate Channels Marketing has agreed to pursue the following activities in pursuit of the 2200 business:

#### GSSR Program

We are in the process of launching a 2200 lead generation campaign, using MarketBase, that will attempt to surface leads for GSSRs to pursue. Draft mailers and telemarketing scripts have been prepared and are being finalized for September/October implementation.

We will be measuring the effectiveness of both the campaign and the receptivity of the marketplace to our latest CS and Unix products.

#### Back To Wang Program

Separately, we have purchased a list, from The Basic-2 Report, of Basic-2 users. This may represent a potential community of non-Wang Basic-2 customers that can be convinced to return to Wang Laboratories based on our story relative to CS Turbo and Unix/Niakwa.

A lead generation campaign will be launched targeting this list, and will be fulfilled by Wang's current VARs, Territory Resellers, and MAAs/GSSRs -- per IMR direction. We will ask each IMR to provide us with their nomination(s) concerning which partners within their territory should participate with us in this program. Any Ts and Cs issues will be examined at that time.

Participating partners will agree to share in the costs of the program via FlexFund -- using a formula not yet determined. Direct Marketing will be targeted at the areas where we have the ability to fulfill via channel partners.

#### Product Training

Gene Schulz has agreed to assume product training responsibilities and we will endeavor to provide regional training once our participating partners are identified.

### Timing

The GSSR program is underway. This will get us started exploiting the 8,000 or so 2200 accounts identified in MarketBase.

The "Back To Wang" program will be driven by me with support from Gene. We will put together a kit to roll-out to the IMRs, as a means of enlisting their support in identifying participating partners, by the end of October. Program will be fielded in the Nov/Dec time-frame based on IMR feedback.

If you have any questions, please let me know.

WANG

# ESO

## NEW PRODUCT ENGINEERING TRANSFER PACKAGE

PRODUCT NAME: 2200 CS TURBO PROJECT # 601

TRANSFER DATE: 1/31/92

FROM:

PRODUCT ENGINEER(S): Charles E. Smith John R. Lytle  
PROGRAM MANAGER: S. J. Smith Alexander Glenwick  
PRODUCT ENG. MGR.: Michael M. Smith CSO William Balmer

TO:

MANUFACTURING SITE(S): Patterson Bldg 1  
SITE NEW PRODUCT ENG. MGR. Ralph Wersch 1  
SITE DOCUMENTATION MGR.: Darlene Ross 1  
LINE ENG. MGR.: BOB DILAND 1  
PLANNING & SCHEDULING: Tony Wersch 1

TRANSFERRED WITH 90 DAY WARRANTY

10/1

10/1

10/1

10/1

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10/1

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10/1



# HARDWARE PRODUCT RELEASE (TOLLGATE 6) CHECKLIST

PRODUCT NAME: 2200 CS TURBO PROJECT NO.: 601 DATE: 1/29/92  
 PRODUCT MANAGER: MIKE RILEY  
 PRODUCT ENGINEER(S): CHARLIE FUNK

| #  | CONFIGURATION MGMT. ACTIVITY     | Y | N | N/A | COMMENTS                                                 |
|----|----------------------------------|---|---|-----|----------------------------------------------------------|
| 1  | FAMILY TREE COMPLETED            | ✓ |   |     | REV I                                                    |
| 2  | HARDWARE BOM'S AT I/S=2          | ✓ |   |     | DCO IN PROCESS                                           |
| 3  | SOFTWARE BOM'S AT I/S=2          | ✓ |   |     |                                                          |
| 4  | AUTO ENCLOSURE BOM'S AT I/S=2    | ✓ |   |     |                                                          |
| 5  | MODELS RELEASED                  | ✓ |   |     |                                                          |
| 6  | PRICING & LEAD TIMES RELEASED    | ✓ |   |     |                                                          |
| #  | ENGINEERING ACTIVITY             |   |   |     |                                                          |
| 1  | TEST & REPAIR PLAN COMPLETE      | ✓ |   |     |                                                          |
| 2  | TEST PROCEDURES RELEASED         | ✓ |   |     |                                                          |
| 3  | PROCESS SHEETS RELEASED          | ✓ |   |     |                                                          |
| 4  | PCB MFG REVIEW CHANGES INCORP.   | ✓ |   |     |                                                          |
| 5  | DESIGN REVIEW CHANGES INCORP.    | ✓ |   |     |                                                          |
| 6  | SITE TEST EQUIPMENT AVAILABLE    | ✓ |   |     | DELIVERED TO P.B. BY 2/7                                 |
| 7  | SITE TECH TRAINED                | ✓ |   |     |                                                          |
| 8  | ASS'Y FIXTURES AVAILABLE         | ✓ |   |     | DELIVERED TO P.B. BY 2/7                                 |
| 9  | SPS PROGRAMS/CABLES AVAILABLE    | ✓ |   |     |                                                          |
| 10 | SMT STENCILS AVAILABLE           |   |   | ✓   |                                                          |
| 11 | ATE FIXT/PROGRAM AVAILABLE       | ✓ |   |     | BACKPLANE TEST DUE 2/15 - ALL OTHER ATE DELIVERED BY 2/7 |
| 12 | CTE EQUIPMENT AVAILABLE          |   |   | ✓   |                                                          |
| 13 | EMULATION PROGRAM AVAILABLE      | ✓ |   |     |                                                          |
| 14 | PARTS ON QVL - SPECS AVAILABLE   | ✓ |   |     |                                                          |
| 15 | SOLDER FIXT/CARRIERS AVAILABLE   | ✓ |   |     |                                                          |
| 16 | MFG. DIAGNOSTICS RELEASED        |   | ✓ |     | IN PRE-RELEASE - DUE 2/15 295-8036-9                     |
| 17 | ALL SOFTWARE RELEASED            | ✓ |   |     | REV 1.1 IN PROCESS                                       |
| 18 | FIRMWARE RELEASED                | ✓ |   |     |                                                          |
| 19 | OEM'S APPROVED                   |   |   | ✓   |                                                          |
| 20 | OEM PRODUCT SPEC'S RELEASED      |   |   | ✓   |                                                          |
| 21 | TEMPEST VERIFICATION COMPLETED   |   |   | ✓   |                                                          |
| 22 | TEMPEST CRITICAL FEATURES COMPL. |   |   | ✓   |                                                          |
| 23 | FCC/VDE APPROVAL MEMO COMPLETE   | ✓ |   |     |                                                          |
| 24 | UL/CSA/IEC APPROVAL MEMO COMPL.  | ✓ |   |     |                                                          |
| 25 | ESD/EMS APPROVAL MEMO COMPLETE   | ✓ |   |     |                                                          |

[Faint, mostly illegible text covering the majority of the page, appearing to be a multi-paragraph document or report.]

# HARDWARE PRODUCT RELEASE (TOLLGATE 6) CHECKLIST

| #  | ENGINEERING ACTIVITY (CON'T)                                                                | Y | N | N/A | COMMENTS           |
|----|---------------------------------------------------------------------------------------------|---|---|-----|--------------------|
| 26 | RAD HAZ APPROVAL MEMO COMPLETE                                                              |   |   | ✓   |                    |
| 27 | PKG DATA ANNOUNCEMENT COMPLETE                                                              | ✓ |   |     |                    |
| 28 | ACCOUST APPROVAL MEMO COMPLETE                                                              |   |   | ✓   |                    |
| 29 | THERMAL APPROVAL MEMO COMPLETE                                                              |   | ✓ |     | DUE 2/3 - WEN SHUI |
| 30 | DRAWINGS RELEASED ON MICROFILM                                                              | ✓ |   |     |                    |
| 31 | VENDOR TOOLING APPROVED                                                                     |   |   | ✓   |                    |
| 32 | LABEL DWG'S RELEASED ON MICROFILM                                                           | ✓ |   |     |                    |
| 33 | ALPHA/BETA TEST RESULTS COMPLETE                                                            | ✓ |   |     |                    |
| 34 | PCB SCHEM/DRILL/ASS'Y DWG'S<br>RELEASED ON MICROFILM                                        | ✓ |   |     |                    |
| 35 | SITE ENG. REVIEW COMPLETE                                                                   | ✓ |   |     |                    |
| 36 | CUST SIMULATION TEST COMPLETE                                                               | ✓ |   |     |                    |
| 37 | PRODUCT CONFIG TESTS COMPLETE                                                               | ✓ |   |     |                    |
| 38 | LABOR STD'S COMPLETE                                                                        | ✓ |   |     |                    |
| 39 | PCB YIELD REPORTS COMPLETE                                                                  | ✓ |   |     |                    |
| 40 | WEIGHTS & MEASURES COMPLETE                                                                 | ✓ |   |     |                    |
| 41 | SAMPLE PCB AVAILABLE                                                                        | ✓ |   |     |                    |
| 42 | PRODUCT COST REVIEWED                                                                       | ✓ |   |     |                    |
|    |                                                                                             |   |   |     |                    |
| #  | PRODUCT PLANNING ACTIVITY                                                                   |   |   |     |                    |
| 1  | BUSINESS PLAN FINALIZED                                                                     | ✓ |   |     |                    |
| 2  | FIELD SUPPORT PLAN FINALIZED                                                                | ✓ |   |     |                    |
| 3  | CSO TRAINING PLAN FINALIZED                                                                 | ✓ |   |     |                    |
| 4  | SALES & MKTG PLAN FINALIZED                                                                 | ✓ |   |     |                    |
| 5  | SOURCING IDENTIFIED                                                                         | ✓ |   |     | PANTRYKES BLVD.    |
| 6  | SITE RECEIPT OF 2 WKS FINISHED<br>GOODS, 4 WKS INV., 13 WKS OPEN<br>PO'S, & THRU LEAD TIMES |   | ✓ |     | IN PROCESS         |
| 7  | FCS DATE IDENTIFIED                                                                         | ✓ |   |     | 9/15/91            |
| 8  | VOLUME SHIP DATE IDENTIFIED                                                                 | ✓ |   |     | 2/14/92            |
| 9  | TRANSFER DATE IDENTIFIED                                                                    | ✓ |   |     | 1/31/92            |
| 10 | SCHEDULE LOADED INTO SITE PSS                                                               |   | ✓ |     | IN PROCESS         |

ATTACH REASONS FOR INCOMPLETE ACTIVITIES AND SUBSEQUENT ACTION ITEMS:

UNCLASSIFIED  
DATE 03-07-2011 BY 60322

ALL INFORMATION CONTAINED  
HEREIN IS UNCLASSIFIED  
DATE 03-07-2011 BY 60322

DATE 03-07-2011 BY 60322

DATE 03-07-2011 BY 60322

DATE 03-07-2011 BY 60322

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DATE 03-07-2011 BY 60322

DATE 03-07-2011 BY 60322

DATE 03-07-2011 BY 60322

3300 LUKBO 380

DATE 03-07-2011 BY 60322

Page 1

# 2200 TURBO 386 SYSTEMS

CS/386-400N  
157/177-3549  
212-9719  
CS/386-400N CPU W/4MBG  
210-9576A\*\*  
CS/386 CPU TURBO  
377-4533(4)  
SIMM 1MB3 CMOS DRAM

CS/386-500N  
157/177-3549  
212-9720  
CS/386-500N CPU W/8MBG  
210-9576A\*\*  
CS/386 CPU TURBO  
377-4533(4)  
SIMM 1MB3 CMOS DRAM

CS/386-1600N  
157/177-3549  
212-9721  
CS/386-1600N CPU W/16MBG  
210-9576A\*\*  
CS/386 CPU TURBO  
377-4533(4)  
SIMM 1MB3 CMOS DRAM

CS/386-3200N  
157/177-3549  
212-9722  
CS/386-3200N CPU W/32MBG  
210-9576A\*\*  
CS/386 CPU TURBO  
377-4533(4)  
SIMM 1MB3 CMOS DRAM

\*\* Includes the 210-9577 CPU daughter board

EXISTING ITEMS COMMON TO ALL MODELS  
# contains new mother board 210-9578

#2790873  
CABINET ASSY CS-DIN  
2900685  
SHPG PKG BOM: CS-D-2200-  
290068502  
SHPG PKG BOM, MFG  
4490702  
HANDLE CHASSIS  
4585026  
COVER, PANEL, REAR (WELD)  
6152029  
LABEL WARNING VOLTAGE SET  
6152265  
LBL DOCK MERGE ID 8X3  
6153872  
CORP SERIAL NO  
615-4282  
LABEL, MODEL NO.  
615-5051  
LABEL, CS/ND CONFIGURATION  
6503200  
SCR 6-32 5/8L PAN PHL SST  
6504120  
SCR 8-32 3/8L PAN PHL SEM  
6560145  
SHLD GSMT RECT .13 X .19

CS/TURBO-CK-XX  
COUNTRY KIT  
200-5265-XX  
XX= AE, AG, AS, AU, AZ,  
BF, CA, CF, DA, FI, FL, GE,  
HK, IC, IT, NL, NO, PO, SF,  
SG, SI, SL, SP, SW, TU, UK,  
US, UV

- 291-1001  
A.E. BASIC-2/TURBO O.S.  
420-xxxx  
POWER CORD#

# Power cords used in the various country kits:  
420-1122 PWR CD U.K. 2.5M  
UK  
420-2026 PWR CD GEN EUR 2.5M  
AE  
420-2027 PWR CD GEN EUR 2.5M  
AU AZ BF FI FL GE IC IT NL NO PO SP SW  
420-2028 PWR CD AUSTRALIA 2.5M  
AS  
420-3033 PWR CD DENMARK 2.5M  
DA  
420-2034 PWR CD SWITZERLAND 2.5M  
SF SG SI  
420-2035 PWR CD UNIVERSAL 2.5M  
SL TU UV  
420-2040 PWR CD U.S. 8FT  
AG CA CF US  
420-2049 PWR CD U.K. 2.5M  
HK

## LEGEND

DASHED LEADER LINES REPRESENT  
CUSTOMER ORDERABLE ITEMS.  
SOLID LEADER LINES IDENTIFY  
PARENT/CHILD RELATIONSHIPS.  
SHADED BOXES REPRESENT ITEMS TO BE  
PILOTTED.  
BREAK LINE BOXES REPRESENT  
UNRELEASED (ITEM STATUS 1) ITEMS.  
SOLID LINE BOXES REPRESENT RELEASED  
(ITEM STATUS 2) ITEMS.  
RADIUS CORNER BOXES REPRESENT  
CUSTOMER INSTALLABLE ITEMS.  
ITALICS IDENTIFY MANUFACTURING  
MIN/MAX INVENTORY ITEMS.  
\*\* IDENTIFY FIELD REPLACABLE  
UNITS (FRUs).

PAGE 1

NAME EXT  
CHARLES FUNK 78349  
REV DATE  
12/20/91  
TITLE  
2200 TURBO 386  
REV  
I

0830 JULY 1953

|         |       |       |       |
|---------|-------|-------|-------|
| 121000Z | 0408T | 0408T | 0408T |
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| 0408T   | 0408T | 0408T | 0408T |
| 0408T   | 0408T | 0408T | 0408T |

TABLE COMPLETION

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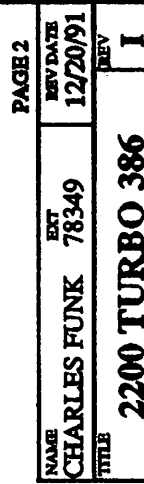
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THE DOCK WENT TO 0408T

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| LEGEND                                                       |
|--------------------------------------------------------------|
| DASHED LEADER LINES REPRESENT CUSTOMER ORDERABLE ITEMS.      |
| SOLID LEADER LINES IDENTIFY PARENT/CHILD RELATIONSHIPS.      |
| SHADED BOXES REPRESENT ITEMS TO BE PILOTED.                  |
| BREAK LINE BOXES REPRESENT UNRELEASED (ITEM STATUS 1) ITEMS. |
| SOLID LINE BOXES REPRESENT RELEASED (ITEM STATUS 2) ITEMS.   |
| RADIUS CORNER BOXES REPRESENT CUSTOMER INSTALLABLE ITEMS.    |
| ITALICS IDENTIFY MANUFACTURING MIN/MAX INVENTORY ITEMS.      |
| ... IDENTIFY'S FIELD REPLACEMENT UNITS (FUA).                |







# 2200 TURBO 386 SYSTEM UPGRADES

## LEGEND

DASHED LEADER LINES REPRESENT CUSTOMER ORDERABLE ITEMS.

SOLID LEADER LINES IDENTIFY PARENT/CHILD RELATIONSHIPS.

SHADED BOXES REPRESENT ITEMS TO BE PILOTED.

BREAK LINE BOXES REPRESENT UNRELEASED (ITEM STATUS 1) ITEMS.

SOLID LINE BOXES REPRESENT RELEASED (ITEM STATUS 2) ITEMS.

RADIUS CORNER BOXES REPRESENT CUSTOMER INSTALLABLE ITEMS.

ITALICS IDENTIFY MANUFACTURING MIN/MAX INVENTORY ITEMS.

\* \* \* IDENTIFY'S FIELD REPLACEABLE UNITS (FRUs).

### 200-6006 MICROVP-TURBO TURBO UPG FOR MICROVP SYSTEM

- 210-9583 CS TURBO I/O MOTHER BD
- 212-9719 CS/386-400N CPU W/4MEG
- 290-0892 SHPG PKG BOM:UPGRADE-2200
- 451-2781 ② RAIL, TOP & BOTTOM
- 451-2782 ② RAIL, MOUNTING
- 452-0830 RAIL, MOUNTING
- 455-0290 PLATE, SHIELD
- 615-2265 BRACKET, SIDE
- 615-5051 LBL DOCK MERGE ID 8X3
- 698-0082 LABEL, CS/ND CONFIGURATION
- LABEL, CONTENTS

### 200-6009 CS-TURBO TURBO UPGRADE FOR CS SYSTEM

- 210-9583 CS TURBO I/O MOTHER BD
- 212-9719 CS/386-400N CPU W/4MEG
- 290-0892 SHPG PKG BOM:UPGRADE-2200
- 451-2782 ② RAIL, MOUNTING
- 452-0830 ② RAIL, MOUNTING
- 458-5194 PLATE, SHIELD
- 615-2265 COVER, PANEL, REAR
- 615-5051 LBL DOCK MERGE ID 8X3
- 698-0082 LABEL, CS/ND CONFIGURATION
- LABEL, CONTENTS

### 200-6007 CS-D-TURBO TURBO UPGRADE FOR CS-D SYSTEM

- 210-9578 CS386 II MOTHER BOARD
- 212-9719 CS/386-400N CPU W/4MEG
- 290-0892 SHPG PKG BOM:UPGRADE-2200
- 458-5026 COVER, PANEL, REAR (WELD)
- 615-2265 LBL DOCK MERGE ID 8X3
- 615-5051 LABEL, CS/ND CONFIGURATION
- 698-0082 LABEL, CONTENTS

### 200-6008 CS-N-TURBO TURBO UPGRADE FOR CS-N SYSTEM

- 210-9578 CS386 II MOTHER BOARD
- 212-9719 CS/386-400N CPU W/4MEG
- 290-0892 SHPG PKG BOM:UPGRADE-2200
- 458-5026 COVER, PANEL, REAR (WELD)
- 615-2265 LBL DOCK MERGE ID 8X3
- 615-5051 LABEL, CS/ND CONFIGURATION
- 698-0082 LABEL, CONTENTS

PAGE 3

| NAME           | EXT   | REV DATE | REV |
|----------------|-------|----------|-----|
| CHARLES FUNK   | 78349 | 12/20/91 | I   |
| 2200 TURBO 386 |       |          |     |

1. The purpose of this report is to provide a summary of the results of the investigation conducted by the FBI on the subject of the above-captioned case.

2. The investigation was conducted by the FBI on the subject of the above-captioned case. The results of the investigation are summarized in the following paragraphs.

3. The investigation was conducted by the FBI on the subject of the above-captioned case. The results of the investigation are summarized in the following paragraphs.

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11. The investigation was conducted by the FBI on the subject of the above-captioned case. The results of the investigation are summarized in the following paragraphs.

# 2200 TURBO 386 BOARD OPTIONS

## LEGEND

DASHED LEADER LINES REPRESENT CUSTOMER ORDERABLE ITEMS.

SOLID LEADER LINES IDENTIFY PARENT/CHILD RELATIONSHIP.

SHADED BOXES REPRESENT ITEMS TO BE FLOATED.

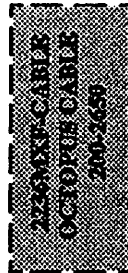
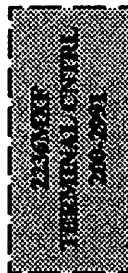
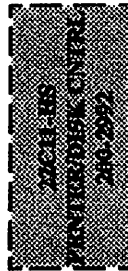
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RADIUS CORNER BOXES REPRESENT CUSTOMER INSTALLABLE ITEMS.

ITALICS IDENTIFY MANUFACTURING MIN/MAX INVENTORY ITEMS.

"\*" IDENTIFY'S FIELD REPLACEMENT UNIT (FRU).



PAGE 4

|                |       |          |
|----------------|-------|----------|
| NAME           | EXT   | REV DATE |
| CHARLES FUNK   | 78349 | 12/20/91 |
| TITLE          | REV   |          |
| 2200 TURBO 386 | I     |          |