PRC WESTERN

WANG

To	:	Gene Schulz	R&D Lowell
		Mike Bahia	R&D Lowell
		Neil Hawes	Northern PRC
		Turan Cagirgan	Central PRC
		Raoul Van Kerckhove	PRC unit Brussels
		Philip Dekker	PRC unit Culemborg
		Philippe De Laulanie	PRC unit Paris
		Carlo De Baere	Distributors Support
		Giancarlo Ceresini	Wang Italy
		Felix Garcia-Hernandez	Wang Spain
From	:	Jan van Arkel	Manager PRC unit Culemborg
		Willem Sloep	Product Specialist
			PRC unit Culemborg
Ref.	:	WJS/co/90.179	
Date	:	July 19th, 1990	
Subject	:	Release of CS/386 system in the Netherlands	

In week 24 we technically released the CS/386 for shipment in the Netherlands.

Although the CS/386 was already available for worldwide shipment in December 1989, the Netherlands never shipped any CS/386 due to problems on compatibility with older 2200/CS applications.

In May of this year the Western PRC and two major software houses in the Netherlands tested the CS/386 with the latest version of the operating system, 1.11, and finally with success. With this hardware and this O/S we can say that the system is of good quality to be shipped to end-users.

WANG

We like to share this information with you as well to provide you with an update of a minibook, which is used by the engineers in the Netherlands to deal with the CS. A hard copy will be sent to the PRC (unit) managers; to the other addressees this documentation will be sent via Wang Office. Past updates are in Dutch and will not be translated.

Feel free to copy this update to te 2200/CS people in your country.

Any remarks can be sent to Willem Sloep.

Kind regards,

Jan van Arkel

Willem Sloep

Encl.

Index

General

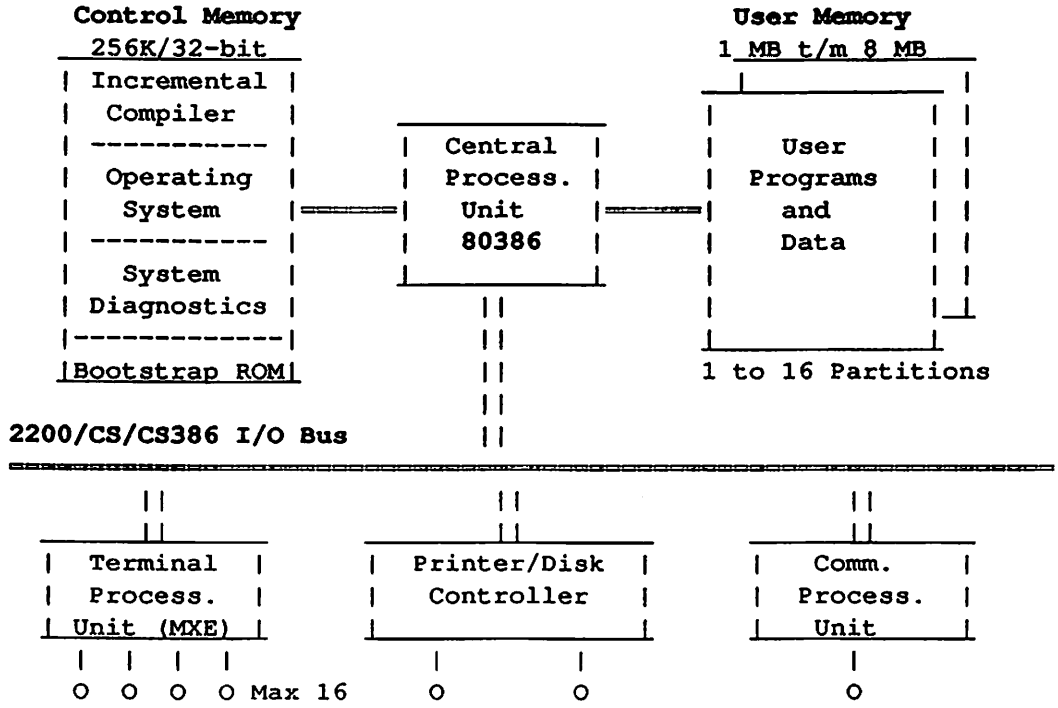
One can see the CS/386 computer line as the replacement of the successfull CS line. In fact, only the CPU board has been replaced by a new one which was designed around the Industrial Standard INTEL 80386 16 MHz processor. The new CPU is compatible with existing 2200/CS hardware (I/O) and software (program and data). You need a specific Operating System, BASIC 2/386 release 1.11 or higher.

The CS/386 is available in two models (-D and -N) and four user-memory configurations (1, 2, 4 and 8MB).

The CS/386-N will be delivered without internal DS disk drives and is ment for customers with existing disk units (DS, 2280, etc,).
The CS/386-D is delivered with a DSPC controller (Disk/Printer/MUX) and the desired DS-XX disk drives.

The CS/386-N and CS/386-D models are not available with CPU RAM (Data Memory) capacity of 128KB and 512KB, therefore the old CS models remain available.
The CS/386 Operating System BASIC 2/386 release 1.11 is software compatible with existing 2200/CS BASIC II Software.
The I/O part, 9 slots, is 100% compatible with every 2200 CPU.
Through upgrade kits you can upgrade a VLSI based CPU (MicroVP, CS) to a CS/386 CPU.

Schematic overview CS/386



Type indication

CPU without DSPC controller (-N type)		CPU with internal DSPC controller (-D type)	
Type	Memory	Type	Memory
CS-2N	= 128 KB CPU	CS-2D	= 128 KB CPU
CS-5N	= 512 KB CPU	CS-5D	= 512 KB CPU
CS/386-10N	= 1 MB CPU	CS/386-10D	= 1 MB CPU
CS/386-20N	= 2 MB CPU	CS/386-20D	= 2 MB CPU
CS/386-40N	= 4 MB CPU	CS/386-40D	= 4 MB CPU
CS/386-80N	= 8 MB CPU	CS/386-80D	= 8 MB CPU

Note: The old types CS-10N to CS-80D are no longer available after October 1989.

Differences between CS/386 and CS

HW:
* Faster
* Other CPU board
* More Control Memory (256k/ 32 bit SRAMs)
* 1M, 2M, 4M or 8MB Data Memory (8 bit DRAM's, 100 ns)

SW:
* No 5 kB Global Partition limit
* No 64 kB Partition limit, up to 8MB
* Needs at least BASIC 2/386 release 1.11
* Can read and write MS-DOS files on a 1.2M drive
* Uses more Data Memory for programs (fist rule = 2 times)

Similarity CS/386 with CS

HW:
* Uses same chassis (-N/-D)
* 16 Terminals / 16 Partitions
* Unused Data Memory addressable as CPU RAM disk
* Same I/O buss structure (speed, pin layout)
* The -D model uses a standard installed I/O controller (DSPC) for the internal DS-XX disk drives. This controller is placed in the left most I/O slot.
* Supports a maximum of 3 internal DS-XX drives :
  - One HH floppy drive
  - One HH tape drive
  - One HH or FH Fixed Winchester (max. 140 MB)

SW:
* Supports BASIC II statements, thus compatible with existing 2200/CS software.
* 2200 Diagnostic Package rev.. 18A4 (195-2956-0), can be used to test the CPU.

System Software

Multi User BASIC 2/386 Operating System release 1.11

Disk 1 of 2 (5 1/4" 320KB)	731-8016
Disk 2 of 2 (5 1/4" 320KB)	731-8017
Combination number	295-7432

Highlights

* Functions only on a CS/386
* Compatible with 2200/CS BASIC II software
* Update on $PACK/$UNPACK/BIN/VAL statements
* New statements :
  - DATALOAD/SAVE AC - Read or write of 512 Bytes sectors (MS-DOS) in an Alfa variable
  - SELECT NEW/OLD - Selectable new CS/386 or old 2200/CS file format program save mode
  - SPACE S/SK - Returns non declared Data Memory in bytes or the total systeem memory in kilobytes

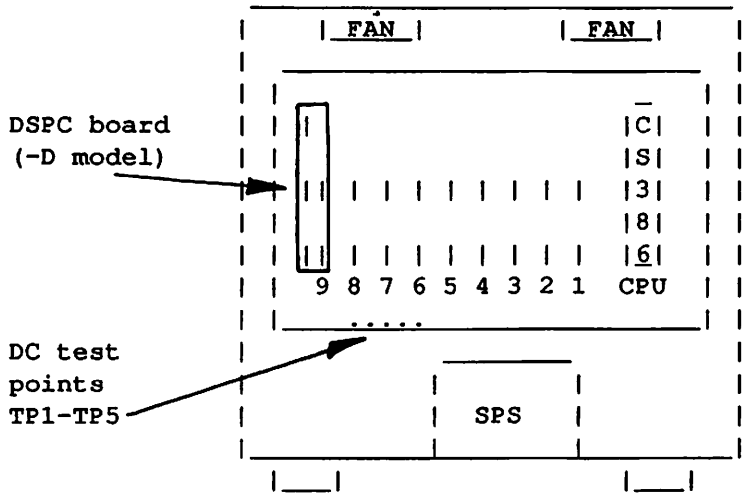
Further Operating System details you can read in the CS minibook update : 'BASIC II Operating System, general'.

Documentation

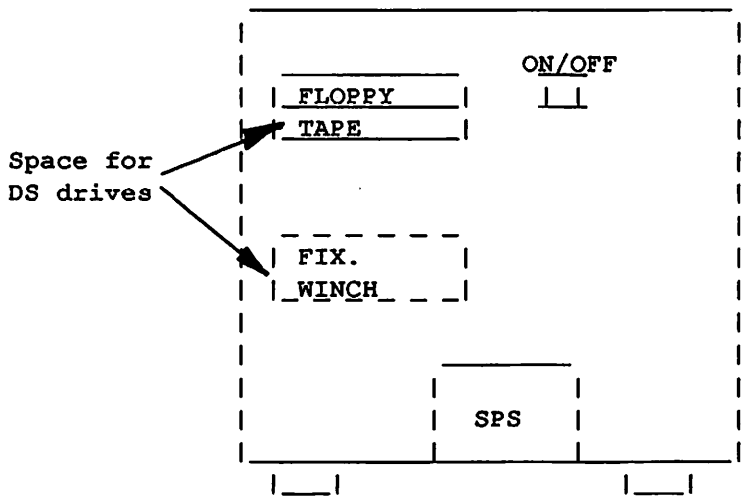
Operating System	
BASIC II Language Ref Manual	700-4080-E
1st update	700-4080-E-01
2nd update (CS/386)	700-4080-E-02
BASIC 2/386 O/S version 1.0 CSRN	715-2787
General	
CS/386 Data Sheet	715-2363-A
CS-D User Guide	715-2364
1st update (CS/386)	715-2364-01
Technical	
CS CE Maintenance Manual	741-1769
1st update	741-1769-2
2nd update (CS/386)	741-1769-3

CS/386 UNIT

Rear



Front



DC test points

The DC Voltages can be measured on TP1 - TP5 of the Mother Board 210-9560 :

TP1	+/-	0 V		
TP2	-	5 V	(- 5.05 to - 4.95)	
TP3	+	5 V	(+ 4.95 to + 5.05)	adjustable
TP4	+	12 V	(+ 11.95 to + 12.05)	adjustable
TP5	-	12 V	(- 12.05 to - 11.95)	

Partnumbers

Description		WPN
CS/386 CPU 1 MB	(CS/386-10)	212-7129-A
CS/386 CPU 2 MB	(CS/386-20)	212-7129-B
CS/386 CPU 4 MB	(CS/386-40)	212-7129-C
CS/386 CPU 8 MB	(CS/386-80)	212-7129-D
256K SIMM module		377-4516
1M SIMM module		377-4518
MOTHER BOARD		210-9560
DSPC CONTROLLER	(-D only)	212-7113
CABLE WINCH. I/O		220-3707
CABLE FLOPPY I/O		220-3708
CABLE TAPE I/O		220-3709
DC POWER SUPPLY	(SPS)	270-0890-1
12V DC FAN		270-3403

Identification CS/386 CPU boards

The CS/386 CPU board exists of 2 PCB's, the 210-9561 with the 210-9562 hooked to it.

CPU TYPE	CPU BOARD LOGISTICS	RAM MEMORY	RAM chip (SIMM)	L62 * PAL chip	J5 **
CS/386-10	212-7129-A	1 MB	4 SIMM (256/9)	377-3776	left
CS/386-20	210-7129-B	2 MB	8 SIMM (256/9)	377-3777	left
CS/386-40	210-7129-C	4 MB	4 SIMM (1MB/9)	377-3778	right
CS/386-80	210-7129-D	8 MB	8 SIMM (1MB/9)	377-3779	right

* Chip L62 (PAL, Program Aray Logic) is being used to address the amount of Data Memory on the board; every RAM capacity has a different PAL chip number.

** On the pins of J5, you can place a jumper on the left or right pins.

Remarks

1. The Build In Test diagnostics (BIT, flashing LED on floppy drive) on a -D type CPU takes up to 30 seconds. If the LED turns off, the CS/386 and internal disk drives are ready for use. Reset during the BIT will lenghten the wait-time.
   On the 386 board is another diagnostic LED, if this one remains on after BIT, the CPU board has failed, which in return results in only a cursor or partial text (MOUNT SYS).

2. You can upgrade a CS, CS-D, CS-N and Micro VP type CPU's to a CS/386. The upgrade kit contains a CS/386 CPU board (with the desired memory) and a CS/386 Country Kit (CS/386 Operating System and documentation).

3. Do not install release 1.0, which is standard delivered with the CS/386 unit or upgrade. Only release 1.11 or higher will function properly.

4. The CS/386 emulates the CS read/write mode, resulting in slow loading of older BASIC II programs on the CS/386. By saving the program with the 'SELECT NEW' statement you temporarily stop the emulation mode, resulting in faster loading, but also in bigger program files on disk (CS/386 format).
   When you get the error A05 (Line to long) on the screen while saving in the new mode, you should break the lines and try it again.

5. There are several TSB's available on the CS/386 for additional information :

HWG 9019 (9/26/89, matrix 4103)	New 386 CPU Board
HWT 9373 (12/12/89, matrix 4103)	Hardware tips CS/386
SWT 9225 (12/26/89, matrix 4301)	Software tips CS/386
SWG 9176 (3/27/90, matrix 4301)	Status CS/386

6. Use the highest hardware revision levels (E-rev) for a Disk MUX situation when using a CS386. The 2275MUX master controller (210-8824) must be at least E-rev 4, the 22C80 slave controllers (210-7715) must be at least E-rev 10.
   Also, be carefull not to mix-up Operating Systems with each other. Boot the CS from O/S 3.3 or higher and the CS386 from O/S 1.11 or higher.

Index

BASIC 2/386 Operating System releases

O/S 1.11

Remark * First stable CS/386 release
* Compatible with 2200/CS BASIC II statements (O/S 3.3)

Added * No 64 KB limit, 8 MB possible for one Partition
Global Partition no limit
SPACE S/SK
SELECT NEW/OLD
DATALOAD/DATASAVE AC

Update * $PACK/$UNPACK/BIN/VAL
MS-DOS files read/write in a 1.2MB drive

O/S 1.0

Remark * Unstable release, do not use !

BASIC II Operating System releases

O/S 3.3

Remark * Latest CS release

Added * PM060 support
* Support CS-N, CS-D
* Support 2536DW (max. 38400 BPS)
* MXE TC transport at 19200 BPS
* Create Reference File for Disk File Names (for tape backup).

O/S 3.1

Remark * First good CS release

Added * Support Data Memory up to 8MB
1MB for Partitions (1 off 61KB, 15 off 56KB)
7MB for RAMdisk
* DM50/300, LDP8-DSK and LCS15-DSK support
* LIST W DCT

Solved * Several problems

O/S 3.0

Remark * First release for CS, do not use this release
* Identical to 2200 O/S 2.7

Added * RAM disk support (address /340)
* DO/RESAVE/RENAME/Block Mode
* Upper/lower case input
* Error message description on screen
* Several program/debug features

O/S 2.7

Remark * Last 2200 CPU O/S release

Added * Max. 16 terminals/ max. 16 partitions
* New user-friendly Format Utility
* PM017/PM018 support
* 2258 VS link support

Solved * Printerdriver and Move problems with 3270 diskettes

BASIC II Operating System releases (cont'd)

O/S 2.6.2

Remark	* Maintenance release
Solved	* 2280 MUX hang problems and I90

O/S 2.6

Remark	* Min. 28KB Control Memory
	* Run one time only @MODSYSF to adapt @SYSFILE for release 2.6
Added	* New General Printer driver (@PM010V0/ @PM016V0)
	* SELECT DRIVER ON/OFF
	* Wild card search (LIST DCT ? *)

O/S 2.5.5

Remark	* Maintenance release
Solved	* Terminal hang problems

O/S 2.5

Remark	* Min. 24KB Control Memory
Added	* Communication possible with MXE (3 times LOAD)
	* New Disk Index structure possible (new hashing) SCRATCH DISK = old structure SCRATCH DISK' = new structure
	* $OPEN/$CLOSE

O/S 2.4

Added	* MXE/Option W (SVP)
	* @DATE/@TIME
	* $DISCONNECT
Solved	* Only I96 after three times repeat of a disk write

O/S 2.3

Added	* User memory to 512KB (MVPc/ LVPc)
	* Max. 13 terminals
	* Max. 16 partitions

O/S 2.2

Added	* #ID function
	* $ALERT statement

O/S 2.1

Added	* MVP/LVP
	* @BACKUP/@RECOVER/@MOVEFIL
Solved	* I90 after reset of a terminal
	* @FORMAT will release the disk

Remarks

1. 2200/CS/CS386 O/S releases are available in English only.

2. The BASIC 2/386 O/S will only function on a CS/386 based system. BASIC II O/S for CS (and older) will only function on 2200/CS systems.

3. Do not install BASIC 2/386 release 1.0, which is standard delivered with the CS/386 unit or upgrade. Only release 1.11 or higher will function properly.

4. BASIC II releases from 3.1 can only function on a CS or 2200 CPU with at least 28KB of Control Memory. An old 2200 CPU must have the highest E-revisions available.

5. Be carefull not to mix up Operating Systems with each other. Especially in a Disk MUX situation with CS and CS386 systems installed. Boot the CS from O/S 3.3 or higher and the CS386 from O/S 1.11 or higher. If the customer only has one disk, the best and simplest thing to do is boot the CS from Diskette (F.i. D10, 310) and the CS386 from Winchester (F.i. D11, B10).

BASIC-2 PLATFORM

Program Summary

1.0 Introduction

The objective of the BASIC-2 platform is to develop and maintain a series of industry standard hardware and software platforms that support the Wang BASIC-2 software language. Wang Laboratories now has the unique distinction of being the only manufacture that has been able to take mature (17 year old) architecture and move it to modern technologies. Only Wang can point to how we have taken care of one of the largest computer user bases.

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

CS/386:	The new INTEL 80386 CPUs, the CS/386-D and CS/386-N series of CPUs, designed to replace the CS VLSI series of CPUs.
PC2200:	PC2200 is a terminal emulator that allows an CS/386, CS, MICROVP or 2200 operator to use a Wang PC200/300 or other XT or AT compatible personal computer as a CS/2200 terminal. PC2200 provides the integration of BASIC-2 and MS-DOS functionality.
OPEN/Basic-2	OPEN/Basic-2 (KCML) is a BASIC-2 compiler (to be licensed from Kerridge Computer) that will allow 2200 applications to run under SCO Xenix or Unix, on Wang's PC 380 series and the OPEN/Server.

2.0 Product Descriptions

2.1 CS/386

- Supports all BASIC-2 statements making the new CS/386 CPUs software compatible with all existing 2200, MICROVP and CS software.
- Hardware compatible with all MICROVP and CS peripherals, I/O controllers and CS/DS options.
- The CS/386 CPU is on an average of 200% faster than a CS CPU
- A Partition can now be a maximum of 8MB versus 61KB on a VLSI CPU.
- All memory can be allocated to program versus 1MB on a VLSI CPU.
- Because of the large partition size, program overlays can be eliminated, resulting in a further performance increase.
- Single or multiple partitions of any size can be declared a global to all other partitions, versus a single 5K global on a CS/2200.
- A CS/386 CPU can read and write MS-DOS files on the DS 1.2.
- Any VLSI CPU can be field upgraded to a CS/386.

2.1.1 CS/386-II

- It is planned for Release 2.0 of the new 386 OS and the 33MHz CS/386, to be at least four times faster than the current CS/386 (which is twice as fast as a VLSI CS) and support 32-64 users/tasks (Jan. 1, 1991).

2.1.2 CS/386-III

- All releases up to this point, utilize the current 2200 Bus. This version will interface to the AT Bus and be the final phase in moving 2200 users to a 100% standard industry platform (Jan. 1, 1992).

2.2 PC2200

- Allows Wang PC200/300 PCs used as workstations on the CS/386, to run faster than a 2236, 2336, 2436 or 2536 workstation.
- BASIC-2 and MS-DOS files can be transferred back and forth between the PC and the CS/386.
- The operator can switch back and forth between a text mode MS-DOS program and a BASIC-2 application at the touch of a key.
- The entire Wang 2200 character set along with true box graphics are supported on Hercules Graphics Plus Monochrome and EGA/VGA color monitors.
- A setup menu emulating the setup screen and features of the 2536DW and includes the selection of 18 built in languages or a user defined set.
- A program is included which allows the users to define unique video and keyboard translation tables as well as unique font designs.
- The user can specify up to 16 color palettes (8 palettes when in 2200 character set mode) on EGA/VGA color monitors.

2.3 OPEN/Basic-2

OPEN/Basic-2 has been designed to preserve the best points of BASIC-2, while offering access to the facilities of a modern portable operating system - UNIX, and removing many of the hardware-imposed restrictions of BASIC-2 on the 2200.

OPEN/Basic-2 is an incremental compiler. This means that each line of a program is compiled into an efficient internal form as the lines are entered. The internal form is interpreted to run the program. OPEN/Basic-2 can later reconstruct the original lines to LIST programs if necessary. This preserves the interactive nature of BASIC-2, while allowing for highly efficient execution at run time.

Utilities are provided to convert programs for the 2200 individually or in batch to OPEN/Basic-2's internal form. Programs that write other programs or depend on the internal form of other programs will run under OPEN/Basic-2 with some modifications.

Contract to be signed in May, FCS July '90.

WANG LABORATORIES, INC. ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 508/459-5000 TELEX: 172108

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare General

NUMBER: HWG 9019 REPLACES: _____ DATE: 09/26/89 PAGE 1 OF 2

MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MICROVP

TITLE: 2200 Update - New 386 Prom Based CPU Board

PURPOSE:

To inform the field of a new CPU Board for the 2200 Product line and supply information for installing and testing.

EXPLANATION:

A new CPU mother/daughterboard for the 2200 has been designed using an Intel 80386-16 microprocessor. With the 386 microprocessor, CPU processing speed has been on the average doubled. The new CPU board, 212-7129-A/B/C/D, comes in 4 sizes and consists of a 210-9561 motherboard & a 210-9562 daughterboard. The only differences between the four are:

Part #	Mem Size	PAL at L62	SIMM Modules	UNDER L39 Jpr J5 (JP3)
212-7129-A	1 Meg	377-3776	4 256K in L10/L14/L27/L43	left
212-7129-B	2 Meg	377-3777	8 256K (full)	left
212-7129-C	4 Meg	377-3778	4 1M in L10/L14/L27/L43	right
212-7129-D	8 Meg	377-3779	8 1M (full)	right

UNDER L41 ABOVE L64
J4 (JP2) & J7
OPEN OPEN

COMPATIBILITY

The 386 board can be used in any of the CPU chassis' built for the single board CPUs which includes: MicroVP, CS, CS-N, & CS-D and is compatible to all boards used with those units. The 386 CPU cannot be used in MVPs or LVPs including those MVPs upgraded to use the VLSI single board CPU.

SOFTWARE

Using the 386 board requires a new Operating System. Basic-2/386 Multi-user O/S Rel 1.0 will be shipped with the board. This new O/S supports all existing Basic-2 statements making it compatible to existing software for the VP/MVP/SVP/LVP/MicroVP/CS CPUs. It can only be used to boot a CPU with a 386 board. The 386 O/S may be resident on the same disk with a standard Basic-2 O/S by making some minor changes to @BOOT and renaming the @MVP file for 1 of the O/Ss. This would allow both a standard 2200 Basic-2 CPU and a 386 CPU when mux'd to the same disk unit, to boot from the same disk address. Wang does not at this time ship an O/S disk with both type O/Ss resident because there is not enough room on a single floppy disk. Loading the 386 O/S is quite similar to the existing process for loading a standard O/S. If familiar with booting from the standard 2200 O/S, you should have no problem loading the 386 O/S if following the prompts.

GROUP: VS On-Line Support MAIL STOP: 001-330

WANG LABORATORIES, INC. ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 508/459-5000 TELEX: 172108

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare General

NUMBER: HWG 9019 REPLACES: _____ DATE: 09/26/89 PAGE 2 OF 2

MATRIX ID. 4103 PRODUCT/RELEASE# CS-D, CS-N, CS, MICROVP

TITLE: 2200 Update - New 386 Prom Based CPU Board

ADDITIONAL INFORMATION:

DIAGNOSTICS

As the 386 CPU is compatible to existing software, all current on-line diagnostics can be used. To test the CPU properly, the 2200 CPU Instruction Exerciser must be used as it should be with the VP/MVP/SVP/LVP/CS. The 2200 Diagnostic Package includes diagnostics for the CPU and most peripherals. The part # for the Package which includes documentation is:

195-2956-0 2200 Diagnostic Package rev 18A4

Problem running Multi-Disk Diagnostics with the 386 Board.

Some versions of Multi-Disk Diagnostics will not run as is with the 386 board. The message "CPU SOFTWARE MUST BE UPGRADED TO RUN THIS PROGRAM" will come up. Should you get this error, take the following steps to circumvent. When this error comes up, immediately key SHIFT/RESET and then LISTS. This will list out the first full screen of the program. Look for the line that has the message "CPU SOFTWARE MUST BE UPGRADED TO RUN THIS PROGRAM". If not on the screen key RETURN to load the next screen and continue this until the message is found. It should be on the 1st or 2nd screen. With ver 64A5 of Multi-Disk the line # is 140. The line begins:

140 P$=$PSTAT(1): IF STR(P$,10).....etc.

Two ways to temporarily circumvent would be:

1. Type in line #, 140 in above case, key RETURN, then RUN & RETURN.

or

2. Type in line #, 140 in the above case, key EDIT, then RECALL. Backspace to the 1st position after the 1st colon (:), and add the following instruction by keying INSERT to create space and typing in:

IF STR(P$,9,1)="W" THEN 150:

The 150 is the line number of the next statement line. This number may change dependent on version. Do not type in over any of the existing program. As shown, the above steps would only circumvent the problem and would have to be repeated each time the program is loaded. If familiar with Saving and Renaming files, the changes could be made permanent. If the changes are saved the 2nd method should be used.

GROUP: VS On-Line Support MAIL STOP: 001-330

WANG LABORATORIES, INC. ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 508/459-5000 TELEX: 172108

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9373 REPLACES: _____ DATE: 12/12/89 PAGE 1 OF 4

MATRIX ID. 4103 PRODUCT/RELEASE# MICROVP/CS/CS-D/CS-N

TITLE: Idiosyncrasies When Using 386 Prom Based CPU Board (212-7129x)

PURPOSE:

To aid the field in troubleshooting problems and idiosyncrasies which may result or occur when using the 386 CPU board.

EXPLANATION:

Over 100 386 CPU Boards have been shipped in new CPUs and as upgrades. Most are running very well and we are getting good reports of increased throughput. However, there are certain issues that need to be made clear and possible problem areas that need to be identified. The following is a list of hardware concerns associated with the 386 Board. Look for TSB SWT 9225, Matrix 4301 in the next week or two for a current list of software concerns.

1. Environment: The 386 CPU Board has a much faster clock than the VLSI single board CPUs (210-8937x & 210-8034) and as such could be more sensitive to environmental issues such as power, grounding, and static. The 386 board meets all FCC requirements. However, it is possible that marginal interference that could sneak in between time slices on a VLSI board could cause a failure with the 386 Board. If a customer has environmental problems, they must be addressed before installation if at all possible. Existing sites with environmental issues, even when they do not appear to be affecting performance, must have those issues documented and made known to the customer. The customer must be made aware of environmental concerns which at some point could present a problem.

2. E-rev: The problem of not having boards at the latest E-rev level is very common, especially when an account is not under Wang Maintenance. Although having the latest E-rev is preferable, the latest E-rev level is not always critical. Those boards that have been found to be critical are listed in this TSB. Other boards may need to be added to the list in the future.

GROUP: VS Systems Hardware MAIL STOP: 001-330

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9373 REPLACES: _____ DATE: 12/12/89 PAGE 2 OF 4

MATRIX ID. 4103 PRODUCT/RELEASE# MICROVP/CS/CS-D/CS-N

TITLE: Idiosyncrasies When Using 386 Prom Based CPU Board (210-7129x)

EXPLANATION (cont'):

3. Upgrades: When upgrading to a 386 Board, a much faster clock is being used. This could magnify a marginal problem with a controller board not seen with a slower CPU. Do not automatically assume the problem is the 386 board because all the controllers worked with the previous CPU.

4. Installation: There is some vertical play when inserting the 386 board into the CPU motherboard, possibly as much as 1/8". When inserting the 386 Board visually line up the contacts on the board with the contacts in the motherboard connectors to insure proper seating. There have been board failures in the field directly related to seating.

5. Addressing: All controller boards must have legal address switch settings even if not being used and not causing a problem in the current configuration. All switches off is not a legal address. For example, the only legal addresses for disk controllers are 310, 320, and 330.

Operating System

6. Within "@GENPART" the device table should have only one entry per disk controller address. There are three possible disk controller addresses on a system: /310, /320, and /330. For example, for controller /310, make a single entry /310, not an entry for each specific platter or tape streamer address like /D11, /D12, /D13, /D14, /D1F, /D51, or /D5F, etc. Additional entries could cause I92 errors if RESET is keyed while accessing disk.

7.Printer drivers - The CS/386 Rel 1.0 operating system has a bug when executing printer drivers. If experiencing these problems you need the next level of O.S. above Rel. 1.0 (when available).

8. The amount of memory space per partition on the CS/386 should be doubled when compared with the VLSI as a general rule of thumb. Variables for example, require more space for coding with the 386 board which will result in most programs requiring a larger partition size. If additional memory is not partitioned, it is possible A01 and A02 errors may occur.

GROUP: VS Systems Hardware MAIL STOP: 001-330

WANG LABORATORIES, INC. ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 508/459-5000 TELEX: 172108

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9373 REPLACES: _____ DATE: 12/12/89 PAGE 3 OF 4

MATRIX ID. 4103 PRODUCT/RELEASE# MICROVP/CS/CS-D/CS-N

TITLE: Idiosyncrasies When Using 386 Prom Based CPU Board (210-7129x)

EXPLANATION (cont'):

Disk Related

9. Both the DS board & the DPU board in a CS-D need a Rev 2 or greater prom. The prom rev level can be determined by running the DS Configuration Utility. Order FCO 1375, kit p/n 728-0386 for the DS & FCO 1376, kit p/n 728-0387 for the CS-D DPU Brd. This corrects a problem where a disk could hang or an error could occur if RESET is keyed while accessing disk.

10. When multiplexing CPUs to disk using a 2275MUX (210-8824), the 2275MUX must be minimum E-Rev 4. The 22C80 (210-7715) needs to be E-Rev 10. This corrects intermittent I90's, I92's, and hangs during heavy access.

11. If experiencing strange errors loading from or accessing disk, or running a program once loaded when using a 22C11 (210-7342 Printer/Disk Controller) or a Single Disk Controller (210-6541-2), try a different type disk controller. Other disk controllers include the Triple Controller (212-3012), or either of 2 other Dual Controllers, the 210-7042-2 or the latest version 210-9746 which is just going into production.

Tape Related

12. If using a DS Cabinet and the message "Not a DS Tape Cassette" comes up using the DS Utility Backup to Tape, the problem may be the Disk Controller. As in # 11 above, try another type Disk Controller. The problem appears to be related to the 210-6541-2 Single Disk Controller.

13. The new 150 Meg Tape Drive for the DS or CS-D requires a rev 3 prom in the DS or on the DPU brd in a CS-D. Use the FCO kits referred to in # 9.

Workstation/Printer Related

14. If using a 2536DW with a daisy wheel printer as a local printer (address 204) and the printer is dropping characters, the terminal needs a minimum E-rev 2 board (210-9557A).

GROUP: VS Systems Hardware MAIL STOP: 001-330

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9373 REPLACES: _____ DATE: 12/12/89 PAGE 4 OF 4

MATRIX ID. 4103 PRODUCT/RELEASE# MICROVP/CS/CS-D/CS-N

TITLE: Idiosyncrasies When Using 386 Prom Based CPU Board (210-7129x)

EXPLANATION (cont'):
Printer Related

15. If using a 2273 Band printer and it is intermittently adding &/or dropping characters, you need the next level of the CS/386 O/S above Rel 1.0 (when available). A maintenance release is available now on an as needed basis.

16. If the 2273 Band Printer is ON and Selected while the system is being powered on or possibly when just loading the Operating System you may not be able to Deselect or print without first powering the printer off.

Workstation Related

17. When powering up a terminal attached to an operating CS/386 system, wait for the 'READY (BASIC-2) PARTITION #' message to show before depressing any keys, especially "SHIFT/RESET." You can blow the O/S or loose the workstation until the system is rebooted. R&D is working on a fix.

18. The 2536DW should have a minimum Rev 1 prom (379-8504) per ECO 55643. It corrects cursor control problems especially at lower Baud rates & some minor bugs associated with certain foreign languages. There is no FCO.

19. The 2536DW Workstation is basically a modified 4230A VS Workstation. The first shipments of 2536DW went out with VS keyboards. These VS style keyboards make the 2200 system much more vulnerable to static interference. The VS keyboard can be identified by looking at the 1st SF' (Special Function) key. If the key is marked 1 it is VS, 0 it is 2200. There is also a 2nd problem with the keyboard to do with static. The board inside should have foil on it and this can be checked by looking thru the holes on the rear feet of the keyboard. This is being addressed. The correct keyboard is part # 279-0904US.

***If you have a customer experiencing problems with a 386 CPU Board or have questions concerning this TSB, please call Mike Bahia at 508-656-0256.

GROUP: VS Systems Hardware MAIL STOP: 001-330

WANG LABORATORIES, INC. ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 508/459-5000 TELEX: 172108

WANG

TECHNICAL SERVICE BULLETIN
SECTION: SoftWare Technical

NUMBER: SWT 9225 REPLACES: _____ DATE: 12/26/89 PAGE 1 OF 3

MATRIX ID. 4301 PRODUCT/RELEASE# CS/386 Release 1.0 Operating System

TITLE: Software Idiosyncrasies with the CS/386

PURPOSE:

To inform the field of problems and differences using the CS/386 O/S.

EXPLANATION:

Although most software running on a VP, MVP, LVP, or CS type CPU can be run as is on the 386 board, there are cases where changes may need to be made. There are also some bugs that have been identified. The following is a current list of problems and concerns. See TSB HWT 9373, Matrix 4103 published 12/12/89 for a current list of hardware concerns.

Partitioning the System:

1. The amount of memory space per partition on the CS/386 should be doubled when compared with the VLSI as a general rule of thumb. Variables for example, require more space for coding with the 386 board which will result in most programs requiring a larger partition size. If additional memory is not partitioned, it is possible A01 and A02 errors may occur.

2. Any partition can be any size up to the maximum available memory (8MB). There are possibilities where increasing the partition size could create a problem. Certain sort modules and possibly other programs may expect a 56KB partition and changing that parameter could cause a failure. The software vendor would need to correct this.

3. Any partition of any size can be global to any other partition. You do not have the concept of bank partitions.

4. Within "@GENPART" the device table should have only 1 entry per disk controller address & the number of terminals should not exceed the number of terminal ports available. There are only 3 disk controller addresses: 310, 320, & 330. For example, for controller 310, make a single entry /310, not an entry for each specific platter address or for tape like D11, D12, D1F, D51, or D5F. Additional entries could cause I92 errors if RESET is keyed while accessing disk. Entering more terminals than physically possible, especially if using a Triple Controller has caused problems.

GROUP: VS Systems Hardware MAIL STOP: 001-330

WANG LABORATORIES, INC. ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 508/459-5000 TELEX: 172108

WANG

TECHNICAL SERVICE BULLETIN
SECTION: SoftWare Technical

NUMBER: SWT 9225 REPLACES: _____ DATE: 12/26/89

MATRIX ID. 4301 PRODUCT/RELEASE# CS/386 Release 1.0 Operating System

TITLE: Software Idiosyncrasies with the CS/386

EXPLANATION (cont'):
Operational Problems and Concerns:

5. The floating point mathematics on the CS/386 assures accuracy to 10 digits compared to 13 digits with previous 2200 CPUs. This could cause the 9th thru 13th numbers to the right of the decimal point to be slightly different after a calculation from the answer on an older type 2200 CPU, especially if multiple math operations are done.

6. There has been a problem identified using advanced math functions that may create an incorrect result. A fix will be in the next release of the O/S and is available now in maintenance release 1.04 on an as needed basis.

7. For any software package that looks for CPU type, the partition status line byte 9 is coded "W" on a CS/386, "V" on a VP, and "M" for a LVP/MVP/CS. On certain versions of TOM software currently running on LVPs, MVPs, or CSs for example, the system won't come up on a 386 CPU board as it sees the CS/386 as a wrong CPU. Contact TOM or the appropriate vendor for a fix. Wang's ISS Utility has to be corrected for this. The problem is found on line 420 of program "ISS.000M":

```
420 A$=$PSTAT(#PART):IF STR(A$,9,1)="M" THEN S3=4:.....etc
```

8. If the current 2200/VLSI software makes decisions on the partition status line bytes 10 and 11, the software may require an update to run on the CS/386. Under the MVP O/S, byte 10 denotes memory bank, byte 11 denotes the amount of partition memory. On the CS/386, partition status bytes 10 and 11 signify the amount of partition memory (there are no banks).

Disk Related:

9. The second digit of the first byte of a header record for a program file sector must be 0. On older 2200 systems it did not matter if the second digit was non-zero. This could cause an error A01 with the 386. Legal program header records must begin with hex 40, 50, 60, or 70.

GROUP: VS Systems Hardware MAIL STOP: 001-330

WANG LABORATORIES, INC. ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 508/459-5000 TELEX: 172108

WANG

TECHNICAL SERVICE BULLETIN
SECTION: SoftWare Technical

NUMBER: SWT 9225 REPLACES: _____ DATE: 12/26/89 PAGE 3 OF 3

MATRIX ID. 4301 PRODUCT/RELEASE# CS/386 Release 1.0 Operating System

TITLE: Software Idiosyncrasies with the CS/386

EXPLANATION (cont'):
Printer Related:

10. The 2273 Band printer may add &/or drop characters intermittently with Rel 1 of the CS/386 O/S. The fix is in maintenance rel 1.03 available now on an as needed basis until the next release of the O/S is available.

11. Printer drivers - Rev 1 of the 386 operating system has a bug when executing printer drivers. If experiencing these problems you need the next level of O/S (when available). A maintenance release is available.

Workstation Related:

12. If EDIT/RECALL is used to recall a long line of program text an error A05 could occur. In re-coding the O/S for the 386 Processor some instructions as well as variables required more space. Split the line between 2 line numbers as a workaround if necessary. R&D is working this.

13. PC2200 (195-7560-X) is the recommended Terminal Emulator if using a PC (XT or AT compatible) as a workstation. PC2200 emulates a 2536DW workstation. There may be a problem coming in and out of emulation with the PC while the CS/386 CPU is operational. When a terminal is powered off or logically disconnected (PC world), the 386 totally ignores it to save time. If the PC is reloaded with the 2200 emulator, avoid hitting any keys, especially the RESET function until the screen is updated by the 386 and either 'READY (BASIC-2) PARTITION #' or the current 2200 program is on the screen. If the 386 receives a signal such as RESET before it has found out the terminal is reconnected, the O/S could be blown. This problem has not been verified with the PC but R&D is working on a related problem with the 2536DW. See TSB HWT 9373, Matrix 4103, item 17.

Tape Related:

14. The DS Tape Utility has a problem going beyond 99mb. In program "@DSTAPEB" at line 1010 the number of #'s in parenthesis must be increased from 5 to 6 as shown: 1010 : : : CONVERT VAL(C$,3) TO C5$,(######)

GROUP: VS Systems Hardware MAIL STOP: 001-330

MICHAEL E BAHIA
PROJ# L097 (1 COPIES)
M/S: 001-330

WANG LABORATORIES, INC. ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 508/459-5000 TELEX: 172108

TECHNICAL SERVICE BULLETIN
SECTION: SoftWare General

NUMBER: SWG 9176 REPLACES: _____ DATE: 03/~~26~~27/90 PAGE 1 OF 3

MATRIX ID. 4301 PRODUCT/RELEASE# CS/386 CPU

TITLE: 386 Update

PURPOSE:

To make the field aware of current information and concerns involving the 2200 '386' board.

EXPLANATION:

There are now over 200 '386' boards installed and the count is growing daily. For those familiar with the history of the board over the last several months, things have quieted down quite a bit and most accounts are running 100% error free.

Maintenance Release 1.08 has been sent to all Regions, Europe, and Australia and is currently the preferred O/S. It should be installed at this time at all new sites and any existing sites experiencing errors which may be attributed to the O/S. If a customer is currently running error-free on a previous release of the O/S and there is no pressing need to upgrade, it may be best to wait for the next 'general release' of the O/S expected out sometime this spring. This general release will fix all known problems and be sent out to all regions for distribution.

Although Maintenance Release 1.08 is running error-free at most sites there are some known bugs. These problems for the most part are rare, occurring only under unique circumstances. The following are the most notable known problems with 1.08:

1. Under certain conditions, doing a COPY or running a back-up while a disk unit is still being actively used could hang the system. If RESET is keyed after a hang only a cursor will appear on the screen. The circumvention is to avoid doing a COPY or backing up a disk unit still being utilized by users. In some cases if $OPEN and $CLOSE are being used by other users, bracketing the COPY statement with a $OPEN and a $CLOSE can also circumvent the problem. A permanent fix is being tested at this time and will be in the next general release. A maintenance release may be available for those customers who may not want to wait.

M O R E

GROUP: VS Systems Hardware MAIL STOP: 001-330

WANG

TECHNICAL SERVICE BULLETIN
SECTION: SoftWare General

NUMBER: SWG 9176 REPLACES: _____ DATE: 03/~~26~~27/90 PAGE 2 OF 3

MATRIX ID. 4301 PRODUCT/RELEASE# CS/386 CPU

TITLE: Update

EXPLANATION (cont'):

2. LISTV sometimes may fail with an error such as S24. If you try to continue on, the system could come down. CLEAR the partition and reload your program to avoid bringing the system down. LISTV works in most cases. A fix is being tested now and will be in the next general release.

ADDITIONAL INFORMATION:

After upgrading to the 386 board there have been several cases where performance has been negatively affected running certain programs. In all legitimate cases the problem stemmed from an excessive number of program overlays, programs loading programs into memory. The reason this affects performance is the 386 is coded in binary while all non-386 CPU's use BCD, binary coded decimal. All programs are in BCD format and must be converted to the 386 format when loaded. Because the 386 requires this extra step to recode a program to 386 format, in most cases the LOAD will take longer. This does not have to be the case. Two new instructions for the 386, 'SELECT NEW' and 'SELECT OLD' allow you to save a program in either 386 or BCD format respectively. If the SELECT NEW statement is executed and a program is then saved, it will be in the 386 format and will not require re-coding when loaded into memory. Once in the 386 format, program loading will be at least as fast as it was with the non-386 CPU while processing time once loaded in memory will be much faster. The system will default to the OLD format on IPL.

There are two things to note when a program is in the 386 format. One is it can no longer be read by a non-386 CPU. However, it can be reloaded into memory and by using 'SELECT OLD' can then be saved back in the old format. The second is a program takes more space in the new format and most likely will not fit in the same space on disk. Programs with long lines may need those lines split between 2 lines to fit within the 256 byte disk sector limit. When listing a disk, programs saved in the new format can be identified by the (') mark following the P which identifies the file type as a program. Data files are loaded as is with either CPU type and therefore will have no effect on performance. Converting programs to 386 format should be done by the customers programmer or the system administrator and not by Wang.

M O R E

GROUP: VS Systems Hardware MAIL STOP: 001-330

TECHNICAL SERVICE BULLETIN
SECTION: SoftWare General

NUMBER: SWG 9176 REPLACES: _____ DATE: 03/27/90 PAGE 3 OF 3

MATRIX ID. 4301 PRODUCT/RELEASE# CS/386 CPU

TITLE: Update

ADDITIONAL INFORMATION (cont'):

As previously mentioned, programs saved in the new format show a (') mark after the P for file type when the disk catalog is listed. The @MOVEFIL utility used to add files to an existing disk catalog has a problem where it changes the 386 identifier byte in the program header which results in the (') mark being left out when moving programs in the new format. The programs are still in the 386 format though and usable. This will be fixed with the next general release of the O/S.

Be aware if using the RESAVE command that the existing file to be overwritten on disk is scratched immediately whether or not enough space exists for the new file. If the new file was too large an error would be returned and the existing file would no longer be usable. The circumvention here would be to save the file to be overwritten under another name before re-saving over it if unsure of adequate space.

For those who are new to the 386 board, please refer to the following TSB's for additional information:

HWG 9019	Matrix 4103	9/26/89	- 2200 Update - New 386 CPU Board
HWT 9373	Matrix 4103	12/12/89	- Idiosyncrasies using 386 CPU Board
SWT 9225	Matrix 4301	12/26/89	- Software Idiosyncrasies with the 386

IMPORTANT NOTE:

There is now a 2200 Software Support person in place at the home office to handle incoming 2200 Software PTR calls. All 2200 Software calls should be addressed to the RSC's where they should be screened and if necessary escalated as PTR's by the RSC's as any other software call would be. Until further notice all 2200 Software calls escalated by the RSC's should be sent to RDB 8760.

If you have questions concerning this TSB or 2200 concerns which you are having difficulty getting assistance with locally, please call:

Mike Bahia,	2200 Hardware Support	508-656-0256
Al Grant,	2200 Software Support	508-967-1556

GROUP: VS Systems Hardware MAIL STOP: 001-3[illegible]

WANG LABORATORIES, INC. ONE INDUSTRIAL AVENUE LOWELL, MA 01851 • TEL: 508/459-5000 TELEX: 172108

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9449 REPLACES: _____ DATE: 05/22/90 PAGE 1 OF 2

MATRIX ID. 4103 PRODUCT/RELEASE# 2200 CS-D/N

TITLE: DPU Disk Port & Jumper Information/Part Number Correction

PURPOSE:

To inform the field of the purpose of the disk/mux port and jumper on the 212-7113 DPU Board which is not documented and to provide the field with the correct part numbers for the Power Supply & On/Off switch.

EXPLANATION:

Every CS-D CPU comes with a 212-7113 DPU Board used to control all internal drives. The DPU Board consists of a 210-9558 Motherboard which has two I/O connectors and a 210-9559 Daughter Board. The top connector is a standard system printer port. The bottom connector is a disk/mux port. The disk/mux port is used to allow access to the internal CS-D drives by other CPUs. This port is activated by the MUX/BUS jumper located on the 210-9558 motherboard up next to the rail between the 2 I/O connectors.

Normally this jumper will be in the BUS position. This causes the disk/mux port to be inactive allowing only the internal CPU to have access to its drives. When the jumper is moved to the MUX position all access must be through the disk/mux port including access by the CS-D CPU itself.

In the MUX position, the drives and DPU Board should be thought of as a separate device much like the DS Cabinet or the 2275. The disk port on the 212-7113 DPU Board is the I/O connector similar to the I/O connectors on the back of the DS & 2275. Any CPU requiring access to these drives must now have a disk controller cabled to this port. Normally when in the MUX position a 2275MUX Master Board, 210-8824, would be installed in the I/O section with a cable from its disk port to the disk/mux port of the DPU Board. This connection allows the CS-D to access the internal CS-D drives. Other CPUs (up to 16 can be mux'd) using 210-7715 boards can be cabled (100' max) to the 2275MUX Master CPU ports allowing them access to the internal CS-D drives.

EXPLANATION (cont'):

Of course, a standard disk controller in any CPU could be cabled directly to this port, but that would limit access to only that CPU. When used in the MUX position, the disk controller in the CPU accessing the drives determines the device address via the device address switch bank on that board. This overrides the device address set on the CS-D DPU Board. This is the same way it is done on all similar 2200 disk connections.

Switch settings for the CS-D DPU Board can be found on a sticker on the right side panel of the CS-D cabinet. These switch settings are correct. Appendix A of the CS Maintenance Manual, 741-1769-2, covers the CS-D & CS-N CPUs and on page A-38 incorrectly shows the drive type switch settings. What is shown as ON should be OFF and vice versa. There is also added confusion as the sticker & manual do not agree on the switch labeling and the male connectors on the sticker do not match the board. Use the side panel for sw settings but beware, labeling may not match. To access, remove the top cover by removing the two screws in back. The side panel can then be removed by sliding it up. The correct sw settings are:

210-9558 Motherboard

SW 1 - Winc Drive Type - between L8 & L13 near bottom of board

No Winc = All OFF	10 Meg Rem Winc = 5 ON only
10 Meg Winc = 6 ON only	20 Meg Winc = 5,6 ON only
32 Meg Quantum Q540 = 7 ON only	64 Meg Winc = 5,7 ON only
140 Meg Maxtor = 6,7 ON only	32/42 Mg Micropolis = 5,6,7 ON
112 Meg Maxtor = 8 ON only	

SW 2 - Printer Address - next to L69 just above connector J5

215 = 1,3,5 ON only 216 = 2,3,5 ON only 217 = 1,2,3,5 ON only

SW 3 - Drive/s Device Address - between L76 & L77 at top of board

310 = 5 ON only 320 = 6 ON only 330 = 5&6 ON only

210-9559 Daughter Board

SW 1 - Factory Use Only - 8 bank sw at top of board ALL OFF

SW 2 - Floppy/Tape Switch - 4 bank switch at bottom of board

1 OFF = 320 Kb Floppy	1 ON = 1.2 Meg Floppy
2 OFF = No Tape	2 ON = Tape Drive installed
3,4 = OFF (not used)	

ADDITIONAL INFORMATION:

Also in Appendix A of the CS Manual, 741-1769-2, on pages A-54 and A-55 the AC On/Off Switch and the CS-D/N SPS-255 Power Supply have incorrect part numbers. The part numbers shown are for the CS. The On/Off switch is not physically compatible and although both CPUs use the same base Power Supply the harness is different. The correct part numbers are:

CS-D/N On/Off Sw 325-0105 CS-D/N SPS-255 Power Supply 270-0890-1

To:
Subject: Disk contoller for CS386?

Distribution:

None, this item is In Progress

To: Mike Bahia From: David Keight
Subject: Disk contoller for CS386? Date Sent: 01/26/90

Mike,

I've been asked to send you this office by a dealer in Bristol UK. He has already spoken to Ken Proffitt (UK National Support), who suggested asking you the following:

TSB HWT9373 Item 11 says that the 210-7342 and 210-6541-2 give problems with the CS386, and that the 212-3012 (triple controller) should be used.
However, page C1 of the introduction manual for the CS386 (715-1213), supplied with the CS386 says that the triple controller is not supported.
Can you advise which controller should be used ???

Regards,

Dave Keight, Wang Bristol, UK South West

---------- Reply ----------

Dave,

The Triple Controller is definitely supported. Have not seen that manual but if it says it is not supported then it is in error. Only 1 Triple Controller can be used /CPU & it not be used if 4 MXE/MXD's are already installed. The 6541-2 has a problem with the 5 1/4" Tape Drives but should be ok w/ disk. In some cases there could be a problem w/ the Dual Controller but you won't know until you try & this does not mean the next Dual will fail. The Dual Controller will be replaced by a new Dual Controller shortly.

Regards,
Mike

Item Subject: New CS/386 Pricing

To : Tim Mooney

From: Gene Schulz

Subj: CS/386 Product Line Repricing

Date: November 11, 1990

The following are the old and new prices for the CS/386 Product Line. CPU prices is effective 12/1/90 but won't appear in FOCUS until 1/1/91. Disk pricing is effective 11/1/90:

MODEL	MEMORY	PRICE OLD	PRICE NEW
CS-2D	128K	4,950	N/A
CS-S2D	128K	6,800	N/A
CS-5D	512K	6,400	4,950
CS-10D	1MB	7,500	6,400
CS/386-10D	1MB	8,500	6,500
CS/386-20D	2MB	9,500	7,500
CS/386-40D	4MB	10,500	8,500
CS/386-80D	8MB	12,500	9,500
CS-2N	128K	3,950	N/A
CS-5N	512K	5,400	3,950
CS-10N	1MB	6,500	5,400
CS/386-10N	1MB	7,500	5,500
CS/386-20N	2MB	8,500	6,500
CS/386-40N	4MB	9,500	7,500
CS/386-80N	8MB	11,500	8,500
UJ-6048	VLSI To 1MB 386	3,500	2,000
UJ-6049	VLSI To 2MB 386	4,500	3,000
UJ-6050	VLSI To 4MB 386	5,500	4,000
UJ-6051	VLSI To 8MB 386	8,000	5,000
UJ-6052	1MB To 2MB	1,500	1,500
UJ-6053	1MB To 4MB	3,000	2,500
UJ-6054	1MB To 8MB	5,500	3,500
UJ-6055	2MB To 4MB	2,500	1,500
UJ-6056	2MB To 8MB	5,000	2,500
UJ-6057	4MB To 8MB	4,000	1,500

One major complaint that John D. had was if they moved their latest 1MB package to CS/386, they needed to go to a 2MB CS/386, as a CS/386 needed 70-80% more memory. UJ-6049 now costs $500 less than it use to cost to go to

1MB (UJ-6048) CS/386 upgrade. Also note that 128K has been discontinued and replaced with 512K at the same price. It also costs $100 less to buy a 1MB CS/386 than a 1MB CS-D/N.

Here some other interesting cost comparisons:

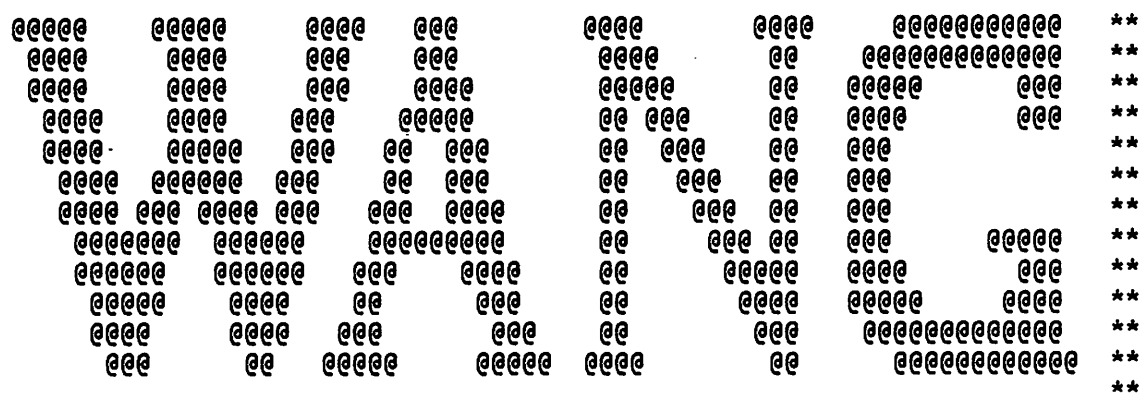
MODEL	DESCRIPTION	SELL
UJ-5056	MicroVP 128K To 512K	2,400
UJ-5057	CS 128K To 512K	1,995
UJ-5065	CS 128K To 1MB	3,150
UJ-5066	CS 128K To 2MB	4,200
UJ-5069	CS 512K To 1MB	2,100
UJ-5070	CS 512K To 2MB	3,150
UJ-6048	VLSI To 1MB CS/386	2,000
UJ-6049	VLSI To 2MB CS/386	3,000

It now costs less or is equal in cost to go to a 1MB CS/386 upgrade versus a 128 to 512K VLSI upgrade or a 128/512K to 1MB VLSI upgrade.

DISK PRICING

MODEL	STORAGE	PRICE OLD	PRICE NEW
DS		2,500	2,500
DS-320	320K	175	175
DS-1.2	1.2M	200	200
DS-20	20M	600	595
DS-32	32M	1,300	995
DS-64	64M	2,500	2,095
DS-140	140M	5,200	5,500
DS-TS150	150M	1,500	1,500
DS-150A	150M	1,600	1,600

VS # 089



CUSTOMER ENGINEERING

FINAL

MAINTENANCE PLAN

VS/2200/OA NEW PRODUCTS

June 6, 1989

CS/386-N and D

J. P. Costello
New Products Engineer
Joseph P. Costello

Ibrahim Azar
New Products Manager
Ibrahim Azar

Sheila D. Mitchell
Product Line Manager
Sheila Mitchell

Henry A. Schinnagel
Product Line Director
Henry A. Schinnagel

TABLE OF CONTENTS

I. PRODUCT DESCRIPTION

A. OVERVIEW OF THE PRODUCT

The 2200 VLSI CPU board has been redesigned around a new platform, the Intel 80386-16 microprocessor. The 386 CPU assembly (212-7129-X) consists of a mother board (210-9561) and a daughter board (210-9562). The CS/386-D(N) are available with either 1 MB (CS/386-10D and 10N), 2 MB (CS/386-20D and 20N), 4 MB (CS/386-40D and 40N), and 8 MB (CS/386-80D and 80N) of user memory.

- The CS/386-10D thru 80D will replace the CS-10D thru 80D models in the current product line. The CS-2D and CS-5D will be retained in the product line as entry level systems. These systems may be upgraded to 386 based systems by replacing the VLSI CPU board with a 386 CPU assembly and loading the 386 operating system. The CS/386-D models will offer the same internal disk options as current CS-D models.

  The CS/386-10N thru 80N will replace the CS-10N thru 80N in the current product line. The CS-2N and CS-5N will be retained in the product offering. These systems may be upgraded to 386 based systems by replacing the VLSI CPU board with a 386 CPU assembly and loading the 386 operating system. The CS/386-N models offer no internal storage and are used with external disk (DS cabinet). CS/386-N models may be upgraded to CS/386-D models by ordering the CS-N to CS-D upgrade kit (UJ-6047).

B. SIMILARITIES/DIFFERENCES (with other WANG products)

1) Software:
   The 386 based system requires a new operating system. Release 1.0 of the BASIC-2/386 Multi-user operating system (OS) will ship concurrently with the hardware. The new OS supports all BASIC-2 statements, making it compatible with all existing 2200, MicroVP, and CS software.

2) Hardware:
   The CS/386 systems will support all peripherals, I/O and communications controllers supported on the VLSI system. The new CPU assembly will use the same motherboard, power supply, disk processor unit (DPU), and internal cables as the current CS models.

3) Other:
   The CS/386 CPU's have unique memory upgrade kits because the CS/386 models use a different memory addressing scheme than the current CS models. They cannot use CS upgrade kits.

C. ANNOUNCE/FIRST CUSTOMER SHIPMENT DATE

1) Domestic:	Announce:May 15, 1988 Volume Ship:August 1989	FCS:July 1989
2) International:	Announce:May 15, 1988	FCS:July 1989

D. SERVICE OFFERINGS/WARRANTY

This product will be installed by Customer Engineering personnel, and maintained by Customer Engineering 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 CPU may be divided into the following functional areas:

1) CPU:
This product uses the Intel 80386-16 32-bit high performance microprocessor chip. The chip is packaged in ceramic and has 132 pins for its different buses and signals as described in the Intel 80386 Hardware Reference Manual. The CPU includes a Real Time Clock (RTC). Previous 2200 systems required the customer to purchase an MXE in order to have an RTC. The RTC is powered by a 4.6 volt battery. The battery is provided with an adhesive backing so that it can be attached to the chassis.

2) Memory System:
The 386 CPU supports 256KB of control memory. User memory is organized as 1 MB (4-256KB x 9 bit SIMM's), 2 MB (8-256KB x 9 bit SIMM's), 4 MB (4-1MB x 9 bit SIMM's) or 8MB (8-1MB x 9 bit SIMM'S).

3) Bootstrap EPROM:
There is 16 KB of EPROM resident on the daughter board (210-9562). The bootstrap EPROMS provide the initial program load and execute the built in test (BIT) at power up.

4) Other:
The CS/386 systems uses the same motherboard, power supply, disk processor unit (D models only), and internal cables as the current CS models.

The CS/386-D models support the same internal storage devices as current CS-D models including a 320 KB or 1.2 MB floppy drive, a 45 MB streaming cartridge tape drive, and one fixed winchester. The winchester may be either a 20 MB, 32 MB, 64 MB, or a 140 MB. The 140MB may be formatted as fourteen 10 MB platters or seven 16 MB platters.

G. CONFIGURATION REQUIREMENTS

The 386 CPU/Memory assembly will be configured in 1 MB, 2 MB, 4 MB, and 8 MB versions. The 1 MB and 2 MB versions will utilize 256 KB SIMM modules. The 4 MB and 8 MB versions will utilize 1 MB SIMM modules. A jumper (JP3) must be set to indicate which SIMM modules, 256KB or 1MB, are on the board. The PAL chip located at L62 will determine addressing capacity and must be compatible with the amount of memory loaded on the assembly.

On the DPU (CS/386-D models only) the CE must set switches to indicate the floppy drive type, if the cartridge tape drive is present in the system, and the capacity of the winchester drive installed in the system. Switches for the disk and printer address must also be set. The DPU must be installed in I/O slot number 9.

The internal winchester disk drive may be multiplexed with up to 16 CPU's by using a combination of 2275MUX and 2275MUXE controllers (CS/386-D models only). This is accomplished by cabling the MUX port on the DPU to the 2275MUX controller and setting the jumper on the DPU to the MUX position.

II. MAINTENANCE PHILOSOPHY

A. Maintenance Objectives

1) C.E. Level:
This system is a redesign of the VLSI 2200 CPU. Effective maintenance of the system will require the following:

a) Skillful cause analysis at the system level.

b) Knowledge of the diagnostics on the 2200 system.

c) Knowledge of the overall system configuration.

2) Maintenance Procedures:
Maintenance on this product will be performed on-site by a Wang Customer Engineer. Currently existing diagnostics will aid the CE in isolating hardware failures to the failing board. When a board failure occurs, that board will be replaced with a board from C.E. stock and the bad board 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, and the system in which it is installed, the Customer should observe the Environmental Considerations outlined in the CUSTOMER SITE PLANNING GUIDE (part # 700-5978) section 4.

2) WANG C.E. performed:
This product will not require P.M.

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

D. Diagnostics required:

1) The CS/386 will utilize the same disk loadable CPU/memory diagnostics as the CS-D(N). In addition the CS/386 CPU assembly incorporates an on board built in test that uses an LED on the assembly as well as screen messages (if possible) to indicate CPU failure. A prom based built in test has been provided on the DPU (CS/386-D models only). This will aid the CE in isolating problems to the DPU.

III. TRAINING

The CS/386 will be included in the 2200 System training classes as they are scheduled. Previously trained 2200 Customer Engineers will be updated via the Technical Service Bulletin (TSB) and PUB's to existing 2200 Product Maintenance Manuals.

A. CUSTOMER ENGINEER COURSE

1) COURSE OBJECTIVE:
The training objective will be to 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 CS/386 will be included in the 2200 training class. Currently, 2200 classes are scheduled once per quarter. The Product Maintenance Manual and TSB will be distributed before FCS date.

3) PREREQUISITES:
The 2200 System Course prerequisites are:

a) 6 months field experience following New Hire Training.

B. SALES SUPPORT COURSE

1) TIMETABLE and FORMAT
TBD

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	(17 to 28 deg c)

B. Voltage Range

115vac, +/- 12 volts, 60 hz. +/- 0.5 hz.
230vac +/- 24 volts, 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

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

E. Service Space Requirements

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

F. Input Current

2.0 amps @ 115V 60hz (running)
1.0 amps @ 230V 50hz (running)

G. Input Power

170 Watts
230 VoltAmps

H. Power Factor

0.74 lagging

I. Heat Loss

581 BTU/hr (146.4 KgCal/hr.)

J. Leakage Current

0.2 Ampere @ 115V 60hz 0.2 Ampere @ 230V 50hz

VI. POWER CORD DATA

A. Plug Type
NEMA 5-15 120V

B. Length
6 Feet (1.8 Meters)

VII. DOCUMENTATION LIST

A. PRINTS:.....210-9561
210-9562
210-9560
210-9558
210-9559
270-0890-1

B. MAINTENANCE MANUAL:.....Appendix B 741-1769-3 CS Manual

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

D. DIAGNOSTIC ERROR LISTINGS:.....Included in Maintenance Manual

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

F. REPAIR PLAN:.....Not Available

G. SALES LITERATURE:.....Number Not Available

H. OPERATORS' GUIDE/USER INFORMATION:...Number Not Available

APPENDICES

MARKETING FORECAST ALL MODELS

	Q1 FY90	Q2 FY90	Q3 FY90	Q4 FY90
DOMESTIC	125	125	125	125
INTERNATIONAL	125	125	125	125
TOTAL	250	250	250	250

PRODUCT MATURE PERFORMANCE PREDICTED

Model Number	Product Description	Service Parameter	Rate per Year	Time (hours)
CS/386-10D CS/386-20D	2200 Computer System 2200 Computer System	Field Failures	0.66	
		Calls	1.41	
		MTTR		1.00
		Call Duration		1.85
		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 GROWTH

Product Field Failures/Year and Calls/Year by Month after Installation

Model Number: CS/386-10D and CS/386-20D

Product Description: 2200 Computer System

	Month after Installation							
	1	2	3	4	5	6	7	8+
Field Failures/Year	1.81	0.72	0.69	0.68	0.68	0.68	0.68	0.68
Calls/Year	3.74	1.99	1.50	1.35	1.35	1.35	1.35	1.35

PRODUCT MATURE PERFORMANCE PREDICTED

Model Number	Product Description	Service Parameter	Rate per Year	Time (hours)
CS/386-40D CS/386-80D	2200 Computer System 2200 Computer System	Field Failures	0.75	
		Calls	1.60	
		MTTR		1.00
		Call Duration		1.85
		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 GROWTH

Product Field Failures/Year and Calls/Year by Month after Installation

Model Number: CS/386-40D and CS/386-80D

Product Description: 2200 Computer System

	Month after Installation							
	1	2	3	4	5	6	7	8+
Field Failures/Year	1.94	0.78	0.75	0.74	0.74	0.74	0.74	0.74
Calls/Year	4.71	2.16	1.63	1.47	1.47	1.47	1.47	1.47

PRODUCT MATURE PERFORMANCE PREDICTED

Model Number	Product Description	Service Parameter	Rate per Year	Time (hours)
CS/386-10N CS/386-20N	2200 Computer System 2200 Computer System	Field Failures	0.60	
		Calls	1.45	
		MTTR		1.00
		Call Duration		1.85
		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 GROWTH

Product Field Failures/Year and Calls/Year by Month after Installation

Model Number: CS/386-10N and CS/386-20N

Product Description: 2200 Computer System

	Month after Installation							
	1	2	3	4	5	6	7	8+
Field Failures/Year	1.48	0.59	0.56	0.55	0.55	0.55	0.55	0.55
Calls/Year	3.05	1.62	1.22	1.10	1.10	1.10	1.10	1.10

PRODUCT MATURE PERFORMANCE PREDICTED

Model Number	Product Description	Service Parameter	Rate per Year	Time (hours)
CS/386-40N CS/386-80N	2200 Computer System 2200 Computer System	Field Failures	0.67	
		Calls	1.53	
		MTTR		1.00
		Call Duration		1.85
		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 GROWTH

Product Field Failures/Year and Calls/Year by Month after Installation

Model Number: CS/386-40N and CS/386-80N

Product Description: 2200 Computer System

	Month after Installation							
	1	2	3	4	5	6	7	8+
Field Failures/Year	1.65	0.66	0.63	0.62	0.62	0.62	0.62	0.62
Calls/Year	3.38	1.79	1.35	1.22	1.22	1.22	1.22	1.22

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,

PART #	DESCRIPTION	FRU	CRU	Unique	stocking location B	A	H
212-7129-A	1 MB CPU/MEM. PCB	X		X	X		
212-7129-B	2 MB CPU/MEM. PCB	X		X	X		
212-7129-C	4 MB CPU/MEM. PCB	X		X	X		
212-7129-D	8 MB CPU/MEM. PCB	X		X	X		
212-7113	DPU Assembly CS/386-D ONLY	X			X		
270-0890-1	Power Supply	X				X	
270-3483	DC Fan Assembly	X				X	
210-9560	Mother Board	X				X	
220-2849	Indicator Cable	X					X
220-2850	Power Harness #1	X					X
220-2851	Power Harness #2	X					X
220-2852	Power Extension Cable	X					X
220-3707	Tape Drive I/O Cable	X					X
220-3708	Floppy Drive I/O Cable	X					X
220-3709	Wini I/O Cable	X					X
220-2057	On/Off switch cable	X					X
377-4532	1 MEG SIMM's						
666-1016	BATTERY						

PARTS LIST

Diagnostic Part Number: 195-2956-0

Parts required for P.M.: N/A

ROBERT M O'CONNELL
PROJ# K632 (1 COPIES)
M/S: 001-310

$$T

CS/386-D/N - DESCRIPTION/STRATEGY

REVIEWED 6/23/93

$$T
03/09/92

CS/386-10D	386 1MB CPU/With Internal Disk Storage
CS/386-20D	386 2MB CPU/With Internal Disk Storage
CS/386-10N	386 1MB CPU
CS/386-20N	386 2MB CPU

With the introduction of the CS/386-D and CS/386-N CPUs, the CS/2200 computer architecture is combined with the Intel 80386-16 microprocessor's performance. The CS/386 will use the Basic-2/386 Multi-User Operating System, released concurrently with the CS/386 hardware.

The 2200 in its present form is a small business computer geared to solving DP problems. It is targeted at the small business marketplace; and there still is no one piece of multi-user, BASIC-2 compatible gear, in its price range, ready to take its place.

The CS/386-D/N price structure positions it for the small business marketplace. It is not only a logical growth path for 2200 users but an excellent multi-user system that's easy to use and low in cost.

Do not confuse the CS/386 with a 80386 PC. MS-DOS is not resident and MS-DOS applications cannot be run. However, MS-DOS files can be read and written.

REVERSE ORDER THESE 2 PARAGRAPHS

The CS/386 CPU board ~~organizes memory as~~ MEMORY IS ORGANIZED IN 5 banks of 36 bits consisting of 32 bits of data and 4 bits of parity. The design uses EITHER eight 32KB SRAM chips ~~and~~ OR four 64KB SRAM chips for ~~to access~~ 256KB ~~system~~ OR CONTROL memory.

ALL ~~Both~~ 386 models have 256KB of control memory, nine I/O slots, support 16 users/partitions, and ~~with the exception of their own memory upgrades, can use CS-N to~~ SUPPORT ALL CS-D upgrades, option boards, peripherals and communication controllers.

CURRENT 22400 MULTI-USER

DATA MEMORY COMES IN 4 SIZES AS FOLLOWS!

~~For user memory~~, 1MB is four 256KB of nine bit SIMMs; 2MB is eight 256KB of nine bit SIMMs; 4MB is four 1MB of nine bit SIMMs; and, 8MB is eight 1MB of nine bit SIMMs. The CPU BOARD COMES WITH AN ON BOARD ~~have their own~~ real-time clocks, a feature previously available only through the 2236MXE.

~~The CS/386-D is available with 1MB to 8MB of main memory. It uses~~ THE CS-D chassis INCLUDES ~~and supports~~ AN IN ~~external~~ DPU WHICH SUPPORTS UP TO ~~and~~ three internal storage devices. The DPU is inserted into I/O slot 9, ~~the same as an I/O controller~~, and contains a system printer port. ~~It can~~ THE BOARD HAS ~~support~~, either a 320KB or 1.2MB diskette, AND OPTIONALLY a 45MB tape streamer, AND one fixed Winchester, ~~and~~ 1,024 sectors of cache, CO-BOARD TO BE USED IN CONJUNCTION WITH

CAN BE CONFIGURED BY THE USER INTO FROM 1 TO 16 ADDRESSES UP TO 16 MEG IN SIZE USING A UTILITY PROGRAM PROVIDED WITH THE SYSTEM

Winchesters supported on the CS/386-D include A 20MB, 32MB, 64MB, and a 140MB. ~~Each~~ THESE DRIVES can either be formatted as ~~14 platters of 10MB each, or 7 platters of 16MB each~~. The fixed Winchester can be multiplexed by 16 CPUs using a combination of 2275MUX and 2275MUXE controllers, ~~with the DPU cable connected to the controllers~~. BY USE OF A JUMPER ON THE BOARD AND THE EXTERNAL DISK PORT. Each MUX CONTROLLER ~~2275MUXE~~ supports UP TO four CPUs. CPU's multiplexing the fixed Winchester can be OF any type of CS/2200 CPU that supports a 22C80 board.

The CS/386-N is a CS/386-D without a DPU board. Panels cover the slots where the diskette and tape streamer would go. It is available with 1MB to 8MB of main memory, and replaces the CS-10N through CS-80N.

Highlights of the CS/386-D/N include:

- Support for all BASIC-2 statements, making it compatible with all existing 2200, MICROVP and CS software.
- Hardware-compatible with all MICROVP and CS peripherals, I/O controllers and CS/DS options.
- A partition can now be a maximum of 8MB. THE ONLY LIMITATION ON PARTITION SIZE IS

- Because of the ~~large~~ INCREASED partition size, CAPABILITY program overlays can be eliminated.
- Single or multiple partitions of any size can be declared ~~a~~ global to all other partitions.
- A CS/386 CPU can read and write MS-DOS files FROM A DOS DISKETTE. ~~on the DS-1.2~~.
- CS/386 models (CS/386-D, CS/386-N), are available with 1MB to 8MB of main memory.
- Up to ~~800~~ 820 sectors of 256 bytes of ~~the~~ cache memory ON THE CS/386-D DPU BOARD can be allocated to RAMDISK, ADDRESS 0/D OR D10 DEPENDENT ON THE ADDRESS OF THE DPU BOARD

BASIC-2/386 Multi-user Operating System (OS) Release 1.1, required for the CS/386-N and CS/386-D, has the following enhancements:

- On an 8MB CS/386 CPU, a partition can be 8MB ~~and all memory can be allocated to program~~. Users can configure one 8MB partition, eight 1MB partitions, sixteen 500K partitions, or any combinations of partitions ~~and~~ PLUS RAMDISK, of ~~any~~ USER DEFINED size, ~~for a total~~ NOT EXCEEDING ~~of~~ 8MB. ALLOWING A PROGRAM UP TO 8 MEG IN SIZE TO BE LOADED. UP TO 16
- Any partition or multiple partitions can be declared ~~a universal~~ global to all other partitions on the CS/386. This allows sharing of data and programs by several different partitions. Each regular partition runs its own programs and is independent of the other partitions. However, any partition can ~~use the~~ BE A Universal Global partition.
- Six new commands ~~that~~ allow a BASIC-2 program to read and write MS-DOS files from an MS-DOS diskette. ~~in the DS-1.2~~.

- ALL DATA MEMORY NOT USED FOR PARTITIONS IS AVAILABLE AS RAMDISK, ADDRESS 340.

NOTE:

1. 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 ~~RETURN, OR TO THE OPERATING SYSTEM~~ RESOURCE OR STATUS BYTE OF THE CURRENT OPERATING SYSTEM WHICH MAY NO LONGER APPLY. THESE WOULD INCLUDE THE CPU ID #, REFERENCE TO THE CPU TYPE STATUS BYTE, REFERENCE TO MEMORY BANK STATUS BYTES, ETC. ADDITIONALLY THE 386 BOARD USES 10 BIT ACCURACY IN MATH CALCULATIONS TO THE RIGHT OF THE DECIMAL POINT WHILE OLDER 2200 CPUs HAVE 13 BIT ACCURACY. THIS IS A LIMITATION OF THE INTEL 386 CHIP AND A COMMON INDUSTRY STANDARD. ANY PROGRAM WHICH MAKES DECISIONS BASED ON 13 BIT ACCURACY MAY NEED TO BE CHANGED.

2. THE 386 IS A BINARY MACHINE. EXISTING 2200 PROGRAMS ARE WRITTEN IN BINARY CODED DECIMAL. THIS MEANS WHEN EXISTING PROGRAMS IN BINARY CODED DECIMA ARE LOADED ~~TO~~ INTO MEMORY THEY MUST BE CONVERTED TO BINARY WHICH REQUIRES ADDITIONAL MEMORY. THIS IS DONE TRANSPARENTLY BY THE ~~SYSTEM~~ CS/386, O/S. TO PROVIDE FOR THIS ADDITIONAL NEED OF MEM: ~~AS A GENERAL RULE OF THUMB~~, PARTITION SIZE SHOULD BE 80% LARGER AS A GENERAL RULE OF THUMB TO INSURE ALL EXISTING PROGRAMS CAN BE LOADED WITHOUT OVERFLOWING MEMORY.

3. BECAUSE OF THE CONVERSION PROCESS NEEDED TO CONVERT PROGRAMS FROM BINARY CODED DECIMAL TO BINARY AS MENTIONED IN NOTE 2, SYSTEMS PERFORMING A LOT OF DISK I/O MAY EXPERIENCE A SLOW DOWN LOADING PROGRAMS. TO CORRECT THIS SITUATION THERE ARE NEW COMMAN ON THE 386

$$T

CS/386-D/N - BASIC SYSTEM COMPONENTS

$$T
03/09/92

- o CPU with 1MB, 2MB, 4MB or 8MB of Main Memory
- o Multi-user BASIC-2/386 Operating System
- o 9 I/O Slots
- o DPU controller (CS/386-D models only)

COUNTRY KITS

When ordering a CS/386-D or CS/386-N country kit, CS/386-CK-XX, must be ordered for each CPU. A country kit is a no charge item containing a country-specific power cord and documentation.

OPTIONS

DISK CONTROLLERS

2275MUX - 2275/DS Disk Multiplexing Unit supports up to ~~8~~ 4 CPUs, THE CPU WHERE USED AND 3 ADDITIONA
2275MUXE - 2275/DS Disk Multiplexing Extender supports up to 4 CPUs (MUST BE USED IN CONJUNCTION WITH THE 2275MUX WHEN MUXING 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

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/ SYSTEM)

2236MXE - 4-Port Terminal Processor with Asynchronous Communication capabilities
22C32 - Triple Controller for diskette, printer and workstation

$$T

CS/386-D/N - SPECIFICATIONS

$$T
03/09/92

CENTRAL PROCESSOR

Floating Point	Yes
Interrupt Levels	8
Logic Terminology	MSI
Microprogrammed	Yes
Standard Registers	48

MEMORY

Control Memory	256K
Minimum User Memory	~~128K~~ 1 MB
Maximum User Memory	8MB

SYSTEM MAXIMUMS

Disk Units	3
Partitions	16
Printers	depends on I/O availability
Terminals	16

PERFORMANCE

Cycle Time	125ns
Word Length	16 bits

PHYSICAL DIMENSIONS

Height	23.10 inches (58.67 cm)
Width	13.60 inches (34.54 cm)
Depth	20.30 inches (51.56 cm)
Weight	66 lbs (30 kg) (without drives)

POWER REQUIREMENTS

Dedicated Branch Circuit	Yes
Incoming Line Voltages	5 amps @ 115V or 2.5 amps @ 230V
Line Frequency	50Hz +/- 1Hz or 60Hz +/- 1Hz
Power Connection	8-ft power cord

ENVIRONMENTAL

Heat Dissipation	1020 BTU/hour
Humidity	35 to 65% noncondensing
Noise Level	35 dB (A)
Temperature Range	
Operating Environment	50 to 90 degrees F

$$T

CS/386-D/N - DISK SUPPORT

$$T
03/09/92

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

When ordering removable storage devices for the CS/386-D, such as DS-320, and DS 1.2, the end-user is responsible for ordering the necessary diskette, disk or tape media. This media must be present at the time the Wang customer service representative installs the drives into the CS/386-D so testing of the drive(s) can be performed.

$$T

CS/386-D/N - PRINTER SUPPORT

$$T
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	16 PPM Laser printer
HQ300/HQ200	300/200 CPS MATRIX PRINTER (PRINTER DRIVER NORMALLY NEEDED)

$$T

CS/386-D/N - SOFTWARE SUPPORT

$$T
03/09/92

For detailed information regarding the following currently marketed software, use the PF16 key and choose the SOFTWARE 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

$$T

CS/386-D/N - TAPE SUPPORT

$$T
03/09/92

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	1600 bpi 9-track tape drive with controller
DS-TS150	150MB tape streamer

$$T

CS/386-D/N - TELECOMMUNICATION SUPPORT

$$T
03/09/92

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

IBM BSC Batch
Remote Control and Maintenance

$$T

CS/386-D/N - WORKSTATION SUPPORT

$$T
03/09/92

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

$$T

CS/386-D/N - DOCUMENTATION

$$T
03/09/92

LITERATURE

DATA SHEETS/MANUALS

Part Number	Title
715-2363A	CS/386 Data Sheet

FOCUS

Title	Date
~~SCSI Disk Controller for 2200 Products~~	~~12/01/90~~
CS 2200 Peripherals repriced/discontinued	11/01/90
CS/386-D, CS/386-N AND BASIC-2/386 1.0	05/15/89

$$T

CS/386-D/N - UPGRADE INFORMATION

$$T
03/09/92

UJ-6047	Upgrade CS/386-N to a CS/386-D
UJ-6048	VLSI To 386 CPU 1MB
UJ-6049	VLSI To 386 CPU 2MB
UJ-6050	VLSI To 386 CPU 4MB
UJ-6051	VLSI To 386 CPU 8MB
UJ-6052	1MB to 2MB 386 CPU Board
UJ-6053	1MB to 4MB 386 CPU Board
UJ-6054	1MB to 8MB 386 CPU Board
UJ-6055	2MB to 4MB 386 CPU Board
UJ-6056	2MB to 8MB 386 CPU Board
UJ-6057	4MB to 8MB 386 CPU Board

Any VLSI CPU can be field upgraded to a 386 CPU by replacing the VLSI CPU board with a CS/386 CPU board and the new 386 operating system (BASIC-2/386 Operating System Release 1.0). VLSI CPUs include the MICROVP-1/2 and all CS, CS-D and CS-N models.

Upgrades to C/S 386 systems include the 386 operating system.

$$T

CS/386-D/N - DISCONTINUED PRODUCT SUPPORT

$$T
05/26/93

The following represents a list of select discontinued products that are currently supported. 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
DM50/300	50/300 cps multifunctional matrix printer
DW/22-20	20 cps bidirectional daisy printer
LCS8-DSK	8 ppm postscript laser printer
LCS15-DSK	15 ppm laser printer
LCS15-CMB	15 ppm laser printer
LDP8-DSK	8 ppm laser printer
PM060	Multifunctional matrix printer

WORKSTATIONS:

2236D	Interactive terminal
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	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:

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

- To compete in the low-end of the CS product line against micros, Wang sold a CS-S2D low-end system that is field upgradable to a CS/386. This package was composed of a CS-2D VLSI CPU, 2236MXE and two 2536DW workstations.

$$T

CS/386-D/N - INTERNATIONAL CONSIDERATIONS

$$T
03/09/92

- The international model numbers for the CS/386-D or CS/386-N are the same as the domestic model numbers When ordering a CS/386-D or CS/386-N country kit, CS/386-CK-XX, must be ordered for each CPU. A country kit is a no charge item containing a country-specific power cord and documentation.

- The following country kits are available for the CS/386-D/N 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-D/N - ADDITIONAL INFORMATION

$$T
03/09/92

- The minimum memory configuration for a CS/386 CPU is 1MB.

- The CS/386-D only includes a DPU controller board. The diskette, tape streamer and fixed Winchester must be ordered separately. A DS-320 or DS-1.2 is the minimum requirement for all CS/386-Ds.

- Users can not transfer memory chips from their ~~expanded memory board on their~~ CS to a CS/386 board because they use a different type memory chips.

- There are several third party 2200 workstation terminal emulators that allow you transfer BASIC-2 and MS-DOS files back and forth between the PC and the CS/386. MS-DOS applications can be run on the PC and through file transfers, data can be shared between the two CPUs.

- The CS/386 CPUs replace the CS-2D through CS-80D, and CS-20N through CS-80N VLSI series.

- The following lists the recommended replacement models/configurations:

Model Number	Description	Replacement
CS-10D	1MB CPU	CS/386-10D
CS-20D	2MB CPU	CS/386-20D
CS-40D	4MB CPU	CS/386-40D
CS-80D	8MB CPU	CS/386-80D
CS-10N	1MB CPU	CS/386-10N
CS-20N	2MB CPU	CS/386-20N
CS-40N	4MB CPU	CS/386-40N
CS-80N	8MB CPU	CS/386-80N

- The CS/386-D and CS/386-N 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.

- The CS/386-D is not shipped with the drives installed; all drives must be installed at the customer site. Therefore, it is recommended that the system be delivered directly to the end-user and not set up at a VAR site. All equipment is CE installable.

- The CS/386-D does not come with any storage devices, they must be ordered separately. The following table illustrates the maximum number and type of fixed/removable Winchesters, diskette and tape streamer the CS/386-D can accommodate. The CS/386-D uses the same storage devices as the DS, with the exception of the DS-10R. Orders for storage devices must always include either a DS-320 or a DS-1.2, in addition to any other storage device. A minimum allowable configuration is a CS/386-D and either a DS-320 or DS-1.2. The CS/386-D supports a maximum of three devices. Order DS-TS150A, DS-20A, DS-32A, 64A or DS-140A model numbers for field upgrades. For CS/386-Ns, order a DS plus peripherals, the same as a CS-N/DS configuration.

THIS IS A 1

Diskette	Tape Streamer	20MB Winch.	32MB Winch.	64MB Winch.	140MB Winch.
1	0	1	0	0	0
1	0	0	1	0	0
1	0	0	0	1	0
1	0	0	0	0	1
1	1	1	0	0	0
1	1	0	1	0	0
1	1	0	0	1	0

1 | 1 | 0 | 0 | 0 | 1

- The 80386 chip requires 70 to 80 percent more program space for BASIC-2 than a 2200 or VLSI CPU. This should not be a problem because all memory can be used for programs and partitions are ~~larger~~ NO LONGER RESTRICTED IN SIZE.

- Recommend a CS/386-D series if less than 140MB of storage is needed. Recommend a CS/386/N and a DS if more than 140MB storage, or more than one single fixed Winchester is required.

Item Subject: CS/386 Bus. Plan/FCS Req.

Mike B.

To : H.L. Lee
M.L. Lee
Bill Hsien
Koby Rotstein
Miguel Brazao

From: Gene Schulz

Subj: CS/386 Business Plan/FCS Requirements

Date: January 18, 1988

This document outlines the proposed business plan and FCS requirements for the CS/386 CPU, PEP # HO213C. This new CPU will utilize the CS-D/N chassis and replace certain CS-D/N models. A board upgrade version will also be made available to existing VLSI CPU users.

The objectives of the attached plan are:

. To improve CPU performance by 200 to 300% for CPU intensive operations.

. For the 386 CPU to be able to handle 16 users at the same level of performance that we currently can handle 8.

. To provide an upgrade path for existing VLSI CPU users by replacing their VLSI CPU board.

. To provide a "stepping stone" product that will address the traditional weakness of the CS/2200 product line, e.g., partition size, number of partitions, efficient filing systems, improved I/O performance, etc.

. 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.

. To provide a transition path for 2200/CS users to modern technology.

INTRODUCTION

Consistent with our continuing cost reduction and modernization program for the CS and related peripherals, and to remain competitive in the small business marketplace, Wang needs to offer a faster CS CPU that utilizes the latest technology. Although we continue to be price competitive, the CS is not associated with the modern buzz-words, e.g., 386, 68000, etc. Our VARs must be able to say that the Wang CPU is "state of the art" technology or bow to competitive technology. We have also taken the traditional architecture as far as it can go and if we are to truly offer a growth path to our user base, it has to be with new technology.

Product Description

Hardware

The CS/386 CPUs will consist of a CS-D/N chassis with a new CPU board and operating system that interfaces to the 2200 bus. Future versions will include the ability to interface to the AT bus and SCSI interface for disk storage. The CS/386 CPU must be plug-compatible with all existing I/O controllers used on the CS series. The following is a list of desired features:

. 16 Mhz. 80386.

. Less than 1 wait state (column static memory).

. 1 to 8MB of RAM.

. 2200 I/O bus interface.

. High-speed I/O channel.

. Battery backed-up real-time clock.

. 80387 coprocessor option.

. Timer.

. Utilizes CS-D/N chassis.

. CPU board compatible with existing VLSI systems, e,g. existing VLSI CPUs can be field upgraded by replacing the VLSI board with a 386 board.

Software

Direct implementation of 3.3 OS BASIC-2, that supports all current features

plus unlimited partition size and global. Included must be the ability to read and write MS-DOS files through the DS-1.2 diskette drive.

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 CPU. Disk performance should be equal to or faster than a DS.

Application Requirements

For current CS/2200 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

Currently we are enjoying great success with the new CS/DS product line as the 2200 user base was looking for a Wang replacement product. We probably will continue to be successful as the user base is very large. However, every day that goes by, more and more non-Wang systems are able to run BASIC-2 programs. As good as the CS product is, VLSI technology is being over shadowed by 80386 and 68000 technology. In addition, the CS, without multiplexing CPUs, can not handle more than 8 to 10 users satisfactory. To maintain our share of the small business marketplace, e.g., both existing users and new business, the product line needs a technological face lift.

While our 2200 and BASIC-2 development efforts were in limbo, new hardware and

software players appeared on the scene. BASIC-2 has become a multi-million dollar, hardware independent market. Because of its ease of use, portability to multiple hardware manufacturers and the availability of thousands of multi-user BASIC-2 software applications, software developers (old and new) are staying with BASIC-2. New users are buying BASIC-2, hardware independent software, from VARs and Dealers on a variety of micro hardware products. Some of these BASIC-2 VARs or Dealers have never run their software on a Wang product.

The following is a list of the software and hardware players:

The Software Vendors

- Wang BASIC-2 and PC BASIC-2
- NIAKWA compiled BASIC
- Kerridge House BASIC-K
- TOM BASIC

The Hardware Their Software Runs On

- Wang CS, PC and APC
- Novell networked IBM PCs (plus other IBM look-a-likes) running NIAKWA compiled BASIC
- IBM, Bluebird, Altos, Compaq, AT&T, NEC, etc., PCs running NIAKWA compiled BASIC and TOM BASIC
- SPECTRIX running Kerridge House BASIC-K
- Honeywell SPX-100 running NIAKWA compiled BASIC
- NCR TOWER running their own version of BASIC-2 supplied by a contractor
- MICROVAX running NIAKWA compiled BASIC and TOM BASIC
- CCI running Kerridge House BASIC-K

Current CS/2200 VARs have too much time and effort invested in their application software and do not want to rewrite their applications in order to move to a box that doesn't support BASIC-2. Therefore, to compete with these products, we need to provide a price/competitive, state of the art CPU.

Market Requirements

Targeted cost, and U.S. selling prices are as follows:

CURRENT VLSI CS-D CPUs

MODEL	MEMORY	COST	SELL	GPM	MAINT.
CS-10D	1MB	2,024	7,500	73.0	67

CS-20D	2MB	2,366	8,500	72.2	74
CS-40D	4MB	2,980	9,500	68.6	88
CS-80D	8MB	4,207	11,500	63.4	116

CURRENT VLSI CS-N Models

MODEL	MEMORY	COST	SELL	GPM	MAINT.
CS-10N	1MB	1,513	6,500	76.7	52
CS-20N	2MB	1,855	7,500	75.3	59
CS-40N	4MB	2,469	8,500	71.0	73
CS-80N	8MB	3,696	10,500	64.8	101

PROPOSED

386 CPU BOARDS (VLSI TO 386 Upgrades)

Models that can be field upgraded to a CS/386 are the MVP-128/512s, MICROVP-1/2s, CS-2/5/10/20/40/80s and all CS-D/N CPUs, e.g., any VLSI CPU.

MODEL	DESCRIPTION	MEMORY	COST	SELL	GPM	MO. MAINT. CS/CS-N MICROVP	MO. MAINT. CS-D
UJ-6048	VLSI To 386 CPU	1MB	835	3,500	76.1	52	67
UJ-6049	VLSI To 386 CPU	2MB	1,134	4,500	74.8	59	74
UJ-6050	VLSI To 386 CPU	4MB	1,731	5,500	68.5	73	88
UJ-6051	VLSI To 386 CPU	8MB	2,925	8,000	63.4	101	116

NOTE Maintenance should increase by the memory model equivilent. Example, a CS-2 (128KB) is upgraded to a CS/386-10, e.g., a 1MB CS. Maint. would change from $42 to $52 per month. A CS-10D upgraded to a CS/386-10D would remain the same.

PROPOSED CS/386 CPU MODELS

Costs are calculated by replacing the VLSI board in the CS-D/N models with a 386 board. All other costs remain the same as the CS-D/N models. There will only be 1MB to 8MB 386 models available. Therefore, 128KB and 512KB models of the CS-D/N will remain in the product line for low-end deals. All other CS-D/N models above 512KB are replaced by CS/386-D/N models.

MODEL	MEMORY	COST	SELL	GPM	MAINT.
CS/386-10D	1MB	2,192	8,500	74.2	67
CS/386-20D	2MB	2,490	9,500	73.8	74
CS/386-40D	4MB	3,088	10,500	70.6	88
CS/386-80D	8MB	4,282	12,500	65.7	116

MODEL	MEMORY	COST	SELL	GPM	MAINT.

CS/386-10N	1MB	1,686	7,500	77.5	52
CS/386-20N	2MB	1,984	8,500	76.7	59
CS/386-40N	4MB	2,582	9,500	72.8	73
CS/386-80N	8MB	3,776	11,500	67.2	101

Memory upgrades for existing 386 boards are as follows:

Additional Memory Chips Only

MODEL	DESCRIPTION	COST	SELL	GPM	MAINT
UJ-6052	1MB to 2MB 386 CPU Board	298	1,500	80.1	7
UJ-6053	1MB to 4MB 386 CPU Board	894	3,000	70.2	21
UJ-6054	1MB to 8MB 386 CPU Board	2,086	5,500	62.1	49
UJ-6055	2MB to 4MB 386 CPU Board	596	2,000	70.2	14
UJ-6056	2MB to 8MB 386 CPU Board	1,788	4,500	60.3	42
UJ-6057	4MB to 8MB 386 CPU Board	1,192	4,000	70.2	28

Strategy

As the recommended minimum memory for a CS/386 is 1MB, the 128 and 512K VLSI models will remain in the product line and be used for price-sensitive deals. New or existing users wishing to update to a 1MB or better VLSI CPU, would have to order a CS-5D/N and add a memory upgrade. The following will be the models available and their selling prices. 386 models are $1,000 higher than previous VLSI models:

MODEL	MEMORY	PRICE	MONTHLY MAINT.
CS-2D	128K	$ 4,950	$ 57
CS-5D	512K	6,400	62
CS/386-10D	1MB	8,500	67
CS/386-20D	2MB	9,500	74
CS/386-40D	4MB	10,500	88
CS/386-80D	8MB	12,500	116
CS-2N	128K	$ 3,950	$ 42
CS-5N	512K	5,400	47
CS/386-10N	1MB	7,500	52
CS/386-20N	2MB	8,500	59
CS/386-40N	4MB	9,500	73
CS/386-80N	8MB	11,500	101

The CS/386 CPU board and CPU addresses three markets:

1. Existing VLSI CPU users (6,000+ CPUs) who can be updated by replacing their current CPU board and operating system.

2. Existing 2200 CPU users who have not yet updated to a VLSI CPU (estimated at 30,000+ CPUs).

3. New users who would not buy a CS/2200 unless it had the latest technology.

Existing VLSI and 2200 users will update for the following reasons:

1. The 386 CPU will provide a 200% increase in CPU throughput

2. Partition sizes are now unlimited.

3. Global partition sizes are unlimited.

4. We will be able to read and write MS-DOS files.

5. We will support all the features of WANG BASIC-2.

New users will buy the product as:

1. It is 386 technology.

2. We can integrate BASIC-2 and MS-DOS.

3. Thousands of existing applications will run "as is".

Wang Comparisons

The following comparisons, show the difference in prices between the new CS/386 models and previous very popular CS-S packages. The CS/386-D configurations are lower in price while CS/386-N configurations (using a DS), are slightly higher in price. The compared CS-S packages include a CPU, 2236MXE, 2 or 4 2436 workstations, a 22C11 and a DS.

MODEL EQUIV.	CS-S $	CS/386-D $	CS/386-N $	SAVINGS CS/386-D	SAVINGS CS/386-N
CS-S7	11,335	11,090	12,890	245	(1,555)
CS-S7+2	13,665	12,880	14,680	785	(1,015)
CS-S11	12,325	11,090	12,890	1,235	(565)

The CS/386 configurations, in comparison to the previous CS-S packages, contain the following additional features:

. S7 and S7+2 packages were 512KB CPUs, the S11 a 1MB CPU. The CS/386 comparisons are 1MB 386 CPUs.

. All "S" packages contained 2436 workstations. The CS/386 configurations contain the "more features" 2536DW workstations.

COMPETITIVE POSITIONING

SYSTEM	USERS	PRICE	HOST	OS	RAM	DISK	BACKUP	WS
Bluebird	2	6,019	Wyse PC	Super-DOS	512K	44MB	60MB	Wyse
Bluebird	2	8,234	IBM AT	Super-DOS	640K	44MB	60MB	Wyse
WANG	2	8,340	CS-2D	BASIC-2	128K	20MB	1.2MB	2536

Altos	2	9,000	Altos 686	Xenix	1M	40MB	60MB	Altos
WANG	2	10,040	CS-2D	BASIC-2	128K	32MB	45MB	2536
N[illegible]11	2	11,335	Acer 910	Netware	1M	40MB	60MB	Acer
Microvax	2	20,785	2000	MicroVMS	4M	71MB	95MB	VT220
CCI	2	24,900	532/10	Unix	2M	85MB	60MB	Power

SYSTEM	USERS	PRICE	HOST	OS	RAM	DISK	BACKUP	WS
Bluebird	4	9,816	Wyse PC	Super-DOS	512K	71MB	60MB	Wyse
Bluebird	4	11,882	IBM AT	Super-DOS	640K	71MB	60MB	Wyse
Altos	4	12,500	Altos 886	Xenix	2M	65MB	60MB	Altos
WANG	4	16,580	CS/386-10D	BASIC-2	1M	64MB	45MB	2536
Novell	4	17,465	Acer 1100	Netware	1M	71MB	60MB	Acer
WANG	4	18,380	CS/386-10N	BASIC-2	1M	64MB	45MB	2536
CCI	4	28,080	532/10	Unix	2M	85MB	60MB	Power
Microvax	4	32,895	MicrovaxII	MicroVMS	5M	71MB	95MB	VT220
Bluebird	6	12,509	Wyse PC	Super-DOS	1.5M	71MB	60MB	Wyse
Bluebird	6	14,560	IBM AT	Super-DOS	1.5M	71MB	60MB	Wyse
WANG	6	19,170	CS/386-10D	BASIC-2	1M	64MB	45MB	2536
Altos	6	19,500	Altos 1086	Xenix	2M	65MB	60MB	Altos
Novell	6	20,855	Acer 1100	Netware	1M	71MB	60MB	Acer
WANG	6	20,970	CS/386-10N	BASIC-2	1M	64MB	45MB	2536
CCI	6	31,670	532/10	Unix	2M	85MB	60MB	Power
Microvax	6	39,555	MicrovaxII	MicroVMS	5M	71MB	95MB	VT220
Bluebird	8	16,108	Wyse PC	Super-DOS	1.5M	71MB	60MB	Wyse
Bluebird	8	16,873	IBM AT	Super-DOS	1.5M	71MB	60MB	Wyse
WANG	8	20,960	CS/386-10D	BASIC-2	1M	64MB	45MB	2536
Altos	8	21,000	Altos 1086	Xenix	2M	65MB	60MB	Altos
WANG	8	22,760	CS/386-10N	BASIC-2	1M	64MB	45MB	2536
Novell	8	24,345	Acer 1100	Netware	1M	71MB	60MB	Acer
CCI	8	31,670	532/10	Unix	2M	85MB	60MB	Power
Microvax	8	41,990	MicrovaxII	MicroVMS	5M	71MB	95MB	VT220
Bluebird	12	21,304	Wyse PC	Super-DOS	1.5M	142MB	125MB	Wyse
Bluebird	12	26,464	IBM AT	Super-DOS	2.5M	142MB	125MB	Wyse
WANG	12	29,040	CS/386-20D	BASIC-2	2M	140MB	45MB	2536
WANG	12	30,740	CS/386-20N	BASIC-2	2M	140MB	45MB	2536
Altos	12	32,500	Altos 2086	Xenix	4M	142MB	60MB	Altos
Novell	12	33,825	Acer 1100	Netware	1M	130MB	60MB	Acer
CCI	12	48,440	532/10	Unix	4M	190MB	60MB	Power
Microvax	12	58,665	MicrovaxII	MicroVMS	5M	159MB	95MB	VT220
Bluebird	16	27,395	Wyse PC	Super-DOS	1.5M	284MB	125MB	Wyse
Bluebird	16	32,555	IBM AT	Super-DOS	2.5M	284MB	125MB	Wyse
WANG	16	33,420	CS/386-20D	BASIC-2	2M	140MB	45MB	2536
WANG	16	41,420	CS/386-20N	BASIC-2	2M	280MB	45MB	2536
Novell	16	43,000	Acer 1100	Netware	1M	260MB	60MB	Acer
Altos	16	43,500	Altos 2086	Xenix	4M	284MB	60MB	Altos
CCI	16	63,620	532/130	Unix	4M	380MB	60MB	Power
Microvax	16	74,900	MicrovaxII	MicroVMS	9M	318MB	95MB	VT220

NOTHING ON PG 16

Forecasts

U.S. Forecast

MODEL	Q1 FY'89	Q2 FY'89	Q3 FY'89	Q4 FY'89	TOTAL
CS-2D	75	75	75	75	300
CS-2N	25	25	25	25	100
CS-5D	75	75	75	75	300
CS-5N	25	25	25	25	100
CS/386-10D	25	25	25	25	100
CS/386-10N	25	25	25	25	100
CS/386-20D	12	12	12	12	48
CS/386-20N	13	13	13	13	52
CS/386-40D	12	12	12	12	48
CS/386-40N	13	13	13	13	52
CS/386-80D	12	12	12	12	48
CS/386-80N	13	13	13	13	52
UJ-6048	25	25	25	25	100
UJ-6049	25	25	25	25	100
UJ-6050	25	25	25	25	100
UJ-6051	25	25	25	25	100

INT. Forecast

MODEL	Q1 FY'89	Q2 FY'89	Q3 FY'89	Q4 FY'89	TOTAL
CS-2D	75	75	75	75	300
CS-2N	25	25	25	25	100
CS-5D	75	75	75	75	300
CS-5N	25	25	25	25	100
CS/386-10D	25	25	25	25	100
CS/386-10N	25	25	25	25	100
CS/386-20D	12	12	12	12	48
CS/386-20N	13	13	13	13	52
CS/386-40D	12	12	12	12	48
CS/386-40N	13	13	13	13	52
CS/386-80D	12	12	12	12	48
CS/386-80N	13	13	13	13	52
UJ-6048	25	25	25	25	100
UJ-6049	25	25	25	25	100
UJ-6050	25	25	25	25	100
UJ-6051	25	25	25	25	100

Worldwide Forecast

MODEL	Q1 FY'89	Q2 FY'89	Q3 FY'89	Q4 FY'89	TOTAL
CS-2D	150	150	150	150	600
CS-2N	50	50	50	50	200
CS-5D	150	150	150	150	600
CS-5N	50	50	50	50	200
CS/386-10D	50	50	50	50	200
CS/386-10N	50	50	50	50	200
CS/386-20D	24	24	24	24	96
CS/386-20N	26	26	26	26	104
CS/386-40D	24	24	24	24	96
CS/386-40N	26	26	26	26	104
CS/386-80D	24	24	24	24	96
CS/386-80N	26	26	26	26	104
UJ-6048	50	50	50	50	200
UJ-6049	50	50	50	50	200
UJ-6050	50	50	50	50	200
UJ-6051	50	50	50	50	200

Announcements

	U.S.	INT.
Announcement Date	4/01/89	4/01/89
FCS	5/31/89	5/31/89
Volume	6/30/89	6/30/89

CS-D/N VLSI AND 386 PRODUCT PRICING

DESCRIPTION	MODEL #	PRICE	MAINT.	MODEL #	PRICE	MAINT.
	CS-N C P U			CS-D CPU		
VLSI MODELS						
128KB CPU	CS-2N	$3,950	$42	CS-2D	$4,950	$ 57
512KB CPU	CS-5N	$5,400	$47	CS-5D	$6,400	$62
128K PACKAGE	(CS-2D CPU, MXE & 2 WS)			CS-S2D	$6,800	$72
386 MODELS						
1 MB CPU	CS/386-10N	$7,500	$52	CS/386-10D	$8,500	$67
2 MB CPU	CS/386-20N	$8,500	$59	CS/386-20D	$9,500	$74
4 MB CPU	CS/386-40N	$9,500	$73	CS/386-40D	$10,500	$88
8 MB CPU	CS/386-80N	$11,500	$101	CS/386-80D	$12,500	$116

ONLY DIFFERENCE IS ADDITION OF DPU BRD.

CS/386 CPU UPGRADE BOARDS

VLSI TO 386 1 MB	UJ-6048	$3,500
VLSI TO 386 2 MB	UJ-6049	$4,500
VLSI TO 386 4 MB	UJ-6050	$5,500
VLSI TO 386 8 MB	UJ-6051	$8,000

RELEASE 1.0 OF BASIC-2/386 OPERATING SYSTEM IS SHIPPED WITH THE 386 BOARD/CPU

4/18/89

WANG LABORATORIES INC ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 1
OPER. NO.	9.0	OPERATION	PACKAGING	ISSUE / REV. / TYPE

A. THE FOLLOWING ITEMS ARE ALL PART OF THE SHIPPING PACKAGE, 290-0685 AND **290-0685-02

a) **685-0100 EDGE PROTECTOR (4)
b) **685-0474 TAPE 2" CLEAR POLY (A/R)
c) **685-0664 STRAPPING POLY .50 (A/R)
d) **685-0665 SEAL STRAPPING FOR .50 (2)
e) 685-0723 BAG GUSSET 23 x 17 x 36
f) 685-2410 FOLHSC 27.13 x 20.00
g) 685-2411 PALLET 28.00 x 20.88
h) 685-2412 CUSHION ASSY, TOP

PLACE CABINET ASSEMBLY ON CUSHION PALLET, AS SHOWN. PLACE GUSSET OVER CABINET AND PLACE TOP CUSHION ASSEMBLY ONTO CABINET ASSEMBLY, AS SHOWN.

SET UP BOX, FOLD TOP FLAPS OVER AND SEAL WITH 2" CLEAR TAPE. PLACE BOX OVER CABINET, AS SHOWN.

RUN POLY STRAPPING UNDER CUSHION PALLET AND OVER THE TOP OF THE BOX, USE EDGE PROTECTORS ON THE TOP OF THE BOX. SECURE STRAPPING USING STRAPPING SEALS, AT POSITIONS AS SHOWN.

1. 615-2265 LABEL, DOCK MERGE

APPLY LABEL AT POSITION, AS SHOWN.

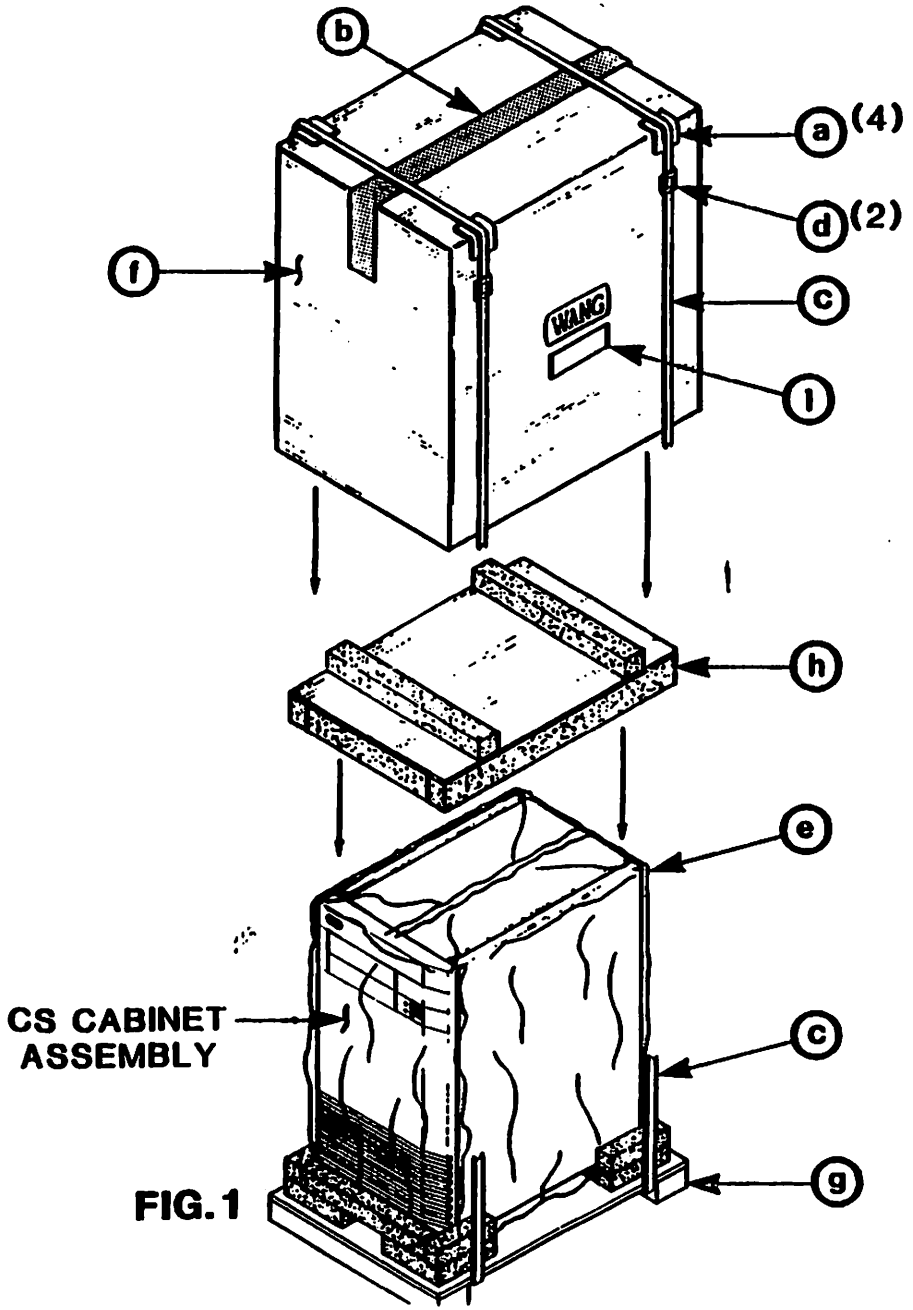


FIG. 1

WANG LABORATORIES INC. ASSEMBLY SHEET

380/12

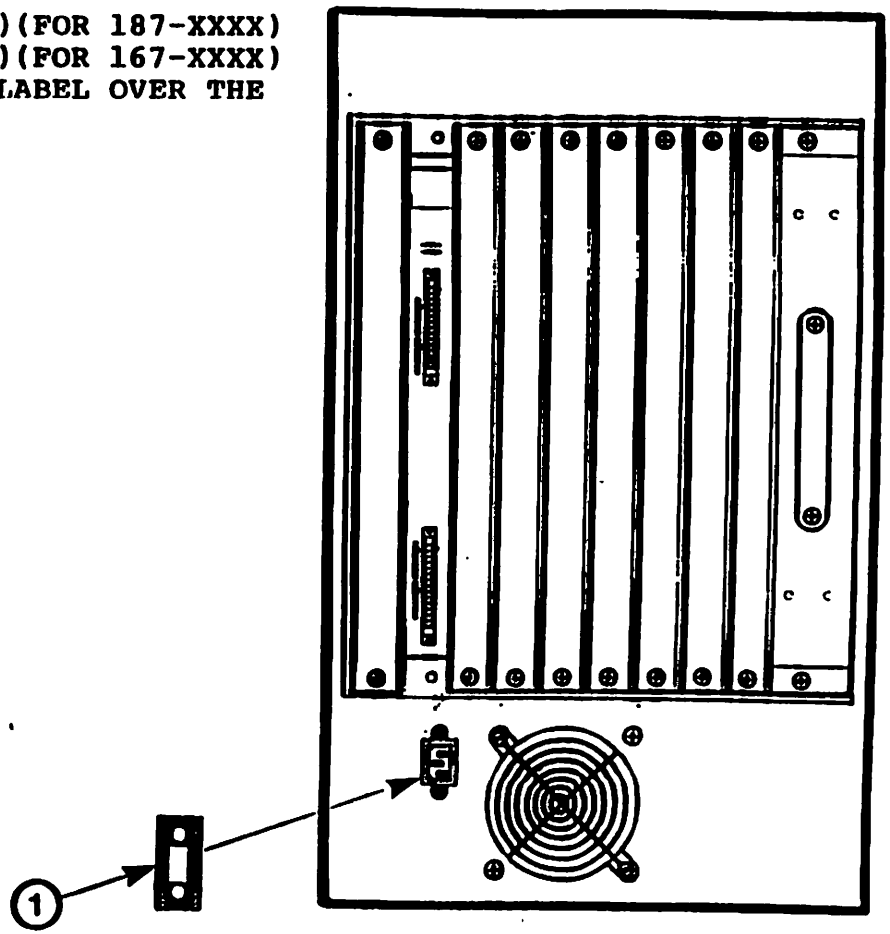
PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 1
OPER. NO.	8.0	OPERATION	QC INSPECTION (EXTERNAL)	ISSUE / REV. / TYPE

PERFORM INTERNAL INSPECTION

REFER TO OPERATION 0.5 "INSPECTION GUIDELINES".

A.

1. 615-2029 VOLTAGE WARNING LABEL (115V)(FOR 187-XXXX)
   615-2071 VOLTAGE WARNING LABEL (230V)(FOR 167-XXXX)
   ATTACH THE APPROPRIATE VOLTAGE WARNING LABEL OVER THE AC PLUG AS SHOWN.



WANG LABORATORIES INC

ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 1		
OPER. NO.	7.5	OPERATION	HY-POT TEST	ISSUE	REV.	TYPE

A. HY-POT PER SPI 10-605

ATTACH THE HY-POT GROUND PROBE TO THE BLANK BRACKETS (455-0093 REF.) LOCATED ON THE REAR OF THE CABINET ASSEMBLY AS SHOWN ON ILLUSTRATION BELOW (UNPAINTED SURFACE).

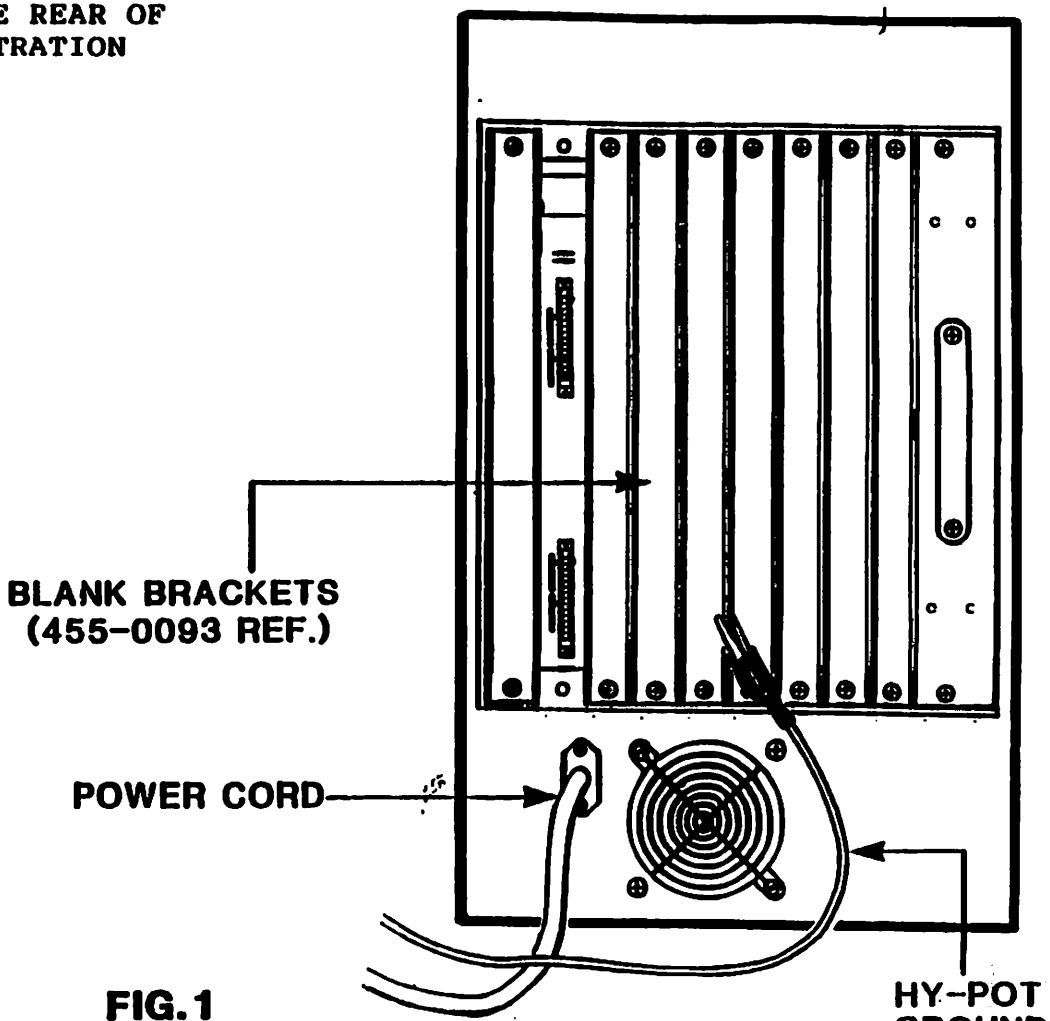


FIG. 1
REAR VIEW
OF CHASSIS

WANG LABORATORIES INC. ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 2 OF 2	
OPER. NO.	7.0	OPERATION	MOUNT/SECURE COVERS	ISSUE	REV.	TYPE

B. MOUNT THE TOP COVER TO THE FRAME BY INSERTING THE FRONT BRACKET OF THE TOP COVER UNDER THE FRONT LIP OF THE FRAME AND SECURE WITH HARDWARE, AS SHOWN.

a) 453-5027 COVER, TOP (WELD)
b) 650-4120 SCR, 8-32 x 3/8 PN HD PHL (2)

VERIFY TORQUE OF 8-32 HARDWARE TO 18 INCH/LBS.

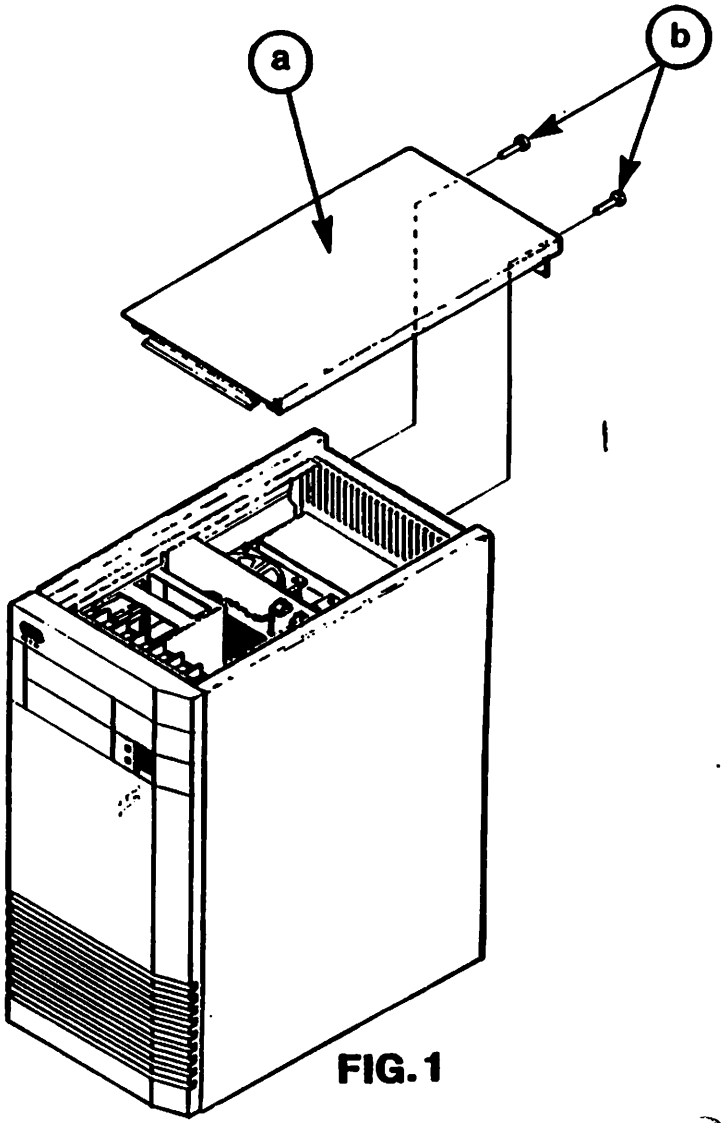


FIG. 1

WANG LABORATORIES INC ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 2	
OPER. NO.	7.0	OPERATION	MOUNT/SECURE COVERS	ISSUE	REV.	TYPE

A. MOUNT THE L.H. AND R.H. COVERS TO THE CS-D/N FRAME BY INSERTING THE FRONT BRACKETS OF THE COVERS FIRST AND THEN PUSHING DOWN INTO POSITION.

NOTE: CHECK INSIDE OF R.H. COVER FOR SWITCH SETTING LABEL.

a) 458-3899 CS-D/N FRAME (WELD) REF.
b) 458-5028 COVER, L.H. (WELD) REF.
c) 458-5029 COVER, R.H. (WELD) REF.
d) 615-4004 LABEL, SWITCH SETTING REF.

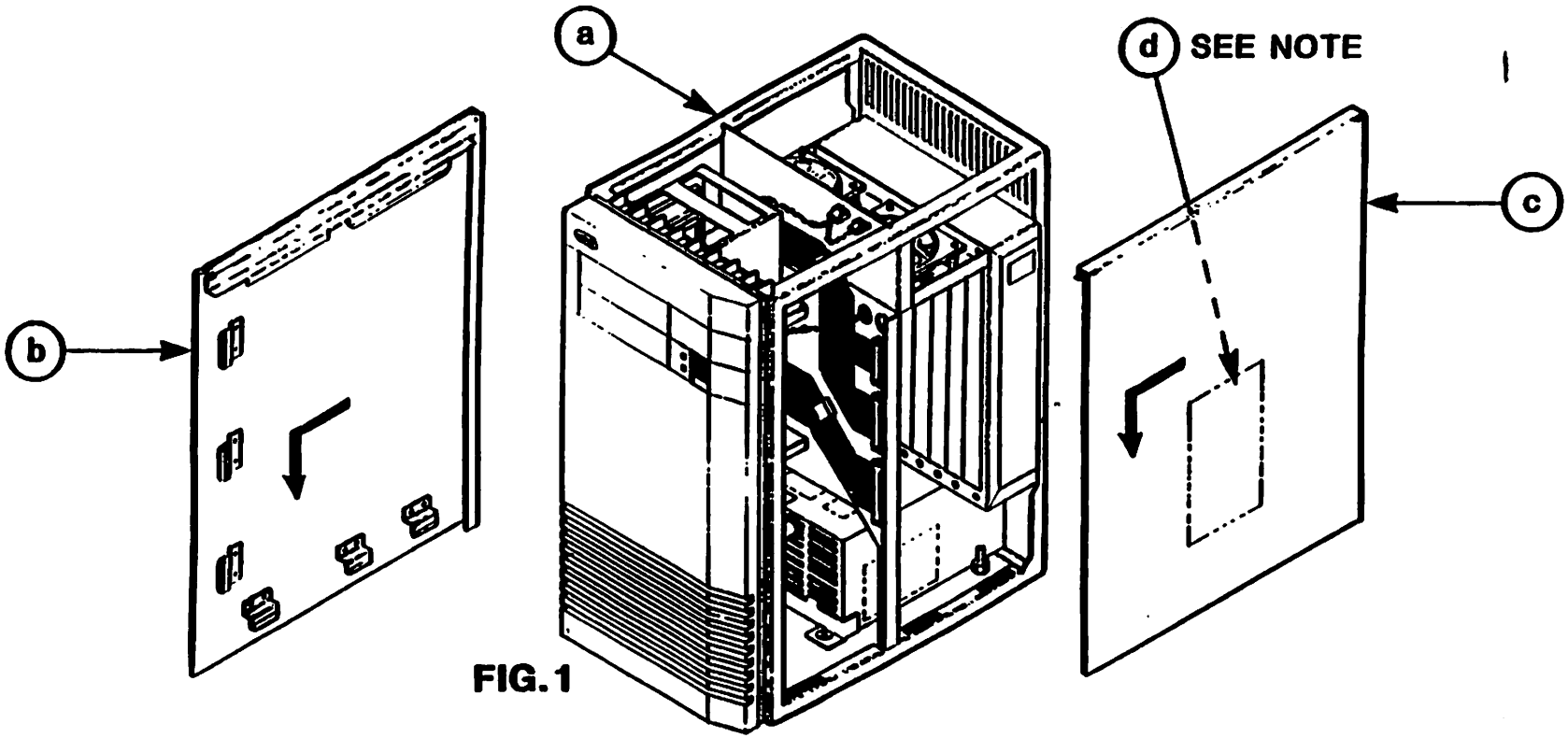


FIG. 1

WANG LABORATORIES Inc. ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 1		
OPER. NO.	6.0	OPERATION	APPLY LABELS	ISSUE	REV.	TYPE

A. 1. 615-3872 LABEL, CORP. SERIAL NO. (3 PARTS)
2. 615-4282 LABEL, MODEL NO.

APPLY THE SMALL PART OF THE SERIAL NO. LABEL TO THE FRONT BEZEL (449-1577 REF.) BELOW THE WANG LOGO (451-3727 REF.) ON CENTER AT APPROXIMATE LOCATION. APPLY ONE OF THE LARGER PARTS OF THE SERIAL NO. LABEL TO THE INSIDE UPPER RIGHT OF THE CHASSIS. APPLY THE OTHER LARGE PART OF THE LABEL TO THE OUTSIDE LOWER LEFT REAR OF THE CHASSIS, AS SHOWN.
APPLY THE MODEL NO. LABEL TO THE LOWER LEFT REAR OF THE CHASSIS.

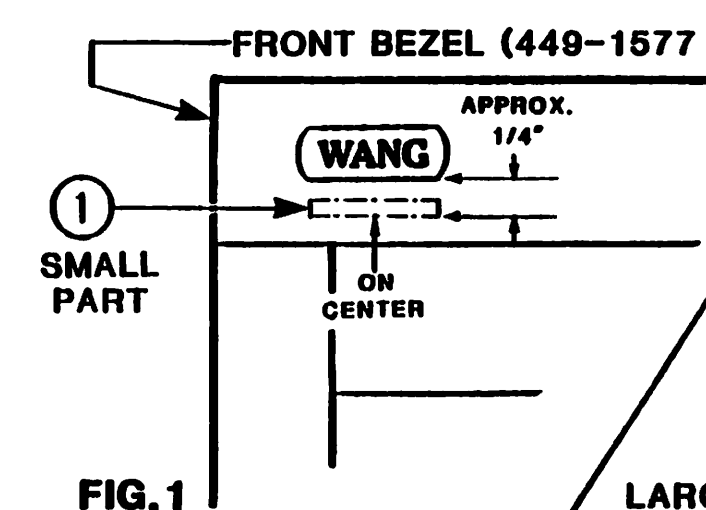


FIG.1
UPPER LEFT CORNER OF FRONT BEZEL

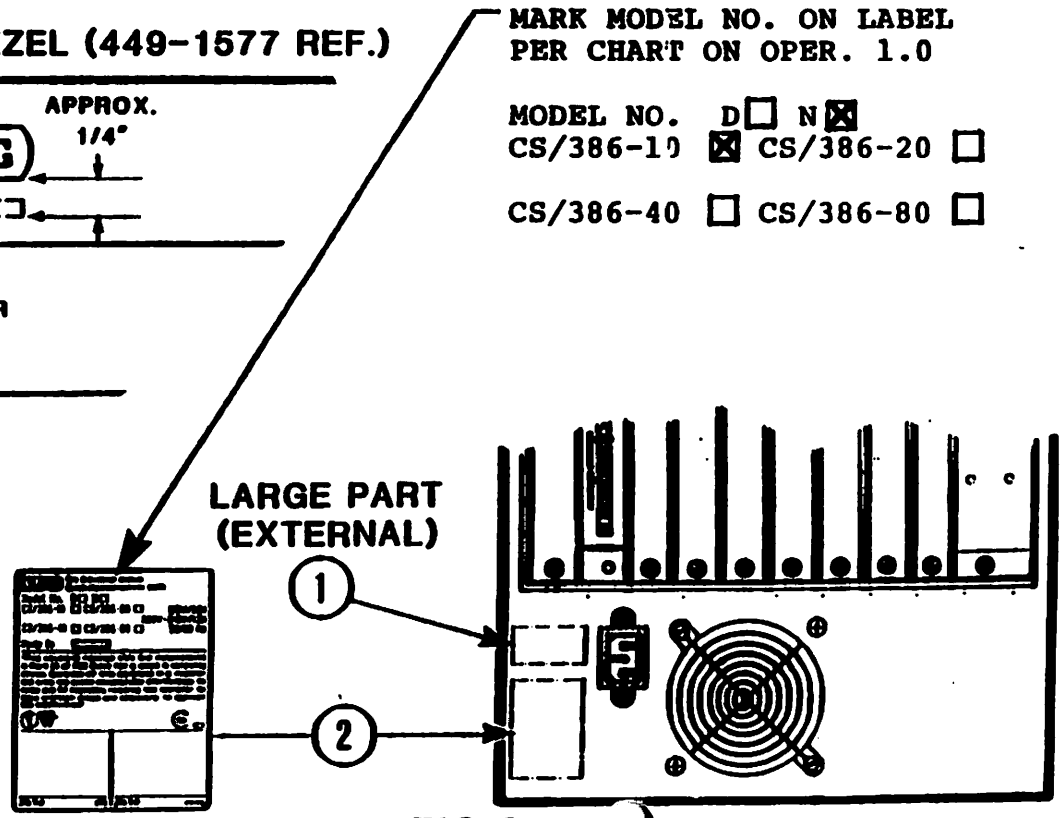


FIG.3

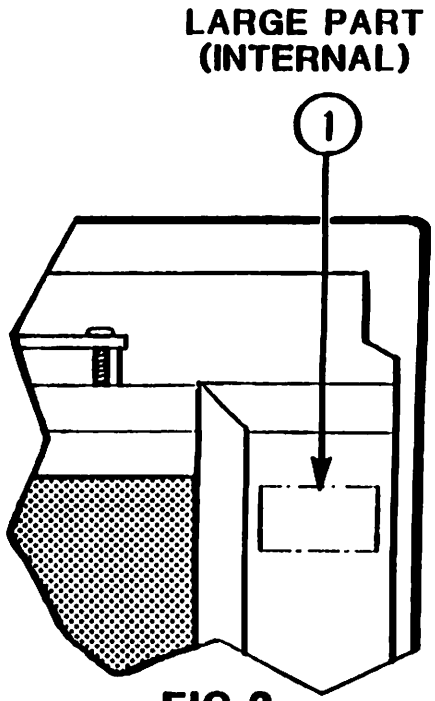


FIG.2
INSIDE UPPER RIGHT REAR OF CHASSIS (RIGHT SIDE VIEW)

WANG LABORATORIES INC

ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 1	
OPER. NO.	5.0	OPERATION	RUN-IN/FINAL TEST	ISSUE	REV.	TYPE

PERFORM SYSTEM TEST USING T.P. 167/187-3539 THROUGH -3542.

WANG LABORATORIES INC ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 1
OPER. NO.	4.5	OPERATION	QC INSPECTION (INTERNAL)	ISSUE / REV. / TYPE

PERFORM INTERNAL INSPECTION

REFER TO OPERATION 0.5 "INSPECTION GUIDELINES".

WANG LABORATORIES INC ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 1		
OPER. NO.	4.0	OPERATION	SET POWER SUPPLY VOLTAGE	ISSUE	REV.	TYPE

A. SET THE VOLTAGE SWITCH ON THE POWER SUPPLY AS FOLLOWS:

FOR 167 ASSEMBLIES SET SWITCH TO 230V 50Hz. (INTERNATIONAL)

FOR 187 ASSEMBLIES SET SWITCH TO 115V 60Hz. (DOMESTIC)

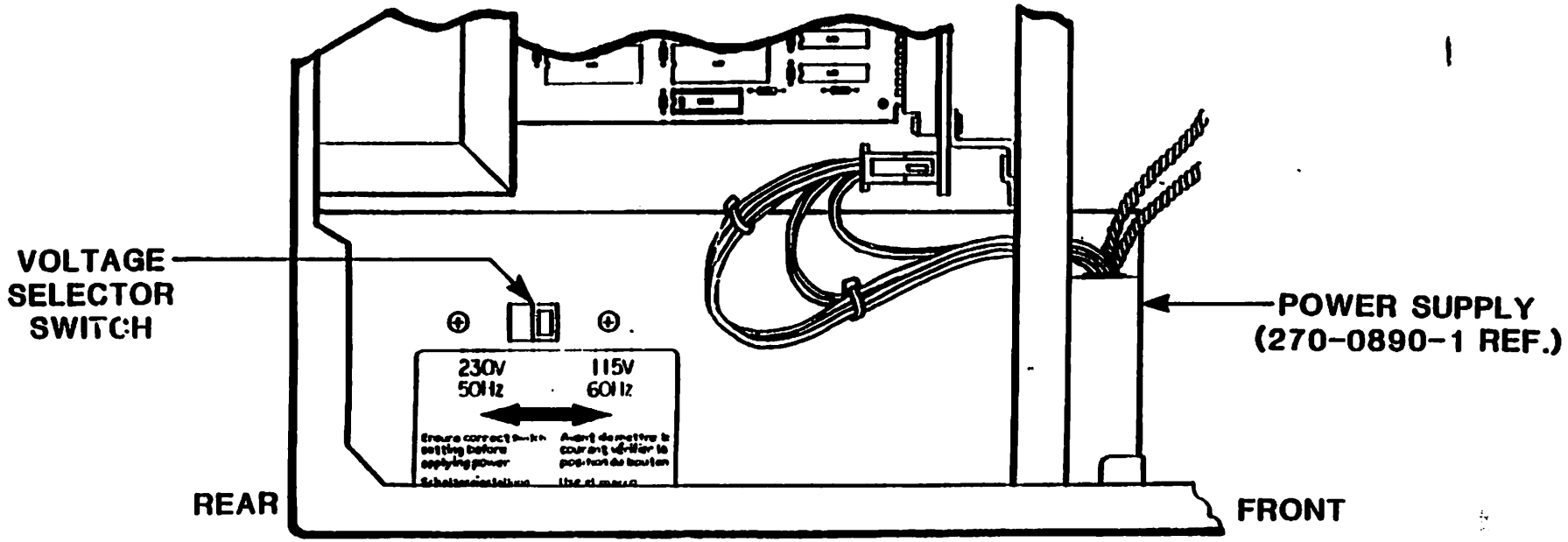


FIG. 1
LEFT SIDE VIEW
OF CHASSIS

WANG LABORATORIES INC ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY		SHT. 1 OF 1	
OPER. NO.	3.0	OPERATION	MOUNT/SECURE BLANK BRACKETS	ISSUE	REV.	TYPE

A. 1. 455-0093 BRACKET, BLANK
2. 650-4120 SCR, 8-32 x 3/8 SEMS (2)

USING THE HARDWARE AS SHOWN, SECURE THE BLANK BRACKET TO THE REAR OF THE CHASSIS AT POSITION AS SHOWN.

VERIFY TORQUE OF 8-32 HARDWARE TO 18 INCH/LBS.

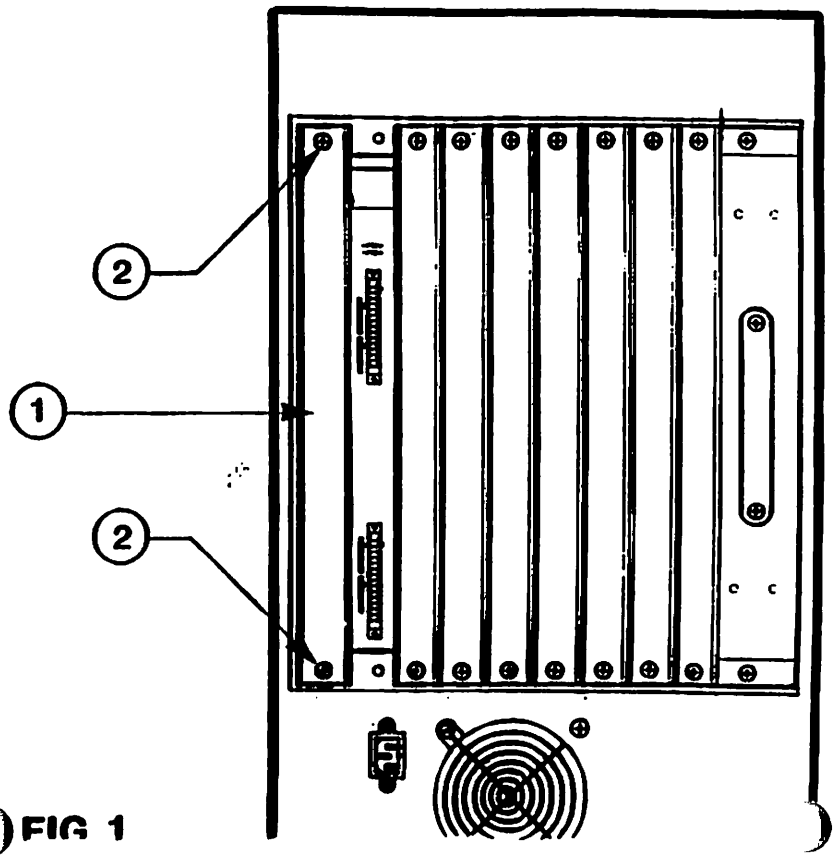


FIG 1

WANG LABORATORIES INC. ASSEMBLY SHEET

380/13

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 2 OF 2		
OPER. NO.	2.0	OPERATION	MOUNT/SECURE CPU BOARD	ISSUE	REV.	TYPE

B.
1. 212-7129-X CS/386 CPU BOARD (REFER TO CPU BOARD CHART - OP. 1.0)
2. 279-0873 CABINET ASSY CS-D/N
3. 650-4120 SCREW, #8-32 X 5/8" SEMS (2)
4. 656-0145 CONDUCTIVE GASKET (21") (2 PIECES)
5. 666-1016 BATTERY

VERIFY CPU BOARD E REV. PER E REV. CHART.

MOUNT THE CPU BOARD, WITH THE CORRECT CORRESPONDING SUFFIX LETTER (REFER TO "CS/386 CPU BOARD CHART" OPERATION 1.0) TO THE CS MOTHER BOARD (210-9560 REF.) AT POSITION AS SHOWN. USING HARDWARE AND REAR PANEL COVER (458-5026 REF.), SECURE THE CPU BOARD AT THE REAR OF THE CHASSIS.

VERIFY TORQUE OF 8-32 HARDWARE TO 18 INCH/LBS.

CUT TWO PIECES OF CONDUCTIVE GASKET TO A LENGTH OF 21" AND ATTACH THEM TO BOTH SIDES OF THE CHASSIS AT THE REAR AS SHOWN. (ONLY THE LEFT SIDE IS SHOWN). CENTER THE GASKET BETWEEN THE TOP AND BOTTOM EDGES OF THE CHASSIS.

PEEL THE VELCRO BACKING OFF THE BATTERY AND ATTACH IT TO THE UNDERSIDE SURFACE OF THE CHASSIS SO THAT THE WIRES BREAK OUT TOWARD THE FRONT OF THE CHASSIS. PLUG THE 2 PIN HOUSING INTO THE J2 CONNECTOR ON THE 9562 BOARD (BEHIND THE 9561 BOARD).

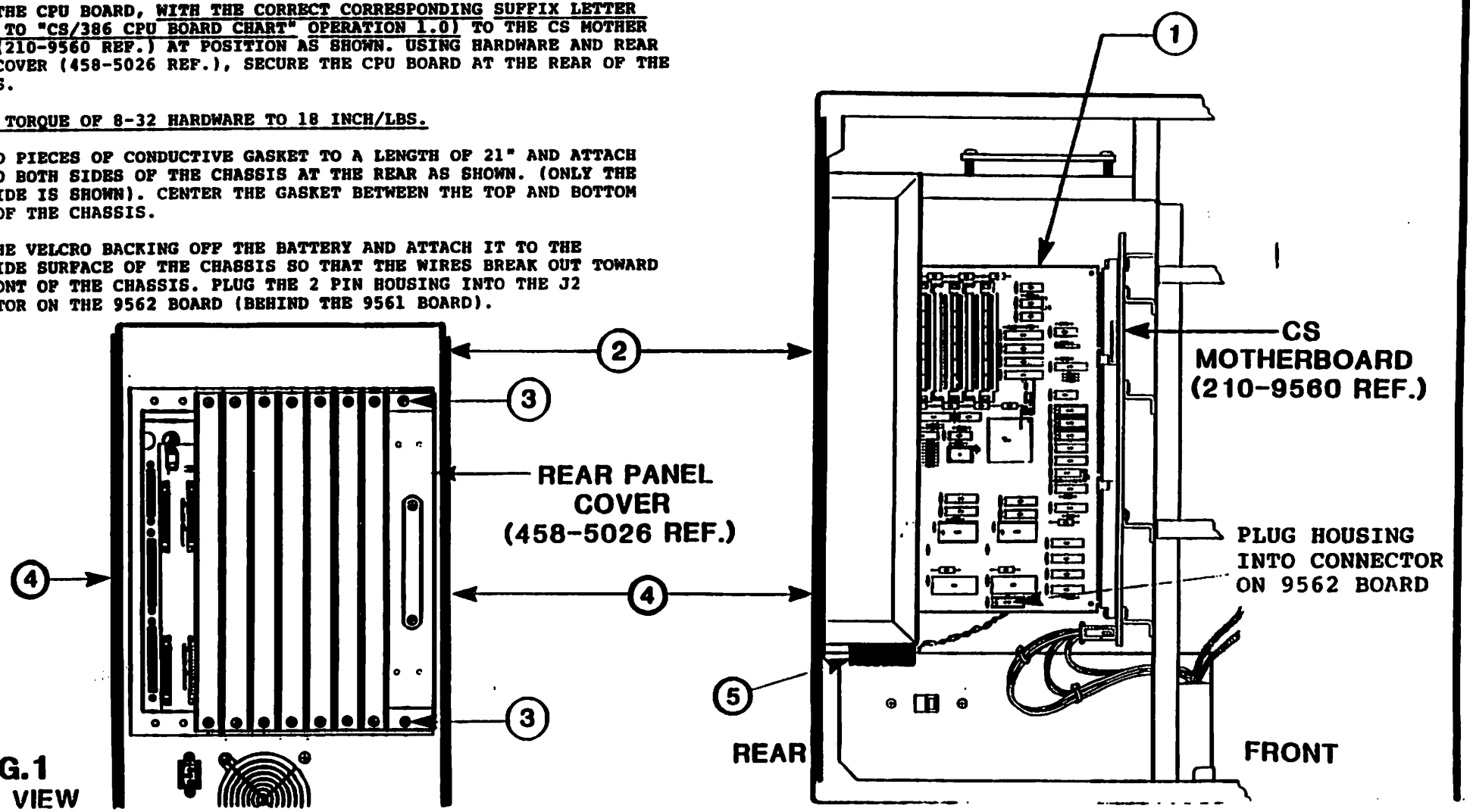


FIG.1
REAR VIEW

WANG LABORATORIES INC. ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 2	
OPER. NO.	2.0	OPERATION	MOUNT/SECURE CPU BOARD	ISSUE	REV. / TYPE

A. 1. 458-5026 COVER, PANEL, REAR (WELD)
2. 449-0702 HANDLE, CHASSIS
3. 650-3200 SCR, 6-32 x 5/8 PL PN (2)

USING THE HARDWARE AS SHOWN, SECURE THE CHASSIS HANDLE TO THE REAR PANEL COVER.

VERIFY TORQUE OF 6-32 HARDWARE TO 9 INCH/LBS.

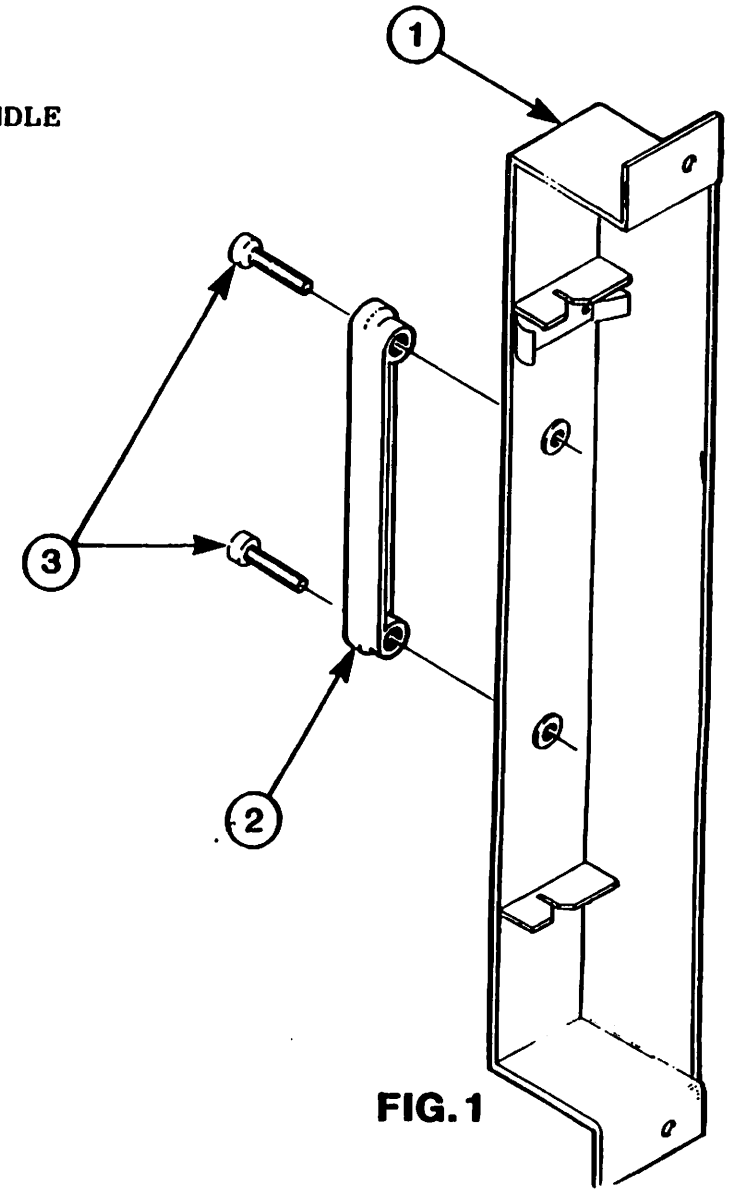


FIG.1

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 1		
OPER. NO.	1.0	OPERATION	CS/386 CPU BOARD CHART	ISSUE	REV.	TYPE

CS/386 CPU BOARD CHART

ITEM NUMBER	MODEL NO.	ITEM DESCRIPTION	CPU BOARD
167/187-3539	CS/386-10N	1MB CPU W/O DPU	212-7129-A
167/187-3540	CS/386-20N	2MB CPU W/O DPU	212-7129-B
167/187-3541	CS/386-40N	4MB CPU W/O DPU	212-7129-C
167/187-3542	CS/386-80N	8MB CPU W/O DPU	212-7129-D

WANG LABORATORIES INC ASSEMBLY SHEET

PART NO.	167/187-3539-3542	DESCRIPTION	CS/386 CPU W/O DPU - FINAL ASSY	SHT. 1 OF 1
OPER. NO.	0.5	OPERATION	INSPECTION GUIDELINES	ISSUE / REV. / TYPE

*** ATTENTION-IMPORTANT ***

THE FOLLOWING GUIDELINES ARE TO BE USED WHILE ASSEMBLING THIS PRODUCT.

1. VERIFICATION OF PCB REVISIONS (E REV'S) BEFORE ASSEMBLY INTO UNITS.
2. VERIFICATION THAT EXTERNALLY VISIBLE PARTS ARE FREE OF SCRATCHES, DISCOLORATION, IMPERFECTIONS, CORROSION OR ANY OTHER OBVIOUS COSMETIC DEFECTS.
3. VERIFICATION THAT ALL HARDWARE IS FUNCTIONAL AND WORKS FREELY. THIS INCLUDES KEY LOCKS, HINGES, SLIDES, LATCHES, SWITCHES, CASTERS, ETC.
4. INCLUSION OF ALL PROPER SWITCH SETTINGS.
5. INCLUSION OF PROPER ALIGNMENT AND BALANCE OF ALL VISIBLE GAPS OR SPACING BETWEEN MATING PANELS, BEZELS, DOORS, OR EXTERNAL SUB ASSEMBLIES.
6. INCLUSION OF PROPER TORQUE REQUIREMENTS FOR ALL HARDWARE FASTENERS.
7. THE INCLUSION OF QC CHECKS AS PART OF LAST OPERATION OF EACH SUB AND FINAL ASSEMBLY.

WANG LABORATORIES INC. OPERATION SHEET

PART NO.	DESCRIPTION	TYPE	ISS.	REV.	SHT.
167/187-3539-3542	CS/386 CPU W/O DPU - FINAL ASSY				1 OF 1

OPER. NO.	OPERATION	WORK CTR.	STD.	SPECIAL TOOLS/FIXTURES
0.5	INSPECTION GUIDELINES			
1.0	CS/386 CPU BOARD CHART			
2.0	MOUNT/SECURE CPU BOARD			
3.0	MOUNT/SECURE BLANK PANELS			
4.0	SET POWER SUPPLY VOLTAGE			
4.5	QC INSPECTION (INTERNAL)			
5.0	RUN-IN/FINAL TEST			T.P. 167/187-3539 THRU 3542
6.0	APPLY LABELS			
7.0	MOUNT/SECURE COVERS			
7.5	HY-POT			PER SPI 10-605
8.0	QC INSPECTION (EXTERNAL)			
9.0	PACKAGING			

WANG

ASSEMBLY PROCEDURE

PART NO.	DESCRIPTION	MODEL	TYPE
167/187-3539-3542	CS/386 CPU W/O DPU - FINAL ASSY		

PREP. BY	MFG. ENG. APPROVAL	Q. C. ENG. REVIEW
Bob Graves	Kevin Mahoney 9/8/89	Bob Donoghue 9/11/89

ISSUE DATE	ISSUE	BOM REV.	OPER. NO.	SHT. NO.	ECO/MPC NO.	DESCRIPTION	WRITER
9/12/89	A	AB	ALL	ALL		RELEASE TO MANUFACTURING	

DISTRIBUTION:

VS

WANG

ASSEMBLY PROCEDURE

PART NO.	DESCRIPTION	MODEL	TYPE
167/187-3543-3546	CS/386 CPU WITH DPU - FINAL ASSY		

PREP. BY	MFG. ENG. APPROVAL	Q. C. ENG. REVIEW
Bob Graves	Tom Mahoney 9/8/89	Bob Donoghue 9/11/89

ISSUE DATE	ISSUE	BOM REV.	OPER. NO.	SHT. NO.	ECO/MPC NO.	DESCRIPTION	WRITER
9/12/89	A	AB	ALL	ALL	–	RELEASE TO MANUFACTURING	B. Graves
10/13/89	B	AB	2.0	2	55601	ADD BATTERY	B. Graves

DISTRIBUTION:

VS

(WANG) LABORATORIES INC. OPERATION SHEET

PART NO.	DESCRIPTION	TYPE	ISS.	REV.	SHT.
167/187-3543-3546	CS/386 CPU WITH DPU - FINAL ASSY				1 OF 1

OPER. NO.	OPERATION	WORK CTR.	STD.	SPECIAL TOOLS/FIXTURES
0.5	INSPECTION GUIDELINES			
1.0	CS/386 CPU BOARD CHART			
2.0	MOUNT/SECURE CPU BOARD			
3.0	MOUNT/SECURE DSPC BOARD SET			
4.0	SET POWER SUPPLY VOLTAGE			
4.5	QC INSPECTION (INTERNAL)			
5.0	FINAL ACCEPTANCE TEST			T.P. 167/187-3543 THRU 3546
6.0	APPLY LABELS			
7.0	MOUNT/SECURE COVERS			
7.5	HY-POT			PER SPI 10-605
8.0	QC INSPECTION (EXTERNAL)			
9.0	PACKAGING			

(WANG) LABORATORIES INC. ASSEMBLY SHEET

PART NO.	167/187-3543-3546	DESCRIPTION	CS/386 CPU WITH DPU - FINAL ASSY	SHT. 1 OF 1	
OPER. NO.	0.5	OPERATION	INSPECTION GUIDELINES	ISSUE	REV.	TYPE

*** ATTENTION-IMPORTANT ***

THE FOLLOWING GUIDELINES ARE TO BE USED WHILE ASSEMBLING THIS PRODUCT.

1. VERIFICATION OF PCB REVISIONS (E REV'S) BEFORE ASSEMBLY INTO UNITS.
2. VERIFICATION THAT EXTERNALLY VISIBLE PARTS ARE FREE OF SCRATCHES, DISCOLORATION, IMPERFECTIONS, CORROSION OR ANY OTHER OBVIOUS COSMETIC DEFECTS.
3. VERIFICATION THAT ALL HARDWARE IS FUNCTIONAL AND WORKS FREELY. THIS INCLUDES KEY LOCKS, HINGES, SLIDES, LATCHES, SWITCHES, CASTERS, ETC.
4. INCLUSION OF ALL PROPER SWITCH SETTINGS.
5. INCLUSION OF PROPER ALIGNMENT AND BALANCE OF ALL VISIBLE GAPS OR SPACING BETWEEN MATING PANELS, BEZELS, DOORS, OR EXTERNAL SUB ASSEMBLIES.
6. INCLUSION OF PROPER TORQUE REQUIREMENTS FOR ALL HARDWARE FASTENERS.
7. THE INCLUSION OF QC CHECKS AS PART OF LAST OPERATION OF EACH SUB AND FINAL ASSEMBLY.

PART NO. 167/187-3543-3546	DESCRIPTION CS/386 CPU WITH DPU - FINAL ASSY	SHT. 1 OF 1
OPER. NO. 1.0	OPERATION CS/386 CPU BOARD CHART	ISSUE / REV. / TYPE

CS/386 CPU BOARD CHART

ITEM NUMBER	MODEL NO.	ITEM DESCRIPTION	CPU BOARD
167/187-3543	CS/386-10D	1MB CPU WITH DPU	212-7129-A
167/187-3544	CS/386-20D	2MB CPU WITH DPU	212-7129-B
167/187-3545	CS/386-40D	4MB CPU WITH DPU	212-7129-C
167/187-3546	CS/386-80D	8MB CPU WITH DPU	212-7129-D

PART NO. 1	187-3543-3546	DESCRIPTION	CS/386 CPU W[illegible]PU - FINAL ASSY		SHT. 1 OF 2
OPER. NO. 2.0	OPERATION	MOUNT/SECURE CPU BOARD		ISSUE	REV. / TYPE

A. 1. 458-5026 COVER, PANEL, REAR (WELD)
2. 449-0702 HANDLE, CHASSIS
3. 650-3200 SCR, 6-32 x 5/8 PL PN (2)

USING THE HARDWARE AS SHOWN, SECURE THE CHASSIS HANDLE TO THE REAR PANEL COVER.

VERIFY TORQUE OF 6-32 HARDWARE TO 9 INCH/LBS.

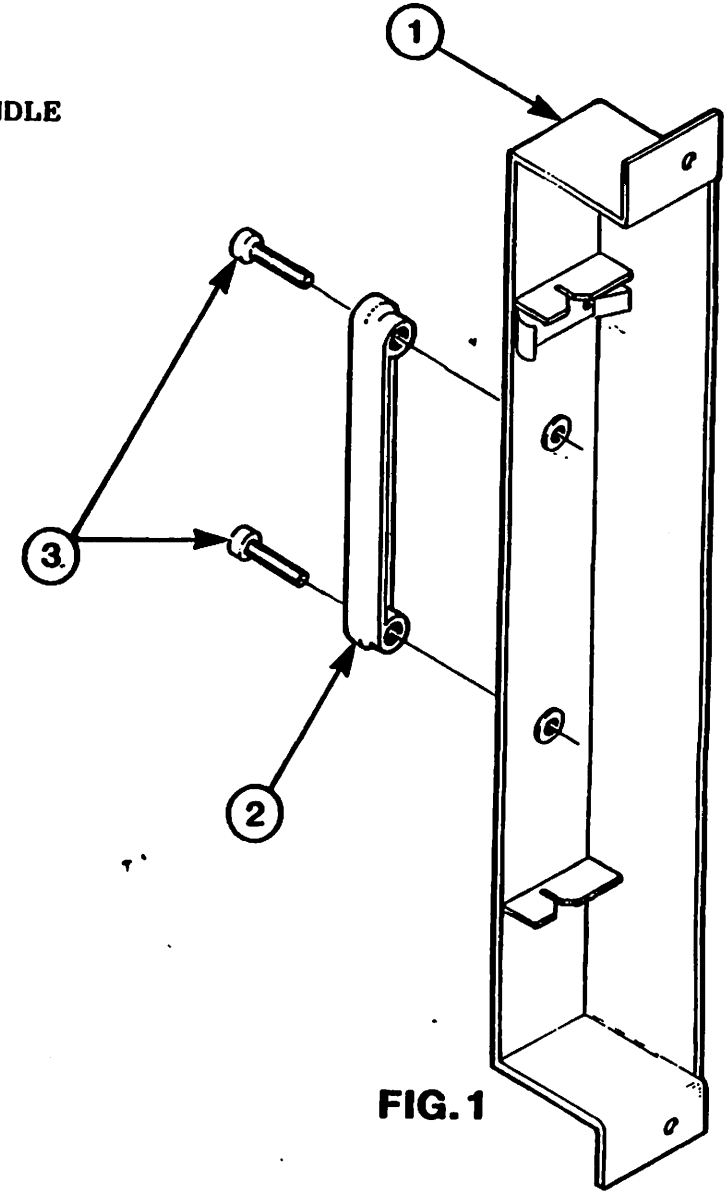


FIG. 1

(WANG) ASSEMBLY SHEET

PART NO.	167/187-3543-3546	DESCRIPTION	CS/386 CPU WITH DPU - FINAL ASSY	SHT.	2 OF 2
OPER. NO.	2.0	OPERATION	MOUNT/SECURE CPU BOARD	ISSUE / REV. / TYPE	

B.
1. 212-7129-X CS/386 CPU BOARD (REFER TO CPU BOARD CHART - OP. 1.0)
2. 279-0873 CABINET ASSY CS-D/N
3. 650-4120 SCREW, #8-32 X 5/8" SEMS (2)
4. 656-0145 CONDUCTIVE GASKET (21") (2 PIECES)
5. 666-1016 BATTERY

VERIFY CPU BOARD E REV. PER E REV. CHART.

MOUNT THE CPU BOARD, WITH THE CORRECT CORRESPONDING SUFFIX LETTER (REFER TO "CS/386 CPU BOARD CHART" OPERATION 1.0) TO THE CS MOTHER BOARD (210-9560 REF.) AT POSITION AS SHOWN. USING HARDWARE AND REAR PANEL COVER (458-5026 REF.), SECURE THE CPU BOARD AT THE REAR OF THE CHASSIS.

VERIFY TORQUE OF 8-32 HARDWARE TO 18 INCH/LBS.

CUT TWO PIECES OF CONDUCTIVE GASKET TO A LENGTH OF 21" AND ATTACH THEM TO BOTH SIDES OF THE CHASSIS AT THE REAR AS SHOWN. (ONLY THE LEFT SIDE IS SHOWN). CENTER THE GASKET BETWEEN THE TOP AND BOTTOM EDGES OF THE CHASSIS.

PEEL THE VELCRO BACKING OFF THE BATTERY AND ATTACH IT TO THE UNDERSIDE SURFACE OF THE CHASSIS SO THAT THE WIRES BREAK OUT TOWARD THE FRONT OF THE CHASSIS. PLUG THE 2 PIN HOUSING INTO THE J2 CONNECTOR ON THE 9562 BOARD (BEHIND THE 9561 BOARD).

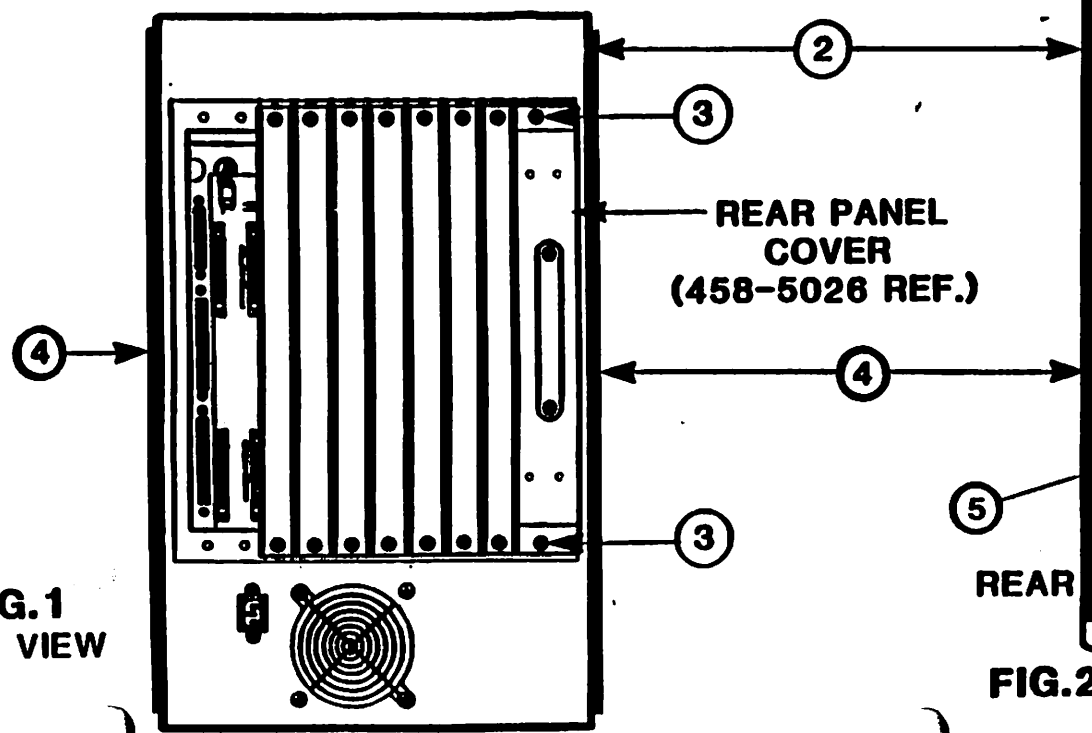


FIG.1
REAR VIEW

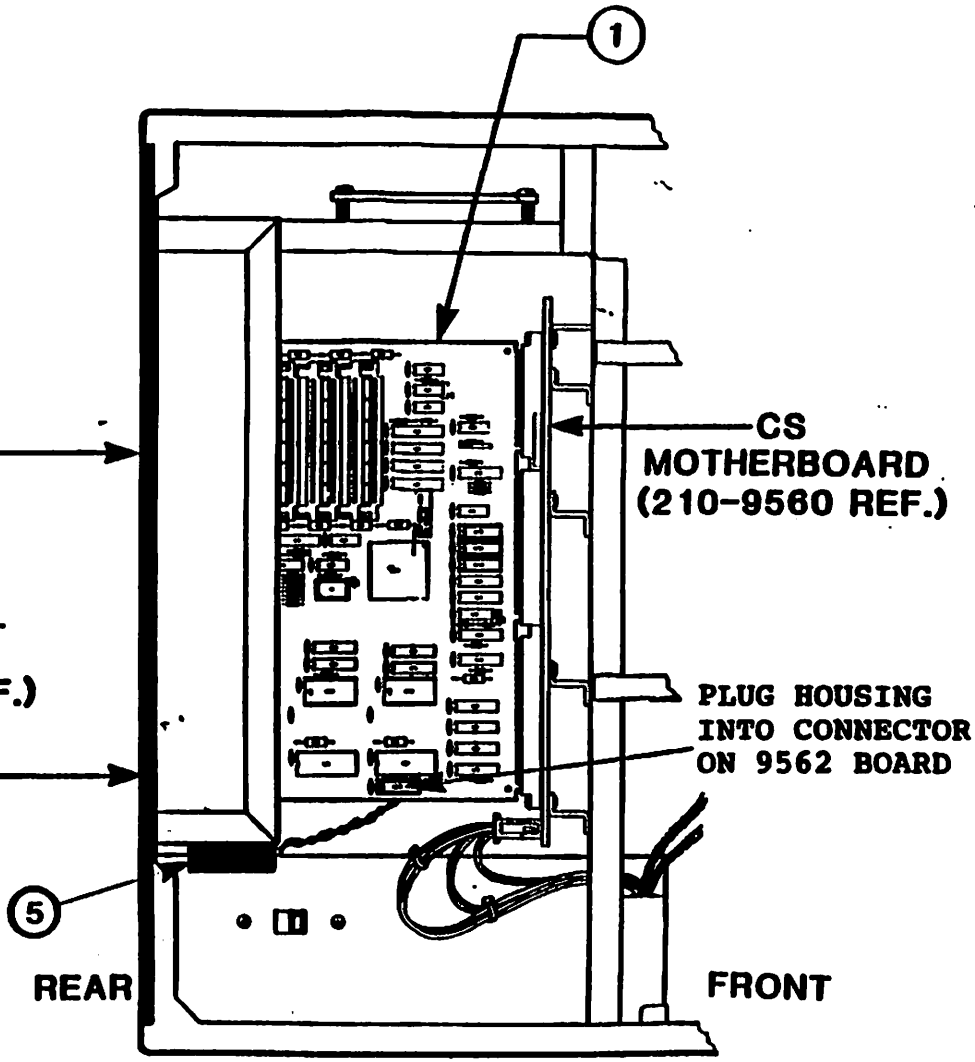


FIG.2 LEFT SIDE VIEW

WANG LABORATORIES INC. ASSEMBLY SHEET

PART NO.	167/187-3543-3546	DESCRIPTION	CS/386 CPU WITH DPU - FINAL ASSY	SHT.	1 OF 1
OPER. NO.	3.0	OPERATION	MOUNT/SECURE DSPC BOARD SET	ISSUE	REV.	TYPE

A. 1. 212-7113 DSPC BOARD SET

VERIFY BOARD SET E REV. PER E REV. CHART.
VERIFY DSPC BOARD SET "SWITCH SETTINGS". REFER TO "SWITCH SETTING LABEL" (615-4004 REF.) LOCATED ON INSIDE OF R.H. COVER (458-5029 REF.).

POSITION THE DSPC BOARD SET AS SHOWN AND PLUG INTO CS MOTHER BOARD (210-9560 REF.) AND DRIVE OPTION FLAT CABLE CONNECTORS. SECURE THE DSPC BOARD SET AT THE REAR OF THE CHASSIS BY TIGHTENING THE FACE PLATE SCREWS INTO MOUNTING HOLES, AS SHOWN.

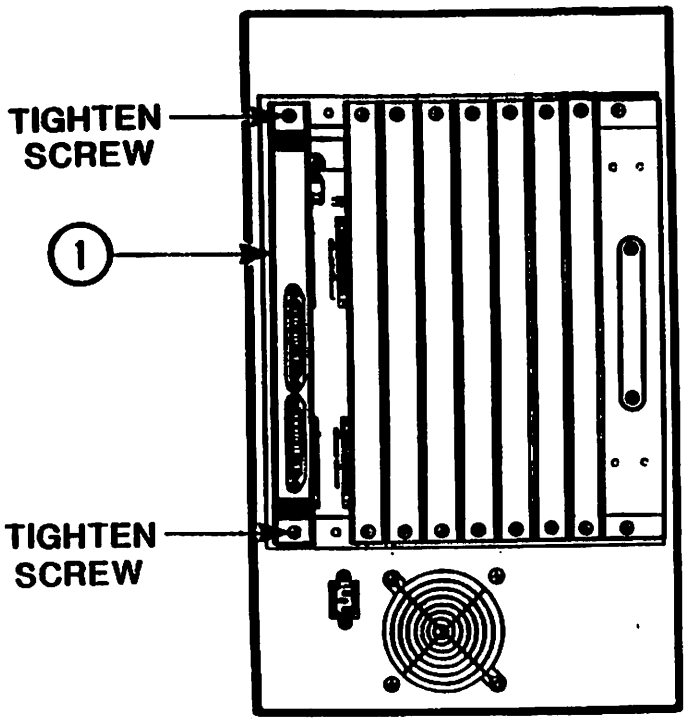


FIG.1 REAR VIEW OF CHASSIS

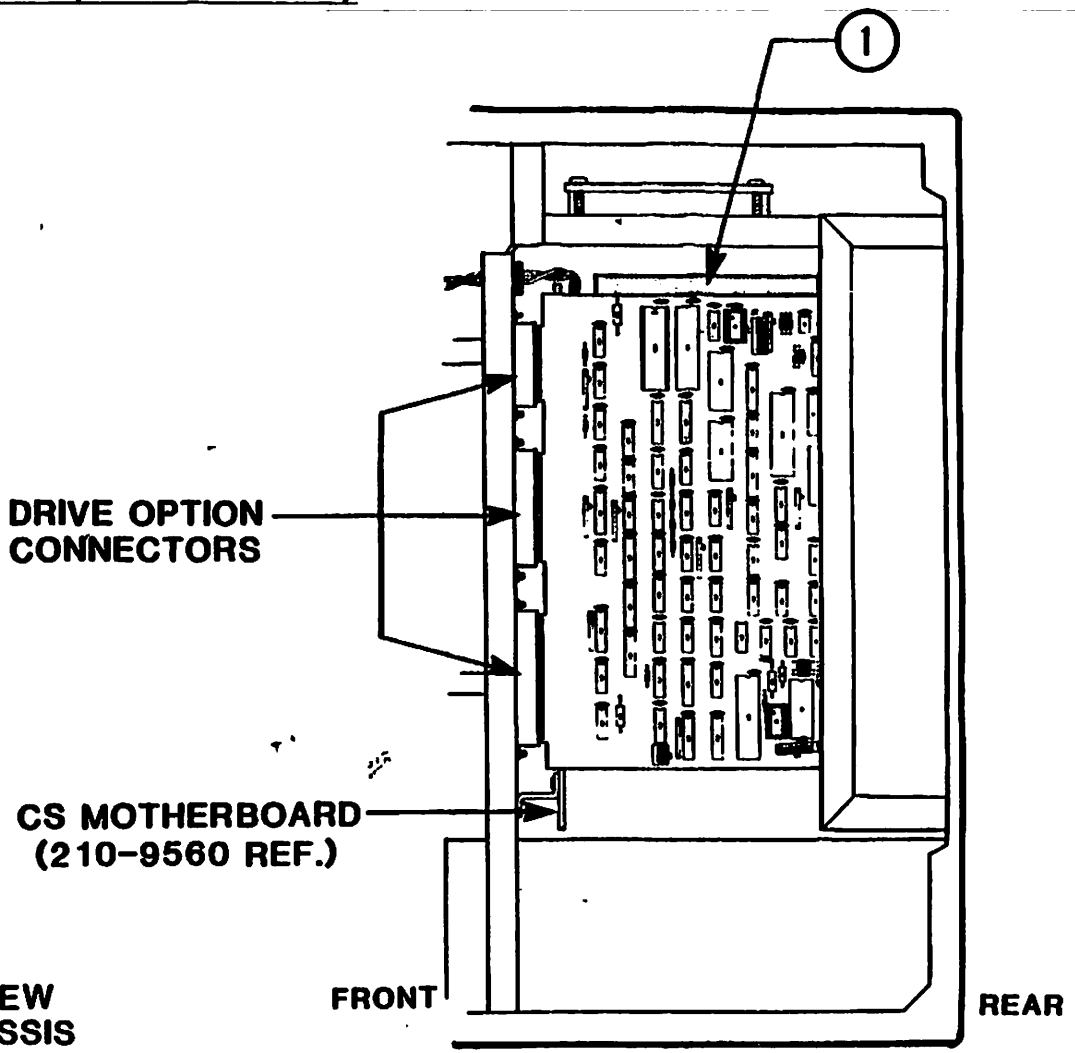


FIG.2 RIGHT SIDE VIEW

WANG LABORATORIES INC

ASSEMBLY SHEET

PART NO.	167/187-3543-3546	DESCRIPTION	CS/386 CPU WITH DPU - FINAL ASSY	SHT. 1 OF 1
OPER. NO.	4.0	OPERATION	SET POWER SUPPLY VOLTAGE	ISSUE / REV. / TYPE

A. SET THE VOLTAGE SWITCH ON THE POWER SUPPLY AS FOLLOWS:

FOR 167 ASSEMBLIES SET SWITCH TO 230V 50Hz. (INTERNATIONAL)

FOR 187 ASSEMBLIES SET SWITCH TO 115V 60Hz. (DOMESTIC)

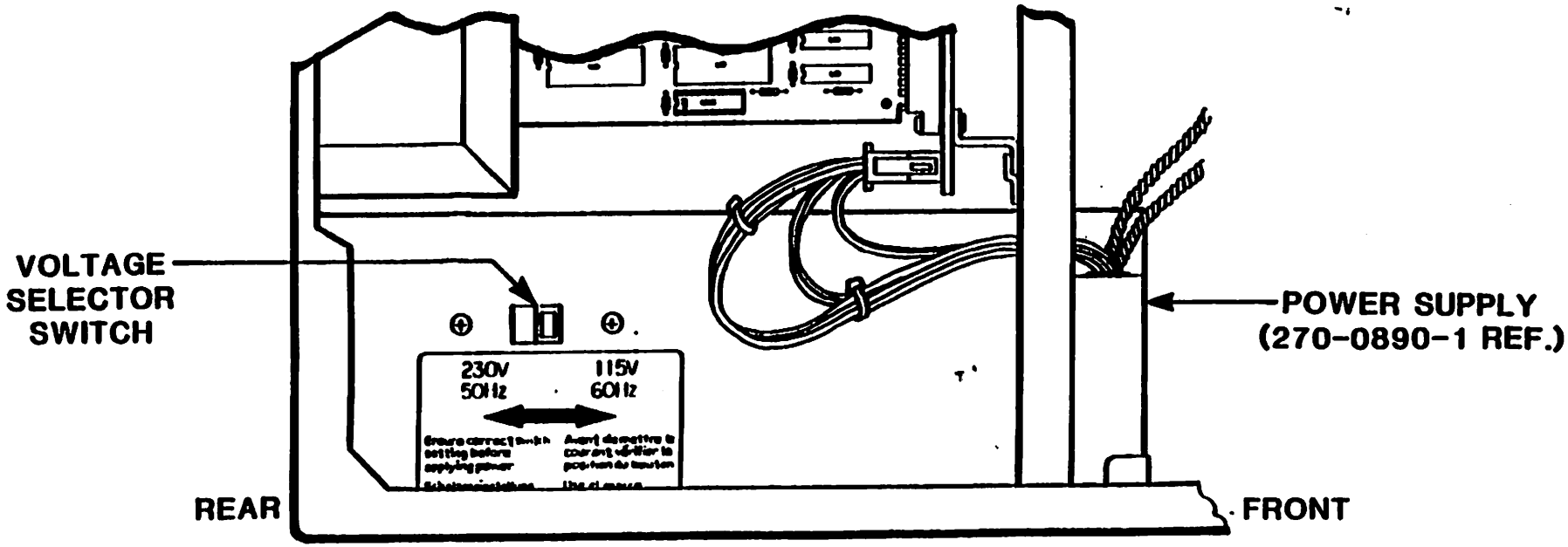


FIG. 1
LEFT SIDE VIEW
OF CHASSIS

WANG LABORATORIES INC ASSEMBLY SHEET

PART NO.	167/187-3543-3546	DESCRIPTION	CS/386 CPU WITH L.. - FINAL ASSY	SHT.	1	0.	1
OPER. NO.	4.5	OPERATION	QC INSPECTION (INTERNAL)	ISSUE	REV.	TYPE	

PERFORM INTERNAL INSPECTION

REFER TO OPERATION 0.5 "INSPECTION GUIDELINES".

NO. 5.0	OPERATION FINAL ACCEPTANCE TEST	SHT. 1 OF 1
	ISSUE / REV. / TYPE	

PERFORM SYSTEM TEST USING T.P. 167/187-3543 THROUGH -3546.

ASSEMBLY SHEET

PART NO.	16[illegible]87-3543-3546	DESCRIPTION	CS/386 CPU WITH [illegible]PU - FINAL ASSY	SHT. 1 OF 1
OPER. NO.	6.0	OPERATION	APPLY LABELS	ISSUE / REV. / TYPE

A. 1. 615-3872 LABEL, CORP. SERIAL NO. (3 PARTS)
2. 615-4282 LABEL, MODEL NO.

APPLY THE SMALL PART OF THE SERIAL NO. LABEL TO THE FRONT BEZEL (449-1577 REF.) BELOW THE WANG LOGO (451-3727 REF.) ON CENTER AT APPROXIMATE LOCATION. APPLY ONE OF THE LARGER PARTS OF THE SERIAL NO. LABEL TO THE INSIDE UPPER RIGHT OF THE CHASSIS. APPLY THE OTHER LARGE PART OF THE LABEL TO THE OUTSIDE LOWER LEFT REAR OF THE CHASSIS, AS SHOWN.
APPLY THE MODEL NO. LABEL TO THE LOWER LEFT REAR OF THE CHASSIS.

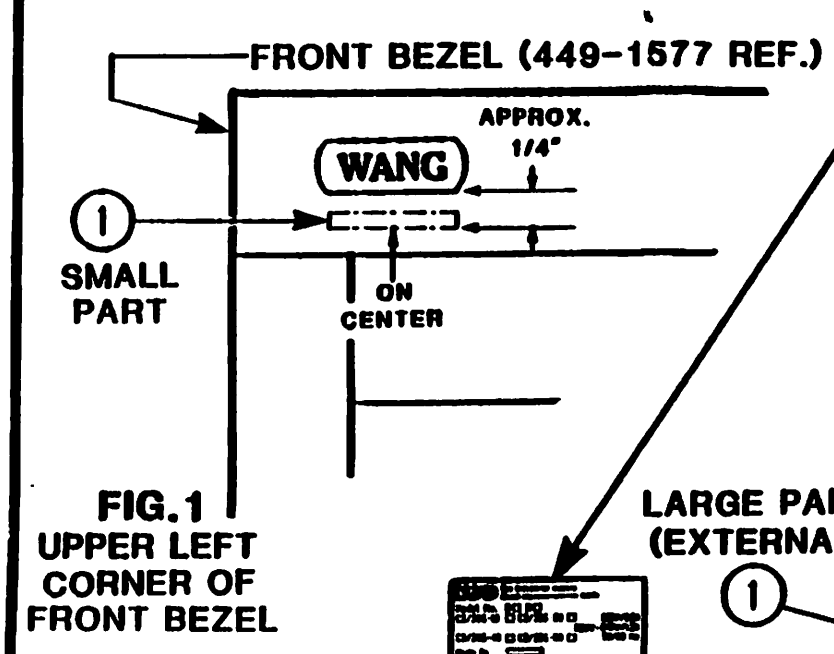


FIG.1
UPPER LEFT CORNER OF FRONT BEZEL

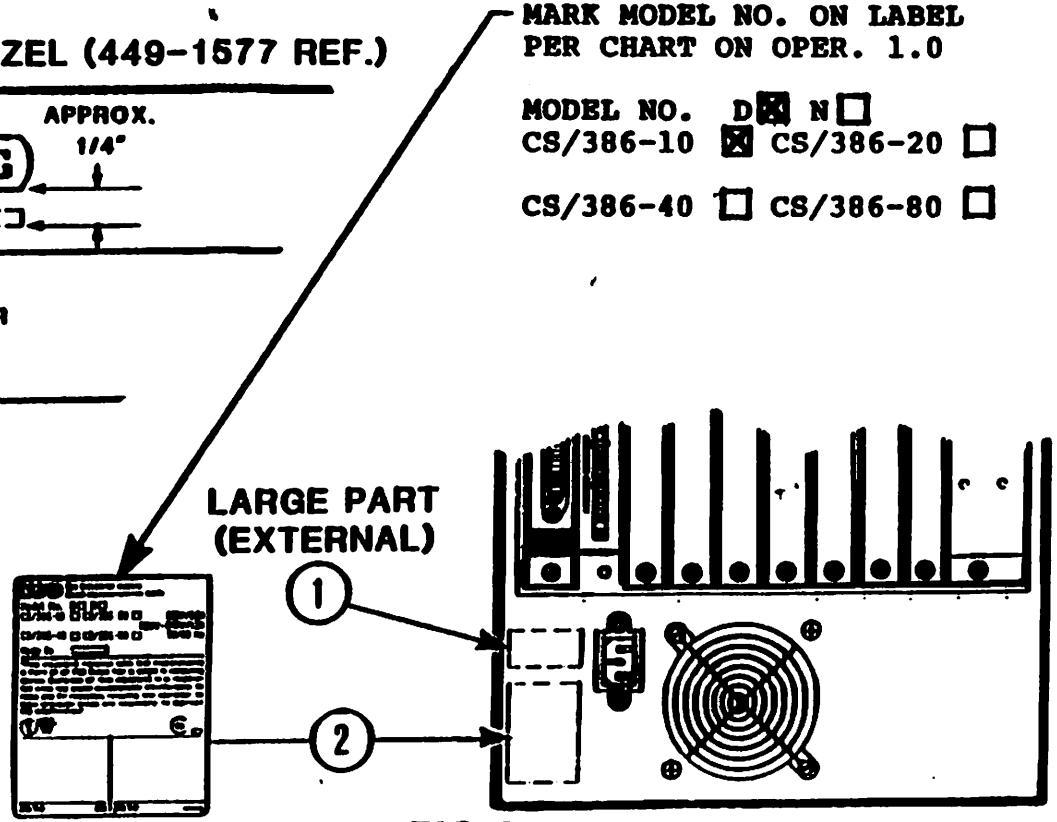


FIG.3 REAR VIEW OF CHASSIS

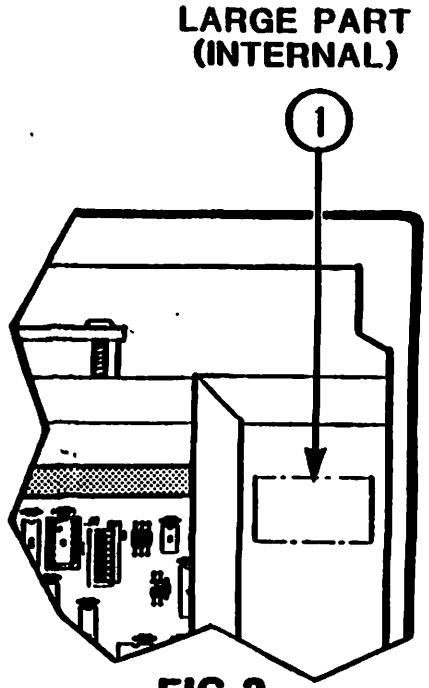


FIG.2
INSIDE UPPER RIGHT REAR OF CHASSIS (RIGHT SIDE VIEW)

ASSEMBLY SHEET

PART NO.	167/187-3543-3546	DESCRIPTION	CS/386 CPU WITH DPU - FINAL ASSY	SHT. 1 OF 2
OPER. NO.	7.0	OPERATION	MOUNT/SECURE COVERS	ISSUE / REV. / TYPE

A. MOUNT THE L.H. AND R.H. COVERS TO THE CS-D/N FRAME BY INSERTING THE FRONT BRACKETS OF THE COVERS FIRST AND THEN PUSHING DOWN INTO POSITION.

NOTE: CHECK INSIDE OF R.H. COVER FOR SWITCH SETTING LABEL.

a) 458-3899 CS-D/N FRAME (WELD) REF.
b) 458-5028 COVER, L.H. (WELD) REF.
c) 458-5029 COVER, R.H. (WELD) REF.
d) 615-4004 LABEL, SWITCH SETTING REF.

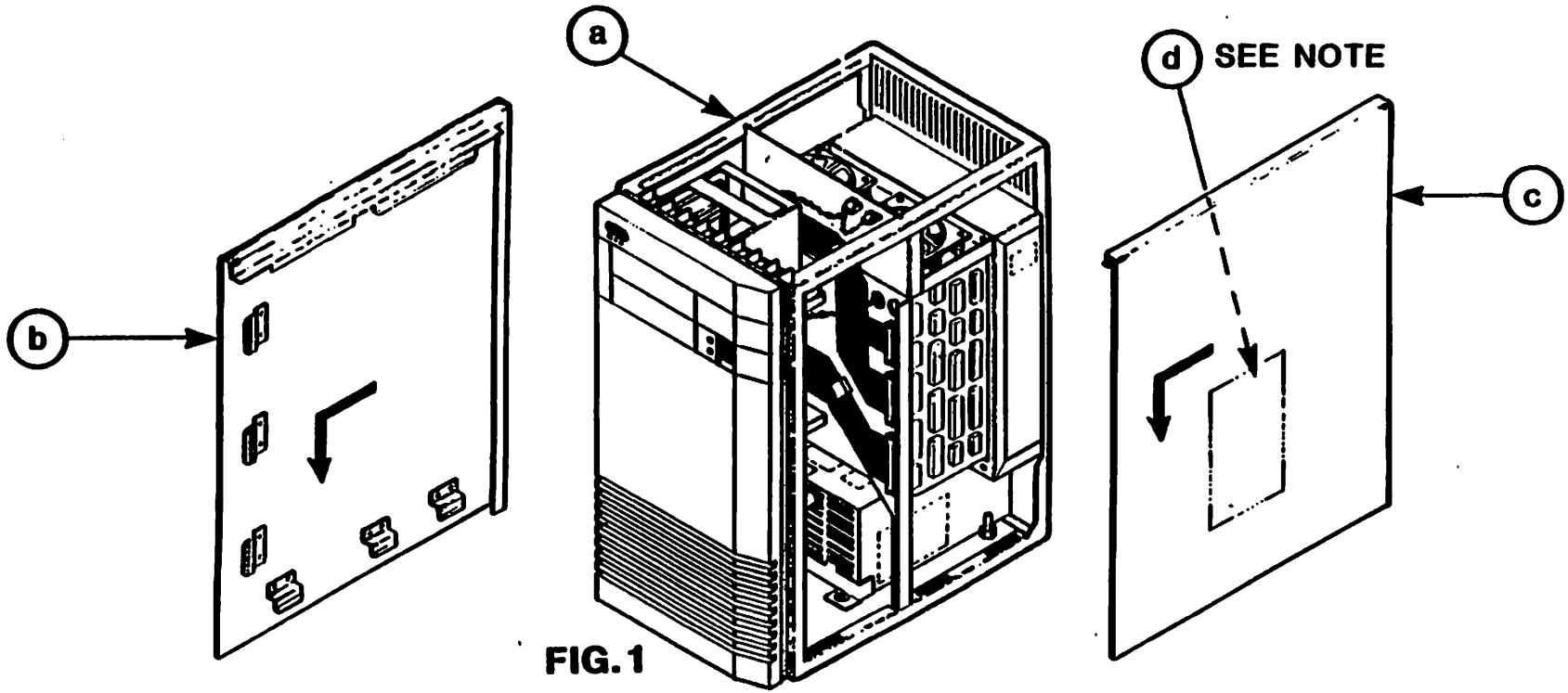


FIG.1

PART NO.	167187-3543-3546	DESCRIPTION	CS/386 CPU WITH U - FINAL ASSY	SHT. 2 OF 2
OPER. NO.	7.0	OPERATION	MOUNT/SECURE COVERS	ISSUE / REV. / TYPE

B. MOUNT THE TOP COVER TO THE FRAME BY INSERTING THE FRONT BRACKET OF THE TOP COVER UNDER THE FRONT LIP OF THE FRAME AND SECURE WITH HARDWARE, AS SHOWN.

a) 458-5027 COVER, TOP (WELD)
b) 650-4120 SCR, 8-32 x 3/8 PN HD PHL (2)

VERIFY TORQUE OF 8-32 HARDWARE TO 18 INCH/LBS.

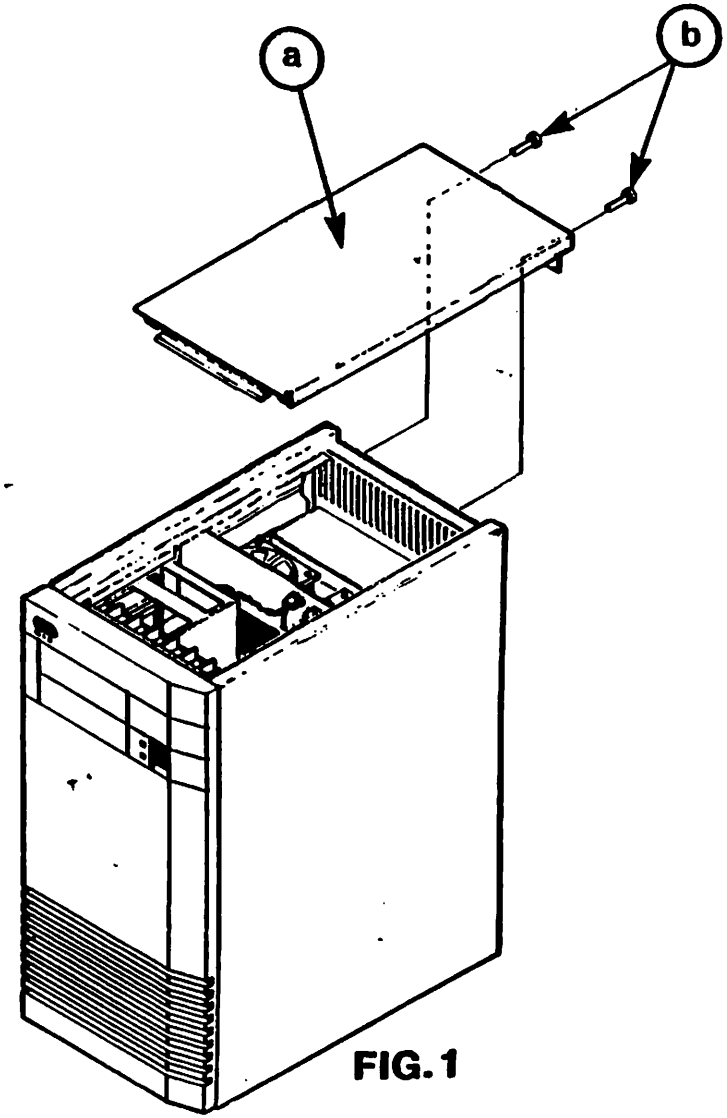


FIG. 1

ASSEMBLY SHEET

PART NO.	167/187-3543-3546	DESCRIPTION	CS/386 CPU WITH DPU - FINAL ASSY	SHT. 1 OF 1		
OPER. NO.	7.5	OPERATION	HY-POT TEST	ISSUE	REV.	TYPE

A. HY-POT PER SPI 10-605

ATTACH THE HY-POT GROUND PROBE TO THE BLANK BRACKETS (455-0093 REF.) LOCATED ON THE REAR OF THE CABINET ASSEMBLY AS SHOWN ON ILLUSTRATION BELOW (UNPAINTED SURFACE).

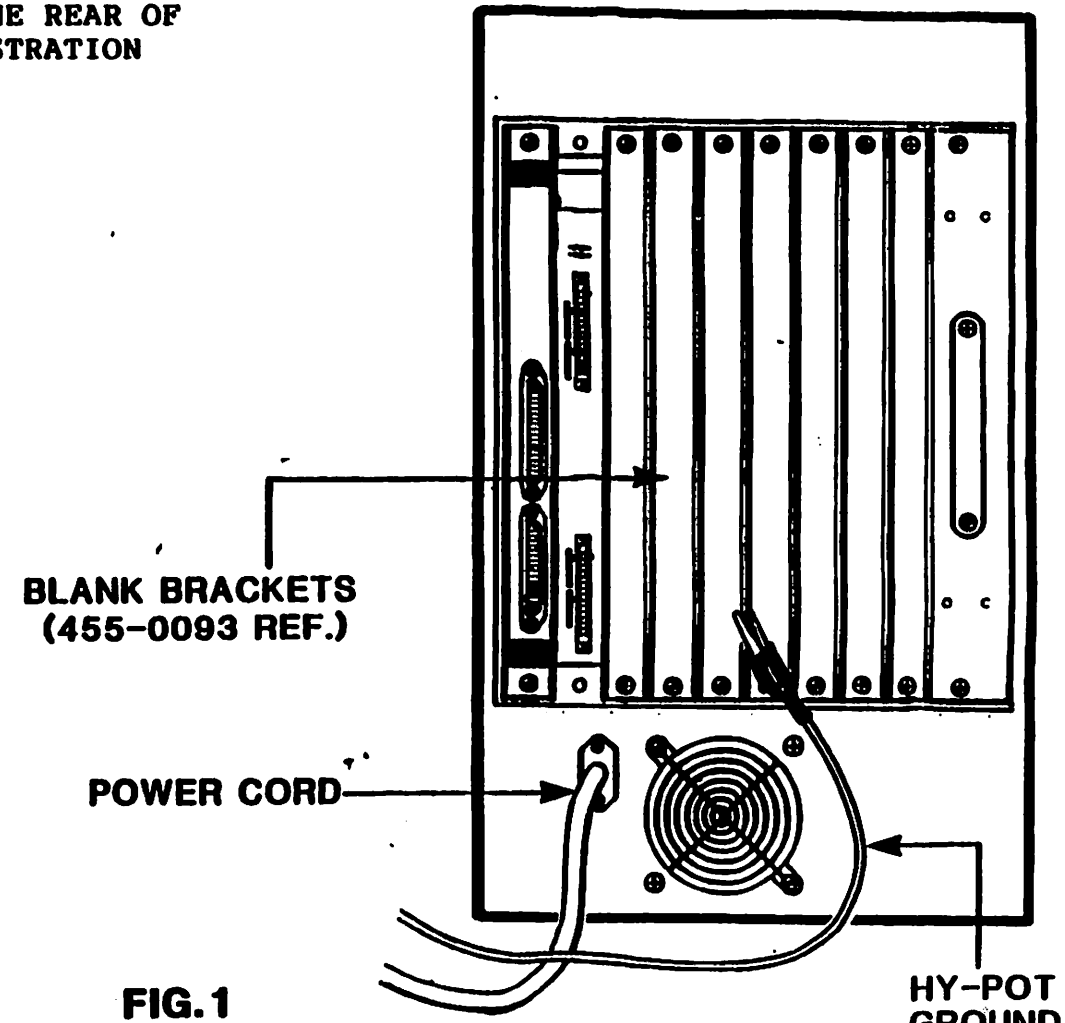


FIG. 1
REAR VIEW
OF CHASSIS

PART NO. 167/187-3543-3546	DESCRIPTION CS/386 CPU WITH DPU - FINAL ASSY	SHT. 1 OF 1

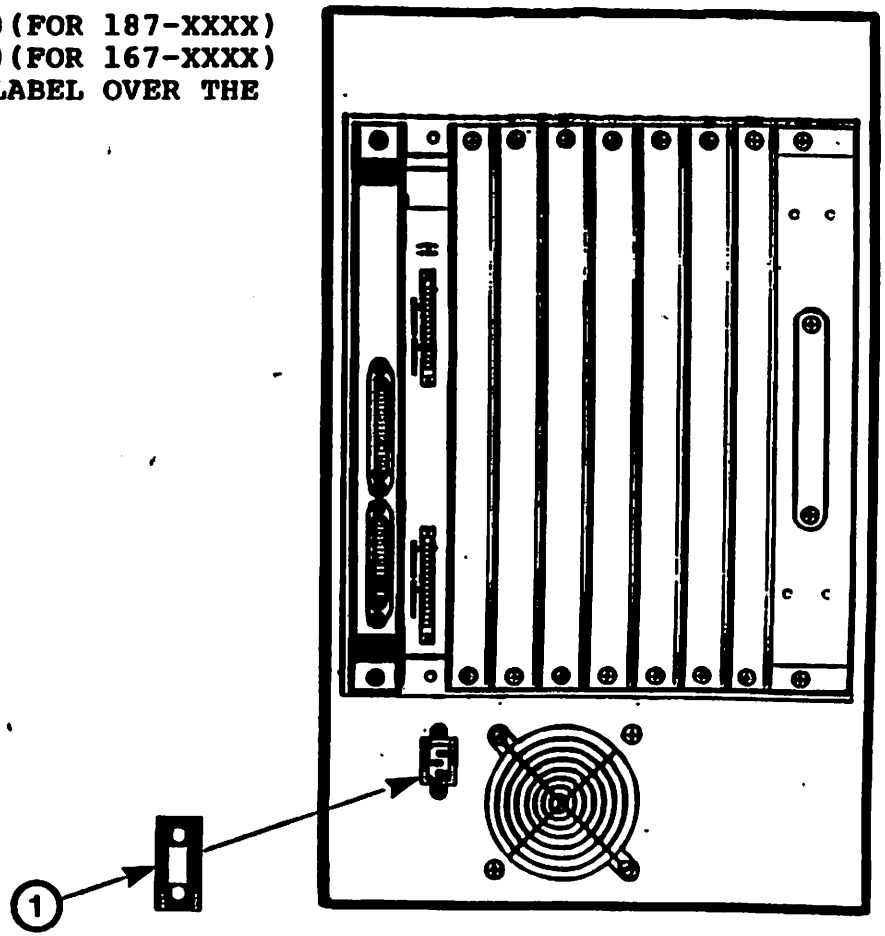
OPER. NO. 8.0	OPERATION QC INSPECTION (EXTERNAL)	ISSUE	REV.	TYPE

PERFORM INTERNAL INSPECTION

REFER TO OPERATION 0.5 "INSPECTION GUIDELINES".

A.

1. 615-2029 VOLTAGE WARNING LABEL (115V)(FOR 187-XXXX)
   615-2071 VOLTAGE WARNING LABEL (230V)(FOR 167-XXXX)
   ATTACH THE APPROPRIATE VOLTAGE WARNING LABEL OVER THE AC PLUG AS SHOWN.



WANG LABORATORIES INC

ASSEMBLY SHEET

PART NO.	167/187-3543-3546	DESCRIPTION	CS/386 CPU WITH DPU - FINAL ASSY	SHT. 1 OF 1
OPER. NO.	9.0	OPERATION	PACKAGING	ISSUE / REV. / TYPE

A. THE FOLLOWING ITEMS ARE ALL PART OF THE SHIPPING PACKAGE, 290-0685 AND **290-0685-02

a) **685-0100 EDGE PROTECTOR (4)
b) **685-0474 TAPE 2" CLEAR POLY (A/R)
c) **685-0664 STRAPPING POLY .50 (A/R)
d) **685-0665 SEAL STRAPPING FOR .50 (2)
e) 685-0723 BAG GUSSET 23 x 17 x 36
f) 685-2410 FOLHSC 27.13 x 20.00
g) 685-2411 PALLET 28.00 x 20.88
h) 685-2412 CUSHION ASSY, TOP

PLACE CABINET ASSEMBLY ON CUSHION PALLET, AS SHOWN. PLACE GUSSET OVER CABINET AND PLACE TOP CUSHION ASSEMBLY ONTO CABINET ASSEMBLY, AS SHOWN.

SET UP BOX, FOLD TOP FLAPS OVER AND SEAL WITH 2" CLEAR TAPE. PLACE BOX OVER CABINET, AS SHOWN.

RUN POLY STRAPPING UNDER CUSHION PALLET AND OVER THE TOP OF THE BOX, USE EDGE PROTECTORS ON THE TOP OF THE BOX. SECURE STRAPPING USING STRAPPING SEALS, AT POSITIONS AS SHOWN.

1. 615-2265 LABEL, DOCK MERGE

APPLY LABEL AT POSITION, AS SHOWN.

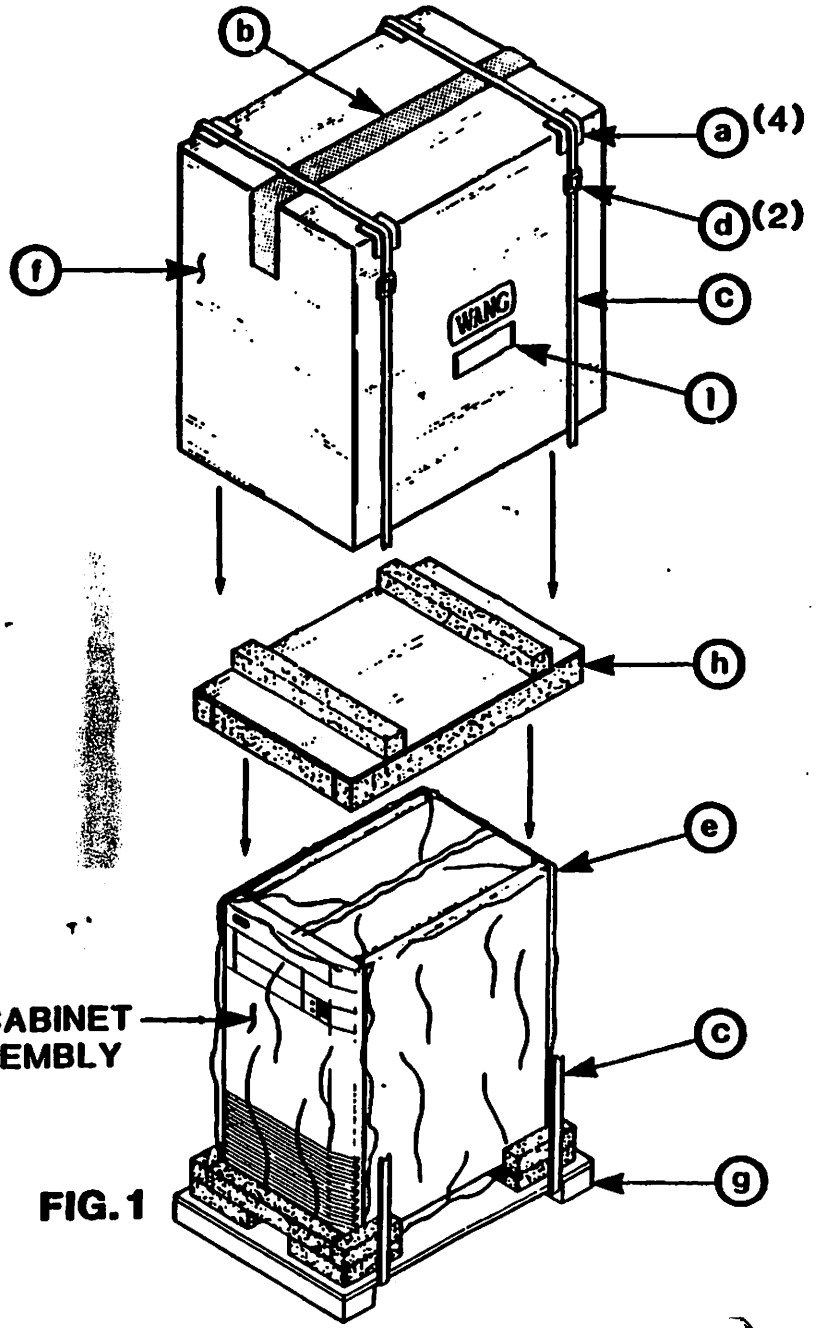


FIG. 1

2/13/92

386 CLOCK FIX (CLOCK LOOSING 2-3 MINUTES PER WEEK)

INSTALLING THE TURBO CLOCK ON THE CS/386 DAUGHTERBOARD.

DS1287 REAL TIME CLOCK CHIP 9048B3 008269 WANG P/N 377-1137

ON THE 210-9562 DAUGHTERBOARD:

1. REMOVE OLD CLOCK CHIP AT L20.
2. UNSOLDER CHIP BED AND REMOVE.
3. INSTALL NEW CLOCK CHIP, 377-1137, PIN 1 TO LOWER LEFT CORNER, AS WITH ALL CHIPS ON BOARD.
4. ADD JUMPER WIRE FROM PIN 1 TO PIN 24 OF L20.
5. ADD JUMPER FROM L20 PIN 1 TO L28 PIN 20.

To: Michael Bahia MS014-A3A/LOWELL
From: Manabu Fukamachi Security: General
Subject: CS386 SQUARE ROOT Date Received: 12/25/91

Mike,

Thank you for your informations.

Merry X'mas.

Best Regards,
Manabu/Japan Dec. 24, 1991

---------- Reply ----------

To: Manabu Fukamachi From: Michael Bahia
Subject: CS386 SQUARE ROOT Date Sent: 12/13/91

Manabu,
Not being a math wizard I compared results shown by the 386 & a VLSI CPU which seems to address your problem. I'm not positive the square root of a number is the exact same as a number to the .5 power. These calculation are probably handled in different manners by the CPU though basically equivalent. The reason for the difference when compared to VLSI can be explained by the fact the 386 has only 10 bit accuracy where the older CPUs have 13 bit accuracy. This is a limitatation of the Intel 386 chip & 10 bit accuracy appears to be the industry standard. Because of this numbers will round off a little differently between the 2 machines. There is no detailed explanation of these differences but is briefly mentioned in the Multiuser Basic-2 Language Reference Manual on page C-5 under Language-Independent Incompatibilities. This manual is part # 700-4080F.
This difference in accuracy was also mentioned in TSB SWT 9225 from 12/26/89, Software Idiosyncrasies with the CS/386, item 5.
Regards, Mike

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

To: Michael Bahia From: Manabu Fukamachi
Subject: CS386 SQUARE ROOT Date Sent: 12/13/91

Mike,

I have one question.
We had tested the square root "SQR( ) and ( )↑0.5" of calculation on CS386.

For example:

```
  SQR(102400 + 0.00000005)  = 320.0000000002
(102400 + 0.00000005) ↑0.5 = 320.0000000001

  SQR(102400 - 0.00000005)  = 319.968
(102400 - 0.00000005) ↑0.5 = 320.0000000001
```



```
A  = (102400 - 0.00000005)
A1 = ROUND (A,4)
 SQR(A1)  = 320
(A1) ↑0.5 = 320.0000000001
```

Why the answer comes out defferently?

Pls advise and are there any manual.

P.S. Thank you for your kindness. I join to the 2200 MAILBOX CLUB.

Best Regards,
Manabu Fukamachi/Japan

To: Michael Bahia MS014-A3A/LOWELL
From: Neil Tooth Security: Limited
Subject: PTR P900005724 Date Received: 10/02/91

Hi, resolved problem. It was in the @BOOT file on the diskett you sent. There is a line 9055 DATA "DG1","CS/386 DIAGNOSTICS","P" we REM this line as the diagnostic @DG1 also appears in line 9050.
Thanks for pointing us in the right direction. With the line in there the symptoms were The screen would flash "Loading CS /386 O/S " & then screen would blank & Hang. Shift reset will bring you back to press system reset.
Thanks for you help
Neil

---------- Reply ----------

To: Neil Tooth From: Michael Bahia
Subject: PTR P900005724 Date Sent: 10/01/91

Neil,
Have tested the O/S and that problem should not exist. FORMAT another floppy and do a MOVE command to move the O/S to another disk. If needed, COPY or MOVE it to hard disk first. There is a possibility the index was created in PC mode and @@ cannot be found because the 2200 sets up the index differently. If this is the case the MOVE command will recreate the index in the 2200 format and correct the problem. This should not be the case as the disk I copied it from is ok, but I may have confused the disks as I had that problem once before.
Another possibility may exist if anyone altered any of the files on the disk. Some of the boot files have size restrictions and if they are exceeded various symptoms may result. This is seen most often when @BOOT is altered to allow loading of multiple O/S's from the same address.
What errors if any are you seeing? A third possibility may be a strange hardware problem. Depending on the error, it could be the CPU board or drive. Less likely would be the DPU board or possibly the controller.
Have sent this O/S out to at least a dozen people and other than the first problem I mentioned with the index created by the PC there have been no problems. Please take another look at the O/S & see if you can find a problem. If nothing can be found, send a copy of the O/S that failed by mail or Wang Office & I will retry it here.
Regards, Mike

---------- Reply ----------

To: Michael Bahia From: Neil Tooth
Subject: PTR P900005724 Date Sent: 10/01/91

Hi, got the diskett it made good time. The software fixes the original problem in the ptr. But still has the problem you can not boot off @@ file when you $INIT "SYSTEM" & hit the pf key, The system hangs. You can boot up if you manualy key in @mvp. We can live with this but it will have to be fixed.
Thanks Neil

---------- Reply ----------

To: Neil Tooth From: Michael Bahia
Subject: PTR P900005724 Date Sent: 09/27/91

Neil,
The O/S is in the mail. The carrier is DHL, airbill # 330908141. Please update the PTR call when received. Once we verify the problem is corrected on site, we can close the call.
Regards, Mike

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

To: Michael Bahia From: Neil Tooth
Subject: PTR P900005724 Date Sent: 09/27/91

Hi, We got the software out of office & onto the 2200 system. It fixes the 2200 problem. But it has another which is that we can boot off of the file @MVP but not off of @@. It looks like the file @@ got corrupted somewhere in the transfer or copy2200.
Could you please send me rel 1.1t on 360k 5 1/4" DSSS floppy, or 1.2 meg 5 1/4" DSDD HIGH DENSITY floppy, or 1.2 meg 8 1/2" DSDD floppy. Please send it to Neil Tooth
C/O WANG CSO
9 King William Road.
Unley, South Australia 5061
Australia.
If the @@ file got corrupted there may be other files corrupted. I have never had mutch success with copy 2200. Have had better luck with floppy dup.
Thanks for your help
Regards Neil Tooth.

TESTING RESULT OF CS/386 OS 1.1s

Problem 10 in the testing result of OS 1.1r update is still exist, ie $OPEN a platter on a master drive will prevent other partition to $OPEN a whole slave disk drive, or vice versa. (OS 1.1p(S) do not has this problem.)

The duplication procedure as followed:

In single CPU config with 2 WS.

WS2 SELECT H ON	WS1 SELECT H OFF	Result	
a) $OPEN /D11	then $OPEN /D12	WS1 hang, but LISTDCT/D12 OK	NORMAL
b) $OPEN /D11	then $OPEN /D53	WS1 hang, but LISTDCT/D53 OK	NORMAL
	(For OS 1.1ps, WS1 can complete $OPEN/D53)		
c) $OPEN /D53	then $OPEN /D11	WS1 hang, but LISTDCT/D11 OK	NORMAL
	(For OS 1.1ps, WS1 can complete $OPEN/D11)		
d) $OPEN /D53	then $OPEN /D54	WS1 hang, but LISTDCT/D54 OK)	NORMAL

For step c) and d), after RESET WS2, WS1 still can't complete $OPEN command except WS2 issue an extra LISTDCT/D1x. But no problem for step a) and b)

CORRECTED w/ 1.1t

NOTE:

Problem of can't R/W tape drive haven't been verified because no 150M tape drive spare part.

CC: Michael Bahia MS014-A3A/LOWELL
From: Michael Bahia
Subject: CS/386 response Date: 11/21/90

Distribution:

Not Requested

Tyler,

Thanks for this information. This answers some questions on some of the new things that will be happening. On question 4 the answer is incorrect. If you have 2 Maxtor drives, the 112 or 140 Meg, you can not have a 3rd full height drive because of the limitations of the power supply. The 64 Meg is a full height. Also if you have 3 full height drives of the 32 Meg & 64 Meg variety, no other winchesters can be installed again because of the power supply. There is a 32 Meg half height available though now. Also on question 5, although you have answered it for me personally, I don't think you answered it in this memo. That was the question concerning having a file span 2 differe nt drives.

Regards,
Mike

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

To: Michael Bahia From: Tyler Olsen
Subject: CS/386 response Date Sent: 11/19/90

This is in response to your query to of Nov.16, 1990.

?1. How many BANKs are supported on the CS/386 system.
Answer. The memory bank concept was a feature of the older 2200 line. This restricted a user partition to a maximum of 56 K of program space. The 2200 was also restricted to a maximum of 16 programmed partitions which had to operate within the first 1MB of cpu memory. Each partition could talk to a partition within the same memory bank or through a 5K universal global set into the first memory bank.

On the CS/386 there are no bank restrictions; each partition can be global to any other partition. Partition sizes are described in the startup configuration; programmed memory is the sum total of the partitioned memory. Any cpu memory not described for partitions is available to cpu RAM disk. The current maximum amount of memory is 8 MB; the current maximum number of partitions is 16. (Projected systems for this winter are 32MB & 64 parts).

?2 Does CS/386 support a 150MB streaming tape drive.
Answer: Yes, the 150MB tape drive requires DS prom release 3.0. It will read or write 150MB cassettes; it will read only 45 mb cassettes.

?3 Would it be possible to declare a single universal global partition for code to share by all users.
Answer: Yes you can have a single partition that is reference by all other partitions. Each terminal should have a partition which references a global partition for code. As with the CS/2200 there are local and global references a global partition for code. As with the CS/2200 there are local and global variables.

?4 How much disk storage.
Answer: The maximum amount of storage in the standard DS cabinet is one 140 MB (14*10MB), one 112 (7*16 MB), and one 64 MB (4*16MB). With release 4.0 of the DS Prom and release 3.0 of the DS utilities we will be able to reconfigure each Winchester drive with 1-14 surfaces. With release 2.0 of the CS/386 OS we will have 3 byte addressing; two byte addressing has allowed us to address up to x'FFFF' or 65000 sectors.

In addition we will have a SCSI controller (22C03-SCSI) which will interface to a SCSI box with up to 29 surfaces of 16MB each.

On any one CS/386 you can support up to 3 disk cabinets. Using the 2275MUX and 2275MUXE boards each disk drive can be multiplexed to a maximum of 16 CS/386 CPUs.

?5 Can a single data file be stored across multiple drives.
Answer. We shall provide three byte addressing and the ability to specify a single surface of up to 14*16MB within the Data Storage cabinet.

?6 What kind of file access method is available. Wang has KFAM-7; other access methods are available in vendor application packages.

?7 If System B goes down, the user on System A would hvae access to the data on DS(B) and DS(C) as long as there was power within system B and the voltage levels to the 2275MUX boards within system B were maintained.

?8 Can we configure more than one DS-140A in a DS. In a CS/D cabinet there is a maximum of one Winchester. Within a DS cabinet we are restricted to three full height Winchesters. See the response to ?4.

Tyler B. Olsen

CC: Michael Bahia MS014-A3A/LOWELL
From: Michael Bahia
Subject: System hanging problem 2 Date: 10/11/90

Distribution:

Not Requested

Torbjorn,
Yes, please open a PTR on this problem and send it to 8760. Also wh
en you Wang Office the ISS file please include the O/S if you have not determin
ed a reasonable cause for the booting of the system.
Regards, Mike

---------- Original Memo ----------
To: Michael Bahia From: Torbjorn Sagner
Subject: System hanging problem 2 Date Sent: 10/11/90

Mike,
i forgot to tell you in prev. memo that when i change from 4mb to 2mb
board the system becomes slower, it takes about the dubble time to
ipl the system, and it takes 10 min to do a SYSTEM INSTALL, os upgrade.
i use os 1.17
reg
Torbjorn

DOA 2 MB BRD
SEE 10/30 W/O

To: Michael Bahia MS014-A3A/LOWELL
From: Torbjorn Sagner
Subject: System hang problem Date: 10/12/90

Distribution:

Not Requested

Thanks Mike,
My Fax# sweden - 8 - 82 51 58

Torbjorn

---------- S V A R ----------
Till Torbjorn Sagner Fran: Michael Bahia
Ärende: System hang problem Avsänt: 12-10-90

Torbjorn,
There are a couple of known problems with the ISS Utilities. One of th
e problems is in SORT.4. To correct this problem LOAD DCT"SORT402A". Change
line 4590 from: 4590 M1=INT(M*1024)-698:.....:.....
to: 4590 M1=INT(MIN(M,64)*1024)-698:.....:.....
We have a few other changes for the ISS Utilities. Give me your FAX # again &
I will send them to you.
Regards, Mike

---------- Original Memo ----------
To: Michael Bahia From: Torbjorn Sagner
Subject: System hang problem Date Sent: 10/11/90

Hallo Mike,
about the hanging problem i mention to you over phone:

The program customer run is the ISS rutine SORT4, i have dupilcate
the problem inhouse once, it seams to be a intermittent problem and
related to CS/386 1mb and 2mb boards on 4mb and 8mb boards it works ok so far.
Could it be related to the 256kb SIMMs?
The problem never occures on VLSI or MVP systems, the customer how reported
the problem has one CS386-10 and one MVP and on MVP it works ok!

When running SORT4 and comes to the print funktion the system hang, and you
must IPL, RESET is not enought.
Right now i am trying to extract the SORT4 program. If want a copy i can
wo it to you.
Do you want me to open a PTR call for this problem ?

Best reg.
Torbjorn Sagner

To: Michael Bahia MS014-A3A/LOWELL
From: Torbjorn Sagner
Subject: Fax number Date: 10/15/90

Distribution:

Not Requested

I will do the changes asap and get back to you with result
Tobbe

---------- S V A R ----------

Till Torbjorn Sagner Fran: Michael Bahia
Ärende: Fax number Avsänt: 15-10-90

Torbjorn,
Did not have the latest ISS changes for the 386 until this AM. Have just finished FAXing them to you. Let me know if this affects your problem.
Regards,
Mike

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

To: Michael Bahia From: Torbjorn Sagner
Subject: Fax number Date Sent: 10/15/90

Mike, i have not received the corrections for sort4 and ISS programs on fax. Have you sent them? My fax number is sweden - 8 - 825158.

Best regards
Torbjorn

CC: Michael Bahia MS014-A3A/LOWELL
From: Michael Bahia
Subject: CS/386 sort4 problem Date: 10/30/90

Distribution:

Not Requested

Torbjorn,
Very glad to hear your ISS problems have been taken care of. The new 386 Turbo has not been announced yet but is now being worked on here in Lowell. There is no guarantee yet it will come out but so far it looks good & we are hoping for 1st customer ship around January. The CPU board has a 33 Mhz clock and will be upgradeable from the 386 to a 486 chip in the future. Our initial tests showed the new board more than twice as fast as the current 386 on CPU intensive testing. Depending on performance we may go to either 32 or possibly 64 users from what I have heard. The I/O controllers are not ready yet. As you seem aware there will be 3 new controllers, a SCSI controller to support any Wang available SCSI drive (a 600 Meg drive is now available I'm told), new Terminal & Disk controllers with 32 bit I/O paths as opposed to the current 8 bit path. The MXF uses 2 octopus type cables that branch out to 8 RS232 connec tors each to support 16 terminals. We are very excited about it as are our domestic VARs. Again nothing is certain yet but we have talked with our VARs about what they want & what we are thinking.
Regards, Mike

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

To: Michael Bahia From: Torbjorn Sagner
Subject: CS/386 sort4 problem Date Sent: 10/30/90

Hallo Mike,
Sorry for delay in this case.
I have now done the change in ISS program sort4 and it seames to solve the problem with the hanging CPU.
That it should be a problem with only 2mb board was wrong, we got two DOA cpu boards (2mb).
Thanks for all help.

I am a bit curious about the new CS/386.
How many users? How many partitions? memory size? cpu rate? release date?
the new MXF how many conectors? type of conectors? release date?
SCSI disks new controler? disk size? etz
You probly can't awnser all questions but perhaps some.

Best regards
Torbjorn Sagner

'S OFFICE Electronic Mail Thursday 10/18/90 09:12 am Page: 2

tem Subject: 2200/CS386 questions

lello,

/e have a few questions

) Starting from which O.S. Release is the error P34 recoverable?
!) What is the instruction, or which utility must we use to create a DOS-
diskette on a CS386?
Or are there other things we have to do attention on?
3) Does there excist an instruction like on PC the DEL(ete) command to eliminat
a file on a DOS diskette?
4) Is it possible that in the update bulletin 700-4080E.02 page 12-36h excist?

Regards

VS OFFICE Electronic Mail Thursday 10/18/90 09:11 am Page: 1

To:
Subject: 2200/CS386 questions

Distribution:

None, this item is In Progress

---

1. There is a fix in Maint Rel 1.0C for the P34 problem. Would suggest the
customer be updated to at least General Rel 1.1. If there are other problems p
lease identify them as there are some obscure bugs that have been corrected sin
ce 1.1. Most of these problems are more likely if at all to be seen in a
developmental environment.
2. DOS Emulation software is being tested now & is planned for release as part
of the next general release of the 386 O/S, Rel 2.0 which will probably be out
in November or December.
3. The DOS emulation utility will allow you to look at the directory of a DOS
disk, format a disk in DOS format, copy & delete files using DOS commands.
Basically the Emulation utility will allow you to manipulate DOS disk files on
a 386 system with 2200 hardware. The DELETE command is one of 10 supported
commands.
4. What is Update Bulletin 700-4180E.02? Title please?

Regards,
Mike Bahia
Product Support

To: Michael Bahia MS014-A3A/LOWELL
From: Torbjorn Sagner
Subject: IDEAS problem on CS386 Date: 10/09/90

Distribution: IDEAS I VER 1.6

Not Requested

Mike, i have received all 10 pages, thanks!
Torbjorn

---------- S V A R ----------

Till Torbjorn Sagner Fran: Michael Bahia
Ärende: IDEAS problem on CS386 Avsänt: 08-10-90

Torbjorn,
Just completed sending you a 10 page FAX on using TOM's Speed I on the Wang 386. If there is any problem, give me your mailing address and I will mail it out.

Regards, Mike

---------- Reply ----------

To: Michael Bahia From: Torbjorn Sagner
Subject: IDEAS problem on CS386 Date Sent: 10/08/90

Mike,
Any news about the problems we discussed over phone last week?
Torbjorn

---------- S V A R ----------

Till Torbjorn Sagner Fran: Michael Bahia
Ärende: IDEAS problem on CS386 Avsänt: 02-10-90

Torbjorn,
Have reproduced your problem correctly & was able to get our software guru to take a look. He has come up with a change to correct this particular problem. In program "IDEAS306" change line 9060 as shown:

before change	after change
9060 AND(STR(K$(1),2,1),80):	9060 AND(STR(K$(1),2,1)C0):
Q$="PROG":	same
IF STR(K$(1),2,1)=HEX(80) THEN 9070:	same
add -	IF STR(K$(1)2,1)=HEX(40) THEN 9070:
Q$="DATA"	same

This should resolve this particular problem. There may be other areas requirin g similar changes. Please let us know how things work out.

Regards,
Mike

---------- Reply ----------

To: Michael Bahia From: Torbjorn Sagner
Subject: IDEAS problem on CS386 Date Sent: 10/02/90

Mike,
Sorry that i forget how you should have your system configurated.
You need one global part. and one part. for program run.
exampel:

part	size	term	prog	name	
1	100	0	Y	IDEASVAR	(backgrund program for IDEAS)
2	100	1	Y		

One more thing you must use BB as an input name beceause to program file BB there is a datafile bb. If you rename BB you also must rename the datafile ex. BB to BBOLD rename bb to bbold
but you don't need to do this if you follow the instruktions in prev. memo.

Better luck this time.
Torbjorn

---------- ORIGINALTEXT ----------

Till Torbjorn Sagner Fran: Michael Bahia
Ärende: IDEAS problem on CS386 Avsänt: 01-10-90

Torbjorn,
Need to know the configuration your using for partitioning. In running your software came up with error X77 (Illegal Partition Reference) on step 6 & never saw the date screen. Do not know how valid my findings were because of this. Anyway, by keying run after the X77 was able to get the menus referenced in steps 9 & 10. If keyed in file name BB on step 11 would get erro r X75 (illegal number) immediately on line 126. At this point cleared memory & loaded program BB and saved in OLD format as BBOLD & in NEW format as BBNEW. When reran again got error X77 on step 6, then did a RUN to get the menus. On step 11 keying in BBOLD or BBNEW gave the exact same results, 'File "BBxxx " does not exist. If keyed RETURN again comes back & says 'Fiole "BBxxx " already exists. If the results are not affected by the problems that occurred it would appear the change of filename creates a problem & being in OLD or NEW format may not be a factor. Looks like it may be initially looking for the fil ename in small letters. Please provide me with the partition configuration & whatever other changes may need to be made to run without error so we can be sure our findings are valid before proceeding further.
If you received a previous Wang Office please excuse me as in trying to attach your original Wang Office I messed up & lost my memo without knowing if it had been sent. Awaiting your reply.

Regards, Mike

Item Subject: Read me first

Hallo Mike,
as you requested i send you the sw for duplication of the problem with IDEAS and converted programs.

The two data files contain IDEAS programs and data and one test menu for duplication of the problem.
File IDEASP-contain programs
File IDEASD-contain data.

1. Install the two diskettes on a clean disk (you can't run from diskette)
2. Select the disk where you have installed the two diskettes
3. Start IDEAS with LOAD RUN "IDEAS"
4. Fill in disk address and press enter
5. Fill in the same disk adress under pf3 to pf6
6. Enter
7. Fill in Date in format yymmdd (swedish format)
8. Enter
9. Pf 9 (Appl. menu prog util)
10. Pf1 (Appl. menu screen & prog rev. module)
11. Fill in file name BB (BB=test menu)
12. A menu occures on screen and you can do changes, press enter to go back.

Now how to duplicate problem:

1. Go out from IDEAS (Reset and clear)
2. Load program BB
3. Reanme program BB on disk to anything (ex. BBOLD)
4. Save the loaded program in step 2 in converted format (SELECT NEW) with the name BB.
5. Start IDEAS go through step 3 to 11.
6. When you had filled in BB in step 11 IDEAS will respond with an error File "BB " does not exsist:

If you have any problems to run or duplicate please call on 8-82 01 80 ext 1278 or send me a WO.

Item Subject: Cover Memo

Torbjorn,
A hex 40 is still a normal VLSI program header block. When converted to NEW format this should have changed to a hex 60. It may be not all of your files have been converted to the new format. It maybe a good idea to send a copy of the software your running back to us with instructions on how to duplicate the problem. Meanwhile, I will forward this information to Tyler Olen to see if he may be able to help.

Regards,
Mike

---------- Reply ----------
To: Michael Bahia From: Torbjorn Sagner
Subject: CS/386 Rel 1.17 package Date Sent: 09/25/90

Mike,
We have now tested IDEAS I with OS 1.17 and we got the same result.
When we run IDEAS I and try to pick up a menue file for editing found IDEAS not the file. I have tryed to locate the problem and get so faar that when Ideas look for the file in index,it check the file for DATA or PROGRAM (D orP)
In IDEAS306 program line 9060 it check the the HEX index code 80 for a program file. When you save in new format the index code become hex 40.
IDEAS will not accept hex 40 as a index code for a program and will there for respond with FILE NOT FOUND.
If change the program line 9060 so it recognise hex 40 as a program file IDEAS find the file and you can do the editing. Then comes next problem IDEAS save this file in OLD format.

At the customer site we are now going to convert all programs exept for menues and start programs and se if we can improve upon performance of the system. If you have any proposals or suggestions, please let me know.
Best reg. Torbjorn

---------- S V A R ----------
Till Torbjorn Sagner Fran: Michael Bahia
Ärende: CS/386 Rel 1.17 package Avsänt: 18-09-90

Awaiting your feedback.

Mike

---------- Reply ----------
To: Michael Bahia From: Torbjorn Sagner
Subject: CS/386 Rel 1.17 package Date Sent: 09/18/90

Mike,
I will try the new version of OS asap and update you with result, it could take same time beceause i must try this out at customer site.

Thanks for your help so faar.

Torbjorn

CC: Michael Bahia MS014-A3A/LOWELL
From: Michael Bahia
Subject: CS386 HELP ME!!! Date: 09/17/90

Distribution:

Not Requested

Torbjorn,
Will send you 386 Maintenance Rel 1.17. Please test against this problem. If you are unsure how to remove the 1.17 from Wang Office, Willem Sloep of the PRC in the Netherlands or Erwin Findt of the PRC in Germany should be able to help as both have already received it.
Talked with Tyler Olsen & he thought there may be a problem if part of the IDEAs module being run was in NEW format & part in OLD. Also when the D82 occurs, try to determine the address being accessed using either TRACE or by the printing the value of the variable representing the disk address in the failing load instruction. Save the program at that address may circumvent the problem. Try 1.174 first. Please let me know the outcome.

Regards,
Mike

---------- Reply ----------

To: Michael Bahia From: Torbjorn Sagner
Subject: CS386 HELP ME!!! Date Sent: 09/17/90

Mike,
The problem is the following: When use 386 format on the program files it works ok in runtime mode but if you go in to IDEAS and try to modifie a menu you can't pick up the program from IDEAS, it comes up with error code D82 FILE NOT IN CAT. if you do a select old of the program and then try to pick it up from IDEAS you get no error.
Another problem is that the customer run IDEAS I ver. 1.6 and i have got the info that IDEAS I not support SCRATCH DISK'.
Reason for customer to use CS386 is related to big perfomance problem and there was no information of any restrictions regarding IDEAS,KFAM or ISS when we (WANG) introduse the 386board, therefor customer was told to by a 386 it will solve your performance problem. Now we are deep in this .. and the customer is as you can understand not happy.

Best regards
Torbjorn Sagner

---------- ORIGINALTEXT ----------

Till Torbjorn Sagner Fran: Michael Bahia
Ärende: CS386 HELP ME!!! Avsänt: 12-09-90

Torbjorn,
What kind of problems are you having if any with Ideas or the ISS utility. We have recently found a problem with PACK/UNPACK where in the mask

if any number other than 1 # sign appears to the left of the decimal point the 386 may return the wrong number when unpacking. We have a fix in O/S 1.17.
Let me know if you need it or what kind of problems your having if any.

Regards,
Mike Bahia
Product Support

Item Subject: Read first

Hallo Mike,

Here is the disk image of a 8' DSDD diskette which includes diskette 1 of CS/386 O/S 1.17 and a modified @BOOT which normally allows to load different operating system versions. But this diskette includes only O/S 1.17. It doesnt' matter because it should only demonstrate what happens if you have such an extended @BOOT file with some Data entries.

1.) In the top left hand corner below the line '******* SYSTEM SOFTWARE *******' you get some garbaged characters and a part of one DATA statement:
"@M33","2200/CS BASIC-
where normally will be displayed: Select item wit SPACE & BACKSPACE.
2.) The three last lines of the @BOOT Menu are twice on the screen

3.) If you try to load an O/S version (like 1.15 or below) and the system file cannot be found you get no ERRD82 message but also garbaged characters and parts of 'no more, end of menu list' and 'diagnostics'. Now you must press RESET and SF' key to get the menu back.

4.) As I added the menu pick for 1.15 I was unable to load 1.15 at all. To resolve this I must remove one DATA statement from @BOOT. But I don't know today how this is reproducable.

Please be so kind and have a look. It's no customer problem and maybe it will be never become a customer problem. But something is going wrong. Maybe the reason is the @@ file.
Please try it and let me know what do you think and what can be done.

CC: Michael Bahia MS014-A3A/LOWELL
From: Michael Bahia
Subject: CS/386 @BOOT Problem Date: 10/09/90

Distribution:

Not Requested

Erwin,
Just heard back from Taiwan. The @BOOT file is restricted to 3 sectors by the boot prom. This is why you were getting garbage.
Regards,
Mike

---------- Original Memo ----------
CC: Michael Bahia From: Michael Bahia
Subject: CS/386 @BOOT Problem Date Sent: 09/14/90

Erwin,
Took a close look at this @BOOT problem this AM. There are obviously some restrictions on the size of @BOOT which when exceeded result in the garbage we see on the boot screen. By deleting lines the problem can be cleared, but it also depends on which lines are deleted. When I deleted lines 9035 & 9030, was able to boot without garbage. But if I deleted 2 other lines instead, garbage may still come up. Renumbering the lines so that the last line was 9030 instead of 9060 did not help but did change the garbage. The garbage is always the same with the exact same program. We will send this off to Taiwan to see if there are limitations on @BOOT or if not to correct the problem. Could you open a PTR on this problem & send it to 8760.
Regards,
Mike

```
READY (BASIC-2) PARTITION 01

:LIST

9000 REM % Prog = @BOOT  PLS  09/11/90  CS/386

9005 REM % COPYRIGHT WANG LABORATORIES 1985, 1986, 1990

9010 DATA "@BOOT","***** SYSTEM SOFTWARE *****",3,0

9012 DATA "@MVP","CS/386 BASIC-2 VERS. 1.17","P"

9014 DATA "@117","CS/386 BASIC-2 VERS. 1.17","P"

     DATA "@115","CS/386 BASIC-2 VERS. 1.15","P"

9018 DATA "@110","CS/386 BASIC-2 VERS. 1.10","P"

9021 DATA "@M1B","CS/386 BASIC-2 VERS. 1.0B","P"

9023 DATA "@M19","CS/386 BASIC-2 VERS. 1.09","P"

9025 DATA "@M18","CS/386 BASIC-2 VERS. 1.08","P"

9030 DATA "@M17","CS/386 BASIC-2 VERS. 1.07","P"

9035 DATA "@M10","CS/386 BASIC-2 VERS. 1.0","P"

9045 DATA "@M33","2200/CS BASIC-2 VERS. 3.3","P"

9050 DATA "@DG1","Diagnostics","M"

9060 DATA "no more","end of menu list"," "

:
```

Item Subject: CS/386 (Problems)

Elena de Bonilla
Cesar A. Williams, Re: the CS/386 Operating system.

Problem with SAVE and RESAVE submitted by Cesar Williams. We tried his scenario on release 1.10. of the CS/386 and had no problems.

Problems with SELECT NEW and SELECT OLD are a misunderstanding. LIST SELECT will show the current status OLD or NEW. The system does not retain how a program was loaded. The CLEAR command resets status to OLD. CLEAR P will not reset the SELECT OLD or NEW status.
A program saved in NEW format will show as P' in the LIST DC T display.
Index item is set to 1040; header byte of program file is 60 or 70.
A program saved in OLD format will show as P in the LIST DC T display.
Index item is set to 1080; header byte of program file is 40 or 50.
The BASIC programs in Release 1.10. "@MOVEFIL" and "Create a Reference List" have been updated to properly handle NEW and OLD index and program items.

Release 1.10 was put into general distribution; Test release 1.0B and 1.0C were available to the field and are operational with few problems.

Release 1.10 has a couple of obscure problems that have been corrected in Release 1.12 which should be available the week of June 6-10. A problem was fixed with SELECT H ON; another with disk I/O after getting a phony S16 error when using COPY or MOVE after addressing a global partition.

To: Mike Bahia MS0126/LOWELL
From: Tyler Olsen
Subject: CS/386 (Problems) Date: 06/01/90

Distribution:

Not Requested

---------- Mailing History ----------

Date: 06/01/90
Time: 04:03 pm
Subject: CS/386 (Problems)
From: Tyler Olsen
Distribution:
Tyler Olsen
Mike Riley
Al Grant
Elena V. de Bonilla

CC: Mike Bahia MS0126/LOWELL
From: Al Grant
Subject: 386 problems Date: 05/14/90
Forwarded By: VOCRECV

Distribution:

Not Requested

Bob -
- Problem 1 should be fixed in the 1.10 general release, which just went out this week.
- Problem 2 - we would like to have a copy of the program that caused that.
- If the cust has a DS or a CSD configuration, There is a possibility that the DPU prom is not up to date. The current REV level is 3.

---------- Original Memo ----------
To: Al Grant From: Robert Miller
Subject: 386 problems Date Sent: 05/14/90

Al, per our conversation here are the problems reported by Rick Shetron, 518-587-3092 (var).

1) a REM in the same statement with an IF loses spaces from the text after the REM. it may have to be saved/loaded to see this.

FIXED w/ 1.14

10 if a = b then 100: rem this is a test (becomes)
1 f a = b then 100: rem thisisatest

2) running a prog that loads an overlay then resaves itself. then halt/steps thru prog, gets A01 and system hangs. he hasn't been able to reproduce.

3) on one occasion he saved a prog then checked disk and found it was all x'00'. not able to reproduce.

On items 2 & 3 he wasn't sure of the exact steps that caused the problem so he was unable to reproduce.

Regards

Bob Miller

To: Mike Bahia MSO126/LOWELL
From: Tyler Olsen
Subject: SPEED ON CS 386 Date: 03/21/90

Distribution:

Not Requested

Peter Ludwig,
My understanding of TOM software on the CS/386 is as follows. TOM release 3.01 rev level 89-14 supplies the "work arounds" required to run on the CS/386. The latest current TOM rev level is 90-01. This solved code changes needed to work with the "W" instead of the "M" returned from $PSTAT & most double memory problems. The latest rev may be available from COMDES in Amsterdam.

The earlier TOM release, 2.3, which runs in 28K has workarounds which have been described by TOM on paper. Release 2.3 may have been modified at individual sites and therefore may have to be updated according to the printed changes.

---------- Reply ----------
To: Tyler Olsen From: Michael Willett
Subject: SPEED ON CS 386 Date Sent: 03/21/90

Tyler,

I checked with Gene and he would appreciate it if you could send a Wang Office response as quickly as possible to Peter Ludwig, because the Hanover Fair has just started in Germany and he may know need to know the information right away.

Mike Willett

---------- Original Memo ----------
To: Michael Willett From: Peter Ludwig
Subject: SPEED ON CS 386 Date Sent: 03/20/90

HALLO MIKE,
PLEASE CAN YOU HELP ME. WE HAVE ONE BIG DEALER GFA. THE OWNER, MR GÄNSSLEN TOLD ME, THAT THERE IS NO WAY TO RUN SPEED ON THE NEW CS 386 OR IN OLD CS WITH AN UPGRADE TO 386. IS THAT TRUE? THANK YOU FOR SOON ANSWER.
PETER LUDWIG

To:
Subject: Real Time Clock CS/386

Distribution:

None, this item is In Progress

To: Mike Bahia From: Erwin Findt
Subject: Real Time Clock CS/386 Date Sent: 02/09/90

Hallo Michael,

could you please supply some informations about the RTC battery and how it must be connected. Thank you.
Best regards,
Erwin Findt

---------- Reply ----------

Erwin,

On the 386 daughterboard, along the left side looking at the component side with connectors down, there is a 2 pin connector, Y1. The battery plugs in there. The battery's only purpose in life is to keep the clock running when the machine is powered off. Other than that it is not needed.

Regards,
Mike

To: Mike Bahia MS0126/LOWELL
From: Marshall Barnes
Subject: 2200 Date: 02/21/90

Distribution:

Not Requested

THANKS VERY MUCH !!!!!
MARSHALL

---------- Reply ----------
To: Marshall Barnes From: Mike Bahia
Subject: 2200 Date Sent: 02/21/90

Marshall,
Talked with Tyler & he did not know of the strap but both he & I also heard something like this from another field source. Called Manufacturing in Puerto Rico & now have the answer. There is a new Rear Panel Assembly for the CS for use with the 386 for FCC purposes. The part # is 458-5026. There are also 2 gaskets used on the side panels part # 656-0145. Talked with Sue & will be sending her 9 keyboard foils via Fed Xpress tonite.
Regards,
Mike

---------- Reply ----------
To: Mike Bahia From: Marshall Barnes
Subject: 2200 Date Sent: 02/21/90

The customer tells us that they are talking to a Tyler Olsen in HO. He is the one telling the customer about this strap. He has also told the customer that they need certain Revs of boards for there 386 upgrade that we cannot find. Do you know who Tyler is and maybe he can let us know.

---------- Original Memo ----------
To: Marshall Barnes From: Mike Bahia
Subject: 2200 Date Sent: 02/20/90

Marshall,
Have checked FCO listing for the CPU strap & there is no such FCO. Also checked ECO's & could not find anything & R&D was unaware of any ECO's. Made arrangements for the keyboard foils & expect to pick them up tomorrow.
Regards,
Mike

To:
Subject: Disk contoller for CS386?

Distribution:

None, this item is In Progress

To: Mike Bahia From: David Keight
Subject: Disk contoller for CS386? Date Sent: 01/26/90

Mike,

I've been asked to send you this office by a dealer in Bristol UK. He has already spoken to Ken Proffitt (UK National Support), who suggested asking you the following:

TSB HWT9373 Item 11 says that the 210-7342 and 210-6541-2 give problems with the CS386, and that the 212-3012 (triple controller) should be used.
However, page C1 of the introduction manual for the CS386 (715-1213), supplied with the CS386 says that the triple controller is not supported.
Can you advise which controller should be used ???

Regards,

Dave Keight, Wang Bristol, UK South West

---------- Reply ----------

Da ,

The Triple Controller is definitely supported. Have not seen that manual but if it says it is not supported then it is in error. Only 1 Triple Controll er can be used /CPU & it not be used if 4 MXE/MXD's are already installed. The 6541-2 has a problem with the 5 1/4" Tape Drives but should be ok w/ disk. In some cases there could be a problem w/ the Dual Controller but you won't know u ntil you try & this does not mean the next Dual will fail. The Dual Controller will be replaced by a new Dual Controller shortly.

Regards,
Mike

To:
Subject: CS 386 The Netherlands

Distribution:

None, this item is In Progress

CC: Mike Bahia From: Willem Sloep
Subject: CS 386 The Netherlands Date Sent: 12/18/89

Colin,

We're testing the CS386 upgrade at this moment in the Netherlands.
Wang is positioning the upgrade as 'plug in and play', but we discover several incompatibility problems with the hardware.

RESULTS DISK CONTROLLER TEST :
We've two CS/DS systems build up with the CS386 upgrade board installed.
From 7 Disk controllers (diverend and the same types), 3 are giving problems like hanging, time-out errors and DS-tape errors on one system. On the other system only 1 controller fails (definitly margin problems). Both systems equiped without the CS386 upgrade doesn't give problems.
This margin problem is also mentioned in HWT 9373 (TSB 11/22/89). They mention that we have to swap controllers when we have problems. Our tests let us see that we can solve it by swapping controllers. Is this the startegy to solve a margin problem of the CS386? We've done our test only with disk controllers, we've not tested printer/TC and terminal controllers. But afterall we're not QA! What guarentee we have that a board wich doesn't seems to give problems in the first case, also works OK in live sytuation at a customer?
We are going to escalate this problem and are not going to ship CS386 to our customers yet.

RESULTS DATA STORAGE SCOOP :
We've done some tracing on the ABS/CBS/OBS lines of the I/O bus and compared the CS with the CS386. We measure much faster cycles and pulses on the CS386, also with more distortion. We can imagine that this give problems on the controllers which are designed for slower cycles.

At the end of this week we've invited a major 2200/CS software developer to test the compatibility of the Operating System in a live customer sytuation.

Will update you soon.

Regards Willem Sloep

---------- Reply ----------

Willem,

Thanks for the update. QA testing was done but unfortunately we are not set-up to be able to easily test every configuration & man power for 2200 has been very limited for awhile. There are quite a few systems installed in the US & other than the disk controllers, the other controllers seem to be running ok. There have been some problems with terminals which may indicate a problem with the terminal controllers, the MXE & MXD, but they have been very intermitt ent. At this time we are experiencing intermittent hang problems at several 38 6 sites which when RESET is keyed the terminal blanks out.. This is the major concern. We believe there are 2 separate problems that cause this. One is a noise, static, or grounding problem to do with the terminal/s especially if usi ng the 2536DW &/or the MXE/MXD controllers. The 2nd has to do with loading a program. Under certain parameters a hang can occur during a load. This proble

m is consistent when all the same steps are taken. We have been able to provid e R&D w/ the data to reproduce the problem & with any luck may have a solution the 1st of the year. As for the disk controllers, there is a new Dual controll er to go into production in late January to replace the 7342. This board has worked well & should resolve the problems w/ the 7342 which will be discontinue d. The new brd, the 210-9746, will be a direct replacement. Testing will need to be done with the 6541 Disk controller to determine what needs to be done to resolve the tape issue. The 2275MUX e-rev 4, the 7715 e-rev 10, & the Triple Controller have not presented any disk problems as of yet.

Could you please identify the part numbers of the disk controllers you tested & found problems with as well as the part numbers of those that worked well.

Have been out of the office working the hang issue 12/18 & 19. Have message to call you. Will try between 4 & 5 pm my time today.

Regards,
Mike

To: Mike Bahia MS0126/LOWELL
From: Willem Sloep
Subject: CS/386 problem Date: 11/20/89

Distribution:

Not Requested

Mike,

You mention a noise problem on the controller. Which board do you wish to examine, the 6541-2 controller or the CS/386 CPU board?
If you mean the CS/386 board then i have to tell you that it is a customer board and that were not able to get spares, do off the fact that there is a spare problem on the board and they also tell me tah the board is not released due to technical problems.
This all in mind makes it very misty for me.

Regards, Willem Sloep

---------- Reply ----------
To: Willem Sloep From: Mike Bahia
Subject: CS/386 problem Date Sent: 11/16/89

Willem,
Thanks for letting us know. There appears to be a noise problem w/ this controller when status from the DS is requested. The reply that comes back is garbled resulting in this message. Please verify the ripple within the CPU & DS is within specs & if so we would appreciate if you could send us the board so R&D will have a 2nd brd to look at. My address is 59 Electronics Ave, Lowel 1, Ma 01851, M/S 001-330, RDB 8759.

Regards,
Mike Bahia
VS/2200 Product Support

---------- Reply ----------
To: Mike Bahia From: Willem Sloep
Subject: CS/386 problem Date Sent: 11/16/89

Micheal,
First let me introduce myself. My name is Willem Sloep an i'm a NTS engineer responsable for the CS productline at Wang the Netherlands.
At this moment i'm testing the CS/386 in combination with the DS.
I run into an error "Not a DS tape cassette". I've red PTR and find PTR call C410002401 from Computer Software Inc. Middleboro, were you're working on.
In the last update you mention a 6541-2 controller problem.

With this knowledge in mind i've discovered that i have the problem on a 6541-2 controller but not with a 2275MUX controller. So i think we have a revision or timing problem? I don't have any problem with a VLSI

CPU board installed. Will this help ?
Regards Willem Sloep, NTS Wang The Netherlands.

CC: Joe Scaglione MSO125/LOWELL
From: Willem Sloep
Subject: CS/386 the Netherlands Date: 11/22/89

Distribution:

Mike,

First let me introduce myself, my name is Willem Sloep and am responsable for CS new products in the Netherlands (NTS department).
The normal way to get answers is through John Baxi, but he told me that he is not always in and that i can contact you with hot CS/386 questions.

We're testing the CS/386 at this moment for a customer and have several hot questions and some problems. Do you know any solutions?

1. We have received an official Basic2/386 version 1.0 with the upgrade board. Is this a correct version. We hear from John Baxi that the're maybe other release(s) which solve bugs in 1.0. Please help us to get the correct version. What are the known bugs? Our customers demand an upgrade without problems (we position the CS/386 as 100% CS compatible).

   yes - for the time being. TSB

2. We get the message 'Not a DS Tape cassette' when we try to backup.
   System: CS/386-10 with DS (R2 Proms) and single diskcontroller (210-6541-2). With a 2275 MUX controller we don't have the error.
   Do we need the new FCO for the DS to solve this problem (379-8500-R3)?

   TSB

3. Are there good diagnostics for the CS/386 comming out soon? All diagnostics we've now give errors, or don't work att all. We've adapted the diagnostics with the lines discribed in the TSB HWG 9019.

   ?

4. The 2200/CS are in fact old systems which may have old I/O controllers installed, which work fine on a 2200/CS.
   Is there a recommended E-rev list for I/O controllers which are the minimum revision levels for a CS/386?
   For instance the problem with the 210-6541-2 and a CS/386 may be solved with a higher E-revision.

   TSB

5. Are there upgrades available for customers with 1,2,4 or 8M CS systems to CS/386 systems? The pricelist only lists opgrades from CS-2 and CS-5 to CS/386-10,-20,-40 or -80.
   So we have a problem for our customers with CS-10,-20,-40 and -80.

   PMM

6. Through our logistic channels we've heared about problems with the CS/386 board (design?). This was last week. We have the board for over three weeks. Do we have an instable board? We do get some strange memory related errors (A02 and P36). After new reboot this is solved.

Debbie,

Monday I went on site with Mike Riley from R&D & Vinnie Lanza the CE. With the ICE machine we were able to isolate the customer's duplicatable hang problem to the linking portion of the LOAD command. In laymen's terms, a LOAD command in this case is used to bring data from a disk to CPU memory. In this particular situation a program was loaded into memory within a 2nd program already existing in memory. Linking refers to how the existing progam & the program just loaded handshake with each other. As well as narrowing down the problem we were also able to get the programs & screens neccessary to duplicate the problem & the info was sent off to R&D in Taiwan.

We also found a 2nd related disk problem which was duplicatable which we also copied & sent to Taiwan.

The ICE machine was used to step thru the O/S code used to complete a LOAD instruction. Working on the phone with M.L. Lee, 2200 S/W Engineer Manager in Taiwan, we were able to step thru the load & identify the linking process as the problem area.

If you have any other questions please feel free to call or send a Wang Office. My extension is 60256.

Regards,
Mike Bahia
VS/2200 Product Support

Danny L. Collins
P.O. Box 1026
Southampton, Pa. 18966

Eugene Shultz
Wang Labs
One Industrial Ave.
Lowell, Mass.

Dear Gene,

I have with great regret discontinued the operations of Northeast Digital Corporation. The combination of events over the past 6 months have brought me to this decision.

I feel the only loose end that requires my continued attention is the SCSI controller. I have completely finished this product including operation on the Turbo high speed channel. Knowing that this product is complete and hearing so much interest from many sources makes me feel personally committed to getting the SCSI controller to market.

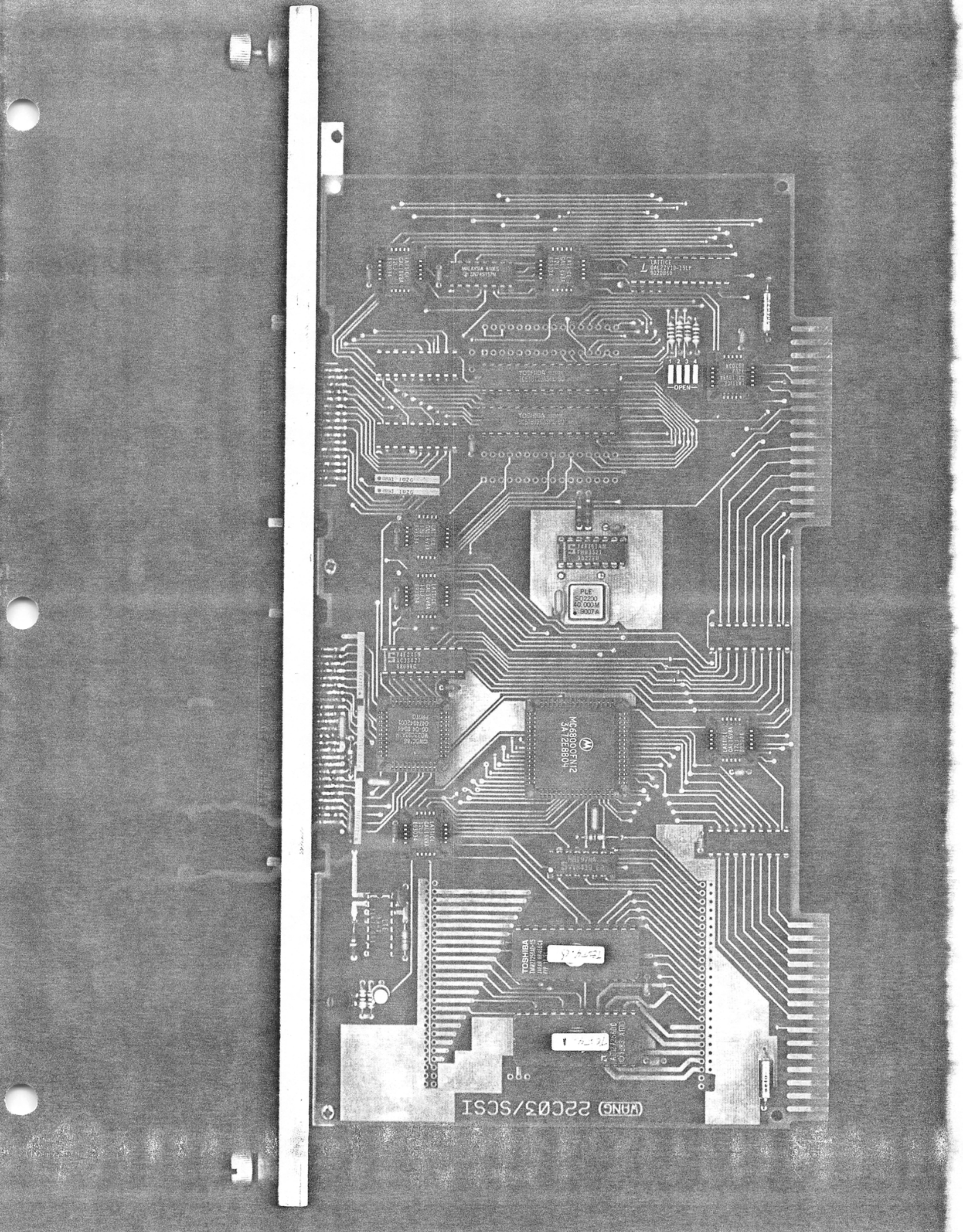
Dissolving Northeast Digital has completely eliminated any manufacturing capability to produce this product. If Wang is still interested in this product we need to develop a new strategy.

I would be willing to work as a consultant to Wang Labs until successful completion and production of the 22C03/SCSI. Under these terms I would supply complete documentation and product support under your direct supervision. Wang Labs would assume full manufacturing of the product which would ultimately result in better control. The only non-negotiable term is that my primary location be at my current residence in Pennslyvania.

Please feel free to contact me regarding any arrangements you require if the 22C03/SCSI is to become a Wang product.

Sincerely,

Danny L. Collins


WANG 22C03/SCSI

WANG OEM PURCHASE AGREEMENT

(WITH TERMS AND CONDITIONS FOR HARDWARE DEVELOPMENT)

Agreement No. _____

By and Between

Wang Laboratories, Inc.

One Industrial Avenue

Lowell, Massachusetts

And

Northeast Digital Corporation

124 Railroad Drive

Ivyland Pennsylvania 18974

("VENDOR")

For The Purchase of

2200 22C03-SCSI Disk Controller

Commencement Date: October 1, 1990

Term: Three Years

Wang Representatives:

9/27/90

Vendor Representatives:

9-27-90

26.2 Schedule. VENDOR agrees to complete the work in accordance with the Development Schedule and Statement of Work, Attachmant 9. VENDOR acknowledges that time is of the essence in the performance of the work. VENDOR agrees to notify WANG promptly if, at any time, it appears that VENDOR will not be able to complete the work or any milestone on time.

26.3 Acceptance. As used in this Agreement, acceptance of the Product shall occur fourteen (14) days after delivery thereof unless prior to the expiration of such twenty-one (21) day acceptance testing period, WANG notifies VENDOR that the product contains defects and/or deficiencies. Upon receipt of such notice, VENDOR shall use its best efforts to correct such defects and/or deficiencies no later than seven (7) days after such notice and to submit the product to WANG for acceptance testing as provided above as required until the milestone is accepted. Acceptance of the product will be given by WANG in writing when (a) all Products listed in the Statement of Work to be delivered to Wang have been delivered; and (b) the Product has been certified by the applicable WANG Component Engineering Group. Acceptance of the Product shall not be deemed a waiver of VENDOR's warranties.

26.4 Final Completion. If the Product has not been accepted by November 7, 1990 due to unexcused delays or unremedied defects and/or deficiencies, WANG may, at its option, and in addition to any other remedies it may have (a) terminate its obligations hereunder, including those under Section 1.4 above; (b) retain so much of the product as has been completed at an equitably adjusted and mutually agreeable price; and (c) complete the product and charge the costs therefor to VENDOR's account.

26.5. INTELLECTUAL PROPERTY.

The intellectual property rights to the Product developed under this Agreement include patent, copyright, tradè secret, and "know how" rights to designs, processes and design information and mask work rights. The intellectual property rights are divided between VENDOR and WANG as follows:

26.5.1. Designs and Processes.

The Product implements WANG designs and VENDOR designs and may also implement joint designs of WANG and VENDOR. All intellectual property rights in WANG designs and jointly-developed designs belong to WANG. WANG grants VENDOR a non-exclusive license to WANG's rights, including any patent rights, in designs owned by WANG solely to the extent that VENDOR reasonably requires such rights to produce the Product exclusively for WANG. All intellectual property rights in VENDOR designs and processes belong to VENDOR. VENDOR grants WANG an exclusive license to VENDOR's rights, including any patent rights, in VENDOR's designs and processes solely to the extent that WANG reasonably requires such rights to sell and use the Product. No other rights to designs or processes owned by WANG or VENDOR are granted or implied by this Section.

SCSI Disk Controller for 2200 products, CS/386 product line repriced, CS-2D/N VLSI CPUs discontinued

2200 Program Management Group

A SCSI Disk Controller for the 2200 product line will be available in December. The 22C03-SCSI will allow the use of VS 5000 and DYNAMIX peripherals like the SCSI Storage Module (SSM-C) and the Mini Data Storage Cabinet (MDSC-D) on an MVP, LVP, MicroVP, CS, CS-D/N, and CS/386-D/N CPUs.

Effective December 1, 1990, prices for the CS/386 product line are significantly reduced, allowing Wang to be competitive in the small business marketplace. This announcement also eliminates 128KB VLSI CPU models and reduces the prices for 512KB and 1MB VLSI CS-D/N models.

The 22C03-SCSI, a SCSI Disk Controller for the 2200 product line, will be available in December. The 22C03-SCSI will allow the use of VS 5000 and DYNAMIX peripherals like the SCSI Storage Module (SSM-C) and the Mini Data Storage Cabinet (MDSC-D) on an MVP, LVP, MicroVP, CS, CS-D/N and CS/386-D/N CPUs. As many as seven SCSI storage devices can be supported by a single 22C03-SCSI Controller. This product supports Wang SCSI storage devices, and also non-Wang, industry standard SCSI tape and disk storage devices.

Effective December 1, 1990, prices for the CS/386 product line are significantly reduced. This reduction is consistent with our cost reduction and modernization program for the 2200 product line, and allows Wang to be competitive in the small business marketplace, and encourages our 2200 users to migrate to CS/386 technology. This announcement also eliminates 128KB VLSI CPU models and reduces the prices for 512KB and 1MB VLSI CS-D/N models.

Responding to marketplace demands

The cost of memory has fallen considerably since the announcement of the CS/386, and the 2200 product line continues to be a very popular small business system in the BASIC-2 marketplace. When customers were asked what improvements were needed for this product line, two requests were most frequently heard:

- Increase CPU and I/O speed to handle more users
- Increase the amount of available disk storage while lowering the cost

The new CS/386 CPUs are, on the average, 200 percent faster than a VLSI CPU, and SCSI drives are, on the average, 25 percent faster than ST-506 drives. Therefore, the typical 2200 user can expect a performance increase when switching to either or both of these technologies.

Wang's largest ST-506 drive is 140MBs. Since the 22C03-SCSI allows the user to address up to 29 16MB platters, up to 464MB of disk storage is available per 22C03-SCSI. With the 2200 product line supporting up to three disk controllers, a maximum of 1.4GB of storage is now available.

The attractive new pricing for the CS/386 product line, plus the latest addition to 2200 technology will provide current and prospective 2200 users the costs/results ratio they are looking for.

Sales Guidelines

Since the announcement of the MicroVP in 1985, and the CS/DS in 1987, thousands of 2200 users have migrated to VLSI technology, DS technology, or both. In addition, many users have already migrated to CS/386 technology. However, there are still thousands of users worldwide who have not yet migrated to VLSI or CS/386 technology. Thousands more DS users require an increase in I/O performance or an increase in the maximum amount of storage (318MB per DS) that they can have on a single DS.

With prices reduced on both a VLSI to 1MB CS/386 CPU upgrade and a complete CS/386-10N CPU, users who have not yet updated to either VLSI or CS/386 technology will find the cost of updating extremely attractive. Generally, non-VLSI users can justify the upgrade to a new CS/386 CPU in maintenance savings alone. In some cases, VLSI users can upgrade their CPU for less than the cost for a memory upgrade.

Target markets

Don't forget to call on the 2280 Phoenix disk drive users. The 2280 users are maxed out at 80MB of storage per cabinet. Plus, the typical 2280 user is paying $216 (US list) per month in maintenance.

In keeping with its strategic goal of innovation on standards, Wang is now offering, via the NIAKWA compiler (FOCUS, October 1990, 751-2378) and DYNAMIX (FOCUS, July 1990, 751-2375), a migration path for VARs and accounts that have investments in BASIC-2 software, and that wish to port their applications to industry standard platforms. Accounts wanting to move to UNIX will find the 22C03-SCSI controller a useful migration tool. For example, an SSM-C configured with a 150MB tape cartridge and a half-height 145MB SCSI drive provides storage media compatibility between a 2200 and a DX100/200 or DX2000. If the SSM-C is moved to the new DYNAMIX system, programs and files can be moved easily. Since 2200 workstations and printers can be moved to DYNAMIX systems, a migration to UNIX only requires a CPU swap.

NOTE: Any VAR involved in migrating 2200 users to Wang's DYNAMIX series should own a 22C03-SCSI, and a storage module like the SSM-C with a 150MB tape cartridge and a 145MB Winchester, to facilitate the transfer of data and programs.

Product description

The 22C03-SCSI disk controller looks very much like the 22C11 Disk/Printer controller, and takes one I/O slot. The following is a list of functions/features:

- Compatible with MVP, LVP, MicroVP, CS, CS-D/N, and CS/386-D/N.
- Supports up to seven SCSI diskette, disk, and tape cartridge devices in the standard 2200 format. This includes Wang 145MB, 320MB, 650MB SCSI disk drives, and the 150MB tape cartridge, mounted in the Wang SSM-C and MDSC-D enclosures.
- Connects from the 22C03-SCSI to a SSM-C or MDSC-D using standard, Wang supplied 50-pin SCSI cables like the 8-inch 421-0066.
- Supports industry standard, non-Wang SCSI tape and disk storage devices.
- Can address as many as 29 16MB platters.
- Uses the same Wang disk cache algorithms as the DS.
- Includes autoretention RAMdisk capability, an option that is planned.
- Includes an external disk port that can be used with the 2275MUX (Multiplexer) to allow up to 16 CPUs to share common SCSI disk drives.
- Makes use of standard tape formats (e.g., QIC-60, 120, 150), which are compatible with UNIX, but include Wang look-alike tape utilities.

Cost comparisons

The following chart compares costs (US list) between a 2200 configuration that includes SSM-C and SCSI devices, and a similar ST-506/QIC-2 configuration on a DS:

DESCRIPTION	SSM-C 145MB	DS 140MB	SAVINGS
Storage Cabinet	$ 500	$ 2,500	
Diskette 1.2MB N/A	200		
150MB Tape Cart. or Cassette	1,995	1,500	
145MB SCSI Drive	2,695	N/A	
140MB ST-506	N/A	3,500	
SUBTOTAL	5,190	7,500	
Controller	1,295	300	
TOTAL	6,485	7,800	$1,315

The following compares costs between a 2200 configuration that includes MDSC-D and SCSI devices, and a similar ST-506/QIC-2 configuration on a DS:

DESCRIPTION	MDSC-D 320MB	DS 316MB	SAVINGS
Storage Cabinet	$ 2,000	2,500	
Diskette 1.2MB	N/A	200	
150MB Tape Cart. or Cassette	1,995	1,500	
320MB SCSI Drive	4,795	N/A	
64MB ST-506	N/A	2,095	
140MB ST-506 (Configured as 112MB)	N/A	3,500	
140MB ST-506	N/A	3,500	
SUBTOTAL	8,790	13,295	
Controller	1,295	300	
TOTAL	10,085	13,595	$ 3,510

NOTE: The DS is at maximum configuration, while the 22C03-SCSI can still support another 144MB (29, 16MB platters = 464MB - 320 = 144MB). Therefore, another 145MB SCSI can be added to the MDSC-D.

2200 PRODUCTS: TO ORDER

Order through normal channels. VAR discounts apply, based on the current 2200 discount schedule, executed agreements and addenda on file with Corporate Contracts. First customer ship for the 22C03-SCSI will be 12/1/90, volume ship 1/31/91:

Model number	Description
22C03-SCSI	SCSI Disk Controller
CS-5D	512K VLSI CPU
CS-10D	1MB VLSI CPU
CS/386-10D	1MB CS/386 CPU
CS/386-20D	2MB CS/386 CPU
CS/386-40D	4MB CS/386 CPU
CS/386-80D	8MB CS/386 CPU
CS-5N	512K VLSI CPU
CS-10N	1MB VLSI CPU
CS/386-10N	1MB CS/386 CPU
CS/386-20N	2MB CS/386 CPU
CS/386-40N	4MB CS/386 CPU
CS/386-80N	8MB CS/386 CPU
UJ-6048	VLSI To 1MB CS/386 Upgrade
UJ-6049	VLSI To 2MB CS/386 Upgrade
UJ-6050	VLSI To 4MB CS/386 Upgrade
UJ-6051	VLSI To 4MB CS/386 Upgrade
UJ-6052	1MB to 2MB CS/386 Memory Upgrade

2200 PRODUCTS: TO ORDER, CONTINUED

Model Number	Description
UJ-6053	1MB to 4MB CS/386 Memory Upgrade
UJ-6054	1MB to 8MB CS/386 Memory Upgrade
UJ-6055	2MB to 4MB CS/386 Memory Upgrade
UJ-6056	2MB to 8MB CS/386 Memory Upgrade
UJ-6057	4MB to 8MB CS/386 Memory Upgrade

Discontinued products

Orders for the following will be accepted until December 31, 1990. Orders submitted after December 31, 1990 must be for recommended replacement configurations. The following lists the discontinued models and their recommended replacement models/configurations:

Model Number	Description	Replacement
CS-2D	128KB CPU with DPU	CS-5D
CS-2N	128KB CPU Without DPU	CS-5N
CS-S2D	2 Workstation, 128KB CPU System Package	NONE

QUESTIONS AND ANSWERS

Q. *The NIAKWA announcement included the following statement about the best way to move programs over to a DYNAMIX system:*

"The CS/2200 writes in 256KB sectors, a PC in 512KB sectors. Format a diskette first on a AT compatible PC. Then, insert this diskette into a DS-1.2 diskette drive on a DS and copy the program files onto this same diskette. This diskette(s) is now media-compatible with a DX100/200 or DX2000."

Is this still true with the announcement of the 22C03-SCSI?

A. The 22C03-SCSI simplifies the process considerably. Since the 22C03-SCSI allows the 2200 to use the same SCSI storage devices as Wang's DYNAMIX product line, you need only unhook, for example, a SSM-C from a 2200, and plug it into a DX2000 in order to read programs and data files.

Q. *Does the 22C03-SCSI require Wang SCSI drives or is it "Open Architecture?"*

A. Any industry standard SCSI drive can be used on the 22C03-SCSI; however, since we cannot test every non-Wang SCSI drive on the market, we cannot guarantee that all will work properly.

To : Bill Hsien/Kin Cheung

From: Gene Schulz

Subj: SCSI Disk Controller For The CS/2200 Product Line

Date: August 3, 1990

In order to increase peripheral sales and reduce R&D costs, this document outlines the proposed business plan and FCS requirements for the purchase of a third party SCSI disk controller for the 2200 and CS/386 product line.

The objectives of the attached plan are:

- For the 2200 product line to be able to use the same SCSI disk and tape drives (in the SCSI Storage Module or Mini Data Storage Cabinet) offered on the VS5000 and DX2000 product lines, thereby reducing R&D development costs by eliminating the need for any additional 2200 disk drive development in the future,

- With no Wang development costs and little, if any, business risk, to provide our 2200 users and VARs a Wang supplied growth path to the latest disk technology and to better mange our installed base.

- To provide our 2200 users and VARs an entree into the world of SCSI disk and tape technology from ST-506 and QIC-2, with all the associated benefits of SCSI, e.g., larger and lower-cost disk drives, faster disk drives, increased I/O speed, etc.

- To provide compatible media between 2200 systems and DYNAMIX, in order to facilitate migration to DYNAMIX/Unix from the 2200.

- To 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 SSM-Cs and MDSC-Ds to the 2200 user base, even if they have updated to a DS.

cc : Mike Riley
Harris Gates
Al Grant
Tyler Olsen
Mike Bahia
Steve Michaelides

INTRODUCTION

Consistent with our cost reduction and modernization program for the 2200 Product Line, and to be competitive in the peripherals marketplace, Wang needs to offer the latest disk technology for the CS/2200 product line. More and more of our 2200 user base and VARs are requesting larger disk drives. There is little if no new development going on in the industry for larger 5 1/4" ST-506 type drives. To fill this need, the product line needs to offer SCSI.

Northeast Digital Corporation (NED), a manufacturer of 2200 peripherals and a highly successful Wang CS/386 Master VAR, has offered to develop (at a cost far lower than we could), and make Wang the exclusive supplier of, a SCSI disk controller compatible with the past, present and future 2200 product line.

Product Description

Hardware

The proposed SCSI disk controller would look very much like the external DPU board in a CS-D, and take one I/O slot. The following is a list of functions/features:

- MVP, LVP, SVP, MicroVP, CS, CS-D/N, CS/386 and the under development Turbo CS/386, compatibility.
- Will support up to 7 SCSI diskette, disk and tape cartridge devices and the standard 2200 format. This includes the Wang SSM-C and MDSC-D enclosures, and the Wang 145MB, 320MB, 650MB SCSI disk drives and the 150MB tape cartridge.
- Unlimited disk addressing capability.
- Wang disk cache algorithms (the same as the DS).
- Auto-retention RAMdisk capability.
- External disk port for use with the 2275MUX (Multiplexer), allowing up to 16 CPUs to share common SCSI disk drives and the new high-speed 22C11 disk controller being developed for the Turbo CS/386 in Taiwan.
- Standard tape formats, e.g., QIC-60, 120, 150, compatible with Unix but with Wang look-a-like tape utilities.

Software

All current Wang disk utilities can be used. Tape cartridge utilities will be supplied by NED.

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

No change to Wang media is needed

Performance

Should be equal to or faster than ST-506 and QIC-2.

Application Requirements

For current CS/2200 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

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 Winchesters, have been updated to a second (or third) 64MB or 140MB fixed Winchesters. 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. The present 2200 architecture can support 448MB (28 fixed platters of 16MB per platter) per data storage cabinet (up to 3 DSs) but we don't offer ST-506 disk drives beyond 140MB in 5 1/4" technology. We also have a outside contractor working on a project (3-bit addressing) that will make the 448MB restriction go away. Without SCSI drives, we will not be able to take little advantage of this technology due to the size of ST-506 disks available.

In addition, with caching, SCSI drives will increase I/O performance by at least 25%, an increase badly needed by current 2200 users.

Benefits

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

1. Increased disk sales to current 2200 users. As previously noted, there is increased demand for larger and faster disk drives. These drives would open new markets to the existing 2200 user based estimated to be 30,000 worldwide. Currently we are still averaging 150 DSs and 500 disk drive domestic shipments per quarter.

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 VS5000 and DYNAMIX product lines. This means we receive the additional benefits of increased quantity buy discounts from our suppliers, common product line spare parts, servicing, etc.

3. No Development Costs In order to acquire a SCSI controller for the 2200 product line, no development would be needed as the third party would assume the development cost (much of which is all ready done). All we would have to do is agree to buy 100 controller boards for resale ($40,000) within 12 months. Currently we are averaging 175 22C11 domestic disk controller shipments per quarter.

4. DX2000 Compatibility We currently do not have any media compatibility with the DX2000 except a 1.2MB diskette. The 150MB SCSI tape cartridge would provide the media compatibility needed to support 2200 users and VARs moving to a NIAKWA/Unix platform. Compatible drives would also encourage users to migrate to DYNAMIX.

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.

Market Requirements

Current 2200/CS controllers range in price from $300 to $1,500, with a Printer/Disk controller costing $300. NED has agreed to absorb all development costs and give Wang exclusive distribution rights if we guarantee to buy 100 units at $400 each. We would have to buy 50 units initially and the remaining 50 over a 12 month period. Technical support by NED would be included. The $400 buy price would be guaranteed for one year regardless of the number bought beyond the 100 unit commitment. We would have exclusive rights to this product, e.g., NED would not be able to sell this I/O board to their customer base except under the Wang label, e.g., as a Wang VAR. NED currently sells, under their own label, a prepackaged SCSI unit that includes the enclosure, RAMdisk and drives. NED has requested that due to a potential conflict with their customer base, we do not publicly disclose them as the OEM of this SCSI I/O board.

Based on a buy price of $400, a 25% burden, and a selling price of $1,500, the following are our projected GPMs:

COST	BURDEN	TOTAL COST	SELLING PRICE	GPM	MAINT.
$400	$100	$500	$1,500	66.7%	$10/mo.

The following are the model numbers of the present Wang enclosures and SCSI drives that the NED SCSI controller will support:

MODEL	DESCRIPTION	VS5000	DX2000
SSM-C	Storage Module	X	X
MDSC-D	Mini Data Storage Cabinet	X	X
2238V-3H	150MB Tape Cartridge	X	
2269V-4H	145MB Fixed Winchester	X	
2269V-5	326MB Fixed Winchester	X	
145-SS-HD	145MB Fixed Winchester		X
320-SS-HD	320MB Fixed Winchester		X
650-SS-HD	650MB Fixed Winchester		X

Using the current SCSI disk prices for the DX2000 and the DS, and assuming a selling price of $1,500 for the new controller, 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:

DESCRIPTION	MDSC-D 326MB	DS 316MB	SAVINGS
Storage Cabinet	$ 2,000	$ 2,500	
Diskette 1.2MB	N/A	200	
150MB Tape Cart. or Cassette	1,995	1,500	
320MB SCSI Drive	4,795	N/A	
64MB ST-506	N/A	2,500	
140MB (Configured as 112MB) ST-506	N/A	5,200	
140MB ST-506	N/A	5,200	
SUBTOTAL	8,790	17,100	
Controller	1,500	300	
TOTAL	10,290	17,400	$ 7,110

The following is a "Cost -To-User" comparison of the small single HH or dual FH SCSI Storage Module versus a similar configuration on a DS:

DESCRIPTION	SSM-C 145MB	DS 140MB	SAVINGS
Storage Cabinet	$ 500	$ 2,500	
Diskette 1.2MB	N/A	200	
150MB Tape Cart. or Cassette	1,995	1,500	
145MB SCSI Drive	2,695	N/A	
140MB ST-506	N/A	5,200	
SUBTOTAL	5,190	9,400	
Controller	1,500	300	
TOTAL	6,690	9,700	$3,010

Benefits To The End-User:

1. The availability of disks that will support the full storage capabilities of the current 2200 OS, e.g., 28 fixed device addresses times 16MB platters = 448MB X 3 devices or drives per CPU = 1.3GB versus the current 948MB, a 396MB increase. When 3-bit addressing is done for the CS/386, storage will only be limited by the physical size of available drives.

2. Lower-cost, large disk drive configurations, in comparison to current DS/ST-506 offerings.

3. All the associated benefits of SCSI, e.g., larger disk drives, faster disk drives, increased I/O speed, etc.

4. Open-architecture and drives that can be used on a DX2000 if the user decides to migrate to NIAKWA/Unix.

Forecasts

For the purposes of meeting the 100 unit objective, the following forecasts only reflect the potential for SCSI controllers. They do not reflect the potential revenue from increased SSM-C, MDSC-D and associated SCSI storage device sales.

U.S. Forecast

MODEL	Q3 FY'91	Q4 FY'91	Q1 FY'92	Q2 FY'92	TOTAL
22C11-SCSI	50	50	50	50	100

International Forecast

MODEL	Q3 FY'91	Q4 FY'91	Q1 FY'92	Q2 FY'92	TOTAL
22C11-SCSI	50	50	50	50	100

Worldwide

MODEL	Q3 FY'91	Q4 FY'91	Q1 FY'92	Q2 FY'92	TOTAL
22C11-SCSI	100	100	100	100	200

Announcements

	U.S.	INT.
Announcement Date	12/01/90	12/01/90
FCS	1/31/91	1/31/91
Volume	2/28/91	2/28/91

M E M O R A N D U M

TO: Mike Britko

FROM: Bruce Waite

SUBJECT: Prototype Evaluation Testing of a 22C03-SCSI Option

DATE: April 17, 1991

A prototype version of a 22C03-SCSI Option board was installed into a 2200 CS-20 CPU. The SCSI option board was then tested to the FCC Class "A" requirements. The test results show that the 22C03-SCSI Option board is IN-COMPLIANCE with those FCC Class "A" regulations.

The 22C03-SCSI Option board also meets the VDE and CISPR-22 Class "A" requirements.

The configuration used for the 22C03-SCSI Option board testing was as follows:

The 2200 CS-20 CPU which was configured as follows:

- The 22C03-SCSI SCSI interface board under test.
- A 210-8176-3 2200 VLSI Mother board.
- A 210-8937-0 2200 CPU board.
- A 210-7515-R4 2200 Triple Controller board.
- A 210-7816-A 2200 Triple Controller Daughter board.
- A 270-0986 Power Supply.

The attachments to the 2200 CS-20 CPU included the following:

- An SSM-C External SCSI Toaster containing a 320 MB FH winchester drive. This Toaster was interfaced to the CPU with a 421-0066 (8') cable, connected to the SCSI board under test.
- A 220-0365 (8') cable left un-terminated and connected to the SCSI board under test.
- A 2336-DW monitor & keyboard with a 220-2336-25 (25') interface cable.

The software used during testing was a continuously running routine which sent and received data to/from the external SCSI Toaster.

Bruce Waite
FCC/VDE Department

0138z

CC: Michael Bahia MS014-A3A/LOWELL
From: Michael Bahia
Subject: Confirming:22C03-SCSI Date: 02/04/91

Distribution:

Not Requested

Gene,
Have done a little research on this matter. Have talked with Bob Eastman, Mike Riley, and some Wang people familiar with creating fail data for Wang and OEM boards. The fail data is generated by inputting a list of components on the board in question into our RAMPS Data base on System W0000427. A request has been made to the system administrator to give me a logon to that system. With an OEM board, often the OEM vendor can supply us with fail data, not likel y to be the case here. Based on the information you provided Bob concerning si milar controller boards, he has established $11.00 as the monthly Maintenance cost. Bob indicated to me it was not essential to run the SCSI board through the RAMPS Data Base as he has established a price and we could probably put the time to better use. However, if we can get a BOM from Dan Collins, I will run it through should you want. We should however get a cost from Dan on repairing the board and any fail data he could supply to forward to Bob. Please let me know if you would like me to follow this through with Dan on any repair info he may have and/or if you would like me to get a BOM to run against the RAMPS Data base.

Mike

---------- Reply ----------

CC: Michael Bahia From: Eugene S. Schulz
Subject: Confirming:22C03-SCSI Date Sent: 02/01/91

The 22C11 is a Printer/Disk controller and mo. maint. is 5$.
The 22C02 is a Printer controller and the mo. maint. is 4$.
The 2236MXE is a workstation (4) controller and the mo. maint. is $10.
The 22C32 is a Printer/Disk/Ws controller and the mo. maint. is $5.

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

To: Eugene S. Schulz From: Bob Eastman
Subject: Confirming:22C03-SCSI Date Sent: 02/01/91

February 1, 1991

Gene,

following up on my DVX, could you please provide me with model numbers of WANG disk controllers similar/comparable to the 22C03-SCSI so that I can take a look at these maintenance prices? I have assigned a Plan A maintenance price of $11 per month to 22C03-SCSI, but this is guesswork than any solid reasoning.

Also, model numbers of other vendors' competitive products would be helpful.

VS OFFICE Electronic Mail Tuesday 02/05/91 10:12 am Page:

Also, as I said in my DVX, we do require that Product Managers provide projected failures per year, calls per year, and time to repair for each and every model number in their Proposals.

Attached you will find a recommended Pricing Proposal format we are providing to all product managers, indicating the information we need in order to price maintenance for products.

Any questions, do not hesitate to give me a call.

Bob, X71693

22C03/SCSI PRELIMINARY SPECIFICATIONS: 725-5171

Switch Settings Down is ON
 #1 - select address 310/350 (Internal Controller only) \
 #2 - select address 320/360 (Internal Controller only) --- Only one may be used
 #3 - select address 330/370 (Internal Controller only) /   NA when MUX is ON
 #4 - Not Assigned
 #5 - Priority 1 select (Selects auto-retention frequency for ramdisk)NA if no ram
 #6 - Priority 2 select, NA when no ram
 #7 - ON for no ram installed, OFF for ram installed
 #8 - AUTORAM (On will automatically restore disk to ram on power up)NA if no ram
 #9 - Not Assigned
#10 - RETENTION (On will assign the disk for Auto-retention of the ram)NA if no ram
#11 - Not Assigned
#12 - MUX (ON selects External disk I/O, OFF selects Internal disk I/O)

SCSI single-ended Interface used in comliance with ANSI X3.131 standard.
Direct connection to Target SCSI device via J2 (50 pin Interface connector).

SUPPORTED DEVICES - known tested

Disk drives- CDC Imprimis (Wren and Swift Series)
            Seagate ST-296N
            Rodime 40MB
            Hewlett-Packard 660MB

Tape drives- Archive 2150S
             Wangdat 1300

Floppy   - Teac FD-55GS/GFR

TO: Gene Schulz
Duncan Chou

CC: Bill Hsien
Mauzan Jau

FROM: Nai-Chi Doong

Date: Feb. 11 1992

SUBJ: A Proposal for the Ethernet Board
--

A coaxial Ethernet Board proposal for CS product is being presented to you. Please evaluate it based on your knowledge and the market demands. Your input is crucial to the success of this product.

Ethernet board.

Configurations

National semiconductor NS8390/91/92 chip set with 32 KB of buffer support 10 Mb/sec D type and BNC connector Ethernet.

Cost

1. NS8390		30
2. PCB		40
3. PAL, Glue Logic, misc		50
Total	USD	120
(286 board not included)		

Software Features:

All communication protocols will be based on the TCP/IP. The TCP/IP is performed by 286. The 386 CPU simply issues high level commands through common memory. The following functions can be implemented.

1. File Server
   Other machines that are connected throuth TCP/IP can request disk access to 22C11 and SCSI on Turbo. We will also offer a library for VARs or users on UNIX.
2. MUX
   Several Turboes can share disks by issuing requests to other Turboes that act as file servers.
3. Terminal Controller
   Other hosts or terminals can use Telnet protocol to emulate 2200 terminals. It is possible to support more than 16 terminals on one controller.
4. Terminal Server
   2200 users can also use Telnet protocol to remote login to other hosts.

Manpower:

H/W	3	
S/W	12	(for file server only)
Diagnostic	2	
Mechanical	1	man-month

Status :

H/W : The circuit is ready. Can go to layout directly if project approved.

S/W File server will be implemented first. All others can be implemented if necessary.

WANG

ECO

10

ECO NO. 55836

SHEET OF

ORIGINATOR	L.JARDIM DEPT07	M/S	015-11B	EXT. 1-78337	DATE 07-07-89
WRITTEN BY	L.JARDIM	M/S	015-11B	EXT. 1-78337	DATE 07-07-89

PART NO.	289-0017
DWG NO.	N/A
MODEL NO.	N/A CS/2200
CLASS	I (II) III

DESCRIPTION
22C11 PCA PTR/DISK CNTLR

PEP #

PSE 21 HP

DOCUMENTS	REVISIONS FROM	TO
HISTORY SHT. 510		
HISTORY SHT. 210		
ARTWORK		
E-REV.		
ASSY. DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.		
CBL DWG.		
S.P.I.		
SPECIFICATION		

CONFORMING AREA	C.E.	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY
*	X			X	X		

CONFORMANCE DATE

DESCRIPTION OF CHANGE

PRELIMINARY

CHANGE BOM 289-0017 AS FOLLOWS:

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
DELETE:	210-7342	PCA 22C11 PTR DISK	1	1	1	1
ADD:	210-9746	PCA 22C11 PTR DISK	1	1	1	1

CHANGE ITEM STATUS OF THE FOLLOWING WLI# FROM (1) TO (2):

WLI#	DESCRIPTION
210-9746	PCA PRINTER DISK CONT.
510-9746	PCB PRINTER DISK CONT.

ECO TO BE REVIEWED
NOV 15 1989

COMPANY CONFIDENTIAL

APPROVALS		DATE
ECO CHAIRPERSON		
DES. ENGRG.	Gilles Carrier	10/2/89
CUST. ENGRG.		
MFG.		
MO	Mary Ellen Marcellino	9/18/89
PROM	PDB [signature]	10/30/89
F.C.C.		
PROD. SAFETY		
SECURE SYS.		
ORIGINATOR	[signature]	

REASON/SYMPTOM FOR CHANGE

*PRODUCT MANAGEMENT HAS DECIDED TO SCRAP ALL 210-7342 RETURNED FROM THE FIELD. REPLACE THESE BOARDS WITH 210-9746

TO PHASE INTO PRODUCTION THE 210-9746 22C11 PRINTER DISK CONTROLLER.

TO RELEASE THE 510/210-9746 PART NUMBERS TO MANUFACTURING.

TSO PRODUCT SUPPORT
IMPACT REVIEW CHECKLIST

WANG ECO# 55836 OEM ECO# _____ P/N# _____

1. WANG MODEL #s AFFECTED: 2200C, 2200T, VP, MVP, LVP, MICROVP, CS, CS-D, CS386

2. WANG FRU(s) #s AFFECTED: 210-7342

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	
TEMPEST INTEG.		CATASTROPHIC		OTHER (See 7)	

324 in Stk

6. PLR DATA:

Unit Population		Product Failure Data: Total Calls	Total Fails	Fails per Year	Parts Related To ECO/PN: Total Used	Reduction by ECO/PN	Reduced FPY
28000 EST	last 12 mo.	24500	6700	.33		%	

7. FIELD REQUIREMENTS:

Level A	Information only	
Level B	TSB required	✓
Level C	FCO required	

FCO requirements: Next Call _____ Immediate _____ Est. installation time _____ 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)	✓

9. LOGISTICS REQUIREMENTS:

Level A	Information only	✓
Level B	Future purchases	
Level C	Purge stock (FSC rework)	

ANY OTHER INFO TO CLARIFY IMPACT: (S/N range, documentation (i.e. Product Maintenance Manual, Service Handbook, etc.), configurations, repair/test process(es), tooling, etc.)

THE 210-7342 MAY HAVE INTERMITTENT DISK ERRORS; I90, I92 &/OL HANGS WHEN USED WITH A DS CABINET OL PHOENIX. IN THOSE SITUATIONS WHERE THE 7342 INTERMITTENTLY FAILS, IT SHOULD BE REPLACED WITH THE 210-9746. THE 9746 SHOULD SHOW AS A DIRECT REPLACEMENT FOL THE 7342 BUT NOT VICE VERSA.

REVIEWER'S SIGNATURE: Michael Balma DATE : 11/7/89

(OVER FOR DEFINITIONS)

WRITE CLEARLY AND USE BLACK INK

WANG LABORATORIES, INC., 59 ELECTRONICS AVENUE, LOWELL, MA 01851 • TEL: 617/656-0208

WANG

TECHNICAL SERVICE BULLETIN

SECTION: HardWare Technical

NUMBER: HWT 6152 REPLACES: _____ DATE: 06/18/86 PAGE 1 OF 1

MATRIX ID. 4201 PRODUCT/RELEASE# 2200 all

TITLE: Problems with the 210-7342 Printer/Disk Controller

PURPOSE:

To inform the field of problems associated with the 7342 printer/disk controller and possible circumventions.

EXPLANATION:

When using the 210-7342 printer/disk controller with a Phoenix Disk Drive or a 2275 Disk Unit, I90, I91, I92, and possibly I96 errors may be experienced. The problem could be intermittent or solid dependent on types of chips used on the board and where the board is positioned in the I/O section of the CPU. This is a design problem with the board for which R&D has a fix. Updated boards are being Beta tested at this time. Once the fix is verified an ECO will be issued.

CORRECTIVE ACTION:

There are several circumventions for this problem:

1. Install the 7342 controller in the last I/O slot farthest from the CPU boards. In testing it was found that a board failing solidly when near the CPU boards would run error free in the last slot.

2. Replace the 7342 controller temporarily with a 210-6541-2 single disk controller and a 210-7079 single printer controller.

3. Replace the 7342 controller with the older style 210-7042-2 printer/disk controller if available.

4. Replace the 7342 controller temporarily with the 212-3012 triple controller. See note 1.

Note 1: Although no problems have been reported with the 212-3012 triple controller (term/printer/disk), this board has the same circuit design and could be subject to the same problems. This board will also be updated.
Note 2: A number of newer disk cables (220-0364/0365) have twisted pair wiring. These cables may seem to work fine but should only be used with the Phoenix Mux boards, the 210-7715 and the 7717. The older cables (220-0105-4/0138) should be used if a newer cable with 1 to 1 wiring is not available. Check the cable by disassembling the connector.

GROUP: VS/2200 Hardware Support Group MAIL STOP: 0126

To:
Subject: 2200 Shipments w/ 7342 Bd

Distribution:

None, this item is In Progress

Marina,

As we discussed earlier on the phone, to minimize our 2200 shipping delays which may result when we switch over from the 7342 Dual Controller to the 9746 Dual Controller as per ECO 55836, it is agreeable to continue to ship the 7342 board with non-386 CPU's as problems are minimal with these systems. Our expectations are that within the next 2 weeks the 9746 board will go into production. We expect all 386 shipments sold with the 22C11 Printer Disk Controller to be shipped with the new 9746 only. This has been discussed with the Product Marketing Manager, Gene Schultz, and Mike Riley, 2200 R&D, and is agreeable to all parties. Should the 9746 cause further delays beyond 2 weeks, we will expect to be notified so that the situation can be re-evaluated. Thanks for your co-operation.

Regards,
Mike Bahia
VS/2200 Product Support

To:
Subject: CS/386 Printer Controller

Distribution:

None, this item is In Progress

To: Mike Bahia From: Ralph Welsch
Subject: CS/386 Printer Controller Date Sent: 02/01/90

Mike:
BOM is on Corp. AMAPS at Item Status Code 2; haven't checked whether the Build Site File has been changed to reflect PB as the mfg. site. Believe this would be necessary for PB to see the BOM.

---------- Reply ----------
To: Ralph Welsch From: Mike Bahia
Subject: CS/386 Printer Controller Date Sent: 02/01/90

Ralph,
Thanks for the update. Anything that can be done that could get the boar d out earlier will be appreciated. I left a DVX for Rich who called me earlier concerning a BOM for this product. We need to know if this is on AMAPS or othe rwise get a hard coy of the BOM to be able to generate MTBF data required by Logistics to order the board.

Regards,
Mike

---------- Reply ----------
To: Mike Bahia From: Ralph Welsch
Subject: CS/386 Printer Controller Date Sent: 02/01/90

Mike:
ref. 210-9746

When this card transferred from R&D/Parkwood to Mfg., the planner code for the 210 was not assigned. As a result of this, production plans were not developed and materials were not driven.

Additionally, Logistics has not placed requirements for the new card on Mfg.

A planner has since been assigned, and he will drop a kit for 50 pcs. on 2/2; 20 of these will be allocated for 210's. However, we will not have any idea as to materials shortages until after the kit is dropped.

Until then, we can't provide a good estimate as to availability; however, under the best of scenarios (all material available) I wouldn't expect completed cards to be available until mid-March.

Rich Leis (PB Planner) will be able to provide a more accurate estimate early next week, after the materials issues are sorted out.

Ralph Welsch

---------- Reply ----------
Appreciate your help.

Mike

WANG LABORATORIES, INC., 59 ELECTRONICS AVENUE, LOWELL, MA 01851 • TEL. 617/656-0208

MEMORANDUM

WANG

TO: DISTRIBUTION

FROM: MIKE BAHIA

DATE: AUGUST 7, 1986

SUBJECT: MEETING on the DISPOSITION of the 2200 DUAL CONTROLLER

A meeting will be held on Wednesday, August 20th, at 9:30 AM, to discuss the future of the 210-7342 Printer/Disk Controller. This board has exhibited problems when used with either a Phoenix Disk Drive or the 2275. The fix for this problem which is now being beta tested is quite extensive. A new artwork board is required for the permanent fix and the new board will have a new part number. This will minimize the usefulness of the 210-7342 Dual Controller. A decision needs to be made on the most cost effective way of handling this board. One option to be considered would be to use the board as a printer controller.

The meeting will be held in the Critical Accounts Conference Room on the second floor at Electronics Ave. Using the stairway closest to the main entrance, go up two flights, and it's the first door on the left.

Regards,

Mike Bahia
VS/2200 Product Support Engineer

DISTRIBUTION:

Gilles Carrier	M/S 1439	
Jim D'Amore	M/S 8240A	REPAIR STRATEGIES
✓Bob Donovan	M/S 8240A	
✓Bob Marsh	M/S 4116B	
✓Bill Morrissey	M/S 4116B	
✓Ron Olesen	M/S 0126	
Mike Riley	M/S 1469	
✓Charlie Tharp	M/S 4116B	

0975D

B. MORRISSEY PHIL MURPHY ECO ACTIVITY FOR LOGISTICS

B. MARSH DEBBIE CABRAL MANAGER OF BOARD

348 DOMESTIC SPARES $185.17 COST OF BOARD

15,587

26 PLAN / 35 USED / MONTH

How many has Mfg built? Debbie Cabral

7342 interchangeable w/ new one

new one alone

Change P Pkg to include new board, Mike Riley

When usage goes down brd will have a replaced by.

MEMORANDUM

TO: Distribution

FROM: Gilles Carrier Gilles Carrier

DATE: July 25, 1986

SUBJ: 2200 Dual Controller ECO Meeting

A meeting will be held on Thursday, July 31, to discuss the ECO to correct the I92 and hang problem on the 2200 systems. Customer Engineering and manufacturing input will be needed for the implementation of the short term ECO and of the later artwork changes.

The meeting location will be in the small conference room in Tower II, floor 3 near the Tower III entramce.

Distribution:

Mike Bahia	M/S 0126
Dave Claffie	M/S 1439
Lou Cornaro	M/S 1439
Dave Norton	M/S 18G1E
John Proulx	M/S 0139
Mike Thompson	M/S 0126

Mike Bahia
M/S 0126

210-7342
MEETING AGENDA

1. Discussion of problems with dual controllers and Beta site update.

2. Discussion on short term ECO on existing boards.

3. Discussion on Artwork ECO implementation.

4. Wrap-up discussion

650 BEAR BRDS IN STOCK | BUILDING 35 A WEEK

NOT ORDERING ANY MORE

8/15

8/19
WED 8/20 9-10:30

✓ BOB DONOVAN REPAIR STRATEGIES 46341 M/S 8240A

CHARLIE THARP LOGISTICS 43371 M/S 4116B

JIM D'AMORE REPAIR STRATEGY FOR 2200
46963 M/S 8240A

BOB MARSH MANAGER FOR THAT BOARD 43381 M/S 4116B

BILL MORRISSEY ECO ACTIVITY FOR LOGISTICS 43370 M/S 4116B
REPRESENTS CHARLIE

WANG

ECO

ECO NO.

SHEET OF

ORIGINATOR	M/S	EXT.	DATE
WRITTEN BY	M/S	EXT.	DATE

PART NO.	DESCRIPTION
DWG NO.	
MODEL NO. 210-7342	PEP #
CLASS I II III	

DESCRIPTION OF CHANGE

Change B.O.M., Parts List, Assembly and Schematic.

① Change L7 & L8 From a 74367 (376-0176)
To a 7407 (376-0056)

② Add 7407 (376-0056) To Locations L4 & L8.

③ Cut Etches From L11 (74367) Pins 3, 5, 7, 9, 11, 13
L15 (74367) Pins 11, 13

④ Add Wires From: L4 (7407) Pin 1 to L14 Pin 7
L4 Pin 2 to CONN. 1 FINGER-19
L4 Pin 3 to L14 Pin-5
L4 Pin 4 to CONN. 1 FINGER-5
L4 Pin 5 to L14 Pin-3
L4 Pin 6 to CONN. 1 FINGER-15
L4 Pin 7 to L5 Pin-7
L4 Pin 8 to CONN. 1 FINGER-P

REASON/SYMPTOM FOR CHANGE

To improve drive capability and resolve problems created by the twisted pair, parallel cables and marginal IC's causing system errors and hang-ups.

DOCUMENTS

DOCUMENTS	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510		
HISTORY SHT. 210		
ARTWORK		
E-REV.		
ASSY. DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.		
CBL DWG.		
S.P.I.		
SPECIFICATION		

CONFORMING AREA	C.E.	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY

CONFORMANCE DATE

APPROVALS

APPROVALS	DATE
ECO CHAIRPERSON	
DES. ENGRG.	
CUST. ENGRG.	
MFG.	
MTO	
PP&M	
F.C.C.	
PROD. SAFETY	
SECURE SYS.	
ORIGINATOR	
OTHER	

14-19030 Printed in U.S.A. 5-85-7M

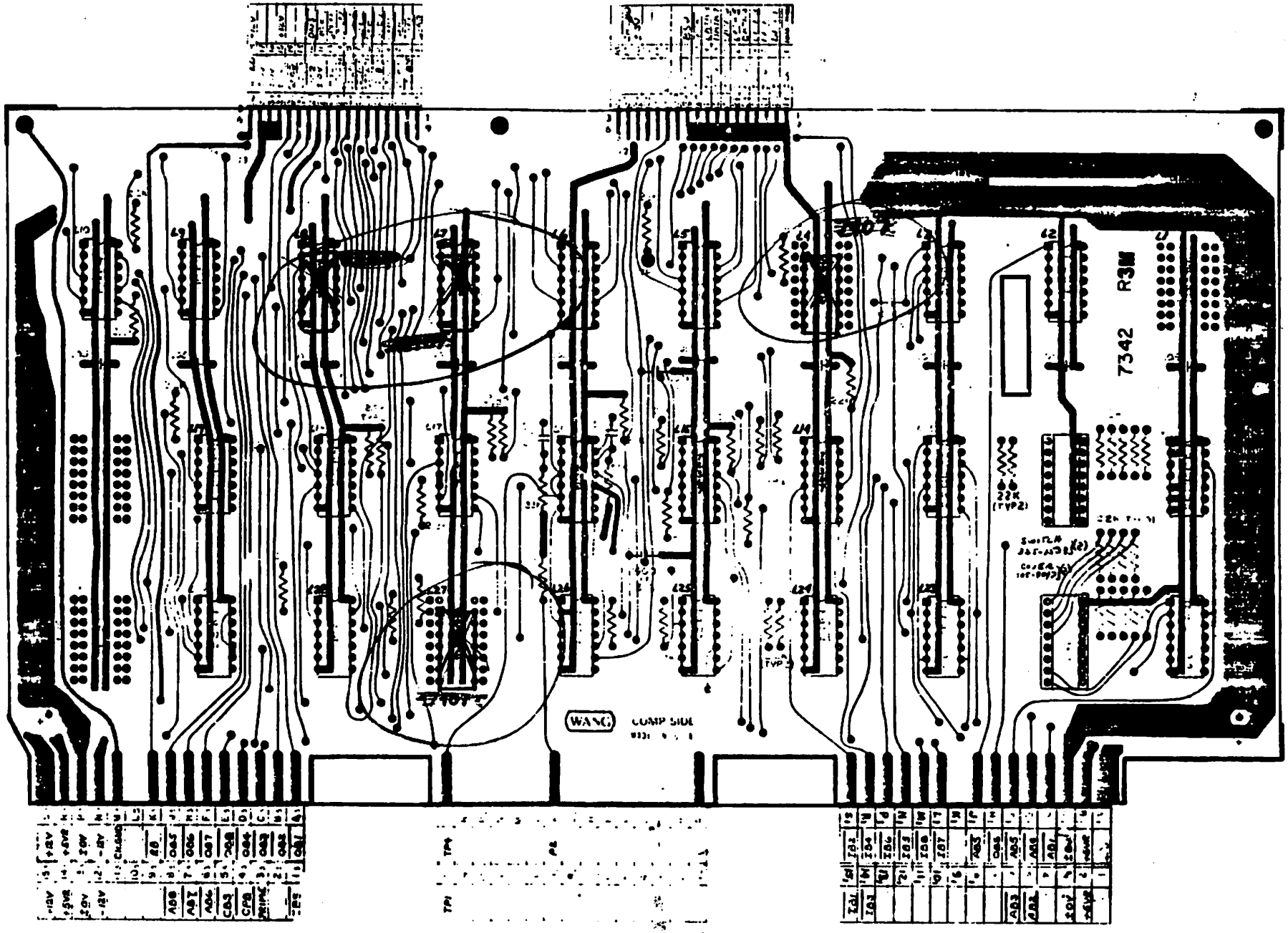
WANG	ENGINEERING CHANGE ORDER CONTINUATION SHEET	DOCUMENT NO.	OLD REV	NEW REV
DOCUMENT TITLE:	THIS ECO SHT, WHEN ATTACHED TO DOCUMENT OF PREVIOUS REV CONSTITUTES THE LATEST DOC.	ECO NO.	SHT	OF

DESCRIPTION OF CHANGE:

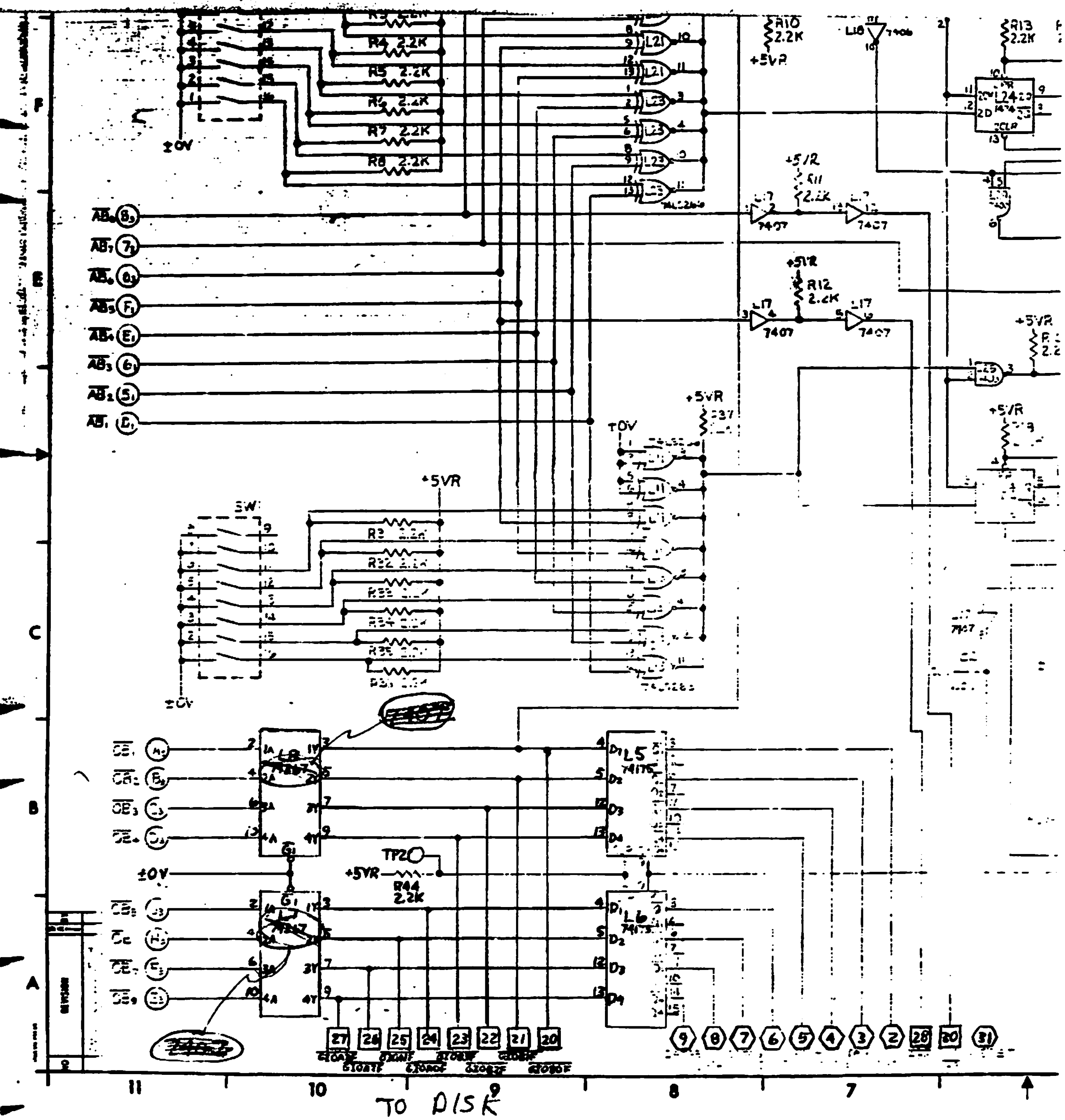
Cont.

Add Wires From: L4 Pin 9 TO L14 PIN-13
L4 Pin 10 TO CONN. 1 FINGER-N
L4 Pin 11 TO L14 Pin-11
L4 Pin 12 TO CONN. 1 FINGER-R
L4 Pin 13 TO L14 Pin-9
L4 Pin 14 TO L3 Pin-14
L27 (7407) Pin 7 TO L28 Pin-7
L27 Pin 10 TO CONN. 1 FINGER-M
L27 Pin 11 TO L15 Pin 13
L27 Pin 12 TO CONN. 1 FINGER-L
L27 Pin 13 TO L15 Pin 11
L27 Pin 14 TO L26 Pin 14

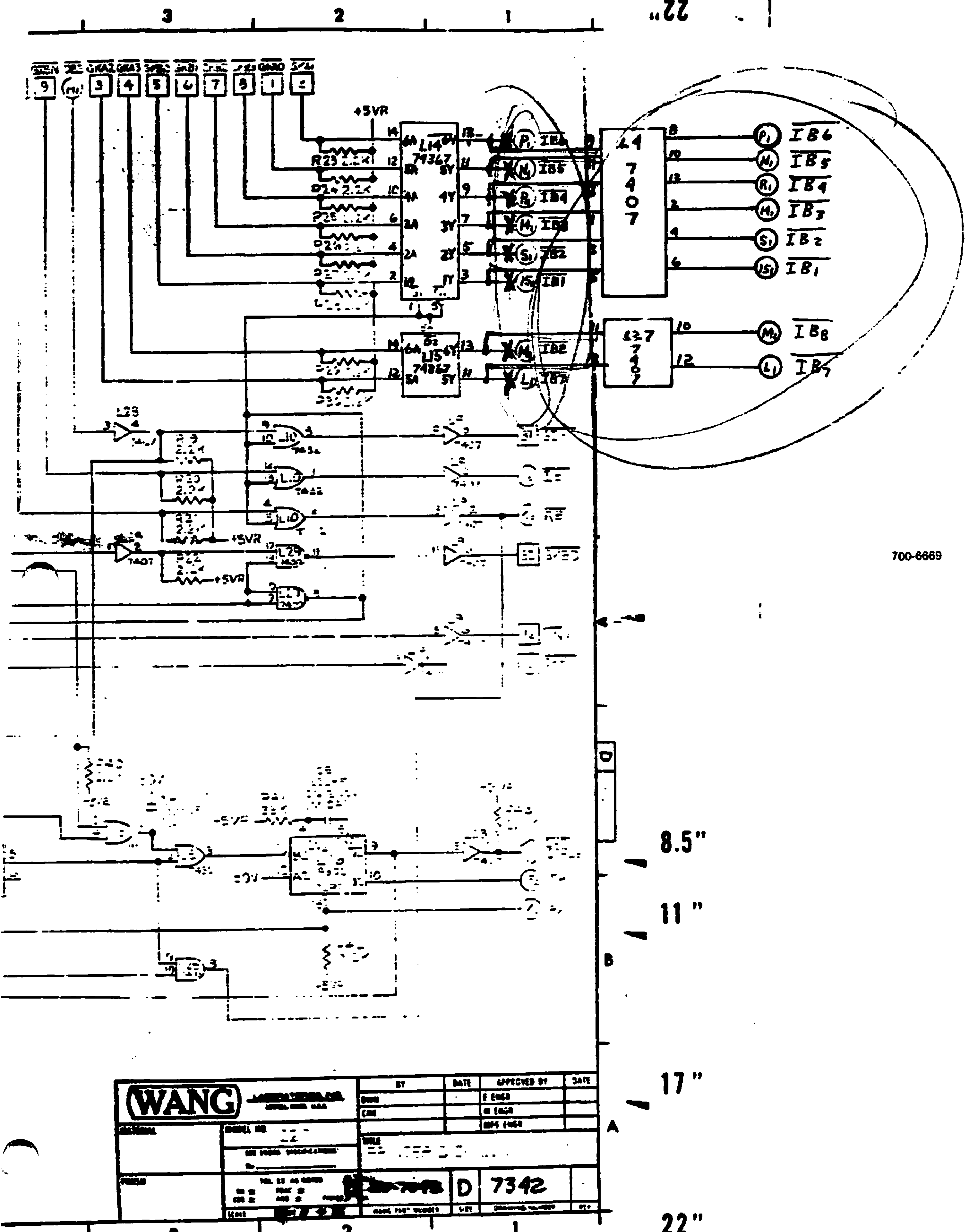
NOTES: ① At L4,7,8 & 27, P[illegible]1 OF 7407's GO
At Hole 2 OF Locations.



CONN. 1 WANG



R4 2.2K
R5 2.2K
R7 2.2K
R8 2.2K
R10 2.2K
R12 2.2K
R13 2.2K
R44 2.2K
+5VR
±0V
7407
74176
74367
TP2
L5
L21
L23
L24
SW
TO DISK
11
10
9
8
7
F
E
C
B
A



700-6669

8.5"

11"

17"

22"

TAC

INFORMATION CALL

CONTROL NUMBER 09207062

CONTACT NAME MARTY DUCHARME POSITION DTS
RDB # 3410 TDX # PHONE # 301 381 0700 EXT # 332

SYSTEM TYPE 2000DS DEVICE TYPE DS
UTILITY NAME SOFTWARE LEVEL

METHOD OF CALL P T = TELEX, P = PHONE, M = MEMO, E = EMS
HAS THE AREA OR DISTRICT BEEN CONTACTED
N A = AREA, D = DISTRICT, B = BOTH, N = NONE
IS THIS INQUIRY PERTAINING TO A NATIONAL ACCOUNT ?
U Y = YES, N = NO, U = UNKNOWN

USE THE FOLLOWING AREA TO DESCRIBE THE SITE THAT CREATED THIS REQUEST
CUST/OFFICE NAME PHONE #
ADDRESS 3M CITY STATE
ON SITE CONTACT NAME

QUESTION (*) / ANSWER (+)

*EMP 05935
*DISPATCH N/A
*LARGE AMOUNT OF PROBLEMS ON I91 RECEIVED 3 DDA DPU BOARDS
*WITH SAME PROBLEM
+HAD 3 DIFFERENT SITES W/ I91 ERRORS CAUSED BY 7342 DUAL
+CONTROLLERS. WAS ABLE TO CORRECT THE PROBS AT 2 SITES BY
+INSTALLING DIFFERENT 7342'S. THE 3RD SITE WAS CORRECTED BY
+MOVING THE DUAL CONTROLLER CLOSER TO THE CPU BRDS. THE PROB
+WAS MOSTLY ON IPL. ONCE SYSTEM UP WOULD USUALLY RUN FINE.
+WILL FORWARD INFO TO MR.

(15MIN) MIKEB

BETA SITES FOR THE 7342 PRINTER/DISK CONTROLLER

WANG CONTACT: DAN SULLIVAN, DTS 9/29 NEW FIX RDB 3160 10/13 REQUESTED CHANGE

TEL # 203-677-5050 FARMINGTON, CONNECTICUT

ORD	DEPT	CALL #	CUST	INSTALL DATE	EQUIPMENT	SLOT
	10/29 TO INSTALL QUICK FIX		11/17 UPDATED 8396 FAILED, REINSTALLED DUAL CONTROLLER & WOULD NOT FAIL, LEFT IN.			
1.	~~H22~~	~~16097000~~	~~ALLEN AGENCY~~	~~6/18~~	~~MICROVP/2275~~	~~1~~
	12/22 QUICK FIX INSTALLED. BETA BRD BEING SENT BACK.			12/30 OK	BRD @ RETURNED	
	~~NO PROBLEMS AS OF 6/27 7/9 OK 7/17 OK 8/4 OK 8/20 OK 9/11 OK~~					
2.	H22	16097000	NORTHWEST SVG BK	7/2	MICROVP/2275	1
	1/30 INSTALLING NEW FIX TODAY.				8/26 BRD RCVD	
	SHIPPED 6/27 7/17 OK 8/4 OK 8/20 OK 9/11 OK					
3.	~~H22~~	~~16097000~~	~~CARUHGLIA INS AGCY~~	~~7/8~~	MICROVP/2275	
	10/86 REINSTALLED DUAL CONTROLLER. ~~WARRICK~~ BRD 3 RETURNED 10/10/86					
	12/22 QUICK FIX INSTALLED. 12/31 OK					
	~~SHIPPED 6/27 7/9 OK 7/17 OK 8/4 OK 8/20 OK 9/11 OK~~					
8.	~~H22~~	~~16097000~~	~~CH. [illegible]~~	~~1/28~~	~~MICROVP/2275~~	~~1~~
	1/30 INSTALLED UPDATED 8396 & DUAL CONTROLLER. HAD PROBLEMS W/ FLOPPY. OK W/ TRIPLE. CE TO TRY ANOTHER DUAL CONTROLLER & 8396 IF NECESSARY. 3/2 BRD RCVD. FIX INSTALLED					
	~~SHIPPED 7/12 7/22 RECEIVED~~ WAS HAVING I/O PROBLEMS BEFORE & AFTER REPLACING					
	~~THE TRIPLE CONTROLLER. PROBLEM WAS NOT COLLECTED BUT HAS NOT REOCCURRED SINCE 7/29.~~					
	~~8/20 OK 9/11 OK~~					

9/28 ASKED ABOUT NEW FIX R 10/13 REQUESTED CHANGE.

WANG CONTACT: GENE WARRICK DTSM RDB 3420 NEED SHIP TO ADDR

1/30 WAYNE MCNULTY CALLED. WILL INSTALL NEW FIX WK AFTER NEXT.

TEL # 215-963-3100 PHILADELPHIA, PA. LEFT MESSAGE W/ TEL # TRIED

REVD 4/17	06293046	3/19 NEW FIX INSTALLED				
~~4.~~	~~H22~~	~~[illegible]~~	~~OCEAN CITY POLICE~~	~~7/16~~	~~MICROVP/2275-30~~	~~1~~
	~~6-20 7/9 OK 7/17 OK 8/4 OK 8/11 OK 8/28 OK 9/15 OK 9/26 OK~~					
REVD 4/17	06293046	3/19 NEW FIX INSTALLED				
~~3.~~	~~H22~~	~~[illegible]~~	~~OCEAN CITY POLICE~~	~~7/16~~	~~MICROVP/2275-30~~	~~1~~
	~~6-20 7/9 OK 7/17 OK 8/4 OK 8/11 OK 8/28 OK 9/15 OK 9/26 OK~~					
LOST	06293046	3/19 INSTALLED NEW FIX.				
4.	H22	[illegible]	RESORT INTERNATIONAL	7/16	MICROVP/2275-30	1
	6-20 7/9 OK 7/17 OK 8/4 OK 8/11 OK 8/22 OK 9/15 OK 9/26 OK					
REVD 4/17	06293046	3/19 NEW FIX INSTALLED				
	~~H22 [illegible] OCEAN CITY POLICE HALL 7/16 MICROVP/2275-30 1~~					
	~~6-20 7/9 OK 7/17 OK 8/4 OK 8/11 OK 8/22 OK 9/15 OK 9/26 OK~~					

RALPH PINCEK, DTS 9/29 LMTC WILL GET ME KNOW RDB 3310

TEL # 412-921-7100 PITTSBURGH, PA

WANG CONTACT: TOM HERRLE, DTS RDB 3310 10 HOW MANY UPTO 4 NEED SHIP TO ADDR

TEL # 216-642-2834 CLEVELAND, OHIO LEFT MESSAGE VIA TEL & TAKNET

TH 10/13 REQUESTED CHANGE.

10. H22 66066001 ASSOCIATION OF DERMATOLOGY 7/7 MICRVP/2280 1

RET 9/16/87

Shipped 7-3-86 7/18 OK 7/22 OK 8/5 OK ~~8/10~~ 9

RP 10/13 REQUESTED CHANGE. 2/9 BRD WENT BAD. TO BE SENT BACK.

~~11. H22 65312002 GEORGE JR REPUBLIC 7/18 MVP/2280 1~~

BRD RETURNED 2/11/87

8/20 OK 8/22 OK 8/29 OK 9/15 OK 9/18 OK

7-3-86 7/22 OK 7/25 OK 7/31 OK 8/7 OK 8/14 OK

RP 66066001 PLACED INTERLINK TRK # 7/27/87

12. H22 65312002 CIS 7/30 MVP/2280 1

8/29 OK 9/15 OK 9/18 OK

SHIPPED 7/23 RCVD 7/25 7/31 OK 8/7 OK 8/14 OK 8/20 OK 8/22 OK

BRD RETURNED 10/16/87

~~WANG CONTACT: JOHN FORBES, RTS RDB 3100~~

~~TEL # 617-273-9150 BURLINGTON, MA CALL IF HAVE XTRA BRDS~~

WANG CONTACT: STEVE RAMER, BM 9/29 LMTC RDB 3225

TEL # 609-234-2840 MOUNT LAUREL, NJ 08054

RCVD 9/29

9. ~~BELLMAWR POLICE~~ 3/19 NEW FIX INSTALLED 8/25 ~~MICRVP/2275~~ 10/1 1

SHIPPED 7/21 8/12 NOT INSTALLED 8/20 NOT INSTALLED 9/15 LMTC 9/18 OK 10/17 OK

RCVD 9/17

13. BELLMAWR POLICE 3/19 NEW FIX INSTALLED 8/25 MICRVP/2275 10/1 2 9

SHIPPED 7/29 8/12 NOT INSTALLED 8/20 NOT INSTALLED 9/15 LMTC 9/18 OK 10/17 OK

2/30 REQUESTED NEW FIX BE IMPLEMENTED.

2/3 LEFT MESSAGE FOR BM TO CALL.

2/4 STARTING NEXT WEEK, 2 AT A TIME.

To:
Subject: CS 386 The Netherlands

Distribution:

None, this item is In Progress

CC: Mike Bahia
Subject: CS 386 The Netherlands

From: Willem Sloep
Date Sent: 12/18/89

Colin,

We're testing the CS386 upgrade at this moment in the Netherlands.
Wang is positioning the upgrade as 'plug in and play', but we discover several incompatibility problems with the hardware.

RESULTS DISK CONTROLLER TEST :
We've two CS/DS systems build up with the CS386 upgrade board installed.
From 7 Disk controllers (diverend and the same types), 3 are giving problems like hanging, time-out errors and DS-tape errors on one system. On the other system only 1 controller fails (definitly margin problems). Both systems equiped without the CS386 upgrade doesn't give problems.
This margin problem is also mentioned in HWT 9373 (TSB 11/22/89). They mention that we have to swap controllers when we have problems. Our tests let us see that we can solve it by swapping controllers. Is this the startegy to solve a margin problem of the CS386? We've done our test only with disk controllers, we've not tested printer/TC and terminal controllers. But afterall we're not QA! What guarentee we have that a board wich doesn't seems to give problems in the first case, also works OK in live sytuation at a customer?
We are going to escalate this problem and are not going to ship CS386 to our customers yet.

RESULTS DATA STORAGE SCOOP :
We've done some tracing on the ABS/CBS/OBS lines of the I/O bus and compared the CS with the CS386. We measure much faster cycles and pulses on the CS386, also with more distortion. We can imagine that this give problems on the controllers which are designed for slower cycles.

At the end of this week we've invited a major 2200/CS software developer to test the compatibility of the Operating System in a live customer sytuation.

Will update you soon.

Regards Willem Sloep

---------- Reply ----------

Willem,

Thanks for the update. QA testing was done but unfortunately we are not set-up to be able to easily test every configuration & man power for 2200 has been very limited for awhile. There are quite a few systems installed in the US & other than the disk controllers, the other controllers seem to be running ok. There have been some problems with terminals which may indicate a problem with the terminal controllers, the MXE & MXD, but they have been very intermitt ent. At this time we are experiencing intermittent hang problems at several 38 6 sites which when RESET is keyed the terminal blanks out. This is the major concern. We believe there are 2 separate problems that cause this. One is a noise, static, or grounding problem to do with the terminal/s especially if usi ng the 2536DW &/or the MXE/MXD controllers. The 2nd has to do with loading a program. Under certain parameters a hang can occur during a load. This proble

m is consistent when all the same steps are taken. We have been able to provid e R&D w/ the data to reproduce the problem & with any luck may have a solution the 1st of the year. As for the disk controllers, there is a new Dual controll er to go into production in late January to replace the 7342. This board has worked well & should resolve the problems w/ the 7342 which will be discontinue d. The new brd, the 210-9746, will be a direct replacement. Testing will need to be done with the 6541 Disk controller to determine what needs to be done to resolve the tape issue. The 2275MUX e-rev 4, the 7715 e-rev 10, & the Triple Controller have not presented any disk problems as of yet.

Could you please identify the part numbers of the disk controllers you tested & found problems with as well as the part numbers of those that worked well.

Have been out of the office working the hang issue 12/18 & 19. Have message to call you. Will try between 4 & 5 pm my time today.

Regards,
Mike

Gentleman,

The Boston district has a 2200 account with a CS and DS system. When the DS is connected to a dual port controller 210-7342 (Erev-0) it gets intermittent I-91 errors during heavy disk I/O, when on a single port controller 210-6541-2 it operates with out error during heavy I/O.

Have you heard of this problem any where else?

John Murdock

.tem Subject: OCPD CS/DS I91 Problem

Config. 3 Mxe's
3 Dual Controllers Printer / Disk 210-7342 Phx/2275/DS No Printers.
1 Tape Controller

You will intermittently get a I91 during boot-up. Also a I91 during heavy read write sort functions. Problem is evident with 2200 micro and 2 Meg. CS. Have tried 2 different DPU pcb's. (1) CPU pcb. CPU power supply. Different cable to DS cabinet. Different dual controller. Voltages in CPU and DPU are great. Ripple is less the .005 v. The only way to get system up was to use a triple controller. WS/PTR/DSK. Customer will be changing config as follows.
4 MXE"S
3 Dual Controllers.
Problem seams to be more evident with a lot of controllers in CPU.
System is on Wang Power Conditioners. Net to Ground less than .5 volts.
Let me know if you have any luck with Product Support.

Thank You
Wayne Mac Murray
(215) 963-3100 Phila Office
(609) 234-2840 N.J. Office

H22- E26062002 -TAC-CALL

WANG LABORATORIES, INC., 59 ELECTRONICS AVENUE LOWELL, MA 01851 • TEL: 617/656-0208

MEMORANDUM

W. L
1818 Market St.
Philadelphia Pa. 19103

WANG

TO: GENE WARRICK

Gene Warrick 215-963-3100

FROM: JOE SCAGLIONE

DEPT: TECHNICAL ASSISTANCE CENTER(Product Support)

DATE: JUNE 30,1986

Wayne McMurry DTS

SUBJECT: BATA SITE (210-7342 Modified boards)

Gene here are ~~two~~ FOUR REQUIREMENTS ~~installation~~ ~~notes~~ to follow.

1) Take note of the model numbers on CPU and DRIVE these boards are tested with.

2) Install these 7342 boards in the first I/O slot closest to the CPU boards.

3) Note install date for each site

4) Keep in touch with the customer, relay any problems to either me JOE SCAGLIONE or MIKE BAHIA at 1-800-822-1122 ext. 0249 or 0256

BATA BD. NUMBER	SITE LOC.	DATE	MODEL OF CPU/DISK	SLOT #
4	OCEAN CITY POLICE			1
5	OCEAN CITY POLICE			1
6	RESORT INTERNATIONAL			1
7	RESORT INTERNATIONAL			1

1178195

AIRBORNE EXPRESS℠

SENDER'S AIRBORNE EXPRESS ACCOUNT NO. 1 10995024

ORIGIN BOS AIRBILL NO. 485385983

2 FROM (COMPANY NAME)
[illegible] LABS
ADDRESS
50 ELECTRONICS AVE
CITY LOWELL STATE MA ZIP CODE (REQUIRED) 01851
SENT BY (NAME/DEPT.) Joe Scaglione PHONE 617-656-0249
BILLING REFERENCE INFORMATION TO APPEAR ON INVOICE
RDBC 3874

3 TO (COMPANY NAME) Wang Labs → 15TH FLOOR
ADDRESS 1818 Market St. [illegible] P.O. BOX
CITY Philadelphia STATE Pa ZIP CODE (REQUIRED) 19103
ATTN. (NAME/DEPT.) Dene Warrick PHONE 215-963-3100
RECEIVER'S AIRBORNE EXPRESS ACCOUNT NO

THANK YOU FOR SHIPPING AIRBORNE EXPRESS!

4 TYPE OF PACKAGING
☐ EXPRESS/AD PACK ENVELOPE ☐ LETTER EXPRESS (UP TO 8 OZ.)
☐ EXPRESS PACK BOX/TUBE ☐ MAG TAPE PACK

DESCRIPTION OF CONTENTS

NO OF PACKAGES | WEIGHT (LBS.) | DIMENSIONS (IN.) L W H

VALUE FOR CARRIAGE (SUBJECT TO ITEMS 6 & 7 ON REVERSE SIDE)
CHECK ONLY ONE ☐ DECLARED VALUE $. ☐ FULL INSURANCE

SENDER'S C.O.D. (SUBJECT TO ITEM 15 ON REVERSE SIDE) $.

5 BILL CHARGES TO (ASSUMED SENDER UNLESS OTHERWISE SPECIFIED)
☐ SENDER ☐ RECEIVER
☐ 3RD PARTY _____ AIRBORNE EXPRESS ACCOUNT NO.
☐ PAID IN ADVANCE $ _____
CHECK NUMBER _____

TYPE OF SPECIAL SERVICE (EXTRA CHARGES MAY APPLY)
☐ SPECIAL PICKUP ☐ SATURDAY DELIVERY
☐ SPECIAL DELIVERY _____ : TIME
☐ HOLD AT AIRBORNE FOR PICKUP (NO CHARGE)
☐

THIS NON-NEGOTIABLE AIRBILL IS SUBJECT TO THE TERMS AND CONDITIONS OF CONTRACT SET FORTH ON THE REVERSE SIDE OF THIS COPY. AIRBORNE SHALL NOT BE LIABLE IN ANY EVENT FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS OR LOSS OF INCOME. AIRBORNE'S LIABILITY, IN THE ABSENCE OF A HIGHER DECLARED VALUE FOR CARRIAGE, IS LIMITED TO $9.07 PER POUND, PER PIECE OF CARGO LOST, DAMAGED, DELAYED, MISDELIVERED OR OTHERWISE ADVERSELY AFFECTED.

6 SENDER'S SIGNATURE X Joseph R Scaglione DATE 6-30-86

EXECUTIVE OFFICES
P.O. BOX 662
SEATTLE, WA 98111
FED ID NO 91-0937469 SCAC:ABFS

ORIGIN 485385983 AIRBILL NO.

AIRBORNE SIGNATURE X | DATE RECEIVED | TIME RECEIVED | NO. OF SHPTS. | PICKUP LOCATION: ☐ SENDER'S DOOR ☐ AIRBORNE TERMINAL ☐ DROP BOX (NO.) ___ ☐ CARRIER'S TERMINAL ☐ OTHER ___ | ROUTE

SENDER'S COPY

202 (1/86)

WANG LABORATORIES, INC.

CONTROL NO. 437255

CUSTOMER ENGINEERING MATERIAL TRANSFER

FROM	RDB	TO	RDB
On Line Prod Suppt	3874		3420
...ERED	LOC. CODE	CUSTOMER CODE	TRANS CODE

SHIP TO	SHIP CODE	SP. INST.
	LOC CODE	

SHIPPED BY	MO DA YR	WAYBILL NO	NO. OF CARTONS
S/BB	063080	485385988	1
METHOD SHIPPED	AB		WEIGHT

ITEM NO.	PART NUMBER	DESCRIPTION	QUANTITY ORD	QUANTITY SHPD	P/N SHIPPED IF DIFFERENT
	210-7342			4	

...IVED BY	EMPL NO.	MO DA YR	PACKAGE CONDITION	D	U	OTHER

729-9009-1

ORIGINATOR COPY

WANG LABORATORIES, INC., 59 ELECTRONICS AVENUE, LOWELL, MA 01851 • TEL: 617/656-0208

MEMORANDUM

Ship to
W Lds.
Rockside Sq. NO 1
6155 Rockside Rd.
Independence Ohio 44131
att: Tom Herrle

WANG

TO: TOM HERRLE

FROM: JOE SCAGLIONE

DEPT: TECHNICAL ASSISTANCE CENTER(Product Support)

DATE: JUNE 30,1986

SUBJECT: BATA SITE (210-7342 Modified boards)

Tom here are four requirements to follow.

1) Take note of the model numbers on CPU and DRIVE these boards are tested with.

2) Install these 7342 boards in the first I/O slot closest to the CPU boards.

3) Note install date for each site

4) Keep in touch with the customer, relay any problems to either me JOE SCAGLIONE or MIKE BAHIA at 1-800-822-1122 ext. 0249 or 0256

BATA BD. NUMBER	SITE LOC.	DATE OF INSTALL	MODEL OF CPU/DISK	SLOT #
10	ASSOC. OF DERMATOLOGY			1
11	GEORGE JR. REPUBLIC			1

THANKS...