WANG MANUFACTURING TEST PROCEDURE	STAMP: ORIGINAL (RED) WANG 2	PART NO: 210-8826-A	REV: 1	SHEET: 1/9
DESCRIPTION: 2200 SERIES DS DPU BOARD		TEST TYPE: IN-SYSTEMS TEST		
BUSINESS ENGINEER: 2/20/95		BUSINESS MANAGER: 2/20/95		

REVISION HISTORY

REV	DATE	MPC/ECO	SHT	DESCRIPTION	CHANGED BY
0	11/93	05926		NEW RELEASE PER ISO 9002	JOE FLYNN
1	7/95	08540		CHANGES PER MPC	JOE FLYNN

DIST: CSO REPAIR

2200 SERIES DS DPU BOARD. IN-SYSTEMS TEST (210-8826-A)

1. PURPOSE:

1.1 The purpose of this document is to allow an operator to thoroughly perform an IN-SYSTEMS TEST on the 2200 SERIES DS DPU BD. (210-8826-A).

2. REFERENCES:

2.1 None required

3. RESPONSIBILITIES:

3.1 Refer to B-DOC-0002 for a complete listing of responsibilities as they pertain to this document.

4. EQUIPMENT REQUIREMENTS:

DESCRIPTION	PART NUMBER	QTY
2200 CPU	187-3315 (OR EQUIV.)	1
WORKSTATION W/RELATED CABLES	187-3249 (OR EQUIV)	1
22C32 TRIPLE CONTROLLER	212-3012	1
TEST BOX	(SEE APPENDIX 7.3)	1
1.2 MEG DRIVE	289-0847	1
320K FLOPPY DRIVE	289-0846	1
STREAMING TAPE DRIVE	289-0905	1
20 MEG WINCHESTER DRIVE	289-0849 (OR EQUIV)	4
SPECIAL CABLES	NPN (SEE APPENDIX 7.1)	1
MULTI-USER W/BASIC	732-0049-B (LATEST REV.)	1

NOTE: SOFTWARE 732-0049-B IS PART OF THE 2200 DIAGNOSTIC PACKAGE. DRIVES LISTED MUST BE INITIALIZED WITH MULTI-DISK.

5. SETUP:

5.1 *CAREFULLY* inspect all cable connectors and set the SWITCHES on the UUT as follows:

SWITCH	SWITCH "ON"	SWITCH "OFF
1	1,2,5, &6	3,4,7, &8
2	1,2,5, &6	3,4,7, &8
3	1, &2	3, &4

THIS CALLS FOR 4 20MB DRI

2200 SERIES DS DPU BD.
IN-SYSTEMS TEST (210-8826-A)

6. ACTUAL TEST (CONTINUED):

6.10 Press the [N] key and change the screen to match the following:

TEST	FRMT	INIT	VER	ADDRESS	MODEL	SECTOR/RANGE	ACCESSES
YES	NO	NO	NO	D10	2200DS FLPM	0/4159	INFINITE
YES	NO	NO	NO	D11	2200DS WIN	0/38911	INFINITE
YES	NO	NO	NO	D12	2200DS WIN	0/38911	INFINITE
YES	NO	NO	NO	D13	2200DS WIN	0/38911	INFINITE
YES	NO	NO	NO	D14	2200DS WIN	0/38911	INFINITE
YES	NO	NO	NO	D51	2200DS WIN	0/38911	INFINITE
YES	NO	NO	NO	D52	2200DS WIN	0/38911	INFINITE
YES	NO	NO	NO	D53	2200DS WIN	0/38911	INFINITE
YES	NO	NO	NO	D54	2200DS WIN	0/38911	INFINITE
NO	NO	NO	NO	D21	2200DS WIN	0/65023	INFINITE
NO	NO	NO	NO	D22	2200DS WIN	0/65023	INFINITE

6.11 Press the [CONTINUE] key followed by the [Y] key.

6.12 At the prompt, type "ENABLE" and press the [CONTINUE key.

6.13 Allow the test to run for ~~5000 accesses~~ A MINIMUM OF 4 HOURS making sure that there are NO errors. BOARD SHOULD BE PARTIALLY COVERED OR ENCLOSED IN A COOL ENVIRONMENT (<70°F) TO BETTER EMULATE THE ON-SITE ENVIRONMENT WHERE THE BOARD IS ENCLOSED IN THE DS CABINET.

6.14 Press the [HALT] key, followed by the [RESET] key.

6.15 Power "OFF" the TEST BOX and the CPU.

6.16 Remove the UUT and send the UUT to the *NEXT PROCESS STEP*.

2200 SERIES DS DPU BD.
IN-SYSTEMS TEST (210-8826-A)

5. SETUP (CONTINUED):

5.2 CONNECT CABLES J1,J2, J3, J4, J6, J7, J8, J9, AND J10 from the TEST BOX to the UUT.

6. ACTUAL TEST:

6.1 Power "ON" the CPU. Press ~~the~~ SHIFT/ [RESET] key located on the WORKSTATION.
(BOOTING FROM D21) MENU FOR O/S OR DIAGNOSTICS COMES UP.

6.2 Press the [SF2] key. Press the [RUN] key. (this will load MULTI-USER BASIC-2).

6.3 Press the [SF15] key, followed by the [Y] key. Press the [RETURN] key two (2) times.
TO LOAD THE CURRENT CONFIGURATION

6.4 Power "ON" the TEST BOX. The 1.2 MEG FLOPPY LED will illuminate for approximately one (1) minute and then go off. (IF FLOPPY LED DOES NOT GO OUT ON IT'S OWN OR BLINKS, UNIT HAS FAILED SELF-TEST.

6.5 Press the [RUN] key. (DS/OPTIONS DIAGNOSTICS)

6.6 Use the [SPACEBAR] to select "BACKUP DISK PLATTERS TO TAPE CASSETTE." and press the [RUN] key.

6.7 The LED on the TAPE CASSETTE DRIVE will blink for approximately one (1) minute and then go off.

6.8 Press the [TAB] key to return to the "DS DATA STORAGE CABINET UTILITIES" menu.

6.9 Press the [RUN] key to execute the "MULTI-DISK TEST". Press the [RETURN] key, the following screen will be displayed:

TEST	FRMT	INIT	VER	ADDRESS	MODEL	SECTOR/RANGE	ACCESSES
NO	NO	NO	NO	D10	2200DS FLPM	0/4159	INFINITE
NO	NO	NO	NO	D11	2200DS WIN	0/38911	INFINITE
NO	NO	NO	NO	D12	2200DS WIN	0/38911	INFINITE
NO	NO	NO	NO	D13	2200DS WIN	0/38911	INFINITE
NO	NO	NO	NO	D14	2200DS WIN	0/38911	INFINITE
NO	NO	NO	NO	D51	2200DS WIN	0/38911	INFINITE
NO	NO	NO	NO	D52	2200DS WIN	0/38911	INFINITE
NO	NO	NO	NO	D53	2200DS WIN	0/38911	INFINITE
NO	NO	NO	NO	D54	2200DS WIN	0/38911	INFINITE
NO	NO	NO	NO	D21	2200DS WIN	0/65023	INFINITE
NO	NO	NO	NO	D22	2200DS WIN	0/65023	INFINITE

2200 SERIES DS DPU BD. IN-SYSTEMS TEST (210-8826-A)

7. APPENDIX

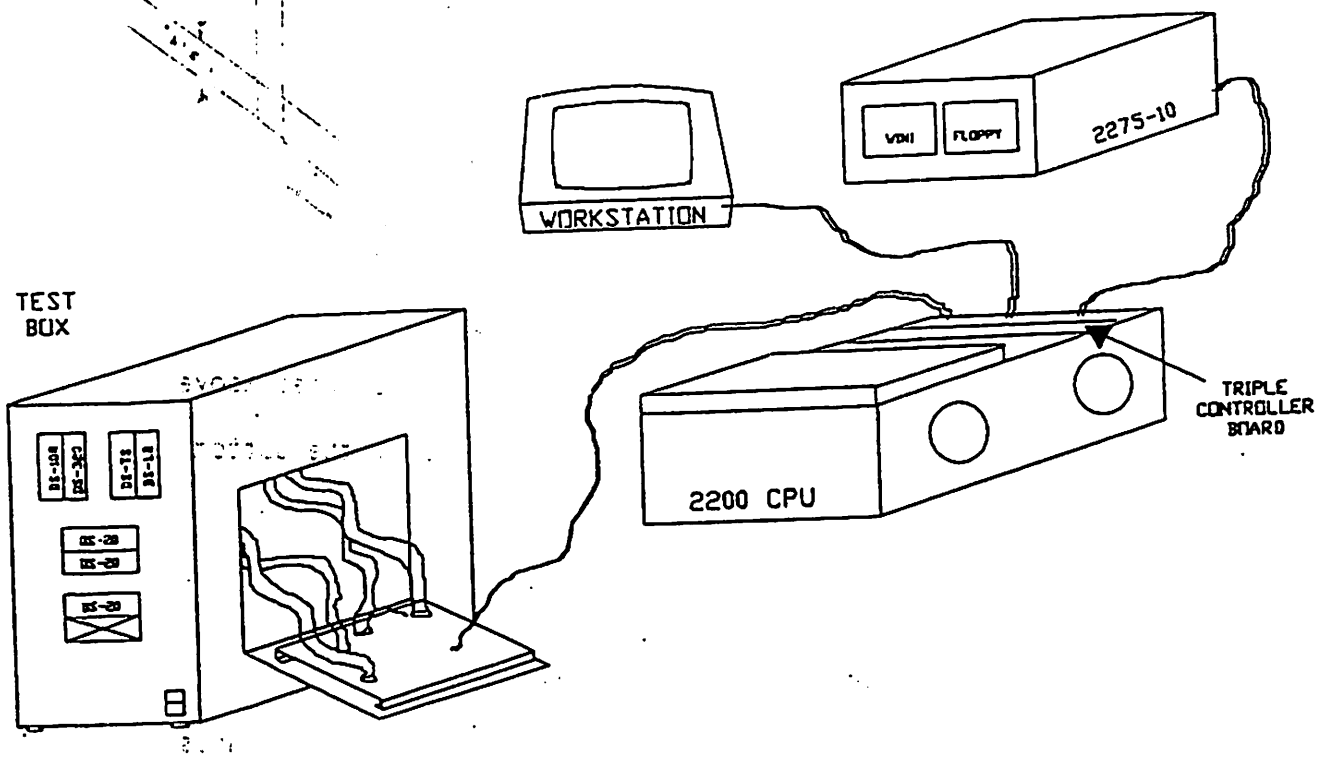
7.1 TEST BOX CABLES:

WINI "A" CABLE (1 PER TEST BOX)	CABLE 220-3629 CHANGE LENGTH BETWEEN ITEM 2 TO DRIVE 4 FROM 15" TO 27"
WINI "B" CABLE (4 PER TEST BOX)	CABLE 220-3630 UNMODIFIED
FLOPPY CABLE (2 PER TEST BOX)	CABLE 220-3439 CHANGE LENGTH FROM 23" TO 35"
TAPE STREAMER CABLE (1 PER TEST BOX)	CABLE 220-3628 CHANGE LENGTH FROM 19" TO 30"
POWER SUPPLY HARNESS (1 PER TEST BOX)	HARNESS 270-3439 CHANGE LENGTH BETWEEN J1/J2 TO J7 FROM 20" TO 28"

2200 SERIES DS DPU BD.
IN-SYSTEMS TEST (210-8826-A)

7. APPENDIX

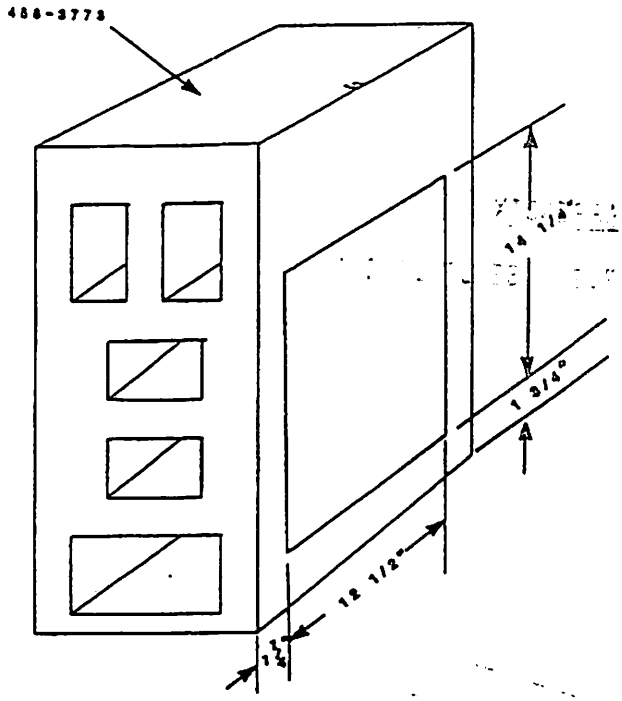
7.2 SETUP DIAGRAM:



2200 SERIES DS DPU BD.
IN-SYSTEMS TEST (210-8826-A)

7. APPENDIX

7.3 TEST BOX DESIGN:



7.3.1 Cut out the side panel per the dimensions noted above.

7.3.2 Re-attach the cutout panel with hinges at the bottom edge.

7.3.3 Deburr and repaint.

7.3.4 MODIFIED TEST BOX ASSEMBLY:

7.3.4.1 Assemble feet (655-0072) to box.

7.3.4.2 Assemble power supply with modified harness.

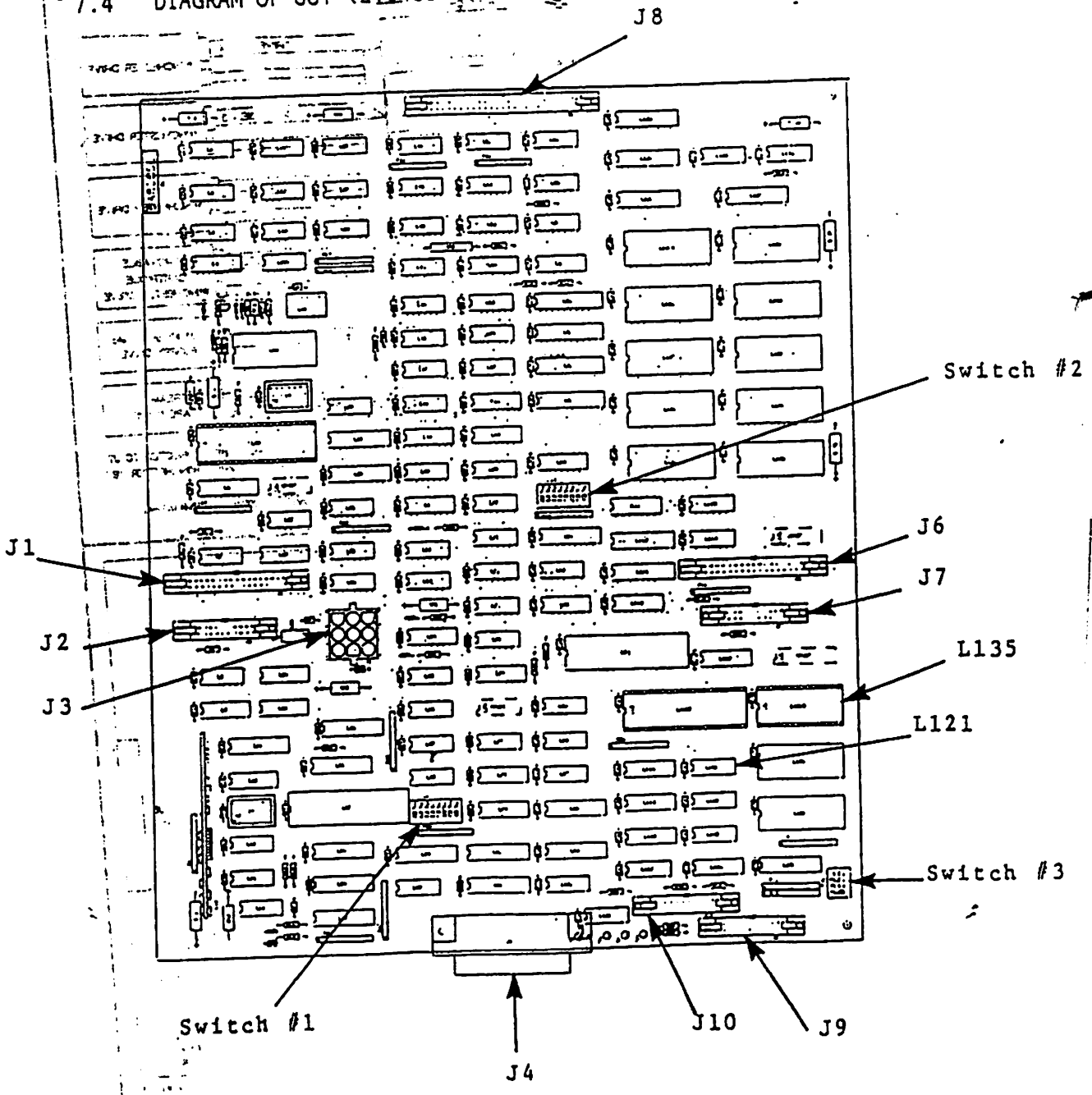
7.3.4.3 Assemble drives (1 of 320K and one of 1.2M Floppy included).

7.3.4.4 Assemble modified cables.

7.3.4.5 Assemble rear panel assembly 279-8059.

7. APPENDIX

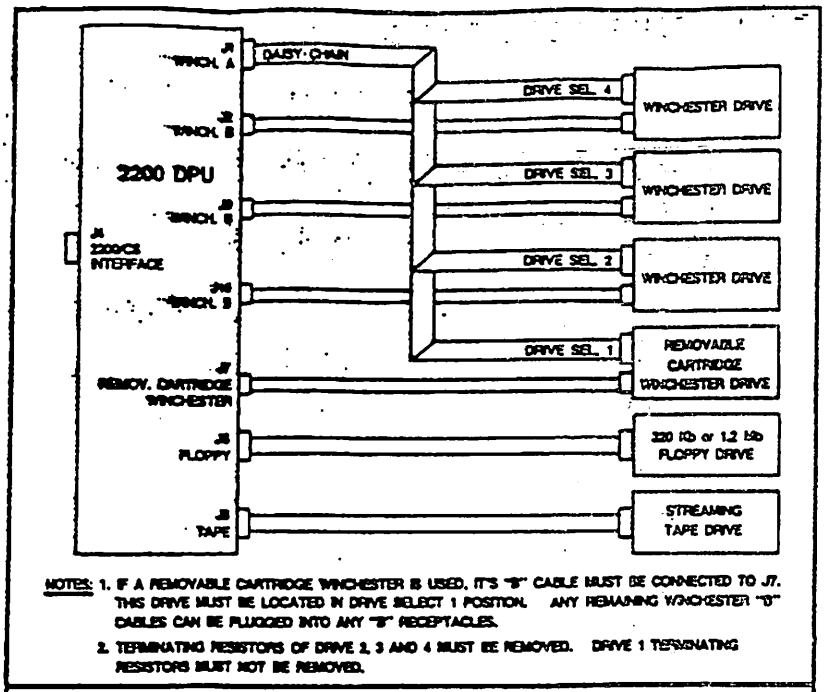
7.4 DIAGRAM OF UUT (210-8826-A):



2200 SERIES DS DPU BD.
IN-SYSTEMS TEST (210-8826-A)

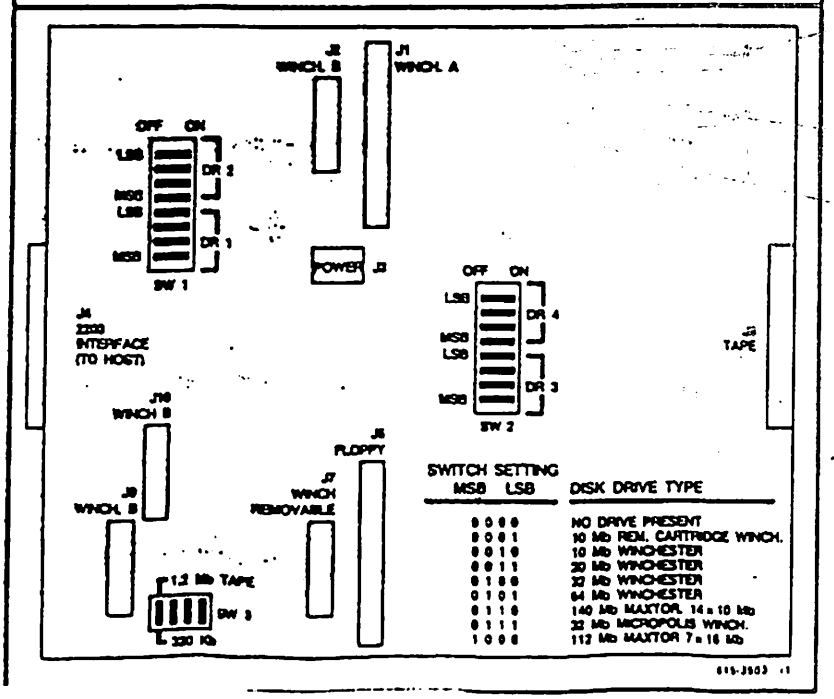
7. APPENDIX

7.5 UNIT TEST CONFIGURATION:



NOTES: 1. IF A REMOVABLE CARTRIDGE WINCHESTER IS USED, IT'S "B" CABLE MUST BE CONNECTED TO J7. THIS DRIVE MUST BE LOCATED IN DRIVE SELECT 1 POSITION. ANY REMAINING WINCHESTER "D" CABLES CAN BE PLUGGED INTO ANY "B" RECEPTACLES.

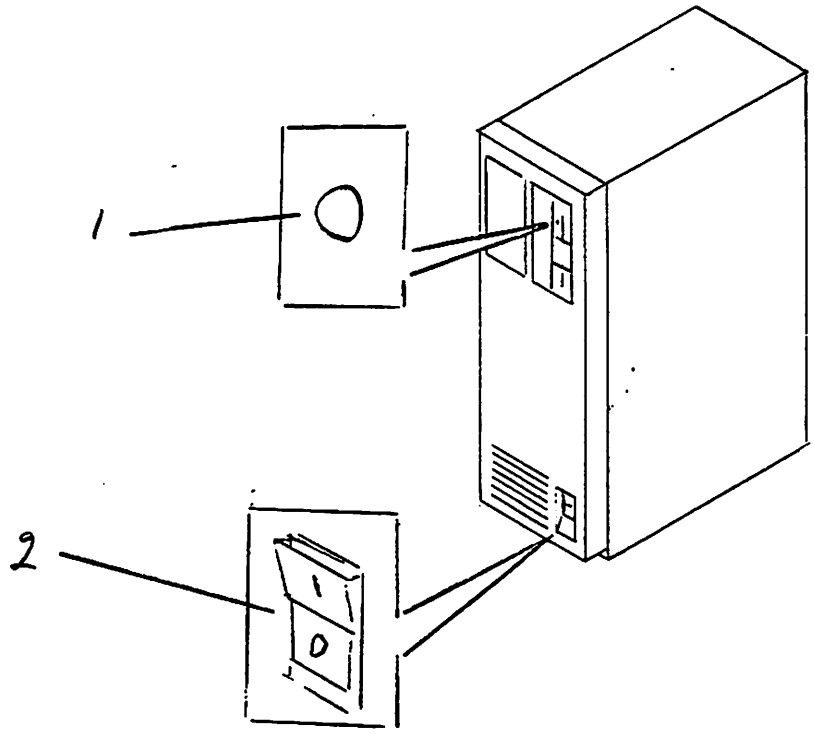
2. TERMINATING RESISTORS OF DRIVE 2, 3 AND 4 MUST BE REMOVED. DRIVE 1 TERMINATING RESISTORS MUST NOT BE REMOVED.



SWITCH SETTING MSB LSB — DISK DRIVE TYPE

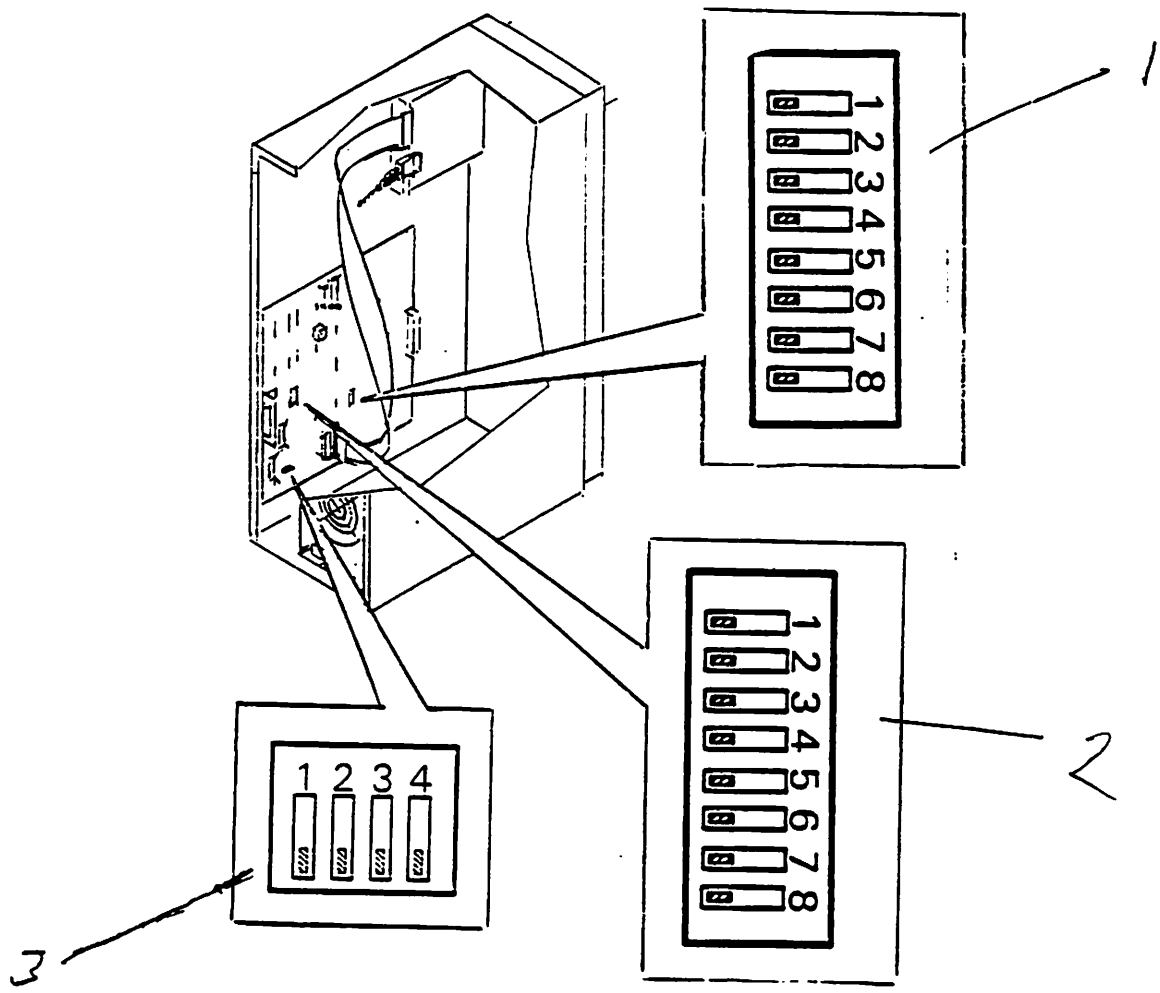
MSB			LSB	DISK DRIVE TYPE
0	0	0	0	NO DRIVE PRESENT
0	0	0	1	10 Mb REM. CARTRIDGE WINCH.
0	0	1	0	10 Mb WINCHESTER
0	0	1	1	20 Mb WINCHESTER
0	1	0	0	32 Mb WINCHESTER
0	1	0	1	64 Mb WINCHESTER
0	1	1	0	140 Mb MAXTOR 14 x 10 Mb
0	1	1	1	32 Mb MICROPOLIS WINCH.
1	0	0	0	112 Mb MAXTOR 7 x 16 Mb

3.1 Operator Controls and Indicators



Item	Name	Type and Function
1	Select	LED; ~~upon~~ power on, the lamp ~~lights~~, and ~~stays lighted until~~ the drive is ready for use. Thereafter, the lamp lights whenever the drive is accessed. (This indication holds true for the indicator lamps of other devices that may be in the DS Cabinet.)
2	AC Power Switch	Rocker switch; applies ac power to the power supply and cooling fan.

3.2 Service Controls



Item	Name	Type and Function
1	SW2	DIP switch; 8-pole; defines configuration of Winchester drives 3 and 4.
2	SW1	DIP switch; 8-pole; defines configuration of Winchester drives 1 and 2.
3	SW3	DIP switch; 4-pole; identifies type of floppy drive (360kb or 1.2mb) and indicates if a tape drive is present.

OPERATION

4.1 Start Up

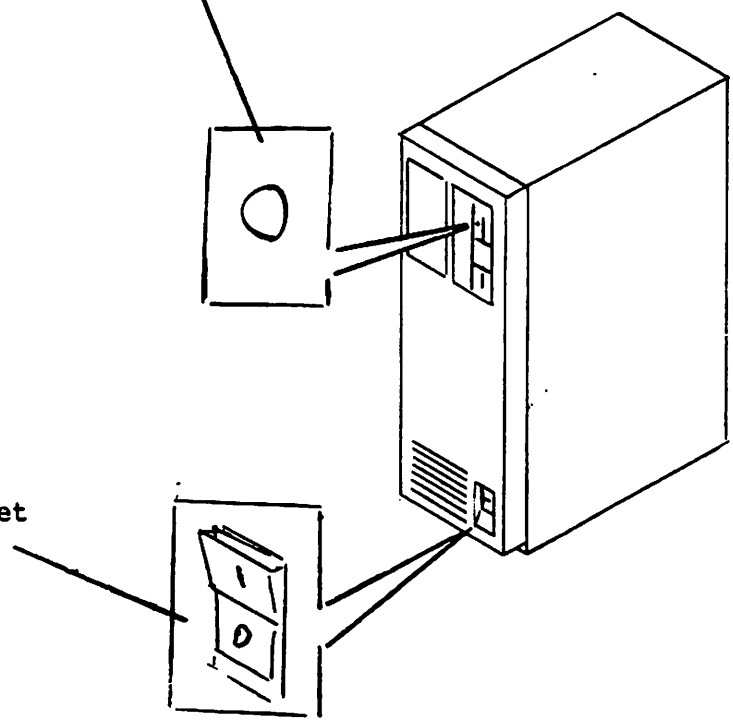
Installation as specified in Section 9 must precede equipment start up.

CAUTION

Do not switch DS Cabinet ON or OFF when a floppy diskette is mounted in drive. Also, never mount or remove a diskette while floppy activity LED is lighted.

2. Activity lamp ~~lights~~, and ~~stays lighted until~~ drive is ready for use. Should lamp fail to light, go to Troubleshooting (para 6.1).

BLINKS DURING THE POWER ON ROUTINE REMAINS ~~GOES~~ OUT WHEN THE



1. Press "1" on DS Cabinet power switch.

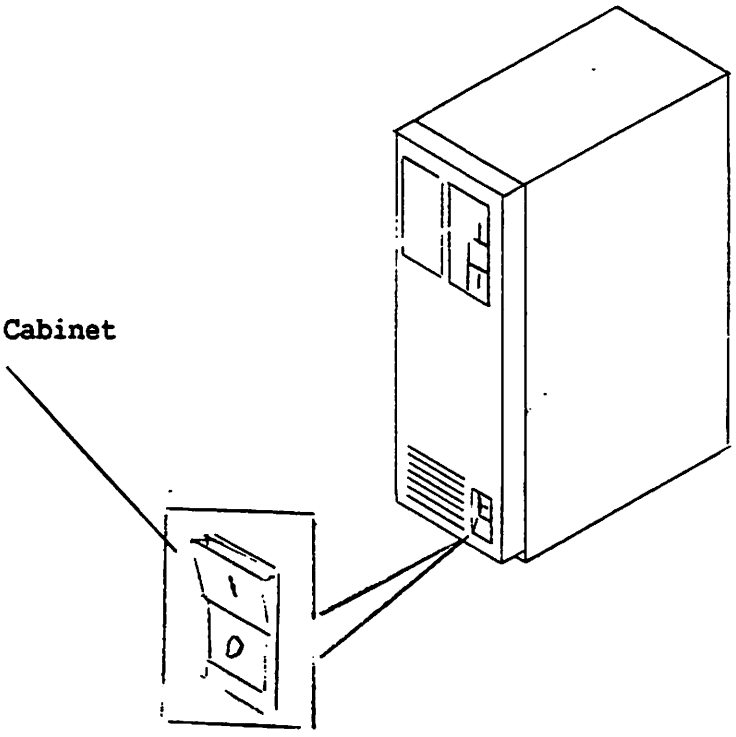
4.2 Power Down

CAUTION

THERE ARE NO USERS USING THE DISK CABINET

Ensure that no diskette is in floppy drive, and that no activity lamps are lighted.

1. Press "0" on DS Cabinet power switch.



UNPACKING AND SETUP

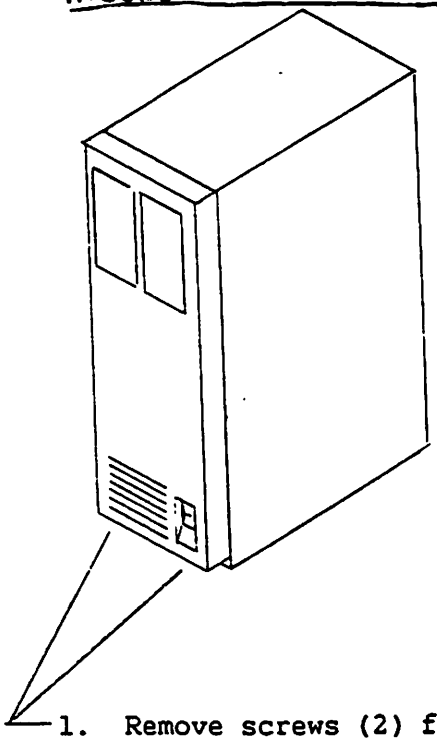
9.1 Installation Site Check

Proper location and site preparation are important for overall operating efficiency. Ideally, the area should be easily accessible, relatively dust free, and temperature and humidity controlled. An adequate number of dedicated, regulated, noise-free ac power outlets should be provided to minimize electro-magnetic interference. The DS Cabinet draws up to 3.15 amps at 120 VAC; 1.57 amps at 220 VAC.

9.2 DS Cabinet Preparation

The DS Cabinet and associated magnetic storage devices are shipped separately. To prepare the cabinet for drive(s) installation:

INSURE CABINET IS NOT PLUGGED IN.

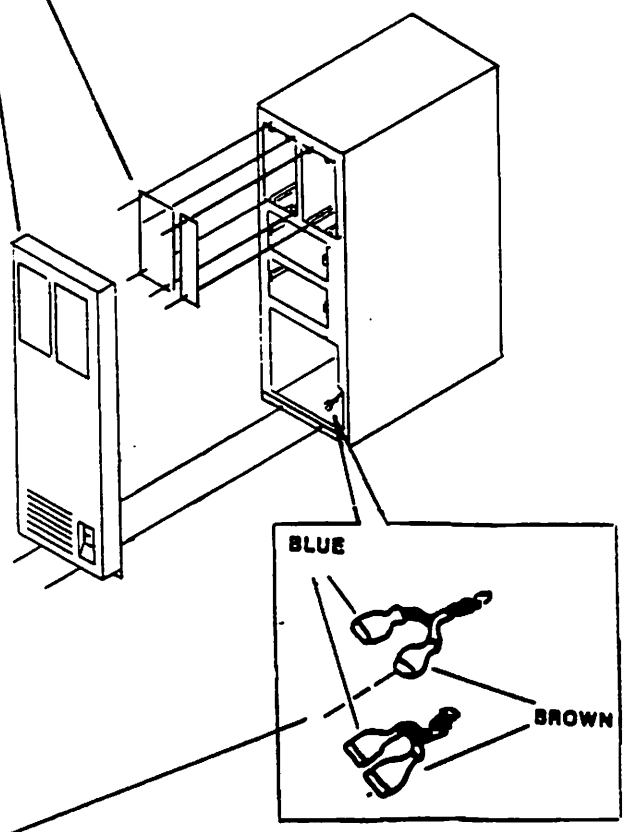


1. Remove screws (2) from recessed portion of lower front panel.

2. Pull lower end of panel away from cabinet; remove slip-on power connectors from switch.

3. Lift panel free of cabinet.

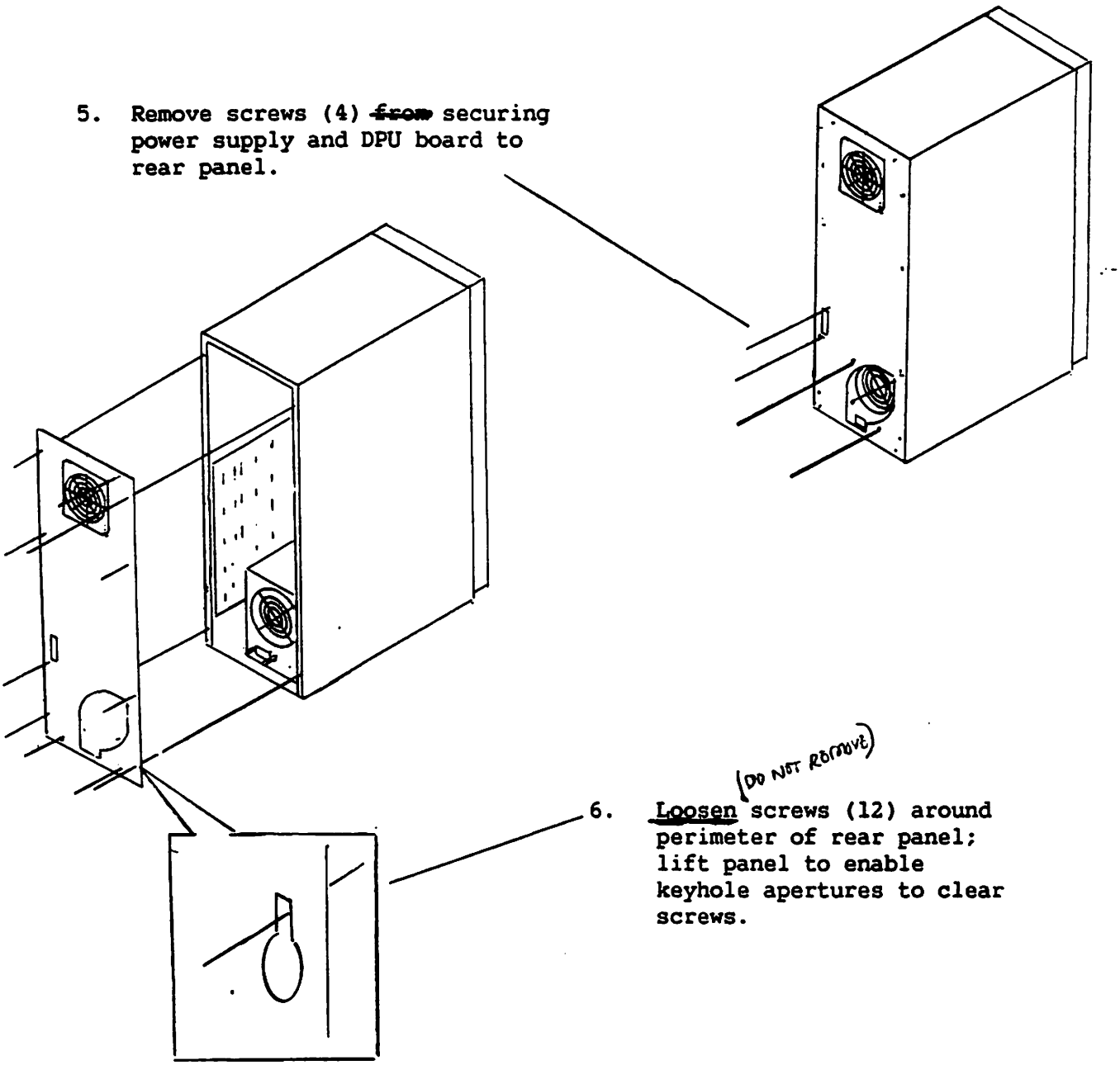
4. Remove front bezel covers (6 screws).



DO THESE HAVE TO BE CONNECTED TO SPECIFIC PINS & ARE THEY LABELED?

9.2 DS Cabinet Preparation

5. Remove screws (4) ~~from~~ securing power supply and DPU board to rear panel.



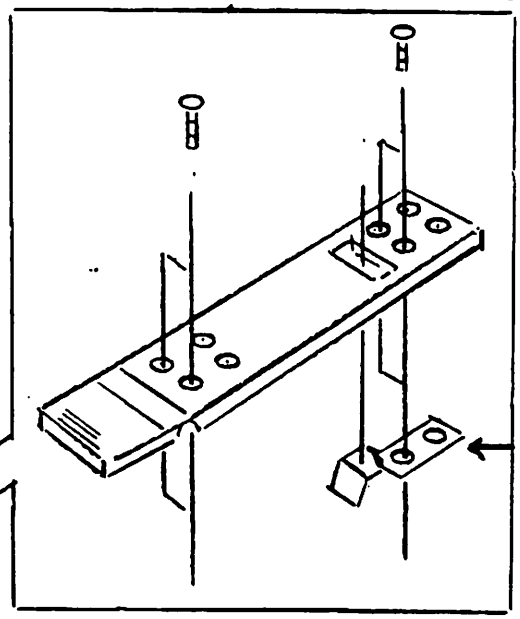
6. Loosen (DO NOT REMOVE) screws (12) around perimeter of rear panel; lift panel to enable keyhole apertures to clear screws.

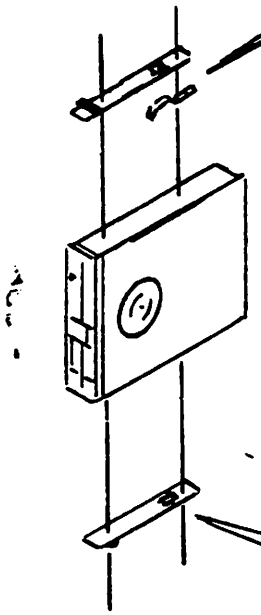
9.3 Device Preparation

Each magnetic device is shipped with an installation kit containing (in addition to items pertaining to the specific device):

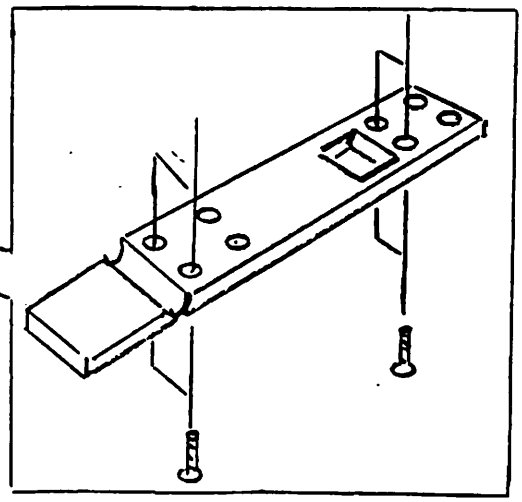
Two Drive Mounting Brackets ? PART #'s
Four Screws - 6/32" x 3/8"
One Grounding Clip ?

The mounting brackets must be attached to the given drive to enable installation of the drive into the selected location in the cabinet.





1. Line up holes in mounting bracket and grounding clip; fasten with screw onto drive. (Use hole in mounting bracket which best fits location of screw receptacle.) Curved end of grounding clip must protrude through bracket ~~aperture~~ HOLE IN



2. Repeat procedure for opposite side of drive (without grounding clip).

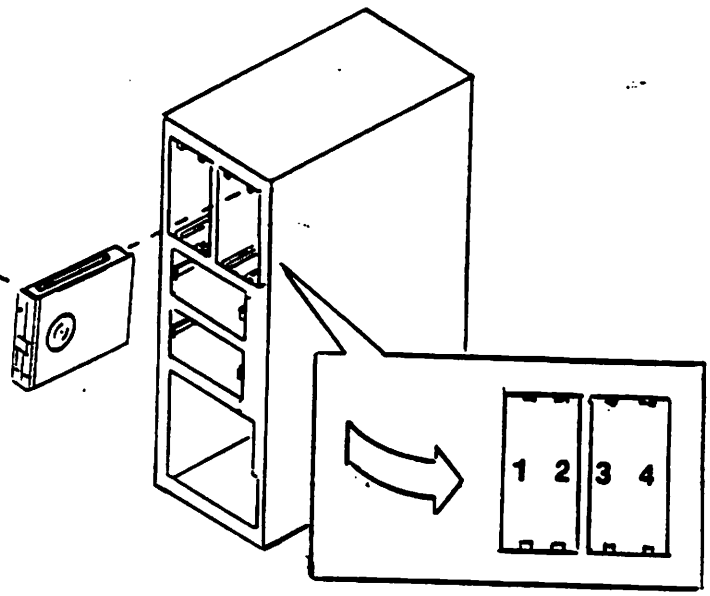
9.4 Floppy Disk Drive Installation

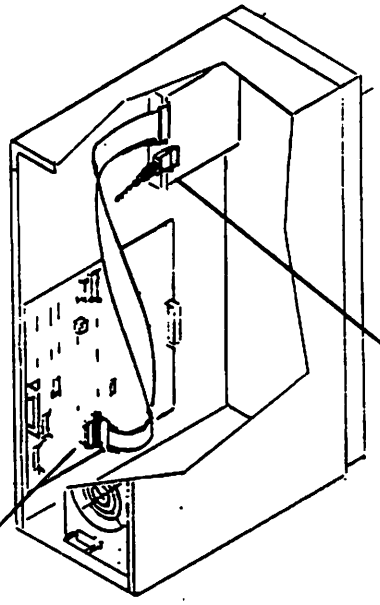
The floppy-disk drive is shipped with an installation kit containing:

Two drive mounting brackets PART # ?
Four screws - 6/32" x 3/8"

1. Attach mounting brackets to drive. (para 9.3).

2. Install drive in available slot ~~2, 3, or~~ 4. Insert to point at which mounting brackets engage latch.





4. Insert available power supply connector.

THIS VISUALLY IS OUT OF PROPORTION TO CABINET. I ASSUM THIS IS FRONT VIE IF FRONT VIEW SHOU SHOW MORE CABINET O RIGHT THEN LEFT.

3. Install floppy signal cable (PART #) (furnished with DS Cabinet) between drive and J6 on DPU board, NOTING THE LOCATION OF PIN 1. PIN 1 ON CABLE IS DENOTED ~~BY~~ USUALLY ON THE CABLE BY THE BLK OR RED WIRE.

9.5 Streaming Tape Drive Installation

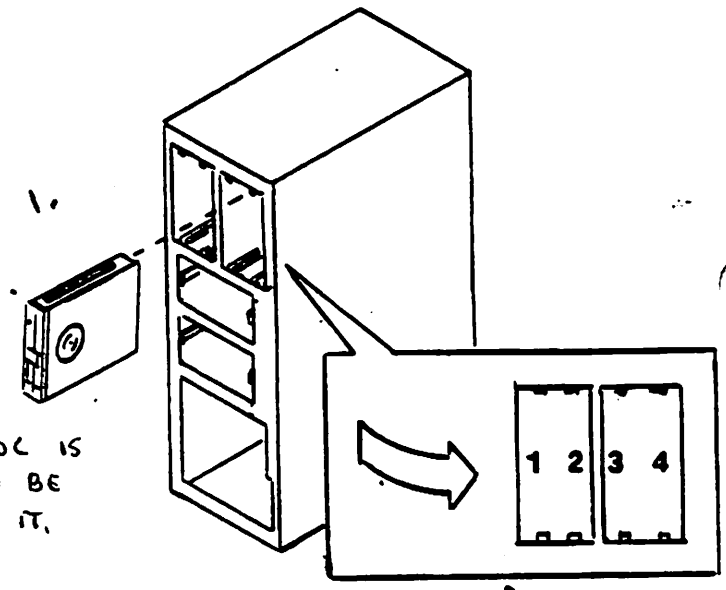
The Streaming Tape Drive is shipped with an installation kit containing:

One Tape Cable (PART #)
Two Drive Mounting Brackets (PART #)
Four screws - 6/32 x 3/8"

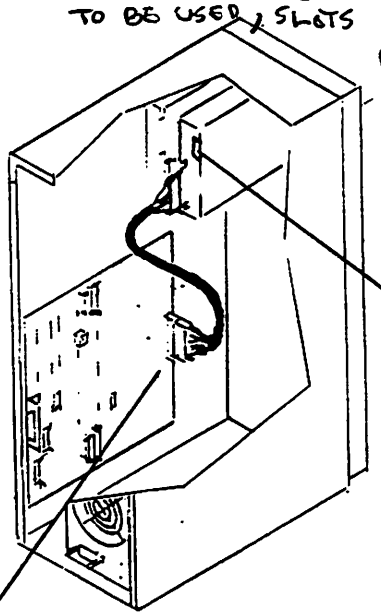
1. Attach mounting brackets to drive (para 9.3).

2. Install drive in available slot 2, 3, ~~or 4~~. Insert to point at which mounting brackets engage latch.
IF A 10 MEG REMOVABLE WINC IS TO BE USED, SLOTS 1 & 2 SHOULD BE RESERVED FOR IT.

WHY NOT SLOT 1.



SEE COMMENT ON PG 9-5 FOR SAME FIGURE.



4. Insert available power supply connector.

3. Install tape signal cable (furnished installation kit) between drive and J8 on DPU board, NOTING LOCATION OF PIN 1. PIN 1 ON CABLE DENOTED NORMALLY BY BLK OR RED WIRE.

9.6 Winchester Drive(s) Installation (1 of 3)

Each Winchester drive is shipped with an installation containing:

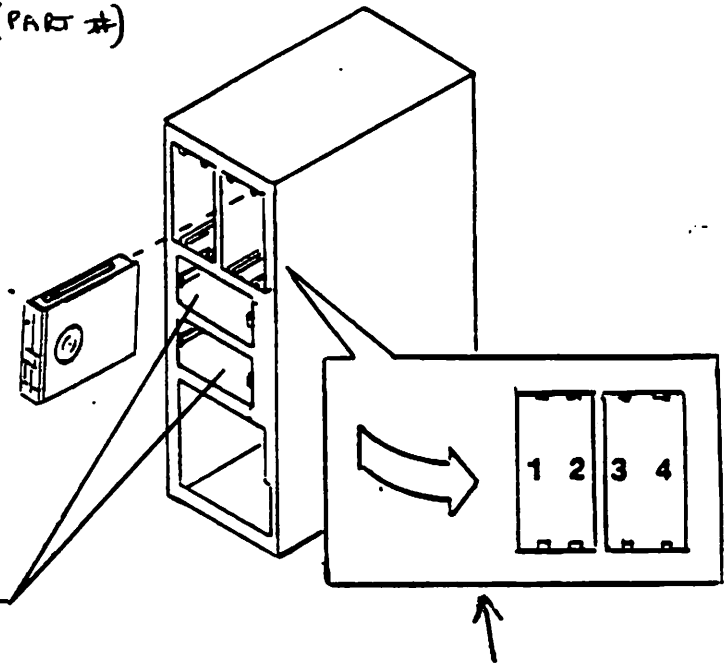
One Winchester "B" cable (PART #)
Two drive mounting brackets (PART #)
Four screws - 6/32 x 3/8"
Half-width front bezel cover (PART #)

1. Attach mounting brackets to drive (para 9.3).

2. If drive is removeable Winchester, install in slot 1 (for accessibility).

   If drive is half-height (non-removeable), install in available slot 2 or 3, ~~or~~ (or slot 1, if available).

   If drive is full-height, install in available full-height slot.



SEE COMMENT ON PG 9-5 FOR SAME FIGURE.

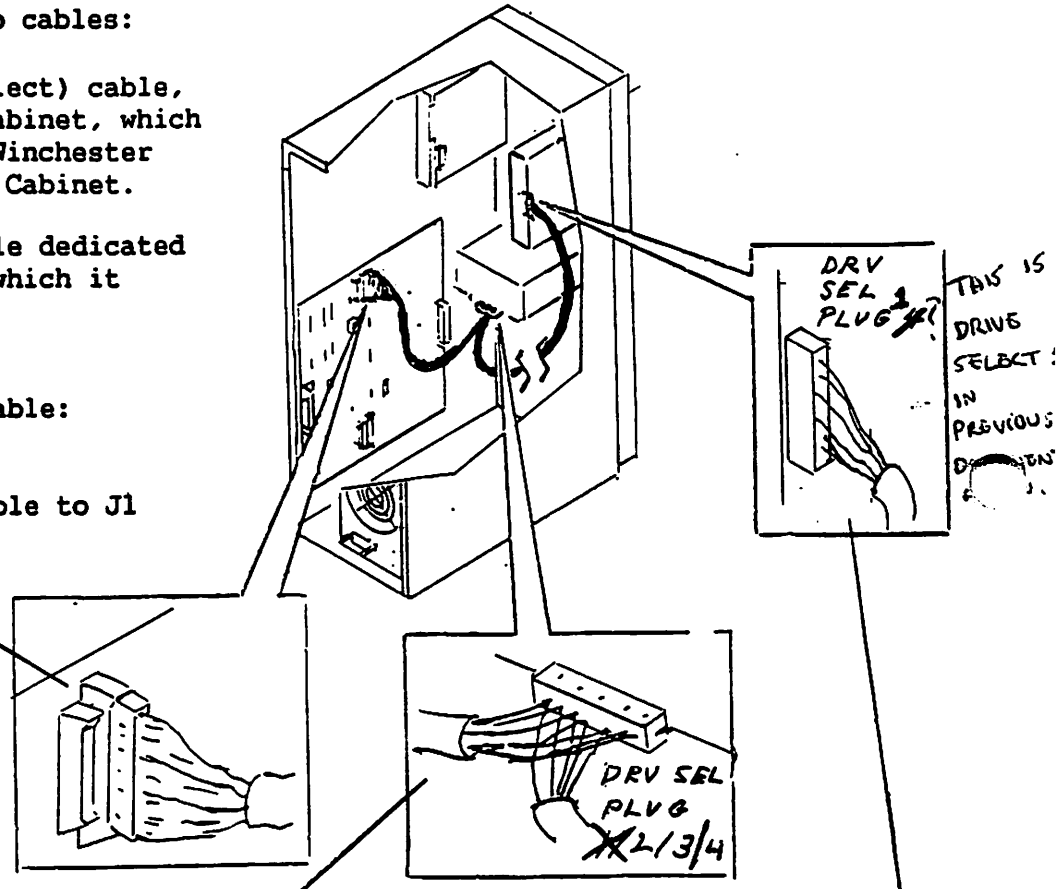
9.6 Winchester Drive(s) Installation (2 of 3)

Each Winchester drive connects to the DPU board via two cables:

- An "A" (drive select) cable, furnished with cabinet, which connects to all Winchester drives in the DS Cabinet.
- A "B" (data) cable dedicated to the drive to which it attaches.

To connect the "A" cable:

1. Attach end of cable to J1 on DPU board.



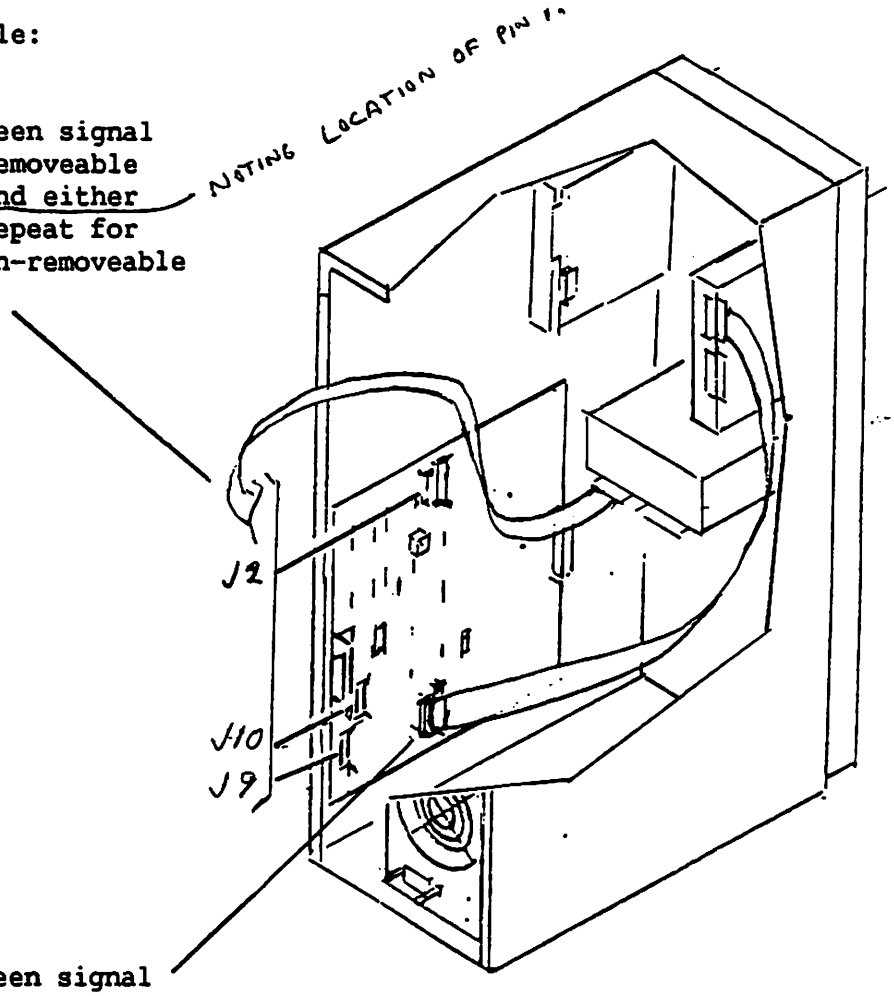
2. Attach DRIVE SELECT PLUG 1 to Winchester removeable drive (if present). If removeable drive not present, attach to alternate Winchester. For Winchester operation, PLUG 1 must attach to a unit.

3. Attach DRIVE SELECT PLUGS 2/3/4 to other Winchester drive(s). (Plug may be selected for locational convenience). PLUGS USED WILL DETERMINE DRIVE ADDRESS/ES.

9.6 Winchester Drive(s) Installation (3 of 3)

To connect the "B" cable:

1. Connect cable between signal connector on non-removeable Winchester drive and either J2, J9, or J10. Repeat for each additional non-removeable Winchester drive.



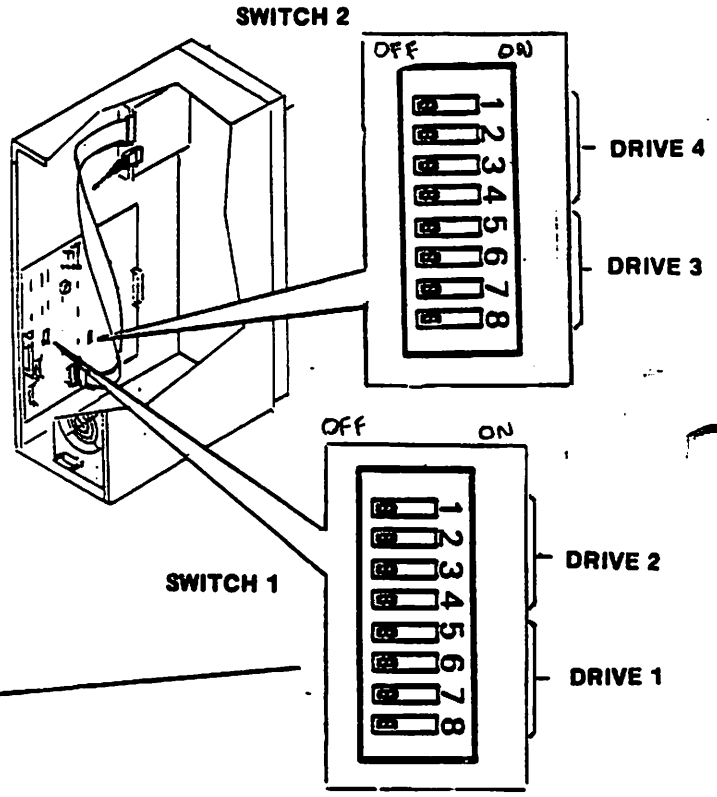
2. Connect cable between signal connector on removeable Winchester drive and J7. NOTING LOCATION OF PIN 1.

9.7 Switch Settings (1 of 2)

NEED INFO REFERING TO ADDRESSING

Switch 1 and switch 2 identify the types of Winchester drives in the system. Each switch bank divides into two segments of four switches each; each segment identifies a given drive. Each drive is numbered according to its position on the "A" cable (para 9.6). To set switches:

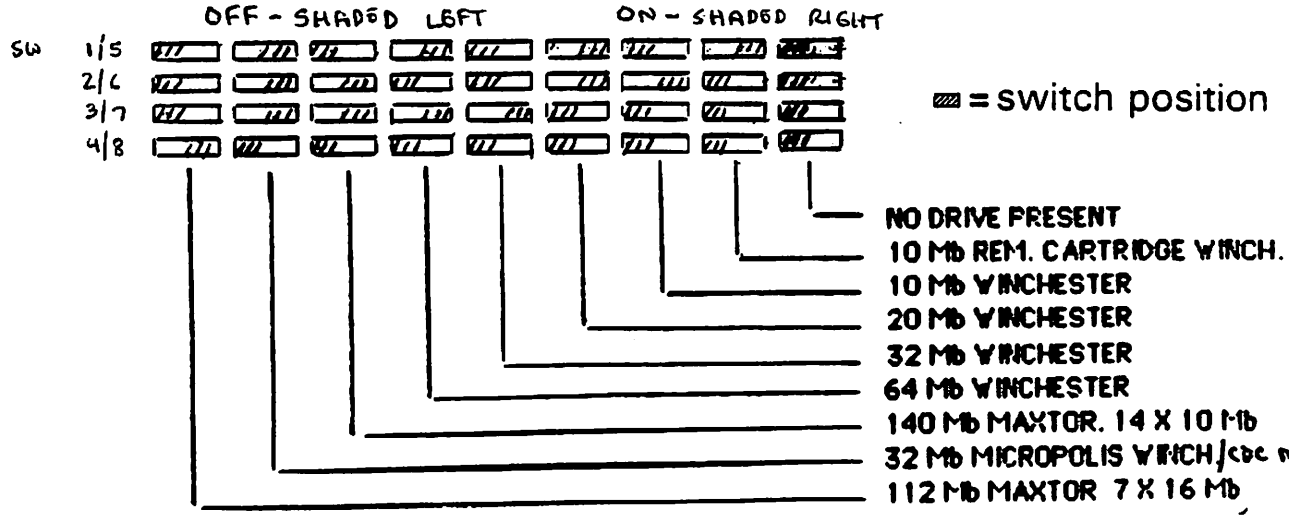
SWITCH BANK 1 DEVICES WILL USE ADDRESSES STARTING W/ D11, D21, OR D31 DEPENDING ON THE CONTROLLER ADDRESS



1. Verify type of drive connected to DRIVE SELECT PLUG #1 (plug located ~~closest to~~ FARTHEST FROM DPU board).

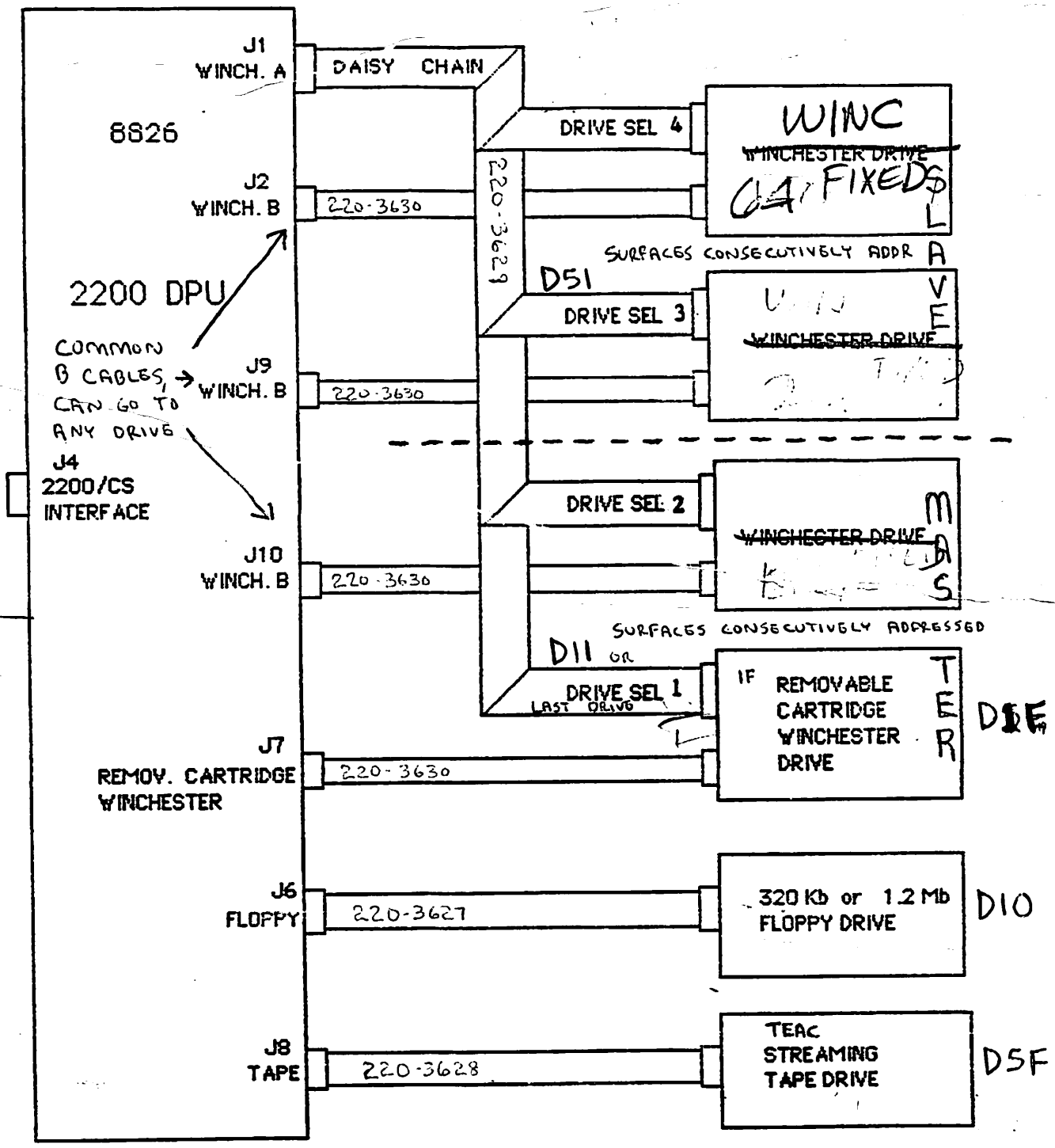
2. Set switches 5 through 8 (of SWITCH 1) according to chart.

3. Repeat steps 1 and 2 for DRIVE SELECT PLUGs 2 through 4.



94205'

310



NOTES:

1. IF A REMOVABLE CARTRIDGE WINCHESTER IS USED, ITS 'B' CABLE MUST BE CONNECTED TO J7. THIS DRIVE CAN BE LOCATED ANYWHERE ON THE DAISY CHAIN. 2 3 4
2. TERMINATING RESISTORS OF DRIVES ~~1, 2, AND 3~~ MUST BE REMOVED. DRIVE 4 TERMINATING RESITORS MUST NOT BE REMOVED. LAST DRIVE MUST BE TERMINATED. LAST DRIVE IS LOWEST DRIVE SEL.

W/ O/S MVP 3.0 WILL HAVE RAM DISK W/ OS D50

(1)

GRND
+5
+12
-12
2200 INTERFACE (TO HOST)
J4
TP1
TP2
TP3
J9 WINCH B
J10 WINCH B
OFF
ON
320Kb
1.2 Mb
TAPE
SW3
MSB
LSB
MSB
LSB
OFF
ON
SW 1
DR 1
DR 2
J7
WINCH REMOVABLE
FLOPPY J6
POWER
J3
J2 WINCH B
J1 WINCH A
2200 INTERFACE
SWITCH SETTING
MSB LSB
DISK DRIVE TYPE
0000 NO DRIVE PRESENT
0001 10 Mb REM. CARTRIDGE WINCH.
0010 10 Mb WINCHESTER
0011 20 Mb WINCHESTER
0100 32 Mb WINCHESTER
0101 64 Mb WINCHESTER
0110 140 Mb MAXTOR. 14 X 10 Mb
0111 32 Mb MICROPOLIS WINCH.
1000 112 Mb MAXTOR 7 X 16 Mb
MSB
LSB
MSB
LSB
OFF
ON
SW 2
DR 3
DR 4
J8 TAPE

9.9 Device Addressing (1 of 2)

Device addresses are:

	MASTER	SLAVE	
Floppy	D X 0 (hex)	D X 0 + 40 (hex)	RAM Disk
	D X 1 (hex)	D X 1 + 40 (hex)	see Note 9
	D X 2 (hex)	2	
	D X 3 (hex)	3	
	D X 4 (hex)	4	
	D X 5 (hex)	5	
	D X 6 (hex)	6	
	D X 7 (hex)	7	
	D X 8 (hex)	8	
	D X 9 (hex)	9	
	D X A (hex)	A	
	D X B (hex)	B	
	D X C (hex)	C	
	D X D (hex)	D	
	D X E (hex)	E	
Removeable Winchester	D X F (hex)	D X F + 40 (hex)	Streaming Tape Drive

X = Base Address

NOTES (Drive Addressing):

1. Switch settings on the Disk Controller PCB (in CPU) control master base address. 310/D10, 320/D20/330/D30
2. The slave address is master address plus 40 (hex).
3. Switch settings on the DPU Board and the pertaining to "A" cable Drive Select connectors (para 9.6) control drive and/or platter addressing. A change to Drive Select 1 (via switches or plug connectors on the "A" cable) could result in a change of address for Drive Select 2. This relationship also holds for Drive Select 3 and 4. A change of switch settings, reflecting changed plug usage for Drive Select 3, could change address for Drive Select 4.
4. The Drive Select 1 connector must be used, if any Winchesters are installed, because of termination concerns.
5. Master addresses are used for control both the floppy and any Winchesters connected to Drive Selects 1 or 2.

9.9 Device Addressing (2 of 2)

6. Slave addresses control RAM Disk, tape (if applicable) and any other Winchesters connected to Drive Selects 3 or 4.

NOTES (Winchester Addressing):

7. First drive address for the fixed Winchester starting with Drive Select 1 (if applicable) starts with D X 1 (hex), and uses successive addresses as needed (see device address table).

8. If a removeable Winchester is used, Drive Select 2 address starts at D X 1 (hex); if a fixed Winchester is at Drive Select 1, the address for Drive Select 2 immediately follows the address for the fixed Winchester.

9. Drive Select 3, if used, starts at address D X 1 + 40 (hex) using successive addresses as required (see device address table).

10. Drive Select 4 address continues at next available address following that of Drive Select 3. If Drive Select 3 is not used, Drive Select 4 address will start at D X 1 plus 40 (hex).

S

T

U

V

W

TEAC TAPE DRIVE - 9 TRACK / 512 BYTE BLOCKS / 40 MEGABYTE

WRITES 128 BLOCKS AT A TIME THEN A FILE MARK (256 SECTORS)

1 DIRECTORY ON BEGINNING OF TAPE FOR EVERYTHING ON TAPE (128 ENTRIES MAX)

TAPES SHOULD BE ERASED WHEN COPIED OVER AS WHEN WRITING DOES NOT ERASE

UTILITIES ALLOW YOU TO SPECIFY SECTOR

ERASE TAKES 3 MINUTES APPROX

UTILITIES WHICH ALLOWS BACKUP WITHOUT CPU WILL BACKUP 2-3 MEG/MIN

BACKUP VIA CPU IS ABOUT 1 MEG/MIN

USING UTILITIES BACKING UP DS DRIVE WILL ALWAYS BE INTERNAL TO CABINET

1.2 MEG FLOPPY

IF A 1.2 MEG WRITES TO A 320 MEG MAY BE PROBLEM READING.

WANG DOES NOT SUPPORT READING & WRITING OF 320 MEG FLOPPYS BY 1.2 MEG

SHOULD WORK ESPECIALLY IF BEING READ BY DRIVE THAT WROTE.

990 SECTOR CACHE

SHARED BY ALL DRIVES

RAM DISK - 900 SECTOR MAX

ADD HEX 40 TO FLOPPY ADDRESS

CPU RAM DISK - ADDRESS 340

10 MEG REM - WITH WRITE PROTECT TAB OFF HANGS IF TRY TO WRITE. WILL LIST C

J Volpini
Feb 23, 87

200DS MISC INFORMATION

MAJOR ASSYS.

Power Supply	270-1094
DPU PCB	210-8826
5 1/4" HH 360KB Floppy	725-0142
5 1/4" HH 1.2MB Floppy	725-0232
5 1/4" HH Casette Tape	725-1481
10 MB HH Removable Disk	725-0195
20 MB HH Winchester	725-0242
32 MB FH Winchester	725-0144
MB FH Winchester	725-0254
MB FH Winchester	725-0231
Floppy Cable	220-3627
Casette Tape Cable	220-3628
Winch A (daisy) Cable	220-3629
Winch B (star(Cable	220-3630
DC Fan assy	400-104X7
ON/OFF Switch	325-0096
CS - DS I/O CABLE	220-0364
42 MEG CDC MAGNETIC PERIPHERALS HH 94205-53	725-3493
TEAC CLEANING KIT (TEAC # TZ 380)	725-7374

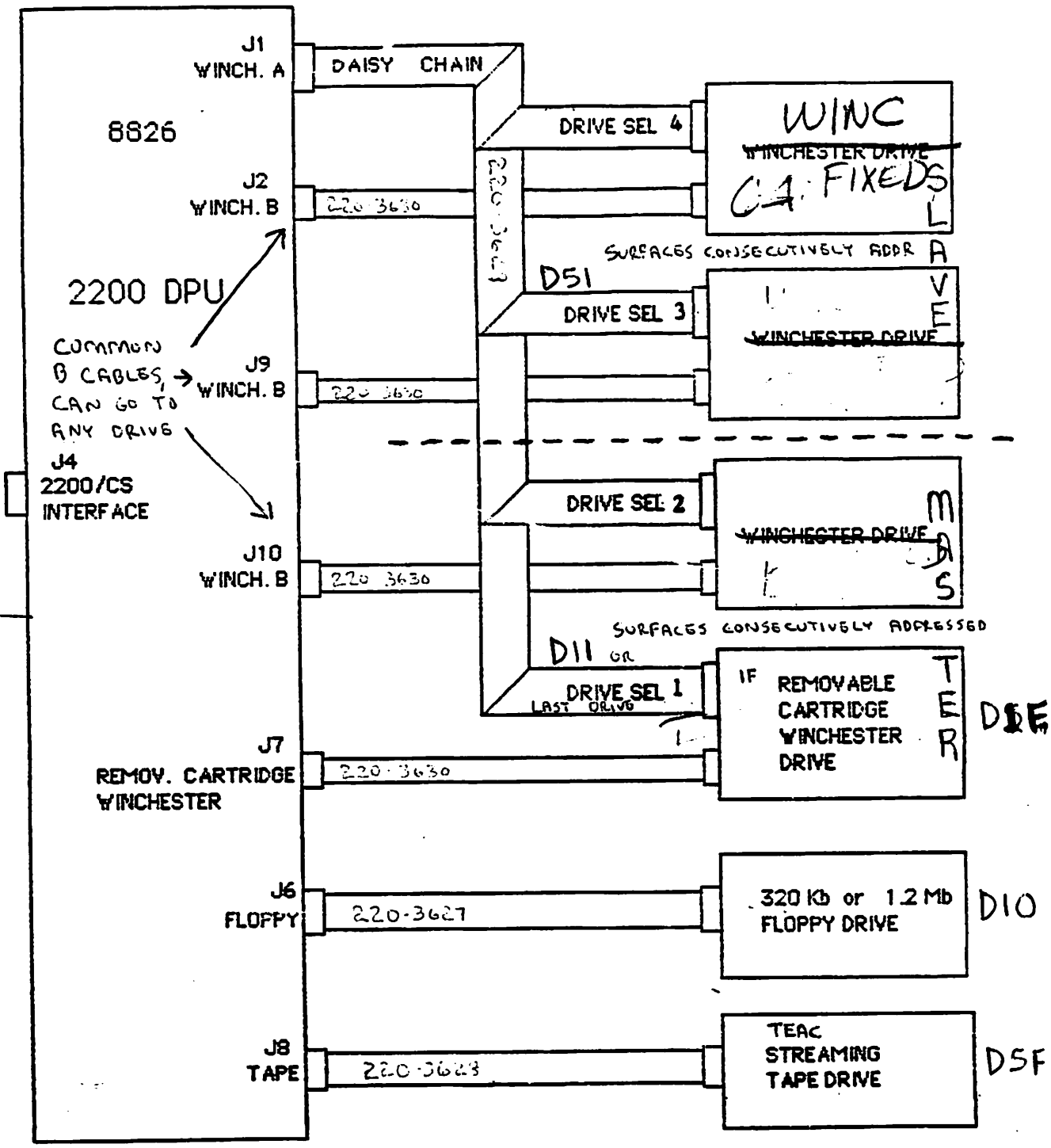
INSTALLATION INFO:

All HH (Half Height) peripherals are to be installed in upper openings of cabinet.

FH (Full Height) peripherals are installed in one of the two lower slots.

The Removable Disk (HH) must be installed in the top-rightmost slot of the cabinet as viewed from the back.

310



NOTES:

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2. TERMINATING RESISTORS OF DRIVES ~~1, 2, AND 3~~ MUST BE REMOVED. DRIVE 4 TERMINATING RESITORS MUST NOT BE REMOVED. LAST DRIVE MUST BE TERMINATED. LAST DRIVE IS LOWEST DRIVE SEL.

W/ O/S MVP 3.0 WILL HAVE RAM DISK W/ OS D50

(1)

2200 INTERFACE
2200 INTERFACE (TO HOST)
J4
GRND
+5
+12
-12
TP1
TP2
TP3
J9 WINCH B
J10 WINCH B
OFF
ON
320Kb
1.2 Mb
TAPE
SW3
MSB
LSB
MSB
LSB
SW 1
OFF
ON
DR 1
DR 2
J7
WINCH REMOVABLE
FLOPPY J6
POWER
J3
J2 WINCH B
J1 WINCH A
MSB
LSB
MSB
LSB
SW 2
OFF
ON
DR 3
DR 4
SWITCH SETTING
DISK DRIVE TYPE
MSB LSB
0000 NO DRIVE PRESENT
0001 10 Mb REM. CARTRIDGE WINCH.
0010 10 Mb WINCHESTER
0011 20 Mb WINCHESTER
0100 32 Mb WINCHESTER
0101 64 Mb WINCHESTER
0110 140 Mb MAXTOR. 14 X 10 Mb
0111 32 Mb MICROPOLIS WINCH.
1000 112 Mb MAXTOR 7 X 16 Mb
J8 TAPE
(2)

1.2M/360K FLOPPY		150M/45M* TAPE	10M REM* WINC	20M/32M HH WINC	32M/64M FH WINC		112M/140M FH WINC
✓	1						
(4) ✓	1	1 OPT	1	3			
✓	1	1 OPT	1	2	1	OR	1
✓	1	1 OPT	1	1	2	OR	2
(4) ✓	1	1 OPT	1	1	1		1
	1	1 OPT		3 ~~X~~			
	1	1 OPT		2 ~~X~~	1	OR	1
	~~1~~	~~1 OPT~~		~~1 X~~	~~2~~	~~OR~~	~~2~~
(2) ✓	~~1~~	~~1 OPT~~		2	1		1
✓	1	1 OPT		1	2	OR	2
✓	1	1 OPT			3	OR	2
	1	1 OPT			2		1

SHOULD NOT USE B CABLE CONNECTOR J1 WITH FIXED WINCHESTERS. J1 IS FOR THE 10 MEG REMOVABLE WINCHESTER ONLY, LIMITING YOU TO 3 FIXED WINCHESTERS.

TO: HARRIS GATES
GENE SCHULZ
TYLER OLSEN
MIKE BAHIA
JOE SCAGLIONE
BILL HASS
STEVE WELFLE
JOE BARBERIO
ED DONAHUE
HENRY MC WHITE
CHUCK O'MALLEY
ROGER SIMENSON
MIKE DURCAN
BILL RANSLEBEN
DORIS BRASHEAR
KEVEN MATHES
CAL BLACKBURN
AL TALLEY
DONNA INMAN
GLEN HOFFHERR

FROM: JACK VOLPINI

DATE: FEBRUARY 25, 1987

SUBJECT: 2200DS CABINET BETA PLAN

Enclosed is a the BETA TEST PLAN for the 2200DS cabinet.

Each BETA unit will be shipped with preliminary documentation enclosed.

If you have any questions or comments please contact me at the Home Office, extension 60347.

TECHNICAL SUPPORT OPERATIONS BETA TEST PLAN

2200 DS CABINET

Prepared by
Jack Volpini

BETA Test Criteria

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

OBJECTIVES:

The BETA test site is the installation and support at a controlled customer site of a pilot system, dedicated to testing applications for the purpose of the evaluation of a products adherence to the design specifications and performance criteria. Also, to highlight reliability/maintainability problems that would adversely impact the ability of Customer Engineering to properly provide field support of the product. Design Engineering has the overall responsibility, control and monitoring function for all the BETA site(s). A Customer Engineering representative will be on the Release Engineering BETA Team (CE New Products Engineer), who will be the focal point for Customer Engineering BETA site support, and will communicate CE concerns and recommendations to the BETA Team and CE management.

BETA Site Selection Criteria:

The BETA site is the test of a product that is specifically selected for a field test prior to the first customer shipment of that product. Products released to a customer prior to the official product release that does not conform to this plan will not be considered part of the BETA test process.

- The BETA site must be a current user of WANG equipment.
- The BETA site must NOT be a critical account.
- A BETA site agreement must be signed by the prospective BETA site before the BETA test cycle begins.
- The BETA site must be committed to testing the product in a non-critical environment.
- The Customer must not expect or depend on the new product to fulfill production needs.
- The proposed site must be located within 25 miles of a Customer Engineering Branch Service Office.
- The Branch Service Office must have sufficient Field Engineering manpower to allow the designated responsible C E to be assigned to the BETA site, on a full time basis if necessary, without significant negative impact on it's customer base support.
- Area and District Technical Support groups must have the available manpower to assign/provide secondary support be qualified individuals as necessary.
- A qualified Customer Support Analyst is assigned to directly support the BETA site, to interface with the customer and provide direct software support.
- Duration of BETA site testing will not be less than 60 days.
- BETA test configuration must exceed the average systems size for that product, as projected by Marketing for shipment during the next fiscal year.

Responsibilities of the BETA Site Customers:

- Provide WANG Labs with a high level, technical contact to function as administrator for the BETA testing.
- Provide the technical support, close supervision and analysis required by the BETA testing.
- Provide WANG with complete and timely feedback on the product being tested, both in the area of problems encountered and suggestions for enhancement.
- Provide time for meetings with WANG representatives during normal business hours to discuss the progress of the BETA test.
- Review and comment on documentation and training materials being utilized.
- 0 Realize that BETA testing may disrupt normal operations and WANG cannot be held liable for any disruptions.
- Provide WANG representatives with access to the equipment as needed during normal business hours for software/hardware upgrades, fixes, etc., whenever necessary.
- Provide any additional equipment desired or necessary for the operation of the BETA test system, i.e., cabling, electricity, phone lines, etc.

Responsibilities of Customer Engineering:

C E Branch:

- The local Customer Engineering Branch Manager will be the customer contact for support of all BETA site hardware and will serve as the focal point for all hardware problems, questions, etc.
- The local Customer Engineering Branch Manager will assign a Customer Engineer to install, maintain and monitor the BETA site on a daily basis, if necessary, for the duration of the testing.
- Provide Field Personnel to be responsible for site survey, installation and primary system support.
- Provide Branch spare support for standard released products at the BETA site.
- After acceptance by Customer Engineering, full support of the product will be provided by local support personnel at the end of the test period.

Home Office:

- Provide the designated site Customer Engineering with Home Office training (if necessary), the necessary preliminary documentation and diagnostics.
- Provide the CE Branch Manager, District Tech Support and Area Tech Support with the necessary preliminary documentation.
- Provide appropriate training for the Home Office Product Support and designated DTS/ATS personnel.
- Provide Home Office hardware support for the product being tested, there local support has failed to resolve a problem after eight hours on site.
- Maintain a problem tracking system (TAC).
- Participate in a weekly meeting with Product Management, R&D Product Support and other involved parties to discuss progress at the site.
- Travel to the site as necessary for problem solving.
- Provide input as to reliability and servicability/maintainability issues.
- Provide a Customer Engineering BETA Test Plan to all participants.
- The New Products Engineer will ensure that a verified full set of unique spares are available from R&D.

I. BETA Highlights:

There are plans for 4 BETA Test Sites:

Site 1	Redshaw Pittsburg, Pa.	(one subsystem)
Site 2	AIMS Plus Austin, Texas	(one subsystem)
Site 3	TOM Software Seattle, Wa.	(one subsystem)
Site 4	WANG CSO 59 Electronics Ave Lowell, Ma.	(one subsystem)

II BETA Site Configuration:

The 2200 DS configurations will be as follows:

Site 1 (Redshaw)
- DS-1.2 MB Floppy
- 10 MB Removable
- 20 MB Winch
- 64 MB Winch

Site 2 (AimsPlus)
- DS-1.2 MB Floppy
- 10 MB REM Winch
- 20 MB Winch
- 64 MB Winch

Site 3 (TOM Software)
- DS-1.2 MB Floppy
- 10 MB REM Winch
- 64 MB Winch
- Tape Streamer

Site 4 (CSO)
- DS-1.2 MB Floppy
- 10 MB REM Winch
- Tape Streamer
- 64 MB Winch

III. BETA Site Contact List:

Home Office Support	Contact	Phone
R&D BETA Test Coordinator	Harris Gates	617-967-3797
PP&M	Gene Schulz	617-967-2790
TSO New Product Engineer	Jack Volpini	617-656-0347
Product Support Engineer	Mike Bahia	617-656-0256
Product Support Engineer	Joe Scaglione	617-656-0249

Site 1

Customer	Contact	Phone
Redshaw Inc. 103 Yost Blvd. Pittsburg, Pa. 15221	Mark Guzan	412-829-2100

Local Support	Contact	Phone
District Manager	Bill Hass	216-642-2826
DTSM	Steve Welfle	216-642-2828
DTS	Tom Herrle	216-642-2834
Branch Manager	Joe Barberio	412-922-5800
Local CE	Ed Donahue	412-922-5800

Site 2

Customer	Contact	Phone
AimsPlus 4301 Travis Country Circle Austin, Texas 78735	Tim VeArd	214-669-8904 512-892-6322

Local Support	Contact	Phone
District Manager	Henry McWhite	713-787-2644
DTSM	Chuck O'Malley	713-787-2652
DTS	Roger Simenson	713-787-2766
Branch Manager	Mike Durcan	512-328-0710
Local CE	Bill Ransleben	512-328-0710

Site 3

Customer	Contact	Phone
TOM Software, Inc. 127 Southwest 156th Street Seattle, Wa. 98166	Chris Cummings	206-246-7022

Local Support	Contact	Phone
District Manager	Doris Brashear	206-340-6122
DTSM	Keven Mathes	206-340-6123
DTS	Cal Blackburn	206-340-6123
Branch Manager	Al Talley	206-433-0808
Local CE	Donna Inman	206-433-0808

Site 4

Customer	Contact	Phone
Customer Service Organization 59 Electronics Ave Lowell, Ma. 01851	Jack Volpini	617-656-0347

Local Support	Contact	Phone
TSO New Products Engineer	Jack Volpini	617-656-0347
Product Support	Mike Bahia	617-656-0256
Product Support	Joe Scaglione	617-656-0249

IV. BETA Support Spares:

Spare for the unique FRUs will be supplied be R&D to the CSO New Product Engineer. These spare FRUs can be obtained by the local branch by contacting Jack Volpini at the Home Office.

If a failure occurs, the local Branch Manager is responsible for returning the failed FRU to the New Product Engineer at the following address:

WANG Laboratories, Inc.
Attn: Jack Volpini
Mailstop 001-250
59 Electronics Avenue
Lowell, Ma. 01851

The New Product Engineer will deliver the failed FRU to R&D for autopsy and repair. Replacements for spare FRUs will come from R&D through the New Product Engineer.

V. Preparation:

The local Branch Manager will assign a CE(s) to install, monitor and maintain the site for the duration of the test.

The New Products Engineer will provide the local CE Branch Manager with preliminary documentation as available.

The New Products Engineer will insure that spares are available at the Home Office.

The New Products Engineer will establish a dialog with the customer via the local Branch Manager of the assigned National Account Manager.

The customer will be advised by the Marketing Project Manager that the installed hardware is for test purposes only and that WANG is not responsible for lost data or down time critical to on-line processing. The customer should also be advised not to process non-recoverable data.

10

DS Utilities

Overview

The DS Utilities screen is available from the Multiuser BASIC-2 System Utilities menu. The DS utilities provided with the CS-D/N enable you to manage the storage devices and RAMdisk of your system.

> ***Note:*** *When upgrading DS or CS-D/N units from R3 to R4 proms, all winchester addresses must be backed up to an external device, tape, or floppy prior to replacing the prom. Once the prom is replaced, the surfaces will be unreadable and must be configured and formatted for use. (Refer to the section "Configuration Utility" in this chapter for additional information.)* IN ADDITION, THE R4 PROM WILL NOT RECOGNIZE SWITCH SETTINGS FOR THE 112 M66 MAXTOR CONFIGURATION. WHEN INSTALLING THE R4 PROM CHANGE THE SWITCH SETTINGS IF USING THE 112 M66 CONFIGURATION TO THE 140M CONFIGURATION.

After you configure the CS-D/N, load the Utilities menu. Use the following two commands to display this menu:

1. SELECT DISK xxx (Press RETURN.)

   The three-digit hexadecimal number (xxx) is the device address of the disk on which the system utilities reside.

   112M: 1 OR 4 ON ONLY
   140M: 2/3 OR 6/7 ON ONLY
2. LOADRUN (Press RETURN.)

The DS Utilities menu appears (see Figure 10-1). Utilities that require user-entered information display a series of prompts requesting this information. When prompted, type the necessary response and press RETURN. The utility requests additional information or performs the specified procedure.

The following sections discuss the Configuration utility and the Protect/Unprotect utility.

```
                    DS Utilities (Release 3.0)
                                                  Partition X, ddd k
                                                        Terminal dd

Select an item and press RUN/EXEC

     DS Configuration
     Protect/Unprotect CS-D Surfaces
     RAMdisk Allocation
     Cache Usage
     Backup disk platters to Tape Cassette
     Restore disk platters from Tape Cassette
```

Figure 10-1. DS Utilities Menu

MISPRINT
THIS IS ON
CORRECTED PAGE
10-10.

Protect/Unprotect Surfaces Utility

The Protect/Unprotect Surfaces utility lets you write protect the surfaces of the storage devices in the CS-D/N. To run the Protect/Unprotect utility, follow these steps:

1. Select it on the Utilities Menu (Figure 10-1) and press RUN/EXEC.

   The first prompt requests the base address of the CS-D/N unit.

2. Press RETURN.

   The screen displays information on each device (including RAMdisk) in the DS or CS-D. This information includes device addresses, index size, sector end, the catalog maximum, and surface protection of each surface. Figure 10-13 is a sample Current Platter Use (DS surfaces) screen.

```
                    C u r r e n t   P l a t t e r   U s e
                         D S   S u r f a c e s

Disk      Index  Current   Catalog   Pro-   Disk      Index  Current   Catalog   Pro-
Address   Size    End      Maximum   tect   Address   Size    End      Maximum   tect

D30         7      253        1231    No
D31        24     6716       65000    No
D32        24     6824       65000    No
D33        24     4534       65000    No
D34        24     7408       65000    No
D35        24     9655       65000    No

Valid keys to alter Protect                          RUN - Accept Screen?
N to set 'No' to disable Soft Protect              RETURN - Restart Program
S to Soft Protect;  H to Hard Protect               FN/TAB - Exit
```

Figure 10-2. Sample Current Platter Use (CS-D/N Surfaces) Screen

The screen shown in Figure 10-13 enables you to accept or change the surface protection values for platter surfaces.

3. Press RUN to accept the information and the surface protection values displayed on the screen.

Configuration Utility

The Configuration utility has two functions. The utility configures winchester drives into platter addresses (required when used with a Revision 4 PROM or greater). The utility is also used to list the addresses of the devices in the CS-D/N.

To run the Configuration utility, follow this procedure:

1. Select DS Configuration from the Utilities Menu (see Figure 10-1) and press RUN/EXEC.

```
                        DS Configuration

          Base Address of DS unit (D10, D20, or D30):  D10

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All rights reserved.
                                                    RETURN - Proceed
                                                    FN/TAB - Exit
```

Figure 10-2. DS Configuration Screen

   The first prompt requests the base address of the DS or CS-D. (See Figure 10-2.)

2. Select the correct address and press RETURN. (If you are setting up a configuration, this address is used for the base disk address.)

   The screen displays information on each device (including DS and DSPC RAMdisk, if configured) in the DS and CS-D. This information includes device addresses, device storage capacities, number of platters, and sectors per platter. Figure 10-3 is a sample configuration information screen.

```
              DS  C o n f i g u r a t i o n
Drive SELECT 3
Diskette Drive                    1.2 MB with 4160 sectors
4160 on D10
64 MB Fixed Hard Disk             7 surfaces
65024 on D11      38912 on D12    4096 on D13   65024 on D14   65024 on D15
65024 on D16      38912 on D17
64 MB Fixed Hard Disk             2 surfaces
65024 on D18      38912 on D19
20 MB Fixed Hard Disk             2 surfaces
38912 on D51    38912 on D52
Streaming Cassette Tape Drive     150 MB tape drive
Address: D5F                      Cassette is not in place

                                             '15 - Start Setup
                                             RUN - Expand display
  DS PROM revision level: DD               RETURN - Restart
         Protocol level: 1                 FN/TAB - Exit
```

Figure 10-3. CS-D/N Sample Configuration Information Screen

3. To display expanded information on the storage devices, press RUN from the screen shown in Figure 10-3. The expanded information appears in Figure 10-4.

If the CS-D/N PROM level is 2.0 or greater, a surface-protect feature exists and the screen displays a Protect field. (See Figure 10-4.)

```
                    C u r r e n t   P l a t t e r   U s e

Disk     Index   Current   Catalog   Pro-   Disk     Index   Current   Catalog   Pro-
Address  Size        End   Maximum   tect   Address  Size        End   Maximum   tect
D10       9'        3767      4000   No
D11      70'       24624     65023   No     D51      47&      11156     38911   No
D12      250       30980     38911   No     D52      50'       6120     38911   No
D13      49'       10472     65023   No
D14      10        52977     65023   No
D15      10'       64777     65023   No
D16      100'      19746     65023   No
D17      129'      61008     65023   No
D18      129'      34267     65023   No

                                                    RUN - Repeat Screen
                                                 RETURN - Restart Program
                                                 FN/TAB - Exit
```

Figure 10-4. CS-D/N Configuration Information Screen (Expanded Display)

The Protect field displays the surface protection status. The contents of the Protect field are:

Content	Description
No	The surface is unprotected; writing is possible.
Soft	The surface is soft protected; writing is not possible. Soft protect is a programmable surface-write inhibit.
Hard	The surface is hard protected; writing is not possible. To remove a hard protect-write inhibit, power down and power up the CS-D/N.
n/a	The CS-D/N does not have a PROM revision greater than 1. You cannot alter the Protect field.

4. If a new configuration is not needed, press RETURN to restart the program, or press FN/TAB to exit. To start a new configuration go to step 5.
5. To "start setup" of a new configuration of surface assignments, press SF key '15 from the screen shown in Figure 10-3. The surface assignments screen appears in Figure 10-5.

RESTRICTIONS ON CONFIGURING DRIVES WITH THE R4 PROM

1. It is possible to reconfigure a single Winchester drive from one to a maximum of fourteen addressable disk surfaces.

   ***Note:** This utility requires DS Prom level 4.0 or greater within a Wang DS or CS/D cabinet.*

2. A CONFIGURATION CAN BE CREATED FROM ANY PARTITION, BUT YOU MUST BE ON TERMINAL 1 TO APPLY IT.

3. EACH DRIVE IS RESTRICTED TO EITHER MASTER OR SLAVE ADDRESSES.

4. ADDRESSES MUST BE USED CONSECUTIVELY STARTING WITH THE 1ST MASTER OR 1ST SLAVE ADDRESS.

5. IT IS ADVISED TO ASSIGN MASTER ADDRESSES TO DRIVE SELECT 1 & 2 AND SLAVE ADDRESSES TO DRIVE SELECT 3 & 4 TO MINIMIZE CONFUSION WHEN TROUBLESHOOTING & REPLACING BOARDS.

```
                Setup D.S. Disk Surface Assignments

3 Winchesters with sectors available
No. 1 = 260,096      No. 2 = 260,096      No. 3 = 77,824

Master Disk     Catalog          Slave Disk     Catalog
Address         Maximum          Address        Maximum

D11               0              D51              0
D12               0              D52              0
D13               0              D53              0
D14               0              D54              0
D15               0              D55              0
D16               0              D56              0
D17               0              D57              0
D18               0              D58              0
D19               0              D59              0
D1A               0              D5A              0
D1B               0              D5B              0
D1C               0              D5C              0
D1D               0              D5D              0
D1E               0              D5E              0

Use D.S defaults  Y

                                                FN/TAB - Exit
```

Figure 10-5. Setup D.S. Disk Surface Assignments

If you want to use the default disk surface assignments, type Y and press RETURN. The program calculates the default disk assignments and takes you to the configuration file name @DEFAULT. (See Figure 10-9.)

Note: DS defaults are:

30 MB drive has 2 disk addresses with 10 MB each
64 MB drive has 4 disk addresses with 16 MB each
140 MB drive has 14 disk addresses with 10 MB each
112 MB drive has 7 disk addresses with 16 MB each

```
                Setup D.S. Disk Surface Assignments

3 Winchesters with sectors available
No. 1 = 260,096      No. 2 = 260,096      No. 3 = 77,824

Master Disk      Catalog          Slave Disk    Catalog
Address          Maximum          Address       Maximum

D11                0              D51             0
D12                0              D52             0
D13                0              D53             0
D14                0              D54             0
D15                0              D55             0
D16                0              D56             0
D17                0              D57             0
D18                0              D58             0
D19                0              D59             0
D1A                0              D5A             0
D1B                0              D5B             0
D1C                0              D5C             0
D1D                0              D5D             0
D1E                0              D5E             0

Configuration file name @DEFAULT
                                                   FN/TAB - Exit
```

Figure 10-6. @DEFAULT Configuration

If you do not want to use the default disk surface assignments, type N and press RETURN. The program enables you to tailor a unique configuration. (See Figure 10-7.)

```
                Setup D.S. Disk Surface Configured Assignments

3 Winchesters with sectors available
No. 1 = 260,096      No. 2 = 260,096      No. 3 = 77,824

Master Disk      Catalog          Slave Disk    Catalog
Address          Maximum          Address       Maximum

D11                0              D51             0
D12                0              D52             0
D13                0              D53             0
D14                0              D54             0
D15                0              D55             0
D16                0              D56             0
D17                0              D57             0
D18                0              D58             0
D19                0              D59             0
D1A                0              D5A             0
D1B                0              D5B             0
D1C                0              D5C             0
D1D                0              D5D             0
D1E                0              D5E             0

Winchester X       Master or Slave M
B = 1.2 (4160)     C = 10MB (38912) D = 16MB  (65024)  R = Remaining or Value
Amount for surface D11 = 00260096
All entries made and acceptable? Y/N __
                                                   FN/TAB - Exit
```

Figure 10-7. Setup D.S Disk Surface Configured Assignments

The surfaces on a single Winchester drive must be assigned to either the left "Master" or the right "Slave" column that is shown on the screen. Make your selection (M or S) and press RETURN.

You must also determine the amount of disk surface space you want on your drive. To do this, follow these steps:

1. Select B, C, or D for the standard platter size numeric value that you want and then press the RETURN key.
   or
2. Enter a numeric sector value and then press the RETURN key. The utility automatically assigns the platter size beginning with the first unused platter address and consectively fills each platter.
3. Enter spaces or 0 and press RETURN to end the selection for the drive specified.
4. Select R and then press RETURN to choose the remainder of the drive's sectors.

If your entries are complete and you respond with a Y(yes) to accept the configuration, the program takes you to the Configuration file name @DEFAULT. You can change the configuration name at this time or you can use the name @DEFAULT. (See Figure 10-6.)

If your entries are not complete and you respond with a N (no), the program returns you to the "DS Configuration" screen (Figure 10-7).

Sample Configuration

The sample configuration of surface assignments (FIG 10-8) shows a DS or CS-D cabinet with three Winchesters. Two 64 MB Winchesters have been assigned to the Master address columns and a 20 MB Winchester drive has been assigned to the Slave address with surface sizes varying from:

```
4160 = 1.2 MB image
38912 = 10 MB image
65024 = 16 MB image
```

Surfaces greater than 65024 sectors require both the 3 byte addressing of the DS Prom level 4 and the 386 Release 2.0 operating system. Surfaces greater than 65024 must be established with the type 2 (&) catalogued index area.

> ***Note:*** *The hashing algorithm for 3-byte addressing is available with the CS/386 operating system Release 2.0 or greater.*

Type Index	Invoked By	
0	SCRATCH DISK T /hhh	OLD HASHING ALGORITHM
1	SCRATCH DISK ' T /hhh	NEW HASHING ALGORITHM W/ O/S 2.5 OR HIGHER
2	SCRATCH DISK & T /hhh	3 BYTE ADDRESSING

```
                Sample D.S. Disk Surface Assignments

3 Winchesters with sectors available
No. 1 = 260,096      No. 2 = 260,096      No. 3 = 77,824

Master Disk      Catalog          Slave Disk    Catalog
Address          Maximum          Address       Maximum

D11   1           65024           D51   3        38912
D12   1           65024           D52   3         4160
D13   1           38912           D53   3         4160
D14   1           38912           D54   3         4160
D15   1            4160           D55   3         4160
D16   1            4160           D56   3         4160
D17   1            4160           D57   3         4160
D18   1            4160           D58   3         4160
D19   1            4160           D59   3         4160
D1A   1            4160           D5A   3         4160
D1B   1           27264           D5B   3         1472
D1C   2          150016           D5C               0
D1D   2           65024           D5D               0
D1E   2           45056           D5E               0

Winchester 3   Slave   0 Sectors remaining

All entries made and acceptable? Y/N __

                                                FN/TAB - Exit
```

Figure 10-8. Sample D. S. Surface Assignments

If your entries are complete and you respond with a Y(yes)to accept the configuration, the program takes you to the Configuration file name @DEFAULT. You can change the file name at this time or use the file name @DEFAULT. (See Figure 10-9.)

If your entries are not complete and you respond with a N (no), the program returns you to the "DS Configuration" screen (Figure 10-2).

Configuration File Name @DEFAULT

The configuration file name @DEFAULT stores your selection of surface configuration into a six sector file on the system surface.

```
                Configuration FileName @DEFAULT

  Configuration file name @DEFAULT

                                                FN/TAB - Exit
```

Figure 10-9. Configuration FileName @DEFAULT

YOU CAN SAVE YOUR DISK ASSIGNMENT IN @DEFAULT BY KEYING RETURN OR ENTER A NEW FILENAME & RETURN.

You can ~~execute~~ APPLY your disk assignments in the configuration file ~~@DEFAULT~~ ONLY from terminal 1 by following the steps listed below. You can create your disk surface configuration from any terminal.

1. Press RESET and then press SF key '10 to apply. (See Figure 10-9.)

If you did not use @DEFAULT go to step 2.

2. Enter the FileName of your choice and press RETURN.

3. Enter printer address 005 and press RETURN. (See Figure 10-10.)

```
                Setup D.S. Disk Surface Configured Assignments

3 Winchesters with sectors available
No. 1 = 260,096      No. 2 = 260,096      No. 3 = 77,824

Master Disk      Catalog          Slave Disk    Catalog
Address          Maximum          Address       Maximum

D11                0              D51             0
D12                0              D52             0
D13                0              D53             0
D14                0              D54             0
D15                0              D55             0
D16                0              D56             0
D17                0              D57             0
D18                0              D58             0
D19                0              D59             0
D1A                0              D5A             0
D1B                0              D5B             0
D1C                0              D5C             0
D1D                0              D5D             0
D1E                0              D5E             0
Hard copy to printer 005
                                  FN/TAB - Exit
```

Figure 10-10. D.S. Surface Assignments

Note: DS Prom level 4 or greater is required in the cabinet. You can only apply changes from terminal 1.

4. Enter any remarks for the hard copy and press RETURN. (See Figure 10-11.)

```
                Setup D.S. Disk Surface Configured Assignments

3 Winchesters with sectors available
No. 1 = 260,096      No. 2 = 260,096      No. 3 = 77,824

Master Disk      Catalog          Slave Disk    Catalog
Address          Maximum          Address       Maximum

D11                0              D51             0
D12                0              D52             0
D13                0              D53             0
D14                0              D54             0
D15                0              D55             0
D16                0              D56             0
D17                0              D57             0
D18                0              D58             0
D19                0              D59             0
D1A                0              D5A             0
D1B                0              D5B             0
D1C                0              D5C             0
D1D                0              D5D             0
D1E                0              D5E             0
Hard copy to printer 005
Remark for hard copy 890101
                                  FN/TAB - Exit
```

Figure 10-11. DS Surface Assignments

5. Enter Y (yes) to execute the configuration or N (no) to go back to the screen shown in Figure 10-9 and press RETURN.

```
                Proposed D.S. Disk Surface Assignments

3 Winchesters with sectors available
No. 1 = 260,096      No. 2 = 260,096      No. 3 = 77,824

Master Disk      Catalog          Slave Disk     Catalog
Address          Maximum          Address        Maximum

D11   1            65024          D51   3          38912
D12   1            65024          D52   3           4160
D13   1            38912          D53   3           4160
D14   1            38912          D54   3           4160
D15   1             4160          D55   3           4160
D16   1             4160          D56   3           4160
D17   1             4160          D57   3           4160
D18   1             4160          D58   3           4160
D19   1             4160          D59   3           4160
D1A   1             4160          D5A   3           4160
D1B   1            27264          D5B   3           1472
D1C   2           150016          D5C                  0
D1D   2            65024          D5D                  0
D1E   2            45056          D5E                  0


Apply Y or N __
```

Figure 10-12. Proposed D.S. Surface Assignments

Protect/Unprotect Surfaces Utility

The Protect/Unprotect Surfaces utility lets you write protect the surfaces of the storage devices in the CS-D/N. To run the Protect/Unprotect utility, follow these steps:

1. Select it on the Utilities Menu (Figure 10-1) and press RUN/EXEC.

   The first prompt requests the base address of the CS-D/N unit.

2. Press RETURN.

   The screen displays information on each device (including RAMdisk) in the DS or CS-D. This information includes device addresses, index size, sector end, the catalog maximum, and surface protection of each surface. Figure 10-14 is a sample Current Platter Use (DS surfaces) screen.

```
                Current Platter Use
                    DS Surfaces

Disk      Index  Current   Catalog   Pro-   Disk      Index  Current   Catalog   Pro-
Address   Size    End      Maximum   tect   Address   Size    End      Maximum   tect

D30         7      253       1231    No
D31        24     6716      65000    No
D32        24     6824      65000    No
D33        24     4534      65000    No
D34        24     7408      65000    No
D35        24     9655      65000    No

Valid keys to alter Protect                          RUN - Accept Screen?
N to set 'No' to disable Soft Protect              RETURN - Restart Program
S to Soft Protect;  H to Hard Protect               FN/TAB - Exit
```

Figure 10-13. Sample Current Platter Use (CS-D/N Surfaces) Screen

The screen shown in Figure 10-13 enables you to accept or change the surface protection values for platter surfaces.

3. Press RUN to accept the information and the surface protection values displayed on the screen.

The program loops to the DS Configuration utility for visual verification.

The DS or CS-D positions the cursor on the first character of the Protect field for each surface. You can change the Protect value by keying the value N (no), S (soft protect), or H (hard protect).

4. Press RUN when you set all surfaces (refer to Figures 10-14 and 10-~~15~~13).

```
                    Current Platter Use
                         DS Surfaces

Disk     Index  Current   Catalog  Pro-   Disk     Index  Current  Catalog  Pro-
Address  Size    End      Maximum  tect   Address  Size    End     Maximum  tect

D30       7      253       1231    Soft   D70       5      8        200     No
D31      24     6716      65000    Soft
D32      24     6824      65000    Soft
D33      24     4534      65000    Soft
D34      24     7408      65000    No
D35      24     9655      65000    No


Highlighted fields denote changes made
Do you wish to set new defaults (Y or N) N                  RETURN - Proceed
                                                            FN/TAB - Exit
```

Figure 10-14. Current Platter Use (Applying Protection on CS-D/N Surfaces) Screen

5. Continue by pressing one of the following keys and then press RETURN:
   - Press N to return to the screen in Figure 10-14.
   - Press Y to set the new protection values.

   You proceed to the screen in Figure 10-15.

```
                    Current Platter Use
                         DS Surfaces

Disk     Index  Current   Catalog  Pro-   Disk     Index  Current  Catalog  Pro-
Address  Size    End      Maximum  tect   Address  Size    End     Maximum  tect

D30       7      253       1231    Soft   D70       5      8        200     No
D31      24     6716      65000    Soft
D32      24     6824      65000    Soft
D33      24     4534      65000    Soft
D34      24     7408      65000    No
D35      24     9655      65000    No

Highlighted fields denote changes made                      RETURN - Proceed
Desired Protection Applied                                  FN/TAB - Exit
```

Figure 10-15. Current Platter Use (Protection Applied on CS-D/N Surfaces) Screen

DS Data Storage Cabinet Utilities
Release 2.00
Customer Software Release Notice

1st Edition - October 1988

715-2211

Standard Class A Disclaimer

CONTENTS

PREFACE

PREFACE

This cu omer software release notice (CSRN) describes the changes and feature of the Wang DS Data Storage Cabinet Utilities (Release 2.00). This CSRN highlights changes made to the utilities. A full discuss on of each enhancement can be found in the updated *DS Data Storage Cabinet User's Manual* (715-0740).

OVERVIEW

The Wang DS Data Storage Cabinet Utilities provides you with interactive data storage management tool for the DS Data Storage Cabinet. The Data Storage Cabinet Utilities features enhancements to the backup and restore tasks between disk and tape cassette, and allows you to protect or unprotect the disk surfaces in the DS Data Storage Cabinet.

Release 2.00 of the DS Data Storage Cabinet Utilities is a general release. It provides significant improvements in user functionality as well as corrections to the reported problems of Release 1.00.

A DS PROM Revision 2 has addded functionality to the Protect/Unprotect DS Surfaces utility, allowing users to protect or unprotect the surfaces of the disk devices in the DS cabinet. However, this release can interface to DS cabinets with any PROM revision.

The Configuration utility has been expanded to show catalogued index usage of all disk surfaces. The utility also provides a significant improvement in the speed of tape backups from external disks.

RELEASE INFORMATION

Release 2.00 is available on the following media:

Part Number	Type	Comment
731-8015A (one diskette)	5 1/4-inch DSDD	DS Utilities diskette

REQUIREMENTS

Release 2.00 requires a Wang CS or 2200 MVP, LVP, SVP, or MicroVP consisting of at least 28K of control memory, a 2200 terminal, and a DS cabinet with a floppy diskette drive.

CHANGES TO THE DS UTILITIES PLATTER

With Release 2.00, the following files are revised:

File	Description
.DS	System menu item file for the DS utilities
@DSCFIG	DS Configuration utility
@RAMDISK	RAM Disk Allocation utility
@HITRATE	Cache Usage utility
@DSTAPEB	Backup Disk Platters to Tape Cassette utility
@DSTAPER	Restore Disk Platters from Tape Cassette utility

With Release 2.00, the following file has been added:

File	Description
@DSCFIGP	Protect/Unprotect Platters Utility

The following descriptions summarize each modification:

- The .DS file has been updated with the Protect/Unprotect menu pick.
- The DS Configuration utility (@DSCFIG) has been updated to correct reported problems and now includes added user functionality.
- The RAM Disk Allocation utility (@RAMDISK) now restores the default surface address if RUN is inadvertently pressed at the time the initial prompt for a surface address is requested.

- The Cache Usage utility (@WITRATE) now restores the default surface address if RUN is inadvertently pressed at the time the initial prompt for a surface address is requested.

- The Backup Disk Platters to Tape Cassette utility (@DSTAPEB) has been updated to correct reported problems and now includes added user functionality.

- The Restore Disk Platters from Tape Cassette utility (@DSTAPER) has been updated to correct reported problems and now includes added user functionality.

- The Protect/Unprotect Platters utility (@DSCFIGP) has been added to allow you to assign protection classifications to the platters in the Data Storage Cabinet.

ENHANCEMENTS

This section highlights enhancements made to the utilities. A full discussion of each enhancement can be found in the updated *DS Data Storage Cabinet User's Manual*.

- Functionality is basically the same as Release 1.0 with enhancements.

- In all modules on this diskette, the RETURN key will restore the default surface if RUN is inadvertently keyed on the initial prompt for Address.

- A new DS PROM has been created with added functionality to the Protect/Unprotect DS Surfaces utility; this release will interface to DS cabinets with either the old or new PROM.

- The DS Configuration utility has been expanded to show catalogued index usage and the protect status of all disk surfaces.

- In the Backup Disk Platters to Cassette utility, improvements were made to the prompt sequences. Additionally, several problems were corrected and enhancements were made to the display. The program now places a check mark next to the surface address after the surface backup is complete.

- The speed of backup from an external disk has been improved significantly.

- In the Backup Disk Platters to Cassette utility, the display shows size of each platter (in megabytes) as well as the cumulative total in megabytes. This allows you to monitor the total amount to backup and thus avoid trying to backup too much data.

- In the Backup Disk Platters to Cassette utility after entering data about the platter to backup, you can accept or decline the entry. This avoids having to reenter a long list of information because the last entry is incorrect.

- In the Backup Disk Platters to Cassette utility, you are now notified if a requested platter is already in the list of platters. This avoids the inadvertent duplication of disk addresses.

ANOMALIES

Corrected Anomalies

- Probe F302090 -- Restore to data is now made to the sector range specified by the directory entry instead of always to sector 0.

  If a user exits the utility after reading the index, the tape is rewound before returning to the menu.

Known Anomalies

- None.

Author : OLSEN Organization : INT.R&D DPT.217
Location : MS/014-890 Job Description : SOFTWARE ENGR

From T.B. Olsen 7/21/88
I talked to Chris Cummings at TOM Software. He suggests that when a user moves to the DS cabinet that all disk surfaces to be used for TOM software be set-up using the new hash algorithm. This can be done by doing:

SCRATCH DISK ' T /hhh creates new hash algorithm
SCRATCH DISK T /hhh creates old hash algorithm

then moving the files desired.

Alternatively the scratch and move can be combined:

MOVE T /hhh, TO T/hhh, moves using the source disk hash method.
MOVE T /hhh, TO T/hhh, LS=xxx, END=dddd moves using the new hash.

Failure to use the new hash method will force program loading to use an excess number of disk accesses. He cites 1 second versus as much as 18-20 seconds. TOM does have tech support for their VARs on this matter.

FIELD UNIT FAILING W/ - BACKUP ABORTED, COMMAND REJ.

DS UTIL S/W P/N 731-8015 RELEASE 1 8500 R0

OUR UNIT LOC 135 W62T2605

UTILITIES 4/16/87

TAPE BACKUP

LOAD RUN PARTITION SIZE & TERM #

* TAPE UTILITY FIELD TEST UNIT / VOL ZAP / ALT SECTOR TEST / MULTIDISK TEST

DS UTILITY RUN

MOVE FILE UTIL

DS CONFIGURATION
RAM DISK ALLOCATION
CACHE USAGE
BACKUP DISK TO CASSETTE TAPE RUN
RESTORE DSK FROM CASSETTE TAPE

ADDR OF TAPE D5F RETURN

APPEND OR ERASE E RETURN

ADDR OF DISK TO BACKUP D10 RETURN (BUILDS TABLE OF DISKS TO BACKUP)

PLATTER NAME RETURN
START SECTOR 0 RETURN
END SECTOR 935 RETURN

ADDR OF DISK TO BACKUP (BLANK IF NO MORE) BLANK RETURN

BOTTOM LEFT
REWIND
ERASE

WRITING TAPE DIRECTORY LABEL HUNG HERE W/ OUR DS

HAD OLD BAD 210-8826 W/ R1 PROM, UPGRADED BRD TO 8826-1 & OK

MUST HAVE 379-8500 R1 PROM

5 1/4-inch Diskette: 320/360KB vs. 1/1.2MB

by Tyler Olsen

The various diskette media and drive options now available to CS/2200 users provide flexible storage options. The diskettes provide options of "porting" data and software between and among CS/2200 systems as well as with the Wang PC. This article dwells on the 5 1/4-inch diskettes: available types, how they are formatted; compatibility with the Wang PC; and compatibility between CS/2200 drives.

TWO TYPES OF DISKETTES AND DRIVES

There are two types of diskette media, DSDD or DSHD, which must be considered when using a 5 1/4-inch diskette drive. The CS/2200 double-sided, double-density (DSDD) diskettes store 320KB or 360KB of data. The double-sided, high-density (DSHD) diskettes introduced with the Wang Data Storage Cabinet store 1MB or 1.2MB of data.

There are two types of 5 1/4-inch diskette drives available with the CS/2200, either 320/360KB or 1/1.2MB. The 2200/2275 drive introduced the 320/360KB 5 1/4-inch diskette. The CS Data Storage Cabinet requires a 5 1/4-inch diskette drive, which may be either a 320/360KB drive or a 1/1.2MB drive.

The DSHD 1/1.2MB formatted diskettes cannot be read by a 320KB drive. The 320/360KB DSDD diskette can be used with both types of drives—320/360KB or 1/1.2MB—but the read/write results vary depending on the diskette/drive combination.

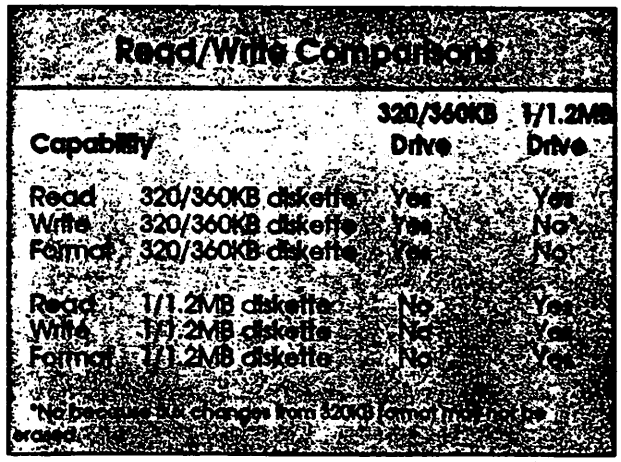
A WORD ABOUT FORMATTING

Before a diskette can store information, it must be formatted for the system with which it will be used. Formatting leaves flux markings (binary 0s and 1s) at locations determined by the drive on the diskette's oxide media surface. Formatting creates circular tracks (analogous to phonograph tracks) on a diskette. In addition to creating the tracks, formatting allocates fixed-length storage areas, called "sectors," along the tracks.

A diskette fresh out of the cellophane pack is not formatted and, thus, has no track or sector markings. Conversely, a diskette that has been used will probably have clearly defined track and sector markings. These last diskettes may cause troubles if used interchangeably between DSDD and DSHD drives.

Tracks. A 320/360KB drive will format 40 tracks at 48 tracks per inch. A 1/1.2 MB drive will format 80 tracks at 96 tracks per inch. In other words, the relatively wide read/write head of the 320/360KB drive describes a track wider than the thin path described by the relatively narrow 1/1.2MB drive.

Sector size. The standard format for CS/2200 BASIC-2 disk operations uses 256-byte sectors. This format should be used for normal CS/2200 and 2200 MicroVP operations. Diskettes formatted



Read/Write Comparisons

Capability		320/360KB Drive	1/1.2MB Drive
Read	320/360KB diskette	Yes	Yes
Write	320/360KB diskette	Yes	No*
Format	320/360KB diskette	Yes	No
Read	1/1.2MB diskette	No	Yes
Write	1/1.2MB diskette	No	Yes
Format	1/1.2MB diskette	No	Yes

*No [illegible] changes from 320/360 format may be made [illegible] erased.

by a 320/360KB drive with 256-byte sectors have 320KB of storage. Diskettes formatted by a 1/1.2MB drive with 256-byte sectors have 1MB of storage.

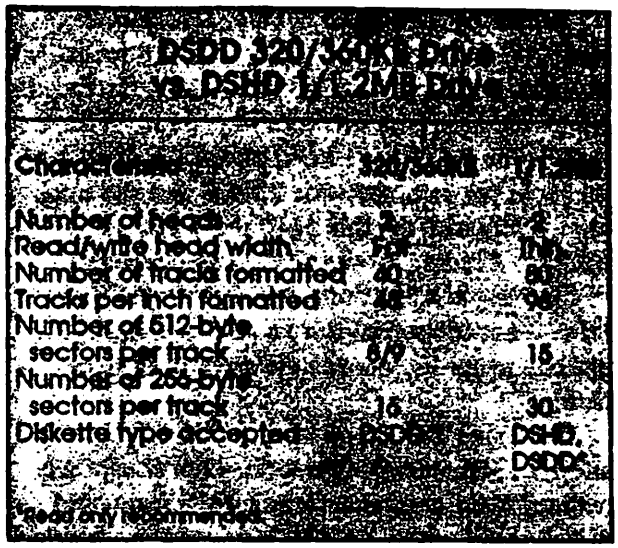
An alternative of 512-byte sectors may be specified. Processing of 512-byte sectors is normally used only for PCs or transfer of diskette information between the CS/2200 and PCs. Diskettes formatted by a 320/360KB drive with 512-byte sectors have 360KB of storage. Diskettes formatted by a 1/1.2MB drive with 512-byte sectors have 1.2MB of storage.

[For more information on diskette formats, see the "DS Data Storage Cabinet User's Manual" (715-0740), from which excerpts have been taken for this article.]

512-BYTE SECTOR DISKETTES

The 5 1/4-inch diskette also supports the Wang PC 512-byte sector format so that data can be easily interchanged between the Wang CS/2200 and PC systems. DSDD diskettes formatted by a 320/360KB drive with 512-byte sectors have a capacity of 360KB; DSHD diskettes formatted by a 1/1.2MB drive with 512-byte sectors have a capacity of 1.2MB. The 1MB drive cannot format 320KB or 360KB diskettes.

The 512-byte formatting is transparent to the CS/2200 operating system because it actually maps two 256-byte logical sectors into one 512-byte physical sector. CS/2200 BASIC-2 can then access diskettes with the 512-byte PC formats as if the diskette were formatted with 256-byte sectors, and all BASIC-2 operations can be performed. Even through the 512-byte format provides more diskette capacity, it it not recommended for normal CS/2200 operations because disk write is considerably slower than with the 256-byte format.



DRIVE-TO-DRIVE CONSIDERATIONS

Fresh Wang diskettes formatted and written on similar drives should pose no problems in reading and writing. Fresh Wang diskettes formatted and written on a 320/360KB drive and read on a 1/1.2MB drive should pose no problem in reading.

Where a diskette has been formatted with a wide track (on a 320/360KB drive) and is then written on a 1/1.2MB drive, there will surely be problems.

Compatible Drive and Media (1/1.2MB). If a 1MB formatted diskette is used with a 1MB drive, read/write is no problem because there is proper alignment between the diskette tracks and the read/write head path. Data resides on the media in 80 tracks, or at a density of 96 tracks per inch.

Compatible Drive and Media (320/360KB). Likewise, if a 320KB formatted disk is used with a 320KB drive, read/write is no problem. Data resides on the media in 40 tracks, or a density of 48 tracks per inch.

Differing Drive and Media (1/1.2MB drive and 320/360KB media). When a 320KB formatted diskette is used with a 1MB drive, the difference in read/write head path becomes important. With data residing on the diskette in 40 tracks at a density of 48 tracks per inch, the wide 320KB diskette tracks align easily with the thin 1MB drive path for reading. Reading should present no problem.

Writing to a 320/360KB diskette by a 1/1.2MB drive is not advised because a good portion of the diskette sector lies outside the drive-head write path.

Differing Drive and Media (320/360KB drive and 1/1.2MB media). The worst-case situation is realized in the combination of a 1MB formatted diskette used with a 320KB drive. In this situation, there is virtually no alignment between the diskette tracks and the wide path described by the 320KB drive head. Data would reside on the diskette in 80 tracks, or at a density of 96 tracks per inch. It could not be written or read properly by the wide read/write heads.

CONCLUSION

Two different 5 1/4-inch diskette drives are available for CS/2200 systems. The advantage of the 1/1.2MB drive is greater media storage. If used for back-up or portability to other systems with 1/1.2MB drives, the 1/1.2MB drive with formatted DSHD diskettes is the logical alternative.

The advantage of the 320/360KB drive is a potential for greater media portability. If used for portability of media to other systems with either 320/360KB of 1/1.2MB drives, the 320/360KB drive is the logical alternative.

For normal CS/2200 operations, format diskettes to a 256-byte format. For PC compatibility, format diskettes to 512-byte sectors—but remember that doing so may slow down writing speed.

If you are trying to upgrade to the latest, use the 1/1.2MB alternative. If you must retain a tie to the past perhaps you should stick with the 320/360KB alternative. If you need compatibility with the past and a connection to the future, why not two Wang DS cabinets, one with a 320/360KB drive and one with a 1/1.2MB drive? [k]

Tyler Olsen is a principal software engineer for Wang Laboratories (Lowell, MA) CS/2200 Product Group.

$$T

DS-320 - DESCRIPTION/STRATEGY

$$T
11/02/92

DS-320 0[illegible] 2200 Series - 320KB Half-Height Diskette Drive

The DS-320 is a 320KB half-height DSDD (double sided double density) diskette drive that provides low-cost and efficient off-line storage back-up. The 320KB is easy to load/unload and store, making it reliable ~~and safe media~~ and less susceptible to destruction from operator errors, program errors, or hardware malfunctions.

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DS-320 - SPECIFICATIONS

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11/02/92

PERFORMANCE

Access Time	
Average	100ms
Random over entire platter	110.3ms
Sequential	19.6ms
Sequential over 1st 2000 sectors	84.9ms
Typical Sequential	17.7ms
Bytes/Sector	256
Capacity/Platter	320KB
Data Transfer Rate	250KB/second
Disk Platters	1
Number of Heads	2
Number of 512-byte sector per track	8/9
Number of 256-byte sector per track	16
Number of Tracks	40 formatted @ 48 tracks per inch
Read/Write Head Width	Fat
Rotation Speed	300 rpm
Sectors/Platter	1,280
Storage Capacity	320KB/360KB
Track per Inch	48 formatted
Type of Media	5 1/4 Inch Half-Height DSDD Diskette Drive

ENVIRONMENTAL

Heat Dissipation	42.7 BTU/hour

$$T

DS-320 - CONFIG. GUIDELINES/DEPENDENCIES

$$T
11/02/92

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

SYSTEMS SUPPORTED

CS/386-D/N, CS-D/N, CS386/TURBO

HARDWARE REQUIRED

One of the following controllers is required:
22C11 disk/diskette controller or
22C32 printer/workstation disk/diskette controller
In order to take advantage of the new high-speed I/O channels of the CS386/Turbo, both new CPUs and field upgrades require the 22C11-HS high-speed printer/disk I/O controller.
If disk multiplexing between systems the following controllers must be used:
2275MUX ~~2275/DS~~ disk multiplexing ~~unit~~ CONTROLLER. Supports up to 3 ADDITIONAL CPUs
2275MUXE ~~2275/DS~~ disk multiplexing extender. Supports up to 4 CPUs. UP TO 3 2275MUXES CAN BE USED WITH EACH 2275MUX
22C80 disk multiplexing controller. One required for each CPU interfacing with 2275MUX or 2275MUXE
36-pin disk interface cable 220-0105-4 (auto enclosed)
When ordering the DS-320, the customer is responsible for ordering the necessary diskette media. This media must be present at the time the Wang customer service representative installs the drives into the DS so testing of the drive(s) can be performed.

SOFTWARE REQUIRED

2200 operating system 3.0 or greater
CS/386 O/S 1.1
TURBO O/S 1.1

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DS-320 - DOCUMENTATION

$$T
11/02/92

DATA SHEETS/MANUALS

Part Number	Title
715-0740	DS Data Storage Cabinet User's Manual
715-0815A	Wang DS Data Storage Cabinet Data Sheet

FOCUS ARTICLES

Title	Date
CS/2200 Products Discontinued	11/01/90
386-D, CS/386-N, and Basic-2/386 Release 1.0	05/15/89
Wang Commitment to CS/2200 continues new workstation, CPUs, OS 3.3 released	12/15/88
2200 Systems - New CS Computer Systems, Operating System, Data Storage Cabinet.	03/15/87

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DS-320 - DISCONTINUED PRODUCT SUPPORT

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11/02/92

The following represents a list of selected discontinued products that are currently supported. This is not all inclusive.

- The 22C03 controller is supported with the DS-320.
- The DS-320A was disontinued effective 11/01/90, as it is no longer neccessary to order the models ending in "A" (with the exception of the DS-TS150A) when adding field add on peripherals.
- The DS-320/DS-320A is supported on the discontinued CS, VP, LVP, LVPC, MVP, MVPC, MicroVP-1 and MicroVP-2 with operating system 3.0 or greater.
- The DS-320A is compatible with the the Wang Standard PC.

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DS-320 - ADDITIONAL INFORMATION

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11/02/92

- The DS-320 is compatible with the the Wang Standard PC.
- The 1.2MB diskette drive can read ~~and write to~~ a 320KB diskette ~~drive.~~ However, ~~not all~~ 320KB ~~will be able to~~ drives cannot read media written by 1.2MB diskette drives. ~~Read and write results vary depending on the diskette/drive combination.~~ BUT WRITING IS NOT SUPPORTED.
- The DS-320 can be ordered thru Wang Express, Part Number 177-0080
- The DS-320 has a 90 day warranty from date of installation.

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DS-20 - DESCRIPTION/STRATEGY

$$T
11/02/92

DS-20 — 2200 Series - 20MB Fixed Half-Height Winchester Hard Disk Drive

The DS-20 is a 20MB Half-Height Fixed Winchester Hard Disk Drive which provides access to stored data and programs.

Fixed hard disks are housed within the DS Storage Cabinet (Compartment 3 and 4) and provide no removable media. Information stored on fixed disks should be periodically backed up onto other devices with removable media for off line storage.

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DS-20 - SPECIFICATIONS

$$T
11/02/92

PERFORMANCE

Access Time	
Average	68ms
Random over entire platter	90.8ms
Sequential	5.0ms
Sequential over 1st 2000 sectors	23.4ms
Typical Sequential	10.1ms
Bytes/Sector	256
Capacity/Platter	10MB
Data Transfer Rate	5MB/second
Disk Platters	2
Logical Disk Surfaces	2
Sectors/Platter	38,912
Storage	
Per Surface	10MB
Capacity	20MB
Type of Media	5 1/4 Inch Half-Height Fixed Hard Disk Drive

ENVIRONMENTAL

Heat Dissipation	136.5 BTU/hour

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DS-20 - ADDITIONAL INFORMATION

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11/02/92

- A 36-pin disk interface cable part number 220-0105-4 is auto enclosed with the DS-20.
- A fixed disk platter should be formatted ~~only when~~ BEFORE it is first used. ~~since formatting the disk overwrites all information contained on that disk.~~
- It takes approximately 22 minutes to format a 10MB platter of a fixed disk. It takes approximately 35 minutes to format a 16MB platter of a fixed disk.
- The DS-20 has two available logical disk surfaces ~~and~~ WITH 10MB available storage per surface.

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DS-20 - CONFIG. GUIDELINES/DEPENDENCIES

$$T
11/02/92

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

SYSTEMS SUPPORTED

CS/386-D/N, CS-D/N, CS386/TURBO

HARDWARE REQUIRED

One of the following disk controllers:
22C11 - disk/diskette controller or
22C32 - printer/workstation disk/diskette controller
In order to take advantage of the new high-speed I/O channels of the CS386/Turbo, both new CPUs and field upgrades require the 22C11-HS high-speed printer/disk I/O controller.
If disk multiplexing the following controllers are required:
2275MUX - disk multiplexing unit. Supports up to 3 ADDITIONAL CPUs
2275MUXE - 2275/DS disk multiplexing extender. Supports up to 4 CPUs. UP TO 3 EXTENDERS SUPPORTED FOR EACH 2275MUX.
22C80 - Disk multiplexing controller. One required for each CPU interfacing with 2275MUX or 2275MUXE

SOFTWARE REQUIRED

2200 operating system 2.7 or greater but 3.0 is the recommended operating system
BASIC-2/TURBO operating system 1.0 for the CS/386 Turbo systems

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DS-20 - DOCUMENTATION

$$T
11/02/92

DATA SHEETS/MANUALS

Part Number	Title
715-0740	DS Data Storage Cabinet User's Manual
715-0815A	Wang DS Data Storage Cabinet Data Sheet

FOCUS ARTICLES

Title	Date
CS/2200 Products Discontinued	11/01/90
CS/386-D, CS/386-N and Basic-2/386 Release 1.0	05/15/89
Wang Commitment to CS/2200 continues new workstation, CPUs, OS 3.3 release	12/15/88
2200 Systems - New CS Computer Systems, Operating System, Data Storage Cabinet.	03/15/87

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DS-20 - DISCONTINUED PRODUCT SUPPORT

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11/02/92

The following represents a list of selected discontinued products that are currently supported. This is not all inclusive.

- The DS-20A 20MB Add-On Half-Height Winchester Hard Disk Drive was discontinued effective 11/01/90, as it is no longer neccessary to order the models ending in "A" (with the exception of the DS-TS150A) when adding field add on peripherals.
- The DS-20/DS-20A is supported on the CS, VP, LVP, LVPC, MVP, MVPC, MicroVP-1 and MicroVP-2 with operating system 2.7 or greater or 3.0 or greater.
- The discontinued 22C03 disk/diskette controller is supported with the DS-20/DS-20A.
- 36-pin disk interface cable 220-0105-4 shipped as an autoenclosure with the DS-20A.

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DS-20 - ADDITIONAL INFORMATION

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11/02/92

- A 36-pin disk interface cable part number 220-0105-4 is auto enclosed with the DS-20.
- A fixed disk platter should be formatted ~~only when~~ BEFORE it is first used. ~~since formatting the disk overwrites all information contained on that disk.~~
- It takes approximately 22 minutes to format a 10MB platter of a fixed disk. It takes approximately 35 minutes to format a 16MB platter of a fixed disk.
- The DS-20 has two available logical disk surfaces ~~and~~ WITH 10MB available storage per surface.

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DS-TS150/DS-TS150A - DESCRIPTION/STRATEGY

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11/02/92

DS-TS150	2200 Series -150MB Half-Height Streaming Tape Cassette Drive
DS-TS150A	2200 Series -150MB Add-on Half-Height Streaming Tape Cassette Drive

The 2200 DS-TS150/DS-TS150A, is a 3 1/2 inch 150MB tape streamer device in a 5 1/4 inch adapter package and provides three times the backup capacity of the 45MB DS-TS. The DS-TS150MB fits in the same slot as the DS-TS 45MB on a DS, CS-D or CS/386-D. It can read tapes created on the ~~DS-TS~~ 45MB but can not write in 45MB format. It is ~~the~~ a replacement ~~of~~ for the DS-TS 45MB tape streamer device.

The DS-TS 150MB is offered because ~~users need a larger~~ IT ALLOWS THE ADDED CAPACITY TO backup ~~device as the result of adding additional~~ 64MB or 140MB fixed Winchesters ~~to their Data Storage~~. WITHOUT HAVING TO CHANGE THE TAPE. THIS ALLOWS THE USER IN MANY CASES TO DO A BACKUP WITHOUT HAVING TO BE THERE. LARGERS DRIVES LIK THI

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DS-TS150/DS-TS150A - CONFIG. GUIDELINES/DEPENDENCIES

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11/02/92

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

SYSTEMS SUPPORTED
CS/386-D, CS-D/N, TURBO

HARDWARE REQUIRED
DS Prom Level R3 or greater
CSD Prom Level R3 or greater
Tape Media (725-7548[illegible]) must be ordered separately and be present at installation.
One of the following controllers:
22C11 disk/diskette controller
22C32 printer/workstation disk/diskette controller
If multiplexing the drive between CPU's one or both of the following ust be ordered:
2275MUX ~~2275/DS~~ disk multiplexing ~~unit~~ CONTROLLER. Supports up to 3 ADDITIONAL CPUs
2275MUXE ~~2275/DS~~ disk multiplexing extender CONTROLLER which supports an additional 4 CPUs, UP TO 3 SUPPORTED / 2275MUX.
22C80 disk multiplexing controller. One required for each CPU interfacing with 2275MUX or 2275MUXE
NOTE: 36-pin disk interface cable 220-0105-4 (auto enclosed)

SOFTWARE REQUIRED
2200 operating system 3.3 or greater
386 operating system 1.1 or greater
TURBO O/S 1.1 OR GREATER

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DS-TS150/DS-TS150A - DOCUMENTATION

$$T
11/02/92

FOCUS ARTICLES

Title	Date
CS/2200 Products Discontinued	11/01/90
Wang Express Adds New Supplies & Accessories	11/01/89
DS-TS150/DS-150A 150MB Tape Streamer Release	08/01/89

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DS-TS150/DS-TS150A - SPECIFICATIONS

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11/02/92

PERFORMANCE

Data Transfer Rate	86,300 bps @ 9 track 116.2 bps @ 17 track
Number of Tracks(Record and Read) (Read only)	17 single track serpentine format 9 tracks
Read/Write Speed	90 ips (forward/reverse)
Recording Density	8000 bpi @ 9 track 12800 bpi @ 17 track
Format	serial/serpentine
Tape Heads	Dual read-after-write, full-width erase bar
Storage Capacity	150MB w/600 foot tape
Type of Media	Streaming Half-Height Tape Cassette Drive

Track Width

Write	0.150 +/- 10 mm
Read	0.150 +/- 10 mm
Write	0.279 +/- 0.013 mm
Read	0.203 +/- 0.013 mm

DIMENSIONS

Overall Unit

Height	41.3 +/- 0.5 mm (1.626 +/-0.020 inches)
Width	146 +/- 0.5 mm (5.750 +/-0.020 inches)
Depth	203 +/- 1.0 mm (8.000 +/-0.040 inches)
Weight	1.2 kg (approximately)

Base Unit (3 1/2 inch formfactor)

Height	41.3 + 0 - 1 mm
Width	101 + 0.2 - 0.5 mm
Depth	146 + 0 - 1 mm
Weight	650 g

ENVIRONMENTAL

Temperature (Operating)	+5 to + 45 degrees
(Nonoperating)	-25 to +60 degrees
Humidity (Operating)	20% to 80% noncondensing Maximum Wet bulb 26
(Nonoperating)	10% to 90% noncondensing Maximum Wet Bulb 26

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DS-TS150/DS-TS150A - DISCONTINUED PRODUCT SUPPORT

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11/02/92

The following represents a list of select discontinued products that are currently supported. This list is not all inclusive.

- The DS-TS150/DS-TS150A is supported on the CS, VP, LVP, LVPC, MVP, MVPC, MicroVP-1 and MicroVP-2 with operating system 3.0 or greater.
- The discontinued 22C03 disk/diskette controller is supported with the DS-TS150/DS-TS150A.

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DS-TS150/DS-TS150A - ADDITIONAL INFORMATION

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11/02/92

- The DS-TS150/DS-TS150A replaces the DS-TS and DS-TSA which was discontinued on 09/30/89
- The Mean Time Between Failure is 8,000 hours minimum operating with tape motion.
- The Mean Time to Repair is 30 minutes maximum.
- The 600ft. (150MB) Cassette (part number 725-7548) is orderable through Wang Express.

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DS-TS150/DS-TS150A - DESCRIPTION/STRATEGY

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11/02/92

DS-TS150	2200 Series -150MB Half-Height Streaming Tape Cassette Drive
DS-TS150A	2200 Series -150MB Add-on Half-Height Streaming Tape Cassette Drive

The 2200 DS-TS150/DS-TS150A, is a 3 1/2 inch 150MB tape streamer device in a 5 1/4 inch adapter package and provides three times the backup capacity of the DS-TS. The DS-TS150MB fits in the same slot as the DS-TS on a DS, CS-D or CS/386-D. It can read tapes created on the ~~DS-TS~~ but can not write in 45MB format. It is ~~the~~ replacement ~~of~~ the DS-TS 45MB tape streamer device.

The DS-TS 150MB is offered because ~~users need a larger~~ backup ~~device as the result of adding additional~~ 64MB or 140MB fixed Winchesters ~~to their Data Storage~~. IT ALLOWS THE ADDED CAPACITY TO LARGERS DRIVES WITHOUT HAVING TO CHANGE THE TAPE. THIS ALLOWS THE USER IN MANY CASES TO DO A BACKUP WITHOUT HAVING TO BE THERE.

ECO DISTRIBUTION MATRIX

MAIL STOP	N/A	BELGIUM	NEW ZEALAND	IRELAND	027-120	026-G2A	HONG KONG	027-G1D	027-G1D	027-G1D	027-G1D	027-G1C	026-G2C	028-G1A	TAIWAN	027-120	TAIWAN	KOREA	027-220	027-220	027-G1C	025-15A	028-G1A	027-220	027-G1D	027-G1C	028-G1A	027-220	SINGAPORE	AUSTRALIA		
Mike Batia MS 027-G1D	ORIGINATOR	~~LUDWIG ADAM~~ Patrick Galle	SHARON ADAMS	GRAINNE BARRY	BOB BOERMEESTER	KAY CAMERON	STEPHEN CHUNG	DAVE CORBIN	ROGER DARKE	MARIA DERY	DON DESCHENES	JIM DUANE (Tempest Only)	JIM GAGNE	PAUL HARPER	WILLIAM HUANG	JACK KELLEY	BARRY LIEN	S.Y. CHUN	GARY MARCOTTE	STEVE MAGLIO	GENE MOORE (Tempest Only)	PHIL MURPHY	STAN PREBLE (Non - Tempest)	LUCY PRUDENCIO	GEORGE REINHART (Non - Tempest)	JULES RUTSTEIN	CARLOS SILVA (Tempest ONLY)	AL SOUMA	L.G. TAN / LIM HONG HIANG	DAVID WRIGHT	DISTR.	TOTAL
ORIGINATOR	1																														ALL	1
R&D ENG. MGR.												1													1						ALL	2
C.A.T.A.																										1					ALL@	1
USMO PURCHASING					1																										ALL	1
LOGISTICS																			1	1	1			1							ALL	4
PCB ASSY/TEST						1							1															1			ALL	3
FA&T MANAGERS																							2				3				ALL	5
PLANNER														1		1															ALL	2
METHODS ENG.											1																				ALL#	1
ED&D ENG.								1																							ALL*	1
ATE ENG.										1																					ALL*	1
COMPONENT ENG.									1																						ALL*	1
CSO MATL'S ACQUISITION																						1									ALL	1
REPAIR SITES		1	1	1			1								1		1	1											1	1	ALL**	9

	PCB ECO'S	QTY
VS	Pink, Brown, Green	26
TEMPEST	Yellow, Black, Green	20
	NON PCB	QTY
VS	Blue, Brown, Green	15
TEMPEST	Yellow, Green, Blue	18

NON-PCB ECO'S ONLY
* PCB ECO'S ONLY
** PCB ECO'S ONLY (Non Tempest)
@ IF SIGNED ONLY BY C.A.T.A.

Brown VS (ALL)
Pink VS (PCB'S Only)
Yellow Tempest (ALL)
Black Tempest (PCB'S Only)
Blue (All Non PCB Only)
Green (All ECO'S)

10/24/94
D. Betty/M. Dery
REV. 8

WANG ECO

CLASS 1 CONTROL NO 61916 SHEET 1 OF 2

ORIGINATOR: Mike Bahia EXT: 87095 M/S: 027-G1D DATE: 11/16/94

PART(S) AFFECTED: 725-4893

MODEL(S) AFFECTED: DS-TS150

ITEM MASTER DESCRIPTION: TEAC MT-2ST/N65 5 1/4" 150M TAPE DRIVE

SECURE SYSTEMS CHANGES?* Y ___ N x

CRITICAL FEATURES UPDATE REQUIRED?** Y ___ N x

DESCRIPTION OF CHANGE:

Remove prom at location U16 on underside of PCBACLD Board and replace with prom part # 730-1774.

Rework Instructions:

1. All newly purchased drives, drives of unknown origin, & all DOA returns must be checked for correct prom. To do so: Use Manufacturing Test Procedure, Rev 1, for part # 725-4893 and verify per Procedure 3.8, last line, that extended status byte 0 on test printout is "97'. If correct, prom is good. Otherwise continue as follows:
2. Remove PCBA-XD Brd, 2 screws, 2 conn, at rear of unit.
3. Remove 2 screws holding PCBACLD Board. Work board up carefully. There is a fixed connection next to the screw hole on the motor side & several cable connections.
4. On underside of board remove spring clip holding prom at location U16 and remove prom. Make note of orientation.
5. Remove sticker from prom and clean window if not clear.

(continued on page 2)

REASON/SYMPTON FOR CHANGE:

Wang is having difficulty purchasing drive from original vendor, TEAC, and has had to purchase the drive from a 3rd party. Drives from the 3rd party do not have the Wang ID imbedded in the prom. The drive is therefore not properly identified as a 150M and will not read or write in Wang proprietary environment.

REMARKS:

Good proms (with Wang ID) on existing drives have had following label on prom: "0131-01 C" Problem proms with no Wang ID have had a "D" on label stuck to prom. Once existing stock purged, problem should only affect newly purchased drives, drives of unknown origin, and possibly field DOAs.

PART(S) AFFECTED DISPOSITION

1-Use As is 2-Rework/Conform 3-Scrap 4-See Remarks

Cust. Units	Field Spares	Field Returns	Field H/O Inv	Mfg. Stock	Mfg WIP	Mfg. Fin.Gds.
1	4	4	2	2	2	2

REVISION LEVEL CHANGES	From	To		Y	N
ELECTRICAL REV.			FCO NEEDED?		N
MECH. DWG.			TSB NEEDED?	Y	
ARTWORK REV. AFFECTED:			ARTWORK REV TO SCRAP:		

EFFECTIVITY DATE	CONFORMANCE DATE
11/21/94	12/13/94
APPROVALS 12/6/94 MB	SIGNATURE/DATE

PROCESS OWNER

ORIGINATOR Michael Bahia 11/7/94

R&D ENG. MGR. [signature] 11-17-94

COMPLIANCE ENG. MGR. Michael Bahia 11/7/94

C.A.T.A.*

CTP II**

USMO PURCHASING [signature]

CSO MATERIAL ACQUISITION DM Phil Murphy 112294

LOGISTICS ENG. Thomas Massoud 11-29-94

ECO COORDINATOR Michael Bahia 12/6/94

BF

Rework Instructions continued:

6. Clean prom code from prom by placing in Prom Cleaner and using applicable cleaning instructions.
7. Rewrite prom using prom part # 730-1774 or associated prom file.
8. Relabel prom with revision C sticker.
9. Reverse steps 4, 3 & 2 to reinstall prom, and reconnect and secure the PCBACLD and PCBA-XD Boards.
10. Use Manufacturing Test Procedure, Rev 1, for part # 725-4893 to insure drive meets all test requirements including verification of extended status byte 0 which must be "97" on test printout.

WANG ECO

CLASS 1 CONTROL NO 61916 SHEET 1 OF 2

ORIGINATOR: Mike Bahia EXT: 87095 M/S: 027-G1D DATE: 11/16/94

PART(S) AFFECTED: 725-4893

ITEM MASTER DESCRIPTION: TEAC MT-2ST/N65 5 1/4" 150M TAPE DRIVE

MODEL(S) AFFECTED: DS-TS150

SECURE SYSTEMS CHANGES?* Y ___ N x

CRITICAL FEATURES UPDATE REQUIRED?** Y ___ N x

PART(S) AFFECTED DISPOSITION

1-Use As is 2-Rework/Conform 3-Scrap 4-See Remarks

Cust. Units	Field Spares	Field Returns	Field H/O Inv	Mfg. Stock	Mfg WIP	Mfg. Fin.Gds.
1	4	4	2	2	2	2

DESCRIPTION OF CHANGE:

Remove prom at location U16 on underside of PCBACLD Board and replace with prom part # 730-1774.

Rework Instructions:

1. All newly purchased drives, drives of unknown origin, & all DOA returns must be checked for correct prom. To do so:
   - Use Manufacturing Test Procedure, Rev 1, for part # 725-4893 and verify per Procedure 3.8, last line, that extended status byte 0 on test printout is "97'. If correct, prom is good. Otherwise continue as follows:
2. Remove PCBA-XD Brd, 2 screws, 2 conn, at rear of unit.
3. Remove 2 screws holding PCBACLD Board. Work board up carefully. There is a fixed connection next to the screw hole on the motor side & several cable connections.
4. On underside of board remove spring clip holding prom at location U16 and remove prom. Make note of orientation.
5. Remove sticker from prom and clean window if not clear.

(continued on page 2)

REVISION LEVEL CHANGES From To

			Y	N
ELECTRICAL REV.			FCO NEEDED?		N
MECH. DWG.			TSB NEEDED?	Y	
ARTWORK REV. AFFECTED:			ARTWORK REV TO SCRAP:		

EFFECTIVITY DATE	CONFORMANCE DATE
APPROVALS 12/6/94	12/13/94 SIGNATURE/DATE

PROCESS OWNER

ORIGINATOR

R&D ENG. MGR.

COMPLIANCE ENG. MGR.

REASON/SYMPTON FOR CHANGE:

Wang is having difficulty purchasing drive from original vendor, TEAC, and has had to purchase the drive from a 3rd party. Drives from the 3rd party do not have the Wang ID imbedded in the prom. The drive is therefore not properly identified as a 150M and will not read or write in Wang proprietary environment.

C.A.T.A.*

CTP II**

USMO PURCHASING

CSO MATERIAL ACQUISITION

REMARKS:

Good proms (with Wang ID) on existing drives have had following label on prom: "0131-01 C" Problem proms with no Wang ID have had a "D" on label stuck to prom. Once existing stock purged, problem should only affect newly purchased drives, drives of unknown origin, and possibly field DOAs.

LOGISTICS ENG.

ECO COORDINATOR

Rework Instructions continued:

6. Clean prom code from prom by placing in Prom Cleaner and using applicable cleaning instructions.
7. Rewrite prom using prom part # 730-1774 or associated prom file.
8. Relabel prom with revision C sticker.
9. Reverse steps 4, 3 & 2 to reinstall prom, and reconnect and secure the PCBACLD and PCBA-XD Boards.
10. Use Manufacturing Test Procedure, Rev 1, for part # 725-4893 to insure drive meets all test requirements including verification of extended status byte 0 which must be "97" on test printout.

5^2

WANG ECO CONTROL NO 60975

CLASS 1 ___
CLASS 2 x
CLASS 3 ___

SHEET 1 OF 8

ORIGINATOR: Mike Bahia DEPT: 15 EXT: 60256 M/S: 019-690 DATE: 12/01/92

PART(S) AFFECTED: 289-1820 167/187-3512 167/187-3527-46	P/N DESCRIPTION: CS-N to D upg DS Cabnt; CS-D CPU's
MODEL(S) AFFECTED: DS Cabinet; CS-D CPUs	DWG(S) AFFECTED:

DESCRIPTION OF CHANGE:

Change 167/187-3512 BOM as follows:
Delete 1 210-8826A
Add 1 210-8826B
Change item status of 210-8826B from 1 to 2. (379-8500R4 PROM)

Change 167/187-3527/28/29/30/31/32 BOM as follows:
Delete 1 212-7113
Add 1 212-7113-1
Change 167/187-3543/44/45/46 BOM as follows:
Delete 1 212-7113
Add 1 212-7113-1
Change 289-1820 BOM as follows:
Delete 1 212-7113
Add 1 212-7113-1
Change item status of 212-7113-1 from 1 to 2. (379-8500R4 PROM)

FEB 04 1993

REASON/SYMPTOM FOR CHANGE:
-Corrects problem where opening floppy door while reading a winchester surface could in a unique case cause an error.
-To provide enhanced features including:
Fixed drives can be configured through software with from 1 to 14 surfaces within specified guidelines.
Fixed addresses are partitioned by cylinder rather than surface.

PART(S) AFFECTED DISPOSITION

1-Use As is 2-Rework 3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
—	—	—	—	—	2	

EFFECTIVITY DATE 4/9/93 CONFORMANCE DATE 4/19/93

REMARKS:

CURRENT BUILD	PB X	PKWD	ME	WPR	
SITE INFORMATION	IR X	TAI X	AU	MX	

APPROVALS	SIGNATURE	DATE
ECO CHAIRPERSON		2/3/93
PROGRAM MGR.		12/4/92
DESIGN ENG.		
COMPLIANCE ENG.		12/3/92
SECURE SYSTEMS		
ORIGINATOR	Mike Bahia	12/1/92
ECO ANALYST	Judy Fuller	12/4/92
OTHER		

Rev 1

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OPTIONS- EFFECTIVITY 2 DATE

PARENT ITEM NUMBER	ITEM DESCRIPTION	UM	ITEM TYPE	ITEM CLASS	ITEM STAT	ENG REV	MFG REV	DSGN SRCE	DWG NUMBER	DWG SIZE	QTY	EFF OPTION
210-8826-B	DS DPU BOARD	EA	1		1	AB	AB				1	2
212-7113-1	CS-D DPU (R4 PROM)	EA	1		1	AA	AA				1	2

COMPONENT ITEM NUMBER	ITEM DESCRIPTION	UM	ITEM CLASS	ITEM STATUS	MAKE BUY	TOTAL QTY
209-8826	PCA DS DPU BOARD	EA		2	1	1.0000
209-9558	PCA DSPC MB CSD	EA		2	1	1.0000
209-9559	PCA	EA		2	1	1.0000
210-9558-B	DSPC MOTHER BOARD	EA		1	1	1.0000
210-9559-A	PCA CSD	EA		2	1	1.0000
300-1058	CAP 56 PF 100V 10% NPO CE	EA		2	2	1.0000
300-1084	CAP 82 PF 50V 5% NPO CER	EA		2	2	1.0000
300-1272	CAP 270 PF 100V 10% NPO C	EA		2	2	3.0000
300-1824	CAP 1000 PF 50V +80-20% X	EA		2	2	1.0000
300-1829	CAP 2000 PF 50V 5% NPO CE	EA		2	2	1.0000
300-1833	CAP .1 UF 50V +80-20% Z5U	EA	S	2	2	1.0000
300-1966	CAP .047UF 50V+80-20% Z5U	EA	S	2	2	79.0000
300-2122	CAP .022 UF 100V 10% MYLA	EA		2	2	1.0000
300-2611	CAP 47PF 100V 10% NPO CER	EA		2	2	1.0000
300-2615	CAP 150 PF 100V 5% NPO CE	EA		2	2	1.0000
300-2616	CAP 180 PF 100V 5% NPO CE	EA		2	2	2.0000
300-2617	CAP 4700 PF 50V 5% NPO CE	EA		2	2	1.0000
300-2618	CAP 1000 PF 50V 5% NPO CE	EA		2	2	3.0000
300-2620	CAP .01 UF 100V 20% Z5U C	EA		2	2	2.0000
300-2631	CAP 330 PF 100VDC 10% NPO	EA		2	2	1.0000
300-2633	CAP 560 PF 100VDC 10% NPO	EA		2	2	2.0000
300-2634	CAP 680 PF 100VDC 10% NPO	EA		2	2	1.0000
300-2639	CAP 2200 PF 100VDC 10% NP	EA	Y	2	2	3.0000
300-2659	CAP 1000 PF 100V 10% NPO	EA		2	2	2.0000
300-4022	CAP 15 UF 20V 10% TANTALU	EA		2	2	5.0000
300-4038	CAP 6.8 UF 35V 10% TANTAL	EA		2	2	2.0000
300-4065	CAP 10 UF 20V 10% TANTALU	EA		2	2	3.0000
300-4072	CAP .1 UF 50V 10% TANTALU	EA		2	2	1.0000
320-0908	COIL RF 4.7UH 1% .095DIA	EA		2	2	1.0000
321-1004	CLK OSC 16.0 MHZ TTL 4.0	EA		2	2	1.0000
321-1010	CLK OSC 10.0 MHZ .01% TTL	EA		2	2	1.0000
325-1503	SW DIP SLIDE SPST 8 POS	EA		2	2	2.0000
325-1504	SW DIP SLIDE SPST 4 POS	EA		2	2	1.0000
325-1514	SW DIP SLIDE SPST 4 POS	EA		2	2	1.0000
325-1516	SW DIP SLIDE SPST 8 POS	EA		2	2	3.0000
330-1034	RES 33 OHM 1/4W 5% METAL	EA		2	2	2.0000
330-1048	RES 47 OHM 1/4W 5% METAL	EA	S	2	2	1.0000
330-2011	RES 100 OHM 1/4W 5% METAL	EA		2	2	3.0000
330-2016	RES 150 OHM 1/4W 5% METAL	EA	S	2	2	2.0000
330-3011	RES 1.K OHM 1/4W 5% METAL	EA	S	2	2	1.0000
330-3021	RES 2K OHM 1/4W 5% METAL	EA		2	2	1.0000

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OPTIONS- EFFECTIVITY 2 DATE

COMPONENT ITEM NUMBER	ITEM DESCRIPTION	UM	ITEM CLASS	ITEM STATUS	MAKE BUY	TOTAL QTY
330-3023	RES 2.2K OHM 1/4W 5% META	EA	S	2	2	2.0000
330-3048	RES 4.7K OHM 1/4W 5% META	EA	S	2	2	8.0000
330-3052	RES 5.1K OHM 1/4W 5% META	EA		2	2	1.0000
330-4011	RES 10K OHM 1/4W 5% METAL	EA	S	2	2	4.0000
330-4023	RES 22K OHM 1/4W 5% METAL	EA		2	2	1.0000
330-4048	RES 47K OHM 1/4W 5% METAL	EA		2	2	1.0000
333-0018	RES 22.1K OHM 1/8W 1% FIX	EA		2	2	1.0000
333-0020	RES 100K OHM 1/8W 1% FIXD	EA		2	2	1.0000
333-0090	RES 10K OHM 1/8W 1% FIXED	EA		2	2	1.0000
333-0107	RES 1.5K OHM 1/8W 1% FIXD	EA		2	2	1.0000
333-0324	RES 130K OHM 1/8W 1% FIXD	EA		2	2	4.0000
333-0341	RES 590 OHM 1/8W 1% FIXED	EA		2	2	1.0000
333-0343	RES 36.5K OHM 1/8W 1% FIX	EA		2	2	1.0000
333-0807	RES NET 220/330 OHM TYPE:	EA		2	2	4.0000
333-0809	RES NET 10K OHM TYPE: 10/	EA		2	2	1.0000
333-0812	RES NET 4.7K OHM TYPE: 10	EA	S	2	2	8.0000
333-0835	RES NET 33 OHM TYPE: 16/0	EA	S	2	2	2.0000
333-0837	RES NET 1K OHM TYPE: 10/0	EA		2	2	3.0000
333-0880	RES NET 1K OHM TYPE: 10/0	EA		2	2	1.0000
333-0887	RES NET 220/330 OHM TYPE:	EA		2	2	1.0000
333-0891	RES NET 10K OHM TYPE: 10/	EA		2	2	4.0000
350-0219	CON UNIV PWR RCPT 3-3-3P	EA		2	2	1.0000
350-0453	CON 4 WALL HDR 17-17P .1C	EA		2	2	2.0000
350-0456	CON 4 WALL HDR 10-10P .1C	EA	S	2	2	4.0000
350-0457	CON 4 WALL HDR 25-25P .1C	EA		2	2	1.0000
350-1096	CON DRBBN RCPT 36P R/A	EA		2	2	1.0000
350-2096	CON DRBBN RCPT 36P SLDR T	EA		2	2	2.0000
350-5334	CON BRK-WY HDR 20-20P .1C	EA		2	2	2.0000
350-5337	CON BRK-WY HDR 3P .1C	EA		2	2	1.0000
350-6315	CON BOX RCPT 20-20P .1C	EA		2	2	2.0000
350-7203	CON SHUNT JUMPER ASSY 2P	EA		2	2	1.0000
376-0128	IC 7438 QUAD 2-INPUT NAND	EA		2	2	9.0000
376-0248	IC 74LS195 4B B SHF RGTR	EA		2	2	3.0000
376-0277	IC 74LS629 VOLT CONT OSC	EA		2	2	1.0000
376-0316	IC 74LS279 QD SET-RST LCH	EA		2	2	1.0000
376-0470	IC 26LS31 DIFF LN DRVR QD	EA		2	2	1.0000
376-0471	IC 26LS32 LN RCVR RS422	EA		2	2	1.0000
376-0486	IC 74LS125 QUAD BUS BFR	EA		2	2	1.0000
376-0502	IC 96LS02 DL RETRIG/RESET	EA		2	2	3.0000
376-0627	IC 74LS590 8BIT BIN CNTR	EA		2	2	1.0000
376-0651	IC 74F280 9BIT PARITY GEN	EA		2	2	1.0000
376-0663	IC 74ALS245 OCT BUS XCVR	EA		2	2	1.0000
376-0665	IC 74F02 QUAD 2-INP NOR	EA		2	2	1.0000
376-0667	IC 74F08 QUAD 2-INP AND	EA		2	2	1.0000
376-0674	IC 74F20 DL 4-INP-NAND	EA		2	2	1.0000
376-0676	IC 74F258 DATA SEL/MUXR	EA		2	2	6.0000
376-0678	IC 74F32 QUAD 2-INP OR	EA		2	2	1.0000

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OPTIONS- EFFECTIVITY 2 DATE

COMPONENT ITEM NUMBER	ITEM DESCRIPTION	UM	ITEM CLASS	ITEM STATUS	MAKE BUY	TOTAL QTY
376-0682	IC 74F74 DL D FF POS-EDG-	EA		2	2	1.0000
376-0715	IC 74LS123 MV RTRGBL	EA		2	2	2.0000
376-0725	IC 74ALS646 OCT BUS XCVR	EA		2	2	1.0000
376-0729	IC 74ALS374 OCT D FF EDG-	EA		2	2	2.0000
376-0730	IC 74ALS244 BFR/LN DRVR	EA		2	2	2.0000
376-0731	IC 74ALS138 DCDR/MUX 3 TO	EA		2	2	3.0000
376-0732	IC 74ALS02 2-INP POS-NOR	EA		2	2	2.0000
376-0736	IC 74ALS240 BFR/LN DRVR	EA		2	2	7.0000
376-0737	IC 74ALS74 DL D FF POS-	EA		2	2	9.0000
376-0738	IC 74ALS04 HEX INV 14 PIN	EA		2	2	3.0000
376-0743	IC 74ALS00 2-INP POS-NAND	EA		2	2	3.0000
376-0744	IC 74ALS08 2-INP POS-AND	EA		2	2	3.0000
376-0745	IC 74ALS11 3-INP POS-AND	EA		2	2	2.0000
376-0747	IC 74ALS32 2-INP POS-OR	EA	S	2	2	5.0000
376-0748	IC 74ALS163 DCD/BIN CNTR	EA		2	2	2.0000
376-0749	IC HEX D-TYPE F/F W/CLEAR	EA		2	2	1.0000
376-0751	IC 74ALS373 D LCH OCT T-S	EA		2	2	2.0000
376-0783	IC 74ALS139 DL DCDR/DMUX	EA		2	2	1.0000
376-0785	IC 74ALS157 DATA SEL/MUX	EA		2	2	1.0000
376-0808	IC 74F163 BIN CNTR SYN	EA		2	2	1.0000
376-0814	IC 74ALS10 3-INP POS-NAND	EA		2	2	2.0000
376-0817	IC 74ALS193 SYN 4BIT CNTR	EA		2	2	2.0000
376-0819	IC 74ALS174 HEX D FF	EA		2	2	1.0000
376-0841	IC 74ALS273 OCT D FF	EA		2	2	1.0000
376-0889	IC 74F14 HEX INV GATE 14	EA		2	2	1.0000
376-0895	IC 74F195 SHF RGTR 4 BIT	EA		2	2	1.0000
376-0904	IC 74F38 QD 2-IN NAND BFR	EA		2	2	1.0000
376-0935	IC 74ALS20 DL 4-INP NAND	EA		2	2	1.0000
376-0953	IC 74ALS21 DL 4-INP AND	EA		2	2	1.0000
376-0955	IC 74ALS153 DATA SEL/MUX	EA		2	2	1.0000
376-0979	IC 74F51 DL AND-OR-INV 2W	EA		2	2	2.0000
376-0998	IC 74ALS564 OCT D FF EDG	EA		2	2	1.0000
376-1064	IC 74ALS520 IDENT COMPTR	EA		2	2	2.0000
376-1142	IC CA3130E OPN AMPL COS/	EA		1	2	1.0000
376-8019	IC DIGITAL DELAYS #1 = 1	EA		2	2	1.0000
376-9008	SPACER DIP 8-8P .3/.1C	EA		2	2	2.0000
376-9011	SKT IC DIP 20-20P .6/.1C	EA	S	2	2	1.0000
376-9015	SKT IC DIP 14-14P .6/.1C	EA		2	2	1.0000
377-0368	IC Z80A CPU 8 BIT MICROPR	EA		2	2	1.0000
377-0371	IC CTC CNTR TIMER CIRCUIT	EA		2	2	2.0000
377-0411	IC 9517A-4 MULTIMODE DMA	EA		2	2	1.0000
377-0426	IC 765A SNGLE/DBLE DNSITY	EA		2	2	1.0000
377-0431	IC 16KX1 CMOS SRAM 100NS	EA		2	2	1.0000
377-0491	IC Z80B CTC COUNTER/TIMER	EA		2	2	2.0000
377-0622	IC 8KX8 SRAM 120NS CMOS	EA		2	2	2.0000
377-0631	IC Z80HCPU 8 MHZ CPU 8-BI	EA		2	2	1.0000
377-0651	IC 256KX1 DRAM NMOS 120NS	EA		2	2	1.0000

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OPTIONS- EFFECTIVITY 2 DATE

COMPONENT ITEM NUMBER	ITEM DESCRIPTION	UM	ITEM CLASS	ITEM STATUS	MAKE BUY	TOTAL QTY
377-0664	IC 64KX1 CMOS SRAM 55NS	EA		2	2	4.0000
377-0763	IC 10C20A DATA SEPARATOR	EA		2	2	1.0000
377-0766	IC 64KX4 NMOS DRAM 120NS	EA		2	2	2.0000
377-0779	IC 32KX8 SRAM CMOS 100NS	EA		2	2	8.0000
377-0784	IC 2010B WINCHESTER CNTRO	EA		2	2	1.0000
377-0905	IC 32KX8 CMOS EPROM 120NS	EA		2	2	1.0000
377-1070	IC 10C20B DATA SEPARATOR	EA		2	2	1.0000
377-4517	SIP 256KX9 NMOS DRAM 30P	EA		2	2	1.0000
377-6022	377-6022 HYB DATA SEPERAT	EA		2	2	1.0000
377-6031	IC WL3023 DATA SEPERATER	EA	Y	2	2	1.0000
380-1032	DIO VARACTOR 15V 460PF	EA		2	2	1.0000
410-1016	FERRITE BEAD W/LEADS,CLAS	EA	S	2	2	1.0000
449-0247	HANDLE,FACEPLATE	EA		2	2	2.0000
452-2095-99	FACE PLATE MACH (PC7042-2	EA		2	2	1.0000
452-2747	CLIP, SPACER (R.F.)	EA		2	2	1.0000
461-3141	SCREW CAP HOUSING B6422-2	EA		2	2	2.0000
461-3405	SCR CAP 8-32 2260C	EA		2	2	2.0000
462-0291	STANDOFF,MALE/FEMALE B681	EA		2	2	4.0000
462-0596	SPCR 6-32 M/F .355L .25HX	EA		2	2	6.0000
462-0920	SPACER, FACE PLATE(R.F.)	EA		2	2	1.0000
505-0030	HOLE PREP (CHEMICAL)	EA	A	2	2	.0000
505-0031	DRY FILM (CHEMICAL)	EA	A	2	2	.0000
505-0032	PLATING (CHEMICAL)	EA	A	2	2	.0000
505-0033	ETCHING (CHEMICAL)	EA	A	2	2	.0000
505-0034	GOLD PLATE (CHEMICAL)	EA	A	2	2	.0000
505-0035	SCREEN IMAGE (CHEMICAL)	EA	A	2	2	.0000
505-0036	OXIDE (CHEMICAL)	EA	A	2	2	.0000
508-8826-2	PCB INNER LAYER	EA	C	2	1	1.0000
508-8826-3	PCB INNER LAYER 4 & 5	EA	C	2	1	1.0000
508-8826-4	PCB INNER LAYER 6 & 7	EA	C	2	1	1.0000
508-9558-2	PCB INNER LAYER 2 & 3	EA	C	2	1	1.0000
508-9559-2	PCB INNER LAYER 2 & 3	EA	C	2	1	1.0000
509-8826	METHUEN LAM	EA	C	2	1	1.0000
509-9558	METHUEN LAM	EA	C	2	1	1.0000
509-9559	METHUEN LAM	EA	C	2	1	1.0000
510-8826	PCB DS DPU BOARD	EA		2	1	1.0000
510-9558	PCB DSPC MB CSD	EA		2	1	1.0000
510-9559	PCB CSD	EA		2	1	1.0000
600-9029	WIRE 22AWG SOLID BARE TIN	FT		2	2	.1250
615-0857	INSULATOR, 2200 D.S.	EA		1	2	1.0000
615-1242	PC TRIM STRP B6422-320	EA		2	2	1.0000
615-2318	LABEL, BARCODE	EA		2	2	1.0000
615-4044	LABEL, WARNING	EA		2	2	1.0000
650-2120	SCR 4-40 3/8L PAN PHL SEM	EA		2	2	3.0000
650-3080	SCR 6-32 1/4L PAN PHL SEM	EA		2	2	6.0000
650-4091	SCR 6-32 1/4L TPTT PAN PH	EA		2	2	1.0000
651-0002	SCR #6 3/8L SLFTPG TY-B P	EA		2	2	2.0000

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OPTIONS- EFFECTIVITY 2 DATE

COMPONENT ITEM NUMBER	ITEM DESCRIPTION	UM	ITEM CLASS	ITEM STATUS	MAKE BUY	TOTAL QTY
651-0030	SCR #4 1/2L SLFTPG TY-B P	EA		2	2	4.0000
652-0034	NUT CLNCH FOR PCB'S 6-32	EA		2	2	6.0000
653-2000	WSHR FLAT 5 .125 .312 .03	EA		2	2	3.0000
654-3022	CONTACT PIN PCB MNT .058D	EA		2	2	4.0000
664-2002-01	1.5 MIL AE D/F 17 3/4"	FT	A	2	2	1.8800
664-2110-01	1.5 MIL DRY FILM 13"	FT	A	2	2	1.7153
664-4014	RONAVEL C GOLD SALT 5T OZ	EA	A	2	2	.0000
664-7014-01	LAMI C1/C1 .008 14" X 18"	EA	A	2	2	1.0000
664-7018-01	LAMI C2/C1 .009 14" X 18"	EA	A	2	2	1.0000
664-7057-01	LAMI C1/C1 .035 14" X 18"	EA		2	2	.5000
664-9004-01	TREATED ALUMINUM 14"X18"	EA	A	2	2	.4000
664-9020-03	TEDLAR 16" X 20"	EA	A	2	2	.2500
664-9029-01	PREPREG 1080 18" X 14"	EA	A	2	2	4.0000
664-9031-01	PREPREG 2116 18" X 14"	EA	A	2	2	1.0000
664-9032-01	PREPREG 7628 18" X 14"	EA	A	2	2	1.0000
664-9051-05	ML BACK-UP BOARD 14"X18"	EA	A	2	2	.0833
664-9075-04	1/2 OZ CU FOIL	EA	A	2	2	1.0000

*** E N D O F R E P O R T ***

ECO NO 60975
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To: [illegible]
From:

Re: [illegible]iderations for 3 byte addressing.

Refererence: Disk storage specification document.

The current CS/386 and DS cabinet development is occuring on several levels.

DS Prom, revision level 4.

A new DS Prom, revision level 4., is being prepared and tested by Susan in the 8th floor lab area. Prom 4 is being introduced to accomplish several things.

. Allow variability in disk surface sizes. Wang 2200 disk surfaces have heretofor been of fixed sizes. eg. 10MB, or 16 MB. The surface size has been dictated by the type of drive installed 10, 20, 32, 64, 112 or 140 MB.

With DS prom level 4 and release 3 of the DS Utilities it will be possible to restructure the drives in a cabinet to differing fixed surface sizes. A single drive can be restructured to a maximum of 14 Winchester surfaces.

Disk surface assignments can be restructured to give the systems much more flexibility than they currently have. An individual application such as Wang WP which requires 4 floppy diskettes could be assigned its own single surface of 5056 sectors. Related data files might be assigned their own unique surface.

. Surface structure. The organization of data is being changed from a horizontal to a vertical structure. Tests run over the extended holiday have shown 8 million passes without error. The change to a vertical structure should improve performance by 10-20%.

. Three byte addressing. The VLSI and CS/386 BASIC-2 operating system have had a built in two byte addressing restriction from the beginning. With DS prom level 4 we will allow three byte addressing. To use three byte addressing we need revision level 2.0 of the CS/386 operating system.

CS/386 release 2.0 and three byte addressing:

. Two byte addressing. The VLSI and CS/386 BASIC-2 operation system have had a built in two byte addressing restriction from the beginning. Until now there has been a two byte surface addressing restriction of 16 MB allows reading or writing using a 2 byte disk address. Eg. a 16 MB platter could be addressed in sectors x'0000'-'FFFF'. The maximum number of sectors addressable is 64K or 65360.

. Three byte addressing. Certain applications have a need for data files that exceed 65000 sectors. Files of this size are not easily manipulated on the Wang 2200 or CS/386 system; such files have had to be specially created and addressed under BASIC-2 software control. In conjuction with DS prom level 4 and a new CS/386 operating system release we will allow three byte addressing.

CS/2200/386 disk surface structures:

... *The media surfaces of a CS/2200 disk are divided into cylinders, tracks, and sectors. A disk is initialized by a FORMAT command which divides it into a number of sectors; the default size of a sector is 256 bytes or optionally they can be formatted into 512 byte sectors.*

To find information on a surface a disk surface is divided into two areas. An index area beginning in surface sector x'0000' describes where each named file on a disk surface will reside. The area of the disk surface beyond the index area is reserved for the storage of data or program files. Normally catalogued files on the CS/2200 system are stored as a series of sequential sectors. There is no splitting up of these sequential sectors within a named file.

. *The index area. The index area of a disk surface is established via a SCRATCH DISK command.*

. *Catalog summary: Sector x'000000' bytes 0-15 summarize the catalogued area.*

item 1 -	*in byte 0 describes the index type 0, 1 or 2.*	
item 2 -	*denotes the number of index sectors.*	*INDEX SECTORS*
item 3 -	*denotes next address available in the catalog.*	*CURRENT END*
item 4 -	*denotes the maximum address available.*	*END CAT. AREA*

The balance of the index area is set to zero by the SCRATCH DISK command. This area is reserved for a number of 16 byte file name entries.

. *File name entries.*

Files are entered into the catalogued area of a disk by MOVE commands or else by a SAVE of programs or data. Each file entered into the catalogued area of a disk surface is given a file name and an entry is made in the file name area of the index area. Each file name must be unique and is accessed within the index area by one of several 'hashing' techniques based on the index type (0, 1, or 2) invoked by the SCRATCH DISK command.

This area is reserved for a number of 16 byte file name entries.

- *item 1 - active, scratched, or available designator.*
- *item 2 - Program, Data, or available designator.*
- *item 3 - start Address pointer to the file.*
- *item 4 - End Address pointer to the file.*
- *item 5 - FileName, the 1-8 byte name of the file stored.*

Important notice before installing DS PROM 4

(Until DS Prom 4.0 is released it will be numbered 3.E or greater).

.1 Assure all surfaces have backed up to cassette before installing prom. The new prom will require you to restructure all fixed Winchester surfaces. No existing fixed Winchester drive can be read by the DPU once the new prom is installed. Steps 1 and 2 can be completed before the Wang CE comes on-site.

.2 Assure the CS/2200/386 Operating system and the new DS utilities provided here are on a readable diskette media before installing the new prom. You cannot bring up the operating system from a fixed Winchester running under the new prom 3.E. until all surfaces are restructured, reformatted, and restored.

.3 Before installing the new DS Prom become familiar with the new DS Configuration Utility ("@DSCFIG"). The DS Configuration screen is slightly different showing the maximum address capability of each disk surface address. Run '15 "Start Setup" which will allow you to reconfigure the system into new surfaces. You cannot apply a new configuration unless you are on terminal one and running with the new prom. Make sure steps 1. and 2. above are completed before installing the new prom.

Wang DS Cabinet Enhancements

by Tyler B. Olsen

The Wang Data Storage cabinet (DS or CS-D) will soon have some new features. These features will be useful whether you are running a DS cabinet with a CS, CS-D, MicroVP or Wang 2200-MVP.

New DS-DPU PROM microcode and related DS utilities will provide enhancements that include the ability to configure platters of varying sizes and have improved tape utilities.

With CS/386 Operating System Release 2, three byte addressing will be added, allowing the ability to address surfaces and files greater than 65,024 sectors.

Improved Tape Utilities

There have been significant changes made to three of the DS cabinet Utilities: DS Configuration, Backup Disk Platters to Tape Cassette and Restore Disk Platters from Tape Cassette.

Within all three utilities, a display is shown of the tape drive type (45 or 150 MB) and the cassette type and status mounted. Progress displays have been added to the backup and restore utilities.

Performance within the tape backup and restore utilities has been improved. Backup from a disk surface external to the DS cabinet has been speeded up by reading 32 sectors at a time from the disk before writing to the tape buffers.

Similar concepts were incorporated into tape restore. Surface transfers within the DS cabinet are handled in 128 blocks, i.e., 256 sector chunks.

The restore utility now provides a rapid display of the index data written on a cassette before tape retensioning. Within a single prompt sequence several surfaces can be called for restoration; restoration of all surfaces specified for restoration occurs on a single tape pass.

Reorganization of Platters

Until DPU PROM Release 4, DS Winchester drives have always been configured in a rigid way. A 64 MB drive was 4 surfaces of 16 MB; a 32 MB drive was 2 surfaces of 16 MB; a 20 MB drive was two surfaces of 10 MB; a 140 MB drive was 14 10 MB surfaces and a 112 MB has been 7 surfaces of 16 MB.

With Release 4 the disk address orientation will become vertical, addressed in a cylinder format. The first track; first cylinder will contain parameters for the entire drive. A single addressed surface will occupy sequentially all the sectors in a track under a read head and then jump within the same vertical cylinder to the next read head.

With this implementation there should be less mechanical movement of the read heads within a specified surface address. A "DS Configuration" utility can be run where a system administrator will be able to reconfigure the Winchester drives into varying platter sizes based on his systems needs. Using "Default" values you can reconfigure to the original disk surface sizes and surface designations.

DS Configuration Utility

The DS Configuration utility has been enhanced with a capability to "Setup DS Surface Assignments". This menu will allow you to configure or reconfigure the Winchester surfaces within a DS or CS-D cabinet to new surface assignments and sizes. Now, a single Winchester drive can be reconfigured to be a single large surface or subdivided into as many as fourteen surfaces. Access to a sector address greater than 65,024 on a single surface will require the CS/386 operating system Release 2 and access via a new index type.

To illustrate how you can take advantage of this feature, we will use a typical system like a CS/386, CS or MicroVP using a DS Cabinet with a 1.2 MB diskette, a 150 MB tape streamer for backup; two 64 MB drives and a one 20 MB hard disk drive.

The following table shows how those three hard drives had to be configured before, along with a sample of just one of the many possible ways you can now configure those same three Winchester hard disk drives.

With DPU PROM Release 4, instead of just 10 surfaces only using configurations of 65,024 or 38,912 sectors, our example has reconfigured the same three drives to use 22 surfaces varying in size from 1,280 sectors to 100,000 sectors.

Typical Hard Disk Previous DPU PROM	Typical Hard Disk Release 4 DPU PROM
— 1st 64 MB Disk —	— 1st 64 MB Disk —
D21 - 65,024 sectors	D21 - 38,912 sectors
D22 - 65,024 sectors	D22 - 4,160 sectors
D23 - 65,024 sectors	D23 - 4,160 sectors
D24 - 65,024 sectors	D24 - 65,024 sectors
	D25 - 65,024 sectors
	D26 - 12,000 sectors
	D27 - 12,000 sectors
	D28 - 12,000 sectors
	D29 - 12,000 sectors
	D2A - 12,000 sectors
	D2B - 22,816 sectors
- 2nd 64 MB Disk —	- 2nd 64 MB Disk —
D25 - 65,024 sectors	D61 - 100,000 sectors
D26 - 65,024 sectors	D62 - 38,912 sectors
D27 - 65,024 sectors	D63 - 38,912 sectors
D28 - 65,024 sectors	D64 - 38,912 sectors
	D65 - 38,912 sectors
	D66 - 4,448 sectors
—— 20 MB Disk —	—— 20 MB Disk —
D61 - 38,912 sectors	D67 - 62,912 sectors
D62 - 38,912 sectors	D68 - 1,280 sectors
	D69 - 1,280 sectors
	D6A - 8,000 sectors
	D6B - 4,352 sectors

Conclusion

With the new DPU PROM level 4, the user has the ability to size disk surface requirements to his own needs isolating selected software and data files to unique surfaces. The rev 4 DPU PROM, DS Utilities Release 3, and the CS/386 Release 2.0 should be available by June 30, 1991. In my next article I will discuss the implementation of 3 byte addressing. *B2R*

Tyler B. Olsen is a principal software engineer for the Wang Laboratories CS/2200 Product Group. Tyler can be reached at m/s: 014-890, One Industrial Ave, Lowell, MA 01851 (508) 967-0339.

WANG FIELD CHANGE ORDER

COMPANY CONFIDENTIAL

FCO NO.
1375

Equipment Affected: 2200 DS

FCO Class: Problem Only/Next Call | FCO Kit No.: 728-0386 | Page 1 of 6

Documentation Class Code: 3107 | FCO Doc. No.: 729-1824 | Approval Date: NOV 15 1989

Est. Install Time: 15 Minutes | Ref. ECO No.: 55876

1. REASON FOR CHANGE

   1. To allow 150M Tape Drive to function with DS.
   2. To correct "Cache Overflow" problem.

2. DESCRIPTION OF CHANGE

   One E-PROM is replaced on the 210-8826 DPU Board.

3. DOCUMENTATION AFFECTED

   N/A

4. PREREQUISITE (S)

   A. Hardware

      N/A

   B. Software

      N/A

Field Support Ops	Logistics 11/9/89	Originator 11/7/89	ECO Support Mgr.

5. INSTALLATION PROCEDURE

A. Power off. Remove AC cord from source outlet.

B. Power down CPU (if attached).

C. Remove I/O cable.

D. Remove rear panel as follows: (Figure 1)

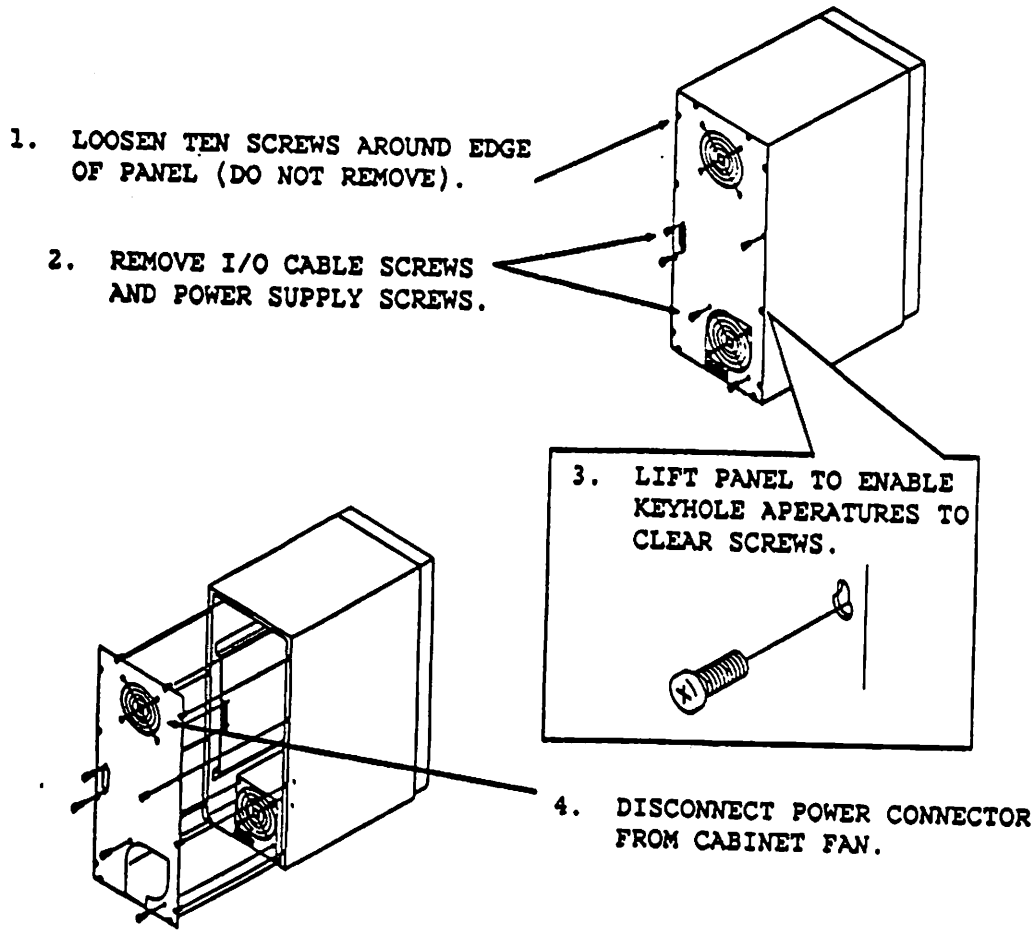
1. Loosen ten screws around edge of panel (do not remove).

2. Remove I/O cable screws (standoffs) and power supply screws.

3. Lift panel to enable keyhole apertures to clear screws.

4. Disconnect power connector from cabinet fan.

FIGURE 1



NOTE

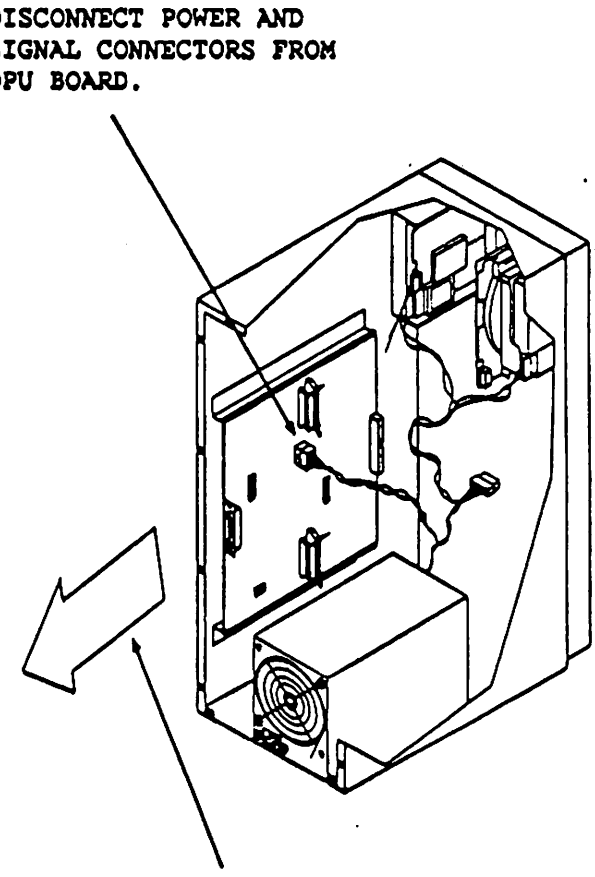
BEFORE PERFORMING NEXT STEP E(1), MARK POWER AND SIGNAL CONNECTORS FOR PROPER RECONNECTION.

E. Remove the 210-8826 DPU Board as follows: (Figure 2)

1. Disconnect power and signal connectors from DPU board.

2. Slide DPU board from cabinet.

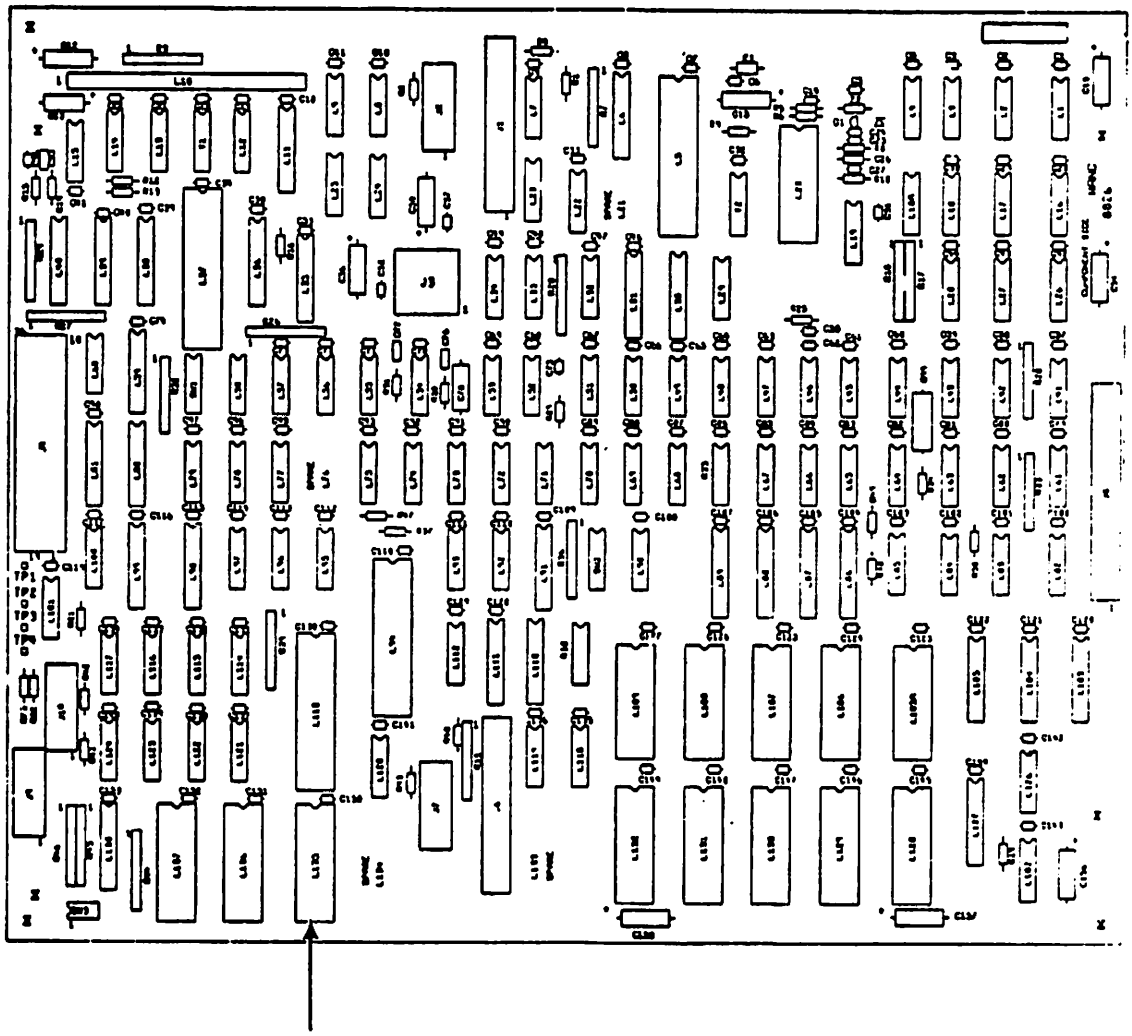
FIGURE 2



F. Rework the 210-8826 DPU Board as follows: (Figure 3)

1. Remove E-PROM from location L135 and replace with E-PROM (379-8500-R3) contained in Kit.

FIGURE 3: 210-8826 DPU BOARD (COMPONENT SIDE)



**REMOVE E-PROM FROM LOCATION L135
AND REPLACE WITH E-PROM (379-8500-R3)
CONTAINED IN KIT.**

G. To complete installation of FCO, fill in applicable information on the Field Change History tag. (Part #615-3299). The tag should be mounted on inside of rear cover.

NOTE: The Field Change History tags can be obtained by placing a routine order through the Logistics Order Processing System.

H. Reassemble unit by reversing Steps E thru B.

I. Perform check-out procedure described in Section 6.

J. Document installation of this FCO by completing a Call Report or Activity Report.

6. CHECK-OUT PROCEDURE

Power up. Verify all disks. Run disk diagnostics. Observe normal operation.

7. FCO KIT PARTS LISTING

KIT #728-0386

Item	Qty	Item Description
729-1824	1	FCO Document 1375
379-8500-R3	1	E-PROM

8. FCO KIT AVAILABILITY DATE

NOTE:

When determining kit requirements, be aware that manufacturing has cut this change into this product as of October 31, 1989. Products shipped/installed after this date will contain this FCO.

8. FCO KIT AVAILABILITY DATE (CONTINUED)

FCO Kit #728-0386 will be available November 27, 1989 and can be obtained by placing a special order. Special orders for FCO kits are exempt from the established approval loop. They should be mailed directly to:

Logistics Order Processing
Wang Laboratories
836 North Street
Tewksbury, MA 01876

Att'n: Order Services
M/S 025-290

Dealers may obtain the FCO Kit by completing a Dealer Parts Sales form and sending it to:

Dealer Distribution Center
Wang Laboratories
836 North Street
Tewksbury, MA 01876

Att'n: Order Services
M/S 025-290

9. REMOVED PARTS DISPOSITION

Recycle removed E-PROM thru your FSC.

10. MISCELLANEOUS

N/A

WANG FIELD CHANGE ORDER

COMPANY CONFIDENTIAL

FCO NO. 1335

Equipment Affected: 2200 DS

FCO Class: Problem Only/Next Call | FCO Kit No.: 728-0347 | Page 1 of 6

Documentation Class Code: 3107 | FCO Doc. No.: 729-1784 | Approval Date: JUN 9 1989

Est. Install Time: 15 Minutes | Ref. ECO No.: 53510

1. REASON FOR CHANGE

1. To allow internal disk to tape transfers greater than 256 sectors.
2. To write-protect/enable platters through software commands.
3. To add diagnostic commands to "Flush Cache" and to "re-run power-on diagnostics".
4. To prevent unit "hang" problem during tape backup.
5. To correct "I90" errors when connected to 2275 MUX.
6. To correct "$FORMAT" problem of not writing all sectors.
7. To add byte to status command to reflect Write Protect/Enable status of drive.
8. To improve restore time of removable Winchester.
9. To correct tape drive reset to allow reset of drive only if a command is in progress.

2. DESCRIPTION OF CHANGE

One E-PROM is replaced on the 210-8826 DPU Board.

3. DOCUMENTATION AFFECTED

N/A

4. PREREQUISITE (S)

A. Hardware

N/A

B. Software

N/A

Field Support Ops	Logistics	Originator	ECO Support Mgr.
6/8/89	6/7/89	6/7/89	6/9/89

5. INSTALLATION PROCEDURE

A. Power off. Remove AC cord from source outlet.

B. Power down CPU (if attached).

C. Remove I/O cable.

D. Remove rear panel as follows: (Figure 1)

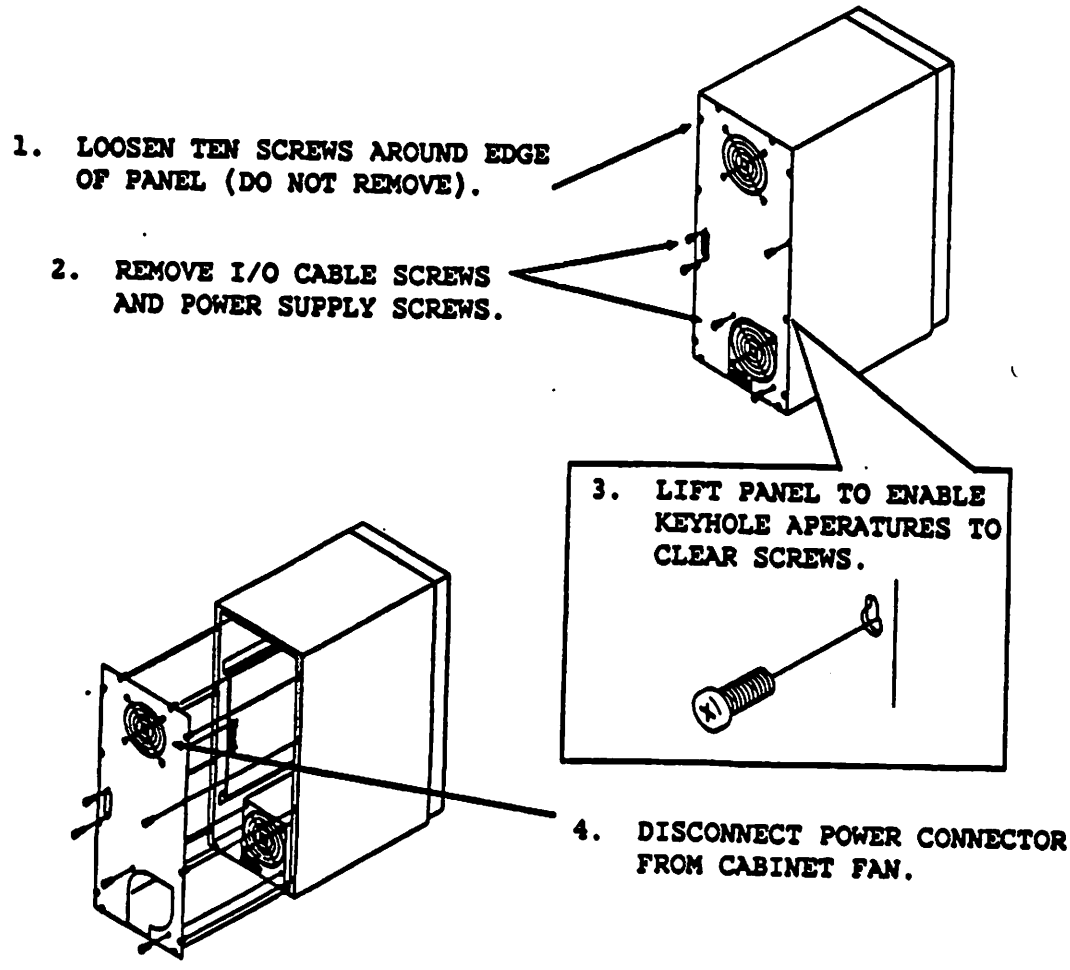
1. Loosen ten screws around edge of panel (do not remove).

2. Remove I/O cable screws (standoffs) and power supply screws.

3. Lift panel to enable keyhole apertures to clear screws.

4. Disconnect power connector from cabinet fan.

FIGURE 1



NOTE

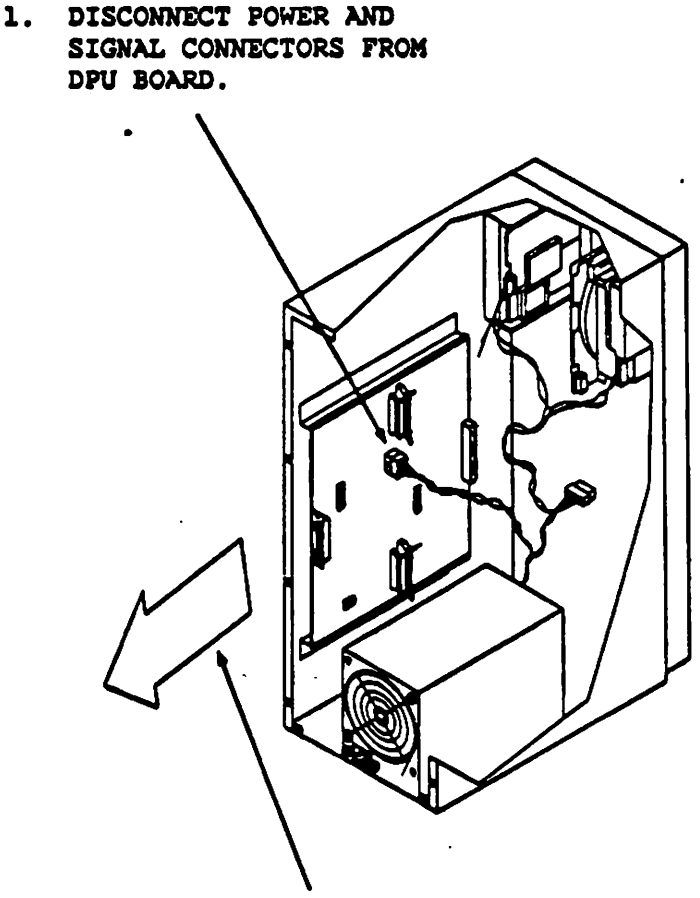
BEFORE PERFORMING NEXT STEP E(1), MARK POWER AND SIGNAL CONNECTORS FOR PROPER RECONNECTION.

E. Remove the 210-8826 DPU Board as follows: (Figure 2)

1. Disconnect power and signal connectors from DPU board.

2. Slide DPU board from cabinet.

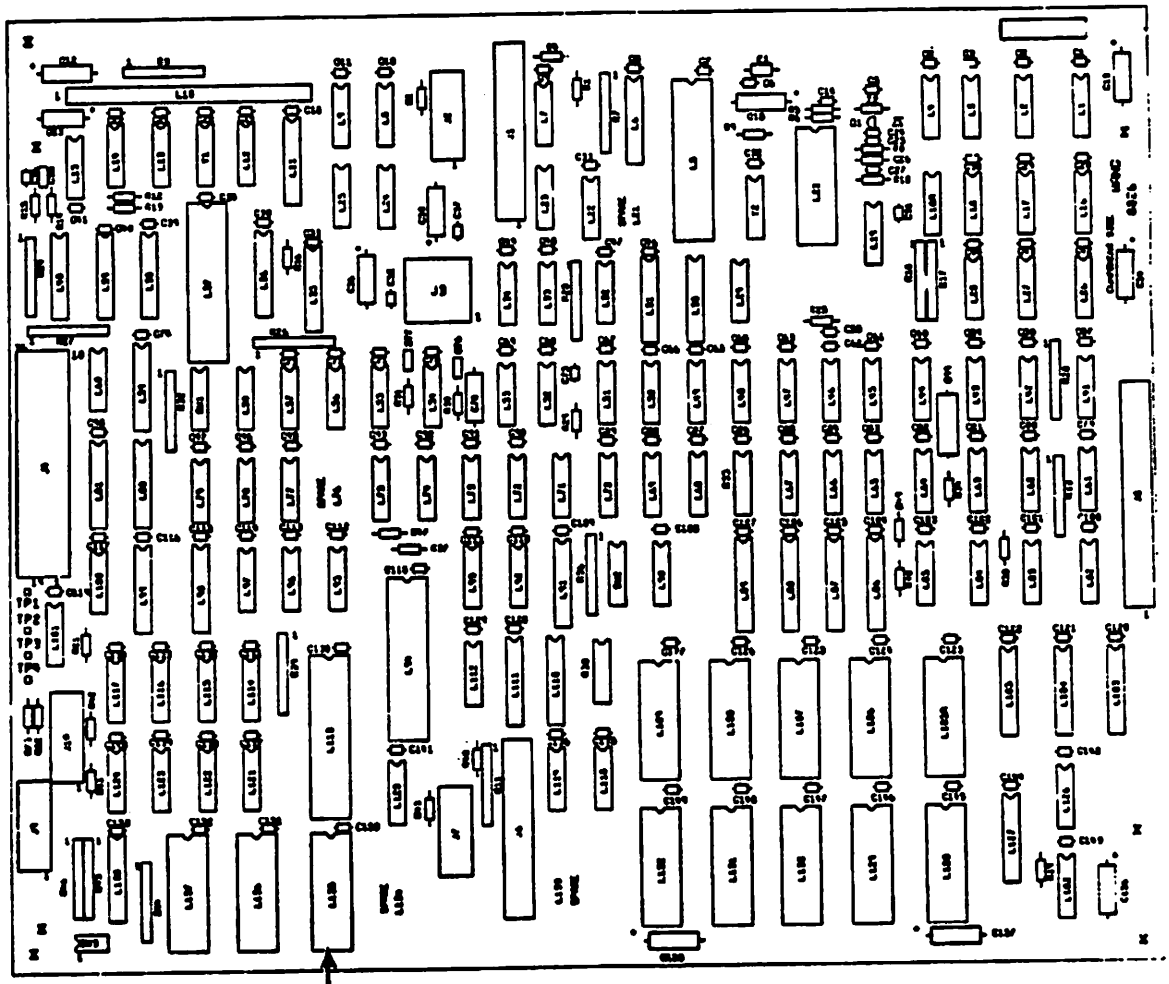
FIGURE 2



F. Rework the 210-8826 DPU Board as follows: (Figure 3)

1. Remove E-PROM from location L135 and replace with E-PROM (379-8500-R2) contained in Kit.

FIGURE 3: 210-8826 DPU BOARD (COMPONENT SIDE)



REMOVE E-PROM FROM LOCATION L135 AND REPLACE WITH E-PROM (379-8500-R2) CONTAINED IN KIT.

G. To complete installation of FCO, fill in applicable information on the Field Change History tag. (Part #615-3299). The tag should be mounted on inside of rear cover.

NOTE: The Field Change History tags can be obtained by placing a routine order through the Logistics Order Processing System.

H. Reassemble unit by reversing Steps E thru B.

I. Perform check-out procedure described in Section 6.

J. Document installation of this FCO by completing a Call Report or Activity Report.

6. CHECK-OUT PROCEDURE

Power up. Verify all disks. Run disk diagnostics. Observe normal operation.

7. FCO KIT PARTS LISTING

KIT #728-0347

Item	Qty	Item Description
729-1784	1	FCO Document 1335
379-8500-R2	1	E-PROM

8. FCO KIT AVAILABILITY DATE

NOTE:

When determining kit requirements, be aware that manufacturing has cut this change into this product as of June 5, 1989. Products shipped/installed after this date will contain this FCO.

8. FCO KIT AVAILABILITY DATE (CONTINUED)

FCO Kit #728-0347 will be available July 14, 1989 and can be obtained by placing a special order. Special orders for FCO kits are exempt from the established approval loop. They should be mailed directly to:

Logistics Order Processing
Wang Laboratories
836 North Street
Tewksbury, MA 01876

Att'n: Order Services
M/S 025-290

Dealers may obtain the FCO Kit by completing a Dealer Parts Sales form and sending it to:

Dealer Distribution Center
Wang Laboratories
836 North Street
Tewksbury, MA 01876

Att'n: Order Services
M/S 025-290

9. REMOVED PARTS DISPOSITION

Recycle removed E-PROM thru your FSC.

10. MISCELLANEOUS

N/A

MICHAEL E BAHIA
PROJ# K616 (1 COPIES)
M/S: 001-330

ECO DISTRIBUTION MATRIX

ECO 6153

MAIL STOP

Mike Bahia
m/s 019-690
027G1D

	N/A	ORIGINATOR	BELGIUM	NEW ZEALAND	IRELAND	C27-120	C25-G2A	HONG KONG	C27-G1D	C27-G1D	C27-G1D	C27-G1D	C27-G1C	C27-G1D	TAIWAN	C28-G1A	TAIWAN	KOREA	C27-220	C27-220	C27-220	C27-G1C	C25-1EA	C28-G1A	C27-220	C27-G1D	C27-G1C	C28-G1A	C25-G2D	SINGAPORE	AUSTRALIA		
																															DISTR.	TOTAL
ORIGINATOR		1																													ALL	1
R&D ENG. MGR.													1													1					ALL	2
C.A.T.A.																											1					ALL@	1
USMO PURCHASING							1																									ALL	1
LOGISTICS																			1	1		1			1							ALL	4
PCB ASSY/TEST								1							1													1				ALL	3
FA&T MANAGERS																								2					1			ALL	5
PLANNER																1																ALL	1
METHODS ENG.										1																						ALL#	1
ED&D ENG.									1																							ALL*	1
ATE ENG.											1																					ALL*	1
COMPONENT ENG.												1																				ALL*	1
CSO MATL'S ACQUISITION																							1									ALL	1
REPAIR SITES		1	1	1			1									1		1	1											1	1	ALL**	9

	PCB ECO'S	QTY
VS	Pink, Brown, Green	25
TEMPEST	Yellow, Black, Green	19
	NON PCB	**QTY**
VS	Blue, Brown, Green	14
TEMPEST	Yellow, Green, Blue	17

Brown VS (ALL)
Pink VS (PCB'S Only)
Yellow Tempest (ALL)
Black Tempest (PCB'S Only)
Blue (All Non PCB Only)
Green (All ECO'S)

NON-PCB ECO'S ONLY
* PCB ECO'S ONLY
** PCB ECO'S ONLY (Non Tempest)
@ IF SIGNED ONLY BY C.A.T.A.

8/1/94
D. Betty/K. Dem-

WANG ECO

CLASS 1 CONTROL NO 61753 SHEET 1 OF 4

ORIGINATOR: Mike Bahia EXT: 60256 M/S: 019-690 DATE: 08/16/94

PART(S) AFFECTED:	ITEM MASTER DESCRIPTION:
725-1481	TEAC MT-2ST/45D 5 1/4" HH Cartridge Tape Drive
MODEL(S) AFFECTED: DS-TS	SECURE SYSTEMS CHANGES?* Y N X
	CRITICAL FEATURES UPDATE REQUIRED?** Y N X

PART(S) AFFECTED DISPOSITION

1-Use As is 2-Rework/Conform 3-Scrap 4-See Remarks

Cust. Units	Field Spares	Field Returns	Field H/O Inv	Mfg. Stock	Mfg WIP	Mfg. Fin.Gds.
4	14	2	4	2	2	2

DESCRIPTION OF CHANGE:

Unsolder revision C prom at location U3 of the PCBA-IC Board and replace with revision D (p/n 730-1728) as per TEAC Engineering Change Notice/Request C-364 dated 7/14/86.

REVISION LEVEL CHANGES	From	To		Y	N
ELECTRICAL REV.			FCO NEEDED?		NO
MECH. DWG.			TSB NEEDED?	YES	
ARTWORK REV. AFFECTED:			ARTWORK REV TO SCRAP:		

EFFECTIVITY DATE	CONFORMANCE DATE
9/13/94	9/20/94

APPROVALS SIGNATURE/DATE

ORIGINATOR Michael Bahia 9/6/94

R&D ENG. MGR. [signature] 9/7/94

COMPLIANCE ENG. MGR. Michael Bates 9/8/94

REASON/SYMPTON FOR CHANGE:

If looking for end of data out beyond the existing end of data where the tape is blank, the drive fails to respond properly resulting in a hang. See TSB HWT 9524, Matrix 3107, from 12/4/90 for additional information.

C.A.T.A.*

USMO PURCHASING [signature] 9/9/94

CSO MATERIAL ACQUISITION Phil Murphy 9.13.94

REMARKS:

Replace as needed, FOR CUSTOMER UNITS AND FIELD SPARES, PER TSB. FIELD H/O INVENTORY (046) HAS BEEN UPDATED TO REVISION D PARTS.

LOGISTICS ENG. Stan M Maglis 9/13/94

ECO COORDINATOR Michael Bates 9/13/94

TEAC ENGINEERING CHANGE REQUEST

Messrs.

ECO NO 61753

SHT 2 OF 4

REQUEST NO: C-364

ISSUE DATE: July 14, '86

Issued By: S. Muroya/Manager, Tech. Support Eng.
Name/Title

INSTRUMENTATION & COMPUTER PRODUCTS DIVISION
TEAC CORPORATION
3-7-3 Naka-cho, Musashino-shi, Tokyo, Japan
Tel: (0422) 53-1111, Telex: 2822561 (TEACSH J)

Model: MT-2ST/45D

TYPE OF MODIFICATION	1 ☐ Circuitry	2 ☐ Dimensions	3 ☐ Parts	4 ☐ Specs.	5 ☒ Others

This is to request your approval of the following engineering change(s).
Please return a copy of this REQUEST form with your signature by the date specified.

Description of Change:

Modification of program of D/CAS 20 IC

1. Applicable models
   (1) MT-2ST/45D : 19305060-14

2. Applicable assembly
   (1) IC (D/CAS 20): 13700065-00 (EPROM 2764)
   Installed at U3 on the PCBA interface control (15532058-10).

3. Change
   When the EOT hole is detected on the last track (Tr 8) during writing, "RETRY" (judged as error) will be output for blocks which could extend beyond the hole, even if correct writing has been done.

4. Reason for change
   Read errors are likely to happen with blocks which extend to the hole.

Reply: Please return this ECR copy (front page only) with your signature dated before August 14, 1986.

INTERCHANGEABILITY: YES ☒ NO ☐

REMARKS:

ISSUE ROM ISSUE C → D
(PCBA ISSUE: no change)

Serial Number Identification:

YES ☒: Starting Number: 650271

Note: It is possible that both previous and changed products are included in the same shipment for a certain period after starting change.

NO ☐:

BUYER SIGNATURE:

APPROVED ☐

DISAPPROVED ☐

SIGNED: _____
Name/Title

Remarks:

TO: WANG
Mike Bahia

From: John x830
TEAC

TEAC ENGINEERING CHANGE REQUEST

Messrs.

ECO NO 61753

SHT 3 OF 4

REQUEST NO: C-407

ISSUE DATE: June 30,1987

Issued By: S.Murova/Tech. support Eng.
Name/Title

INSTRUMENTATION & COMPUTER PRODUCTS DIVISION
TEAC CORPORATION
3-7-3 Naka-cho, Musashino-shi, Tokyo, Japan
Tel: (0422) 53-1111, Telex: 2822661 (TEACSH J)

Model: MT-2ST/45D
MT-2ST/45DF

TYPE OF MODIFICATION	1 ☐ Circuitry	2 ☐ Dimensions	3 ☐ Parts	4 ☐ Specs.	5 ☒ Others

This is to request your approval of the following engineering change(s).
Please return a copy of this REQUEST form with your signature by the date specified.

Description of Change: Program change for ROM 2764

1. Applicable model

   1) MT-2ST/45D :P/N 19305060-14

   2) MT-2ST/45DF :P/N 19305060-16

2. Applicable assembly

   1) IC, D/CAS 20 :P/N 13700065-00(for 45D model)

   2) IC, D/CAS 30 :P/N 13700067-00(for 45DF model)

   *These ICs are mounted on the interface control board.

Reason(s) for Change:

Please refer to next page 2/2.

Reply: Plz.return this copy by July 31,1987. This issue may implement unless any response notifys by returning data.

INTERCHANGEABILITY: YES ☒ NO ☐

REMARKS:

ISSUE

Refer to next page.

Serial Number Identification:

YES ☒: Starting-Number: 663001

Note: It is possible that both previous and changed products are included in the same shipment for a certain period after starting change.

NO ☐:

BUYER SIGNATURE:

APPROVED ☐ DATE:

DISAPPROVED ☐

SIGNED:
Name/Title

Remarks:

3. Description of change

The following farmware change is made for ROM 2764.

1) Before change

The data blocks were eritten to the end of EOM,but in case of no written a file-mark on the tape while the writing operation of MT-28T/20D drive. All data of that can be correctly read by MT-28T/45D or 45DF drive,but a error status of BOT/EOT(84 Fault) may occur from current farmware when detected BOT/EOT hole, and terminates all operations.

2) After change

At the read operation for such tape by 28T·45D/DF drive,he issues the status information of "Read error filler block transfer(8600)" (=one Filler Block to be added onto last data block at the end of read operation.) and terminates all operations after finishing of all data reading and transfered to the host.

4. Reason for change

Since either no-error or BOT/EOT error will occur at reading such tape as mention above, there is a difference in error status at terminating read operation. The change is then made so that Read Error status(8600) becomes True at termineting read operation.

5. Change ROM issue

ROM issue will be changed as follows.

1) IC, D/CSA 20 : Issue D ⟶ E

2) IC, D/CAS 30 : Issue C ⟶ D

55 7.

WANG ECO

CONTROL NO 61119

PRIORITY 1 ___
PHASE-IN 2 X
DOCUMENTATION 3 ___

SHEET 1 OF 3

ORIGINATOR:	DEPT:	EXT:	M/S:	DATE:
Mike Bahia	15	60256	019-690	02/05/93

PART(S) AFFECTED: 289-0847

P/N DESCRIPTION: DS-1.2MB FLPY DSKT DR

MODEL(S) AFFECTED: DS-1.2

DWG(S) AFFECTED:

DESCRIPTION OF CHANGE:

Change BOM 289-0847 as follows:

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete:	725-0258-G	5 1/4" HH 1.2MB FLPY	EA	1	1	1
Add:	270-5162	5 1/4" HH 1.2MB w/TERM	EA	1	1	1

NOTE: Use existing stock of 725-0258-G

REASON/SYMPTOM FOR CHANGE:

The 1.2MB 5 1/4" HH Drive, 725-0258-G is no longer available from the vendor. New floppy drive to replace old floppy drive.

DISPOSITION CODES:
1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
1	5	1	1	1	1	5

EFFECTIVITY DATE	CONFORMANCE DATE
2/26/93	3/1/93

REMARKS: There are 3 1.2 Meg drives that can be used to fill orders for the DS-1.2. They are: 270-5162 5 1/4 1.2MB Floppy Dr
725-0258-G 5 1/4 1.2MB Floppy Dr
725-0258 5 1/4 1.2MB Floppy Dr

CURRENT BUILD	PB X	PKWD X	ME	WPR	
SITE INFORMATION	IR X	TAI	AU	MX	

APPROVALS	SIGNATURE	DATE
ECO CHAIRPERSON	[signature]	2/24/93
PROGRAM MGR.	[signature]	2/9/93
DESIGN ENG.		
COMPLIANCE ENG.	[signature]	2/8/93
SECURE SYSTEMS		
ORIGINATOR	Mike Bahia	2/05/93
ECO ANALYST	Judy Fuller	2/8/93
OTHER		

IS 2

WANG ECO

CONTROL NO 59729

PRIORITY 1 ___
PHASE-IN 2 2
DOCUMENTATION 3 ___

SHEET 1 OF 3

ORIGINATOR:	DEPT:	EXT:	M/S:	DATE:
Mike Bahia	15	60256	014-A3A	11/20/91

PART(S) AFFECTED:	P/N DESCRIPTION:
289-0850	DS-32 32 MB FXD WIN DSK DR OPT
MODEL(S) AFFECTED:	DWG(S) AFFECTED:
DS-32	

DESCRIPTION OF CHANGE:

Change BOM 289-0850 as follows:

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete:	725-3493	5 1/4" HH 42 MB Winc	EA	1	1	1
Add:	725-0254	5 1/4" FH 33.6M Winc	EA	1	1	1

NOTE: Use existing stock of 725-3493.

DEC 19 1991

REASON/SYMPTOM FOR CHANGE:

The 42 MB 5 1/4" HH Winchester is being obsoleted by the vendor. The 33.6 MB is in still in stock and will enable Wang to continue to fill orders for these drives. See REMARKS.

DISPOSITION CODES:
1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
5			5	5		

EFFECTIVITY DATE	CONFORMANCE DATE
12-20-91	12-23-91

REMARKS: There are 3 32 Meg drives that can be used to fill orders for the DS-32. They are: 725-0254 5 1/4 Micropolis 32M FH
725-3493 5 1/4 CDC 42M HH Winc
725-0144 5 1/4 Quantum 32M FH

CURRENT BUILD	PB X	PKWD	ME	WPR	
SITE INFORMATION	IR X	TAI	AU	MX	

APPROVALS	SIGNATURE	DATE
ECO CHAIRPERSON		12/18/91
PROGRAM MGR		12/2/91
DESIGN ENG.		
COMPLIANCE ENG.		12/6/91
SECURE SYSTEMS		
ORIGINATOR	Mike Bahia	11/20/91
ECO ANALYST	Judy Fullem	11/22/91
OTHER		

MANUFACTURING ECO IMPACT — ECO No. 59729

TOTAL MANUFACTURING SUMMARY — TOTAL MANUFACTURING SUMMARY DATE 12/18/91

REQUESTED EFFECTIVITY DATE 00/00/00 — REQUESTED CONFORMANCE DATE 00/00/00

APPROVED EFFECTIVITY DATE 12/20/91 — ***APPROVED CONFORMANCE DATE*** 12/23/91

DOLLAR SUMMARY:	SITE: 07	SITE: 13	SITE: 14	SITE: 15	SITE: 25	TOTAL
SAVINGS:						
B.O.M. CHANGE SAVINGS (EXP)	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
ENG IMPLEMENT SAVINGS (EXP)	0	0	0	0	0	0
TOTAL SAVINGS (EXPENSE)	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
EXPENSE:						
REWORK/SALVAGE - IN HOUSE	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
REWORK AT OUTSIDE VENDORS	0	0	0	0	0	0
SCRAP/OBSO COSTS	0	0	0	0	0	0
CANCEL. CHARGES - VENDORS	0	0	0	0	0	0
TOTAL (EXPENSE)	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
NET SAVINGS (EXPENSE)	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

MATERIAL CONFORMANCE:

ALL SITES SPECIFIC SITE(S)

PART No.

	DIST	FINAL ASSY	SUB ASSY	STK WHS
RAW MATERAL				
WIP				
FINISHED GOODS				
IN-TRANSIT				
OUTSIDE VENDOR				

REMARKS:

ACTION CODES:
1 - USE AS IS 2 - REWK/SALVAGE 3 - SCRAP
4 - NEXT ORDER 5 - OBSOLETE 6 - REDISTRIBUTE(*)
7 - OTHER(*) (*) SEE REMARKS

PREPARED BY:

NAME: TEL#
SIGNATURE DATE 00/00/00

ECO IMPACT REVIEW BOARD:

NAME:
SIGNATURE [signature] TEL# DATE 12/18/91

WANG

ENGINEERING CHANGE ORDER
CUSTOMER ENGINEERING IMPACT SHEET

ECO NO. 59729
SHEET 3 OF 3

ALL UNITS	☐
PROB ONLY	☐
INFO	☑
FCO REQUIRED	☐
IMMED ☐	NEXT CALL ☐
IS A MUB REQUIRED FOR FSC REWORK	☐

IMPACT COMMENTS

	DOMESTIC	INTER-NATIONAL
EST. UNIT POP		
EST. SPARE POP		
TOTAL		

EST. COST IMPACT	APPROVALS	DATE
MATERIAL	TECH OPS	
LABOR	LOGISTICS Phil Murphy	12-10-91
TOTAL	FSC SUPPORT	
IMPLEMENTATION PERIOD	FINAL J Prouty	12/10/91
ANNUAL COST	OTHER	

GENERAL COMMENTS

54

152

WANG DCO

CONTROL NO 59153

PRIORITY 1 ___
PHASE-IN 2 ___
DOCUMENTATION 3 X

SHEET 1 OF 12

ORIGINATOR: BOB SANSCARTIER DEPT: 84 EXT: 64367 M/S: 018-24C DATE: 06/19/91

PART(S) AFFECTED: SEE BELOW	P/N DESCRIPTION: REMAN BOM'S
MODEL(S) AFFECTED: MANY	DWG(S) AFFECTED: N/A

DESCRIPTION OF CHANGE:

CHANGE THE BOM FOR 187-9377-R AS FOLLOWS

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-2627	CUSHION	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	271-1224	KYBD.	EA	1	1	1
	725-0096	MATRIX HEAD	EA	1	1	1
DELETE:	685-0441	CUSHION	EA	1	1	1
	685-0448	CUSHION	EA	1	1	1
	685-2352	BAG	EA	1	1	1

CHANGE ITEM STATUS OF WPN # 420-1256 FROM 1 TO 2.

JUL 01 1991

REASON/SYMPTOM FOR CHANGE:

THIS DCO IS TO CORRECT DOCUMENTATION. PRODUCTS HAVE ALWAYS BEEN BUILT TO CORRECT SPECIFICATION.

TO UPDATE THE BOM'S SO THE RIGHT PARTS CAN BE ORDERED TO SUPPORT THESE PRODUCTS.

DISPOSITION CODES:
1-Use As is 2-Rework
3-Scrap 4-Next Order 5-See Remarks

Cust. Units	Field Spare	Field Ret.	Fin. Goods	Stock	WIP	Next Order
					5	

EFFECTIVITY DATE	CONFORMANCE DATE
7/5/91	7/15/91

REMARKS:
SEE REASON/SYMPTON FOR CHANGE.

CURRENT BUILD	PB X	PKWD	ME	WPR	
SITE INFORMATION	IR	TAI	AU	MX	

APPROVALS	SIGNATURE	DATE
ECO CHAIRPERSON	Paul G Daniel	7/1/91
PROGRAM MGR.		
DESIGN ENG.		
COMPLIANCE ENG.		6/27/91
SECURE SYSTEMS		
ORIGINATOR	BOB SANSCARTIER	
ECO ANALYST	M C Blais	6/26/91
OTHER		

ECO NO 59153

SHT 2 OF 12

WANG DCO

CONTINUATION SHEET

CONTROL NO _____

CHANGE THE BOM FOR 725-0288-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	615-1957	LABEL	EA	1	1	1
	685-1613	BOX	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	725-3676	RIBBON	EA	1	1	1

CHANGE THE BOM FOR 725-0290-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	726-7722	CORD	EA	1	1	1
	615-1957	LABEL	EA	1	1	1
	685-1613	BOX	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	725-3649	RIBBON	EA	1	1	1

CHANGE THE BOM FOR 725-0229-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	615-1957	LABEL	EA	1	1	1
	685-1613	BOX	EA	1	1	1
	685-1614	CUSHION	SET	1	1	1
	685-0722	BAG	EA	1	1	1
	725-1239	RIBBON	EA	1	1	1

CHANGE THE BOM FOR 725-1485-R AS FOLLOWS

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-0704	BOX	EA	1	1	1
	685-0722	BAG	EA	1	1	1

ECO NO 59153

SHT 3 OF 12

WANG DCO

CONTINUATION SHEET

CONTROL NO _____

CHANGE THE BOM FOR 725-0249-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-1890	BOX	EA	1	1	1
	685-0726	BAG	EA	1	1	1
	615-1957	LABEL	EA	1	1	1
	726-2475	TRAY	EA	1	1	1
	725-1404	TONER	EA	1	1	1
DELETE:	685-2353	BAG	EA	1	1	1

CHANGE THE BOM FOR 187-9473-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-0726	BAG	EA	1	1	1
	615-1957	LABEL	EA	1	1	1
	725-2678	TONER	EA	1	1	1
DELETE:	685-0768	BAG	EA	1	1	1

CHANGE THE BOM FOR 187-9506-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-0726	BAG	EA	1	1	1
	615-1957	LABEL	EA	1	1	1
	725-2678	TONER	EA	1	1	1
DELETE:	685-1354	CUSHION	EA	1	1	1
	685-2353	BAG	EA	1	1	1

ECO ID 59153

WANG DCO

CONTROL NO _____

CONTINUATION SHEET

SHT 4 OF 12

CHANGE THE BOM FOR 725-0246-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	726-3910	COVER	EA	1	1	1
	726-7720	TABLE	EA	1	1	1
	726-2487	PANEL	EA	1	1	1
	615-1957	LABEL	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	726-4017	PULLEY	EA	1	1	1
DELETE:	685-2352	BAG	EA	1	1	1

CHANGE THE BOM FOR 725-0221-R AS FOLLOWS

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	615-1957	LABEL	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	725-2988	RIBBON	EA	1	1	1
DELETE:	685-2352	BAG	EA	1	1	1
	725-2987	RIBBON	EA	1	1	1

CHANGE THE BOM FOR 725-0129-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	615-1957	LABEL	EA	1	1	1
	685-2716	BOX	EA	1	1	1
	685-2717	BOX	EA	1	1	1
	685-2718	CORNERS	EA	1	8	1
	685-0638	BAG	EA	1	1	1
	725-0165	RIBBON	EA	1	1	1

ECO NO 59153

WANG DCO

CONTROL NO _____

CONTINUATION SHEET

SHT 5 OF 12

CHANGE THE BOM FOR 187-9373-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-0447	BOX	EA	1	1	1
	685-2627	CUSHION	EA	1	1	1
	685-0959	SKID	EA	1	1	1
	685-0809	SPACER	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	220-2750	CABLE	EA	1	1	1
	270-0578	FILTER	EA	1	1	1
	271-1141-1	KYBD.	EA	1	1	1
	615-1957	LABEL	EA	1	1	1
	279-5256	PLATEN	EA	1	1	1

CHANGE THE BOM FOR 187-9374-FR AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-0444	BOX	EA	1	1	1
	685-2627	CUSHION	EA	1	1	1
	685-0960	SKID	EA	1	1	1
	685-0809	SPACER	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	615-1957	LABEL	EA	1	1	1

CHANGE THE BOM FOR 725-1314-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-1613	BOX	EA	1	1	1
	685-0769	BOX	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	725-2777	TRAY	EA	1	2	1
	700-8605	MANUAL	EA	1	1	1
	615-1957	LABEL	EA	1	1	1

ECO NO 59153

WANG DCO

CONTROL NO _____

CONTINUATION SHEET

SHT 6 OF 12

CHANGE THE BOM FOR 725-1316-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-1613	BOX	EA	1	1	1
	685-0722	BAG	EA	1	1	1
DELETE:	685-0048	BOX	EA	1	1	1
	685-2352	BAG	EA	1	1	1

CHANGE THE BOM FOR 725-4863-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-0722	BAG	EA	1	1	1

CHANGE THE BOM FOR 725-0145-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	726-3314	COVER	EA	1	1	1
	726-3311	KNOB	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	685-2719	BOX	EA	1	1	1
	685-2720	BOX	EA	1	1	1
	685-2718	CORNERS	EA	1	8	1
DELETE:	685-1613	BOX	EA	1	1	1
	685-0772	TUBE	EA	1	1	1

CHANGE THE BOM FOR 187-9285-1R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
DELETE:	187-9285-1	PRT	EA	1	1	1

ECO NO 59153 WANG DCO CONTROL NO _____

SHT 7 OF 12 CONTINUATION SHEET

CHANGE THE BOM'S FOR 725-1316-R, 725-0249-R, 187-9474-R, 187-9473-R, 187-9506-R, 725-4863-R, 187-9377-R, 187-7058-R, 187-2235-R, 187-2233-R, 187-9500-R, 187-7222-R, 725-0221-R, 725-0224-R, 725-0246-R, 725-0229-R, 725-0247-R, 725-0288-R, 725-0290-R, 725-0129-R, 725-0145-R, 187-9373-R, 725-1314-R, 725-1485-R, 187-9374-FR AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	615-2265	LABEL	EA	1	1	1
	685-0735	ENVELOPE	EA	1	1	1
	698-0000	ROUTING FORM	EA	1	1	1

CHANGE THE BOM FOR 725-0224-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	726-4155	COVER	EA	1	1	1
	725-3302	COVER	EA	1	1	1
	726-7720	TABLE	EA	1	1	1
	726-7715	KNOB	EA	1	1	1
	615-1957	LABEL	EA	1	1	1
	685-0722	BAG	EA	1	1	1
DELETE:	685-2352	BAG	EA	1	1	1

CHANGE THE BOM FOR 187-9500-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	726-8132	EXP. ASSY.	EA	1	1	1
	725-7261	TRAY	EA	1	1	1
	725-3796	TRAY	EA	1	1	1
	725-7262	TRAY	EA	1	1	1
	726-8135	FIX ASSY.	EA	1	1	1
	726-0980	SPACER	EA	1	1	1

ECN NO 59153

WANG DCO

CONTROL NO _____

CONTINUATION SHEET

SHT 8 OF 12

CHANGE THE BOM FOR 187-9474-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-1613	BOX	EA	1	1	1
	685-0722	BAG	EA	1	1	1
DELETE:	685-0014	TAPE	RL	1	1	1
	685-0769	BOX	EA	1	1	1
	685-0770	BOX	EA	1	1	1
	685-0771	CUSHION	EA	1	8	1
	685-1019	PAD	EA	1	1	1
	685-2352	BAG	EA	1	1	1

CHANGE THE BOM'S FOR 187-22[illegible]-R AND 187-2233-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-0447	BOX	EA	1	1	1
	685-2627	CUSHION	EA	1	1	1
	685-0959	SKID	EA	1	1	1
	685-0809	SPACER	EA	1	1	1
	685-0722	BAG	EA	1	1	1
	271-1223	KYBD.	EA	1	1	1
	279-5233-66	BOARD	EA	1	1	1
	291-0019	AUTO ENC.	EA	1	1	1
	279-4130	COVER	EA	1	1	1
	420-1025	CORD	EA	1	1	1
	615-1667	LABEL	EA	1	1	1
	615-1639	LABEL	EA	1	1	1
	725-0096	MATRIX HEAD	EA	1	1	1
	615-1957	LABEL	EA	1	1	1

ECO NO 59153

WANG DCO

CONTROL NO _____

SHT 9 OF 12

CONTINUATION SHEET

CHANGE THE BOM FOR 187-7222-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	726-3614	SPRING	EA	1	1	1
	655-9501	MAGNET	EA	1	1	1
	615-1957	LABEL	EA	1	1	1
	685-2419	BAG	EA	1	1	1
	446-0106	GLASS	EA	1	1	1
	451-7142	PLATE	EA	1	1	1
DELETE:	685-0058	BAG	EA	1	1	1
	685-0556	BAG	EA	1	1	1
	685-1125	CUSHION	EA	1	1	1

CHANGE THE BOM FOR 725-0247-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-2627	CUSHION	EA	1	1	1
	449-1846	STOPPER	EA	1	2	1
	420-1256	GND. STRAP	EA	1	1	1
	650-4083	SCREW	EA	1	1	1
	726-7722	CORD	EA	1	1	1

420-1256 CHANGE ITEM STATUS FROM 1 TO 2

CHANGE THE BOM FOR 187-7401-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	340-0115	CRT. TUBE	EA	1	1	1
	615-2924	LABEL	EA	1	1	1
DELETE:	458-2522	BRACKET	EA	1	1	1

ECO NO 59153

SHT 10 OF 12

WANG DCO

CONTINUATION SHEET

CONTROL NO _____

SHEET 10 OF 12

CHANGE THE BOM FOR 187-7058-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	685-2627	CUSHION	EA	1	1	1
	271-1262	KYBD.	EA	1	1	1
	615-1872	LABEL	EA	1	1	1
	449-0215	CLIP	EA	1	2	1
	220-3199	CABLE	EA	1	1	1
	220-3200	CABLE	EA	1	1	1
	452-0234	PLATE	EA	1	1	1
	449-0557	LEVER	EA	1	1	1
	420-2017	CABLE	EA	1	2	1
	458-0474	RACK	EA	1	1	1
	478-1226	CLIP	EA	1	2	1
	449-0558	CATCH	EA	1	1	1
	655-0287	CAP	EA	1	1	1
	654-1286	CLAMP	EA	1	6	1
	279-5260	SCALE	EA	1	1	1
	685-0722	BAG	EA	1	1	1
DELETE:	685-0446	CUSHION	EA	1	1	1
	685-0448	CUSHION	EA	1	1	1
	685-2352	BAG	EA	1	1	1

CHANGE THE BOM'S FOR 187-9374-FR, 187-9373-R, 187-9373-FR AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	449-0293	STOP	EA	1	4	1
	653-0033	WASHER	EA	1	4	1
	650-9007	SCREW	EA	1	4	1

ECO NO 59153

SHT 11 OF 12

WANG DCO

CONTINUATION SHEET

CONTROL NO _____

CHANGE THE BOM FOR 279-0659-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	340-0115	CRT. TUBE	EA	1	1	1
	615-2667	LABEL	EA	1	1	1

CHANGE THE BOM FOR 187-8193-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	725-4859	DISK DRIVE	EA	1	1	1
	210-9785-A	CONT. BD.	EA	1	1	1
	220-3744	CABLE	EA	1	1	1
	455-0175	BRACKET	EA	1	1	1
	650-3077	SCREW	EA	1	3	1

CHANGE THE BOM FOR 187-8723-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	725-4860	DISK DRIVE	EA	1	1	1
	210-9785-A	CONT. BD.	EA	1	1	1
	220-3744	CABLE	EA	1	1	1
	455-0175	BRACKET	EA	1	1	1
	650-3077	SCREW	EA	1	3	1
DELETE:	725-3493	DISK DRIVE	EA	1	1	1

ECO NO 59153

SHT 12 OF 12

WANG DCO

CONTINUATION SHEET

CONTROL NO _____

CHANGE THE BOM'S FOR 187-8737-R, 187-8747-R
187-8244-R AS FOLLOWS.

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
ADD:	725-4860	DISK DRIVE	EA	1	1	1
	210-9785-A	CONT. BD.	EA	1	1	1
	455-0175	BRACKET	EA	1	1	1
	650-3077	SCREW	EA	1	3	1
	220-3743-01	CABLE	EA	1	1	1
DELETE:	725-3493	DISK DRIVE	EA	1	1	1

WANG

ECO

ECO NO. 55876

SHEET 1 **OF**

ORIGINATOR	Michael Riley Dept 217	**M/S**	014-690	**EXT.** 70524	**DATE** 10/20/89
WRITTEN BY		**M/S**		**EXT.**	**DATE**

PART NO. 209/210-8826-A	**DESCRIPTION** DS PROMS
DWG NO. 8826	
MODEL NO. 2200 DS CABINET	**PEP #**
CLASS (I) II III	HF

DESCRIPTION OF CHANGE

Change the part list and sample board as follows:
Change L135 from IC 27256-2 DS E PROM (379-8500-R2)
To IC 27256-2 DS E PROM (379-8500-R3)

Change BOM 210-8826A as follows:

	WLI#	DESCRIPTION	COMP UM	COMP TYPE	QTY QTY	QTY TYPE
Delete:	379-8500-R2	IC 27256-2 DS E PROM	EA	5P	1	1
Add:	379-8500-R3	IC 27256-2 DS E PROM	EA	5P	1	1

REWORK EXISTING REVISIONS:
100 BOARDS ARE IN PROCESS:

COMPANY CONFIDENTIAL

REASON/SYMPTOM FOR CHANGE

1. Enables The 150 M Tape Drive To Work With The DS.
2. Fixes The Cache Overflow Problem.

CUSTOMER SATISFACTION ISSUE PER PP&M.

DOCUMENTS

DOCUMENTS	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510		
HISTORY SHT. 210	9	10
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	X		

CONFORMANCE DATE

APPROVALS

	DATE
ECO CHAIRPERSON	
DES. ENGRG.	
CUST. ENGRG.	
MFG.	
MTO	
PP&M	
F.C.C.	
PROD. SAFETY	
SECURE SYS.	
ORIGINATOR	Michael Riley
OTHER	

14-19030 Printed in U.S.A. 8-88-7M

TSO PRODUCT SUPPORT
IMPACT REVIEW CHECKLIST

WANG ECO# 55876 OEM ECO# _____ PN# _____

1. WANG MODEL #s AFFECTED: 2200 DS

2. WANG FRU(s) #s AFFECTED: 210-8826A

3. IS THERE AN IMPACT ON WANG INSTALLED BASE? (If NO, go to 7) YES ✓ NO N/A

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)	✓

6. FLR 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
6000 APPROX	last 12 mo.	6000	2500	1.5	400	1%	4

7. FIELD REQUIREMENTS:

Level A	Information only	
Level B	TSB required	✓
Level C	FCO required	✓

FCO requirements: Next Call ✓ Immediate ____ Est. installation time 15 min Est. % of units to FCO 10%

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.)

ANY BOARD WITH DOWN REV PROM COULD HAVE CACHE PROBLEM. PROBLEM CAUSES CACHE TO BE VERY SLOW & DS NEEDS TO BE POWERED OFF TO CORRECT. MUST HAVE REV 3 PROM TO USE 150 MB TAPE DRIVE WHICH MAY ALREADY BE SHIPPING.

REVIEWER'S SIGNATURE: Michael Bolin DATE : 10/25/89

(OVER FOR DEFINITIONS)

WRITE CLEARLY AND USE BLACK INK

WANG

ECO

ECO NO. 53[illegible]0

SHEET 1 OF 4

ORIGINATOR	Mike Riley Dept 217	M/S	019-890	EXT. 70524	DATE 03/20/89
WRITTEN BY	Carol Sullivan	M/S	012-18B	EXT. 74312	DATE 03/20/89

PART NO. 209/210-8826-A	DESCRIPTION DS PROM
DWG NO. 8826	
MODEL NO. 2200	PEP #
CLASS I (II) III	HF

DESCRIPTION OF CHANGE

Change the part list and sample board as follows:

Change L135 from IC 27256-2 DS E PROM (379-8500-R1)
to IC 27256-2 DS E PROM (379-8500-R2

Change BOM 210-8826-A as follows:

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete:	379-8500-R1	IC 27256-2 DS PROM	EA	SP	1	1
Add:	379-8500-R2	IC 27256-2 DS E PROM	EA	SP	1	1

0120/05

40

REASON/SYMPTOM FOR CHANGE

MAY 4 1989

1. Allow internal disk to tape transfers greater than 256 sectors.
2. Write-protect/enable platters through software commands.
3. Added diagnostic commands to "Flush Cache" and to "re-run Power-on Diagnostics".

SEE PAGE 2

DOCUMENTS

DOCUMENTS	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510		
HISTORY SHT. 210	8	9
ARTWORK		
E-REV.		
ASSY. DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.		
CBL DWG.		
S.P.I.		
SPECIFICATION		

CONFORMING AREA	CE	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY
	X	X		X	X		

CONFORMANCE DATE 6-5-89

APPROVALS

	DATE
ECO CHAIRPERSON Paul H Daniel	5/2/89
DES. ENGRG. J. Scherpelz	3/27/89
CUST. ENGRG. Wanda	5/3
MFG.	
MTO Dana Coffelle	5/3
PP&M	
F.C.C. Michael Bouchs	3/29/89
PROD. SAFETY	3/30/89
SECURE SYS.	
ORIGINATOR Michael Riley	3/24/89
OTHER	

14-19030 Printed in U.S.A. 8-85-7M

WANG	ENGINEERING CHANGE ORDER CONTINUATION SHEET	DOCUMENT NO.	
DOCUMENT TITLE:	THIS ECO SHT, WHEN ATTACHED TO DOCUMENT OF PREVIOUS REV CONSTITUTES THE LATEST DOC.	ECO NO. 53510	SHT 2 OF 4

DESCRIPTION OF CHANGE:

CONTINUED

4. Corrected problem where unit would hang during tape backup.
5. Corrected problem with I90 errors when connected to a 2275MUX.
6. Corrected problem with $FORMAT not writing all sectors.
7. Added byte to status command to reflect Write Protect/Enable status of drive.
8. Improved restore time of removable Winchester.
9. Corrected tape drive reset so that drive is reset only if a command is in progress.

WANG

ECO

ECO NO. 50012

SHEET 1 OF 3

ORIGINATOR	Edward Daigneault	Dept # M/S	015-11B	EXT 78635	DATE 07/13/88
WRITTEN BY	Arlene Elliott	022 M/S	012-18B	EXT 74313	DATE 07/13/88

PART NO. 289-0850	DESCRIPTION DS-32 32 MB FXD WIN DSK DR. OPTION
DWG NO.	
MODEL NO. DS-32	PEP # - PEP# HU
CLASS I (II) III	HF

DESCRIPTION OF CHANGE

Change BOM 289-0850 as follows:

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
Delete:	725-0254	51/4 FULL HT. 33.6MB	EA	1	1	1
Add:	725-3493	51/4 H.H. 42MB WINCH	EA	1	1	1

Note:Use existing stock of 725-0254.

AUG 0 4 1988

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REASON/SYMPTOM FOR CHANGE

Phase out of 33.6MB Winch.
Wang is no longer offering this product.

COMPANY CONFIDENTIAL

0314 /06

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
				X	X		

CONFORMANCE DATE 10-31-88

APPROVALS

	DATE
ECO CHAIRPERSON	8/3/88
DES. ENGRG.	
CUST. ENGRG.	8/3
MFG.	
MTO	8/3
PP&M	
F.C.C.	
PROD. SAFETY	
SECURE SYS.	
ORIGINATOR E. Daigneault	7/14/88
OTHER	

14-10020 Printed in U.S.A. 5-85-7M

WANG

ENGINEERING CHANGE ORDER
MANUFACTURING IMPACT SHEET

ECO NO. 50012
SHEET 2 OF 3

PART NO./ASSY NO.

MATERIAL DISPOSITION	QUANTITY	DISP	COST
PARTS ON HAND			
PARTS ON ORDER			
ASSEMBLIES IN PROCESS			
FINISHED SUB ASSEMBLIES			
ASSEMBLIES IN UNITS			
PREPARATION, IMPLEMENTATION COSTS			

DISPOSITION

1. USE AS IS
2. REWORK
3. SCRAP/SALVAGE
4. NEXT ORDER
5. SEE REMARKS

AFFECTED SITES

TEWKS	☐	BOS	☐	HONG	☐
PKWD	☐	IR	☒	MEX	☐
METH	☐	PR	☒	_____	☐
LOW	☐	SCOT	☐	_____	☐
HLOK	☐	AUST	☐	_____	☐
PT BLVD	☒	TW	☐	_____	☐

COST OF INCORPORATION

PRODUCT COST CHANGE PER UNIT PRODUCTION QUANTITY FROM MPP IN WKS _____ WKS		
PRODUCT COST CHANGE (EXTENDED)		
TOTAL COST (OR COST SAVINGS) OF ECO		

APPROVALS

ECO ADMIN	D Caffell
MFG ENG	Sam J Nadd 8/2
QUALITY	
MATERIALS	
PROD. CONTROL	
FINANCE	
RE-MFG	
OTHER	

REMARKS

OEM Planning - conf date 10/31/88
WPR's response 8/2 - conf 8/8
Taiwan 8/3 - NA
Ireland 8/3 - conf 8/5
Dartford 8/3 - NA

SMS EFFECTIVITY DATE 10-24-88

DOCUMENTATION ONLY ☐

WANG

ENGINEERING CHANGE ORDER
CUSTOMER ENGINEERING IMPACT SHEET

ECO NO. 50018
SHEET 3 OF 3

ALL UNITS	☐
PROB ONLY	☐
INFO	☒
FCO REQUIRED	☐
IMMED ☐	NEXT CALL ☐
IS A MUB REQUIRED FOR FSC REWORK	☐

IMPACT COMMENTS

No impact

	DOMESTIC	INTER-NATIONAL
EST. UNIT POP		
EST. SPARE POP		
TOTAL		

EST. COST IMPACT	APPROVALS	DATE
MATERIAL	TECH OPS	
LABOR	LOGISTICS	7-26-88
TOTAL	FSC SUPPORT	
IMPLEMENTATION PERIOD	FINAL	7/26
ANNUAL COST	OTHER	

GENERAL COMMENTS

14-19031 Printed in U.S.A. 5/85 7M

WANG

ECO

ECO NO. 49-57D

SHEET 1 OF 2

ORIGINATOR	~~Bill Magro~~ Leora Wells	#166 Dept #	M/S 013-290	EXT 74118	DATE 05/18/88
WRITTEN BY			M/S 012-188	EXT 75283	DATE 05/18/88

PART NO. 449-1512	DESCRIPTION GUIDE, DRIVE
DWG NO. E00449-1512	
MODEL NO. 442	PEP # PEP# HU239A/H024UA
CLASS I (II) III	HD

DESCRIPTION OF CHANGE

Change drawing E00449-1512 as follows per attached marked print.

MAY 31 1988

COMPANY CONFIDENTIAL

NOTE: Use existing stock.

DEVELOPMENT

4 5

REASON/SYMPTOM FOR CHANGE

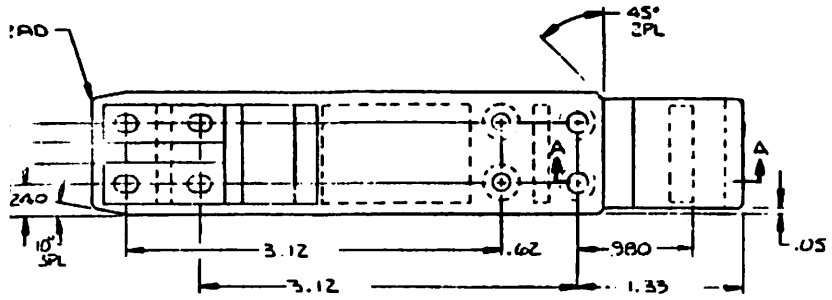
To improve locking of drives in unit and to minimize loose gap.

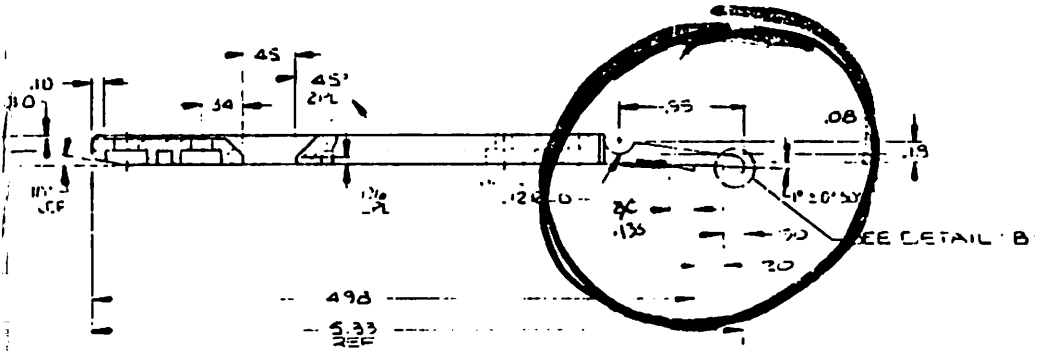
DOCUMENTS	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510		
HISTORY SHT. 210		
ARTWORK		
E-REV.		
ASSY. DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.	A	B
CBL DWG.		
S.P.I.		
SPECIFICATION		

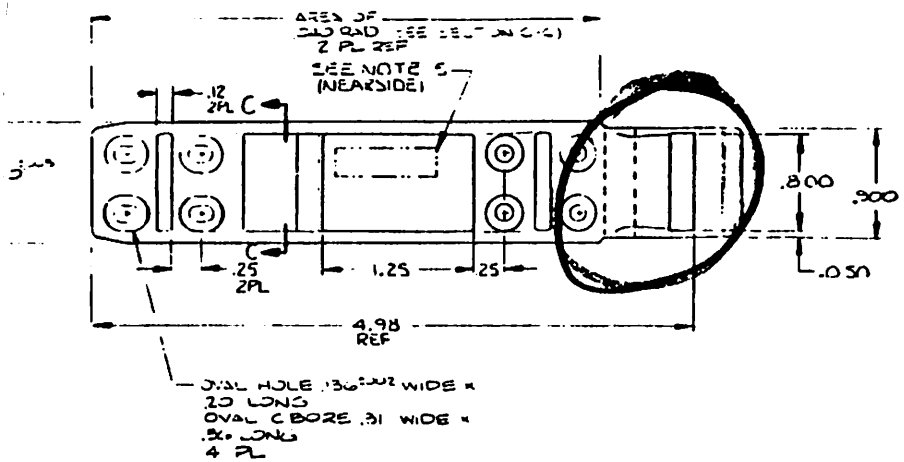
CONFORMING AREA	C.E.	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY
						X	

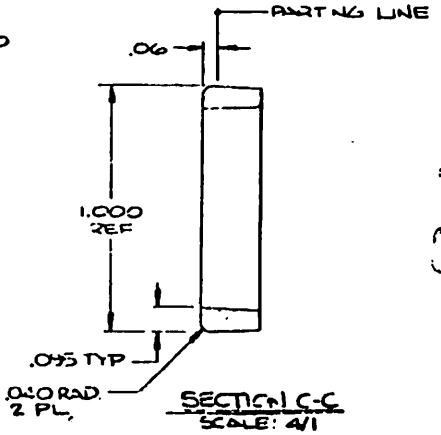
CONFORMANCE DATE

APPROVALS	DATE
ECO CHAIRPERSON	Paul D Daniel 5/27/88
DES. ENGRG.	William Magro 5-11-88
CUST. ENGRG.	
MFG.	
MTO	
PP&M	
F.C.C.	Michael Bautista 5/20/88
PROD. SAFETY	A. Delany 5/19/88
SECURE SYS.	
ORIGINATOR	
OTHER	

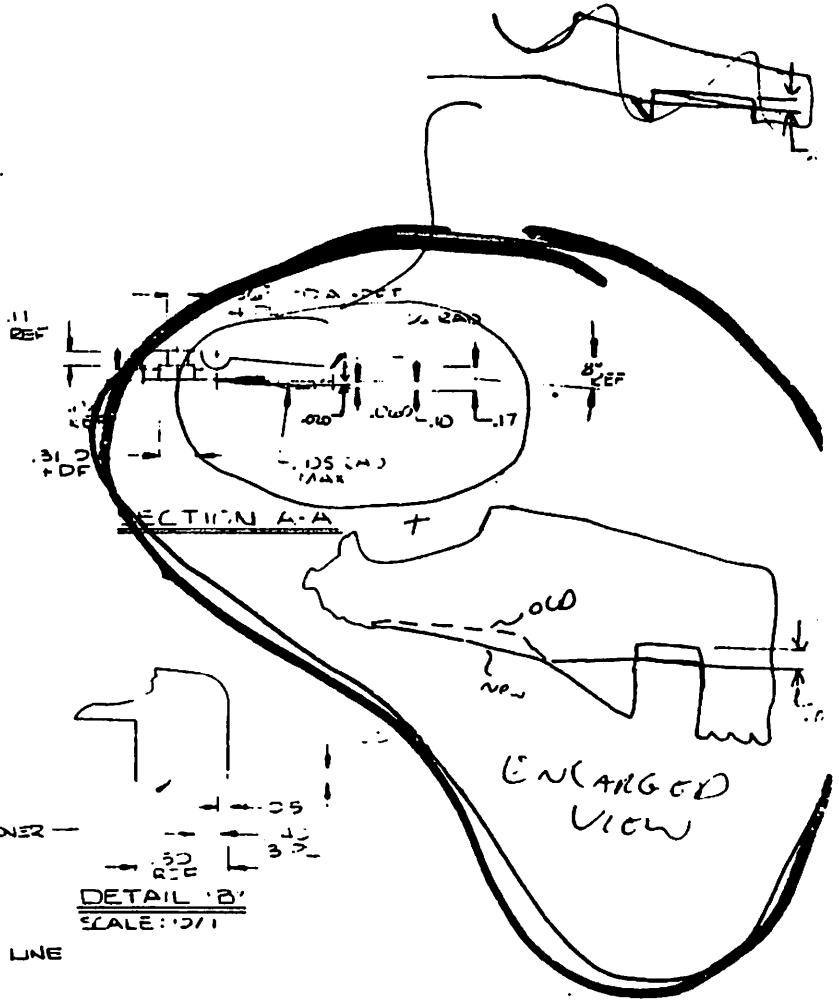


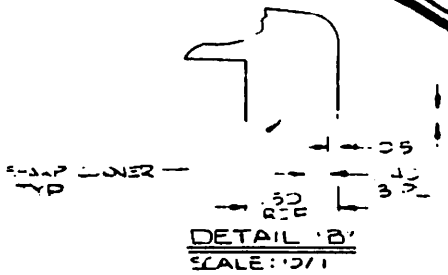






SECTION C-C
SCALE: 4/1

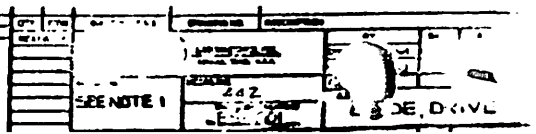




DETAIL 'B'
SCALE: 10/1

.00 ND 49351D

SHT 2 OF 2



WANG

ECO

ECO NO. 45188

SHEET 1 OF 3

ORIGINATOR	Carolyn Gacek	M/S		EXT. 64520	DATE 5/26/87
WRITTEN BY	Carolyn Gacek	M/S		EXT.	DATE

PART NO. See Below	DESCRIPTION DS-Data Storage Cabinet
DWG NO.	
MODEL NO. 2200-DS	PEP #
CLASS I II III	

DESCRIPTION OF CHANGE

Change Boms 167/187-3512 as follows:

	WLI	Description	UM	Comp Type	Qty	Qty Type
Delete:	279-8059	Rear Panel Assy	ea	5P	1	1
	650-3193	Scr Taptite 6-32x1/2	ea	1	10	1

Change Bom 279-5518 as follows:

	WLI	Description	UM	Comp Type	Qty	Qty Type
Add:	279-8059	Rear Panel Assy	ea	5P	1	1
Chg Qty:	650-3193	Scr Taptite 6-32x1/2	ea	1	From: 2 To: 12	1

JUL 02 1987

REASON/SYMPTOM FOR CHANGE

Correcting new bom to agree with actual build configuration.
279-8059 is put on at the vendor.

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
							X

CONFORMANCE DATE N/A

APPROVALS

	DATE
ECO CHAIRPERSON	7/1
DES. ENGRG.	
CUST. ENGRG.	7/1
MFG.	7/1
MTO	
PP&M	
F.C.C.	
PROD. SAFETY	
SECURE SYS.	
ORIGINATOR	Carolyn Gacek 6-2-87
OTHER	6-5-87

14-19030 Printed in U.S.A. 5-85-7M

WANG

ENGINEERING CHANGE ORDER
MANUFACTURING IMPACT SHEET

ECO NO. 45168
SHEET 2 OF 3

PART NO./ASSY NO.

MATERIAL DISPOSITION	QUANTITY	DISP	COST
PARTS ON HAND			
PARTS ON ORDER			
ASSEMBLIES IN PROCESS			
FINISHED SUB ASSEMBLIES			
ASSEMBLIES IN UNITS			
PREPARATION, IMPLEMENTATION COSTS			

DISPOSITION

1. USE AS IS
2. REWORK
3. SCRAP/SALVAGE
4. NEXT ORDER
5. SEE REMARKS

COST OF INCORPORATION

PRODUCT COST CHANGE PER UNIT PRODUCTION QUANTITY FROM MPP IN WKS ____ WKS		
PRODUCT COST CHANGE (EXTENDED)		
TOTAL COST (OR COST SAVINGS) OF ECO		

REMARKS

SMS EFFECTIVITY DATE 7/10/87 7/6/87

DOCUMENTATION ONLY ☐

AFFECTED SITES

TEWKS ☐	BOS ☐	HONG ☐
PKWD ☐	IR ☐	MEX ☐
METH ☐	PR ☐	____ ☐
LOW ☐	SCOT ☐	____ ☐
HLOK ☐	AUST ☐	____ ☐
PT BLVD ☐	TW ☐	____ ☐

APPROVALS

ECO ADMIN	
MFG ENG	Sam J Nat 7/1/87
QUALITY	
MATERIALS	Littlefield Diane Lawrence 6/25 6/26
PROD. CONTROL	
FINANCE	
RE-MFG	
OTHER	

WANG

ENGINEERING CHANGE ORDER
CUSTOMER ENGINEERING IMPACT SHEET

ECO NO. 45188
SHEET 3 OF 3

ALL UNITS	☐
PROB ONLY	☐
INFO	☒
FCO REQUIRED	☐
IMMED ☐	NEXT CALL ☐
IS A MUB REQUIRED FOR FSC REWORK	☐

IMPACT COMMENTS

Documentation

	DOMESTIC	INTER-NATIONAL
EST. UNIT POP		
EST. SPARE POP		
TOTAL		

EST. COST IMPACT	APPROVALS	DATE
MATERIAL	TECH OPS	
LABOR	LOGISTICS Phil Murphy	6/23/87
TOTAL	FSC SUPPORT	
IMPLEMENTATION PERIOD	FINAL W Davis	6/84
ANNUAL COST	OTHER	

GENERAL COMMENTS

14-19031 Printed in U.S.A. 5-85-7M

WANG

ECO

ECO NO. 44917

SHEET 1 OF 9

ORIGINATOR	Joe Freni	M/S	013-290	EXT. 76817	DATE 06/01/87
WRITTEN BY	Leora Wells	M/S	012-18B	EXT. 73283	DATE 06/01/87

PART NO. SEE BELOW	DESCRIPTION SEE BELOW
DWG NO. SEE BELOW	
MODEL NO. 2200 DS	PEP # PEP# H0245A
CLASS I (II) III	

DESCRIPTION OF CHANGE

Change Item Status for the following items from 1 to 2:
458-3773 458-3774 458-3775
458-3799

Release the following drawings to production level, Rev. 0:

DWG#	WLI#	DESCRIPTION	DWG REV F	DWG REV T
E00458-3773	458-3773	HOUSING (WELDMENT)	B	0
E00458-3774	458-3774	PANEL FRONT SILKSCREEN	B	0
E00458-3775	458-3775	PANEL, REAR	B	0
E00458-3799	458-3799	HOUSING, DISK (WELDMENT)	B	0

Transfer all alpha rev stock listed below to non-alpha rev.
458-3773 458-3774 458-3775
458-3799

NOTE: Notify vendor of alpha rev to non-alpha rev changes.

JUL 02 1987

CONTINUED ON PAGE 2

REASON/SYMPTOM FOR CHANGE

To release drawings and part numbers to production. Update drawings to reflect design changes.

COMPANY CONFIDENTIAL

6/5

DOCUMENTS

DOCUMENTS	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510		
HISTORY SHT. 210		
ARTWORK		
E-REV.		
ASSY. DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.	SEE	BELOW
CBL DWG.		
S.P.I.		
SPECIFICATION		

CONFORMING AREA	C.E.	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY
						X	

CONFORMANCE DATE 6/15

APPROVALS

	DATE
ECO CHAIRPERSON	7/1
DES. ENGRG.	6-5-87
CUST. ENGRG.	7/1
MFG.	
MTO	
PP&M	
F.C.C.	6/19/87
PROD. SAFETY	6/22/87
SECURE SYS.	
ORIGINATOR	6-5-87
OTHER	

14-19030 Printed in U.S.A. 5-85-7M

WANG

ECO

ECO NO. 44806

SHEET 1 OF 3

ORIGINATOR	Jeff Jelescheff	M/S	014390	EXT. 77234	DATE 05/22/87
WRITTEN BY	Valerie Donahoe	M/S	012-18B	EXT. 74313	DATE 05/22/87

PART NO. 270-3440	DESCRIPTION DC Fan Assy
DWG NO. D06482-2286	
MODEL NO. 2200 DS	PEP # PEP# H0
CLASS I II III	

DESCRIPTION OF CHANGE

Change drawing D06482-2286 as follows:

Change Item 1 from Fan (400-1046)
to Fan (400-1047)

Change BOM 270-3440 as follows:

	WLI#	DESCRIPTION	UM	COMP TYPE	QTY	QTY TYPE
DELETE:	400-1046	Fan	EA	1	1	1
ADD:	400-1047	Fan	EA	1	1	1

Change Item Master description as follows:

WLI#			DESCRIPTION	ITEM STATUS
270-3440	Line 1:	From:	DC FAN (1046) ASSY	
		To:	DC FAN (1047) ASSY	

JUL 17 1987

REASON/SYMPTOM FOR CHANGE

COMPANY CONFIDENTIAL

To reduce acoustic noise.

DOCUMENTS	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510		
HISTORY SHT. 210		
ARTWORK		
E-REV.		
ASSY. DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.		
CBL DWG.	C	1
S.P.I.		
SPECIFICATION		

CONFORMING AREA	C.E.	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY
					X		

CONFORMANCE DATE 9-1-87

APPROVALS	DATE
ECO CHAIRPERSON	7/15
DES. ENGRG.	5-21-87
CUST. ENGRG.	7/15
MFG. John Wadmond	7/15/87
MTO	
PP&M	
F.C.C.	
PROD. SAFETY Wm Pozzela	6/17/87
SECURE SYS.	
ORIGINATOR	
OTHER	

WANG

10

ECO

ECO NO. 4,154 0 D

SHEET 1 OF 4

ORIGINATOR	Jeff Jelescheff	M/S	014390	EXT. 77234	DATE 05/02/87
WRITTEN BY	Valerie Donahoe	M/S	012-188	EXT. 74313	DATE 05/02/87

PART NO. 510/209-8826	DESCRIPTION DS DPU BD
DWG NO. 8826	
MODEL NO. DS	PEP # PEP# H0371Z
CLASS I (II) III	

DESCRIPTION OF CHANGE

Change artwork, assembly drawing, fabrication drawing, schematic, parts list and sample board per attached prints and as follows:

Change artwork as follows:
Change D1 on silkscreen
Move C50 to left. Interference with J2 connector
Move etch per attached print. Too close to feed thru

MAY 1 4 1987

PRINT ROOM

Change sample board as follows:
Change socket at L5 from 40 pin (376-9027)
to 40 pin (376-9011)

NOTE: TO EDD: Incorporate ECO 43920D in with these artwork changes along with ECO 44255D which is in EDD at this time.

When incorporating artwork changes per ECO 43920D: Ground TP1 to inner ground layer.

continued on next page

DEVELOPMENT

REASON/SYMPTOM FOR CHANGE

Effectivity Date 5/18/87

To change socket to an improved design for better fit.
To correct silkscreen.
To move cap that causes interference.
To incorporate artwork changes together
To move etch that is too close to feed thru.

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DOCUMENTS

DOCUMENTS	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510	1	2
HISTORY SHT. 210	3	4
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	

CONFORMANCE DATE

APPROVALS

	DATE
ECO CHAIRPERSON	5/12/87
DES. ENGRG.	5/14/87
CUST. ENGRG.	
MFG.	
MTO	
PP&M	
F.C.C.	
PROD. SAFETY	5/14/87
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. 44540D	SHT 2	OF 4

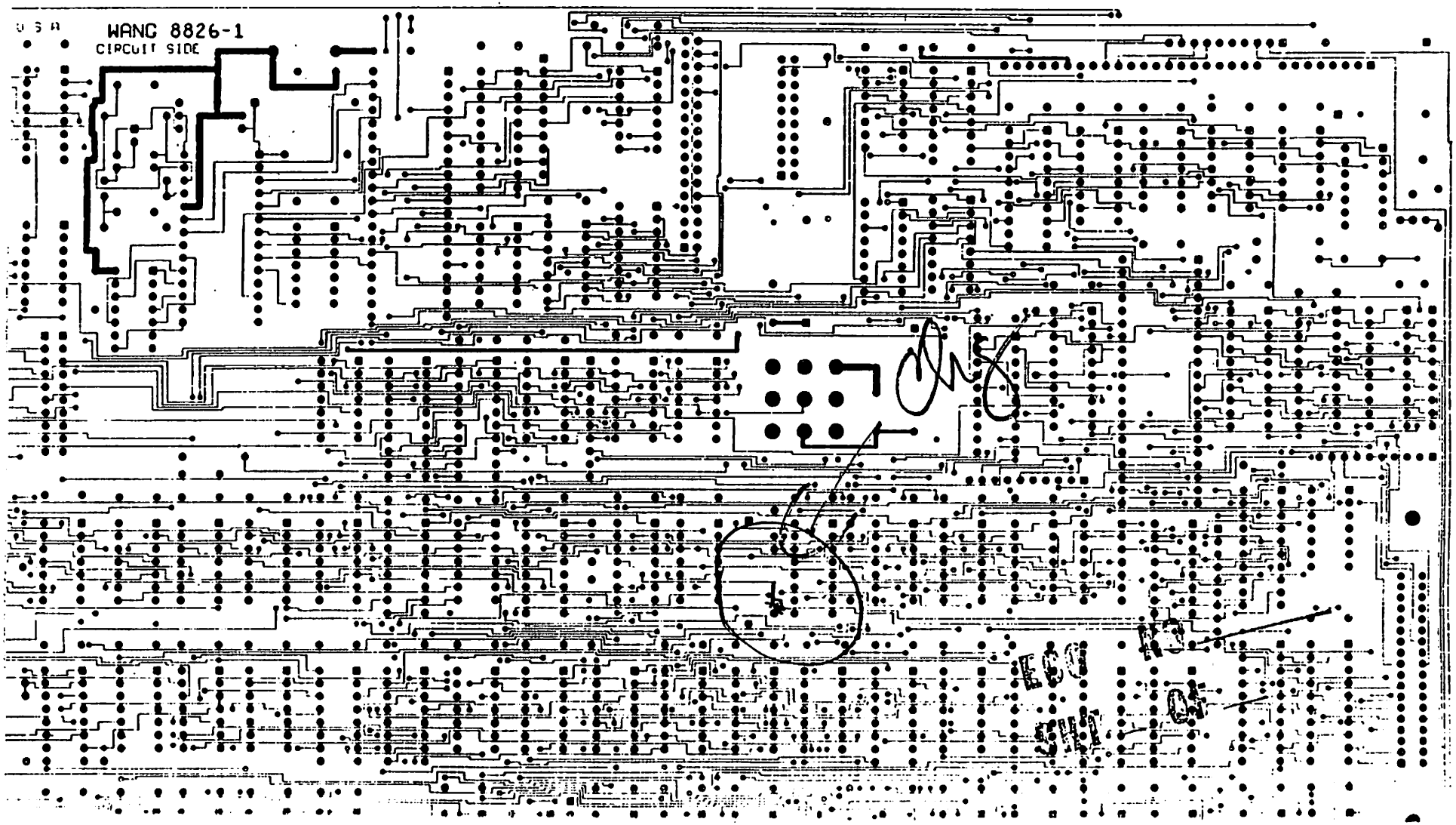
DESCRIPTION OF CHANGE:

Change BOM 209-8826 as follows:

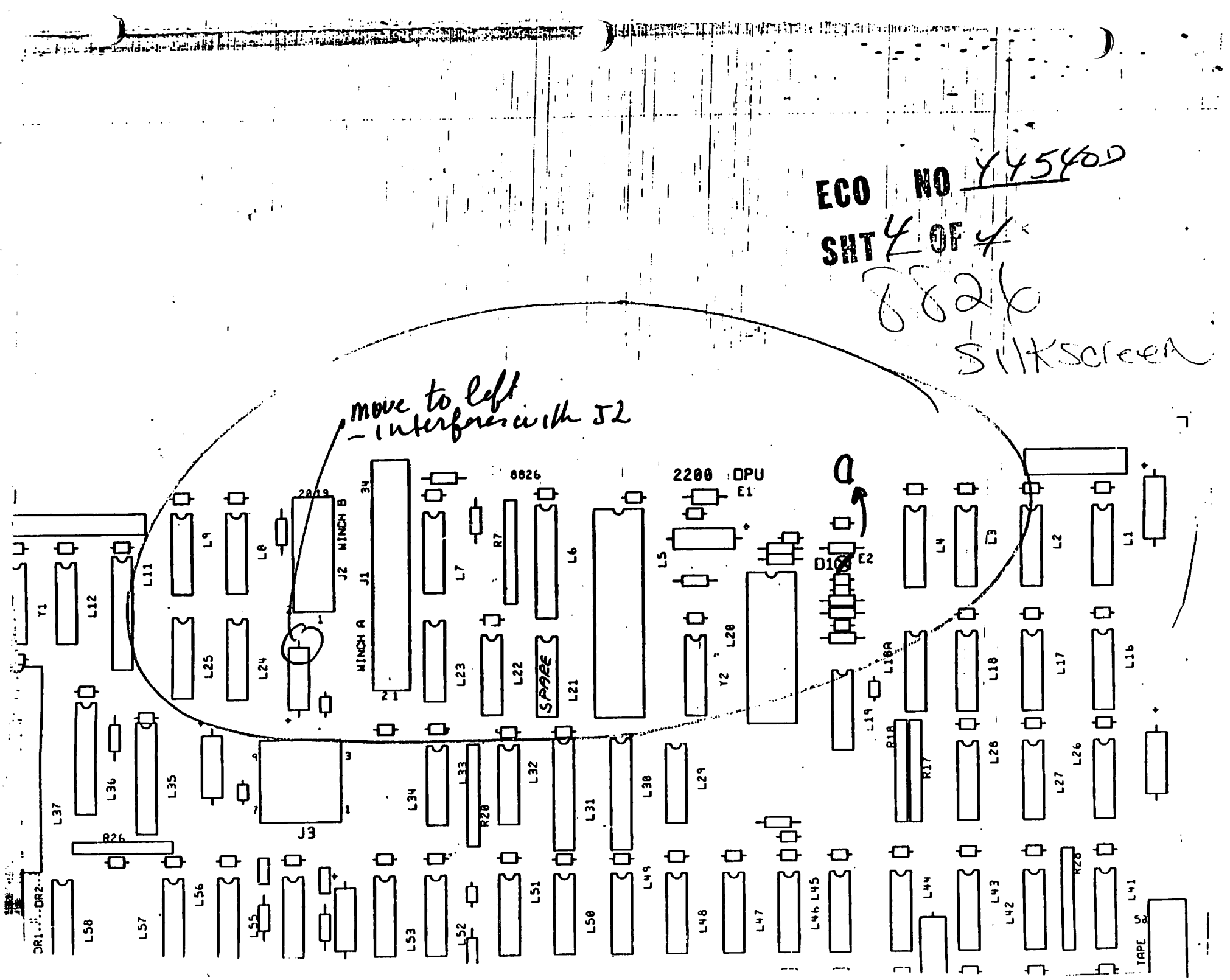
	WLI#	DESCRIPTION	UM	COMP TYPE		QTY	QTY TYPE
DELETE:	376-9027	IC 40 pin socket	EA	1		1	1
CHANGE:	376-9011	IC 40 pin socket	EA	1	From:	1	1
					To:	2	

ECO NO 44524/00

SHT 3 OF 4



ECO NO Y4540D
SHT 4 OF 4
6026
SILKSCREEN



WANG

ECO

ECO NO. 44246D

SHEET 1 OF 3

ORIGINATOR	Moe Turmel	M/S	01215A	EXT 73326	DATE 04/09/87
WRITTEN BY	Jeannine Roy	M/S	012-18B	EXT 76930	DATE 04/09/87

PART NO. 220-3629	DESCRIPTION Cables
DWG NO. See Below	
MODEL NO. 2200DS	PEP # PEP# H0371Z
CLASS I (II) III	

DESCRIPTION OF CHANGE

Change drawings per attached prints and as follows:

Change drawing rev as follows:

DWG#	WLI#	DESCRIPTION	DWG REV F	DWG REV T
D06482-2285	220-3629	34 Posn-(4) Card Edge	0	1
C06482-2288	220-3630	20 Posn Edge Card Socket	0	1

Change BOM 220-3629 as follows:

	WLI#	DESCRIPTION	UM	COMP TYPE		QTY	QTY TYPE
CHANGE	420-0235	Cable, 34 Cond Rnd/Flt	FT	1	From:	4.1700	1
					To:	5.6200	

DEVELOPMENT APR 30 1987 PRINT ROOM

Effectivity 5/1/87

REASON/SYMPTOM FOR CHANGE

To prevent shorting to removable drive.

DOCUMENTS

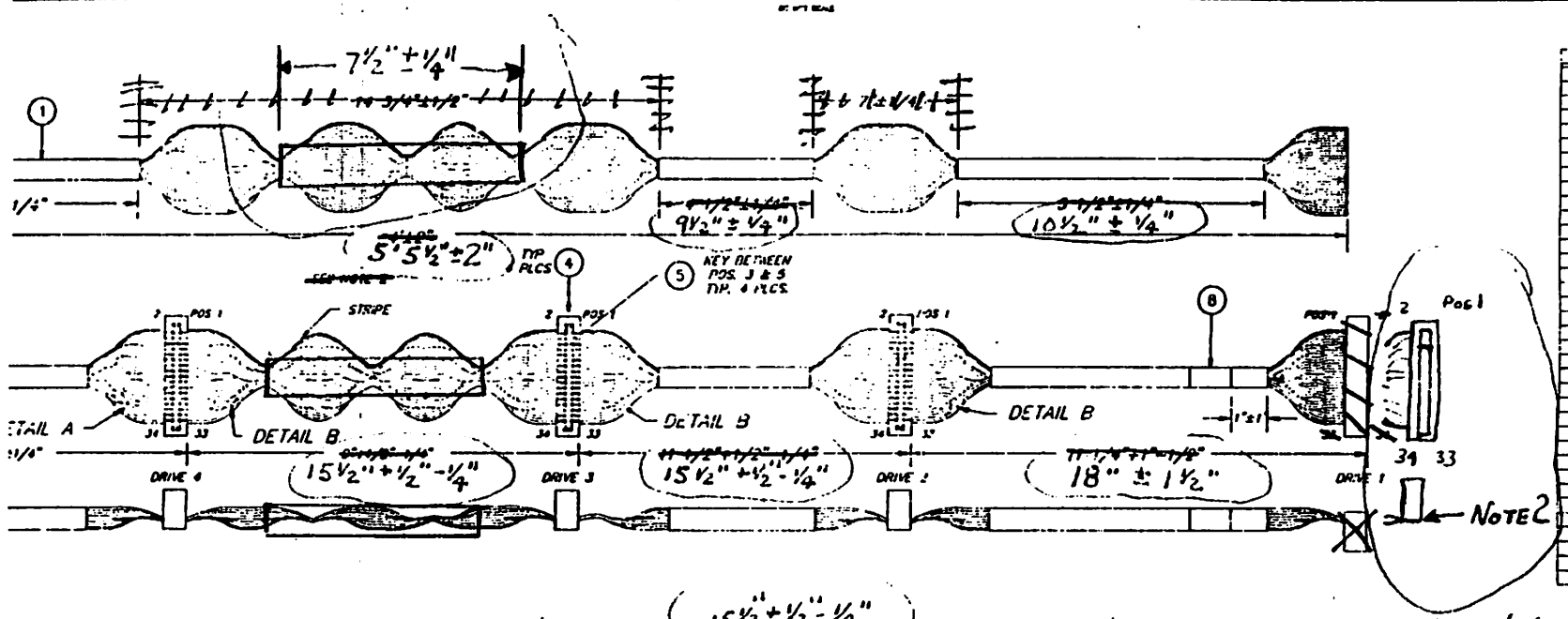
	REVISIONS FROM	REVISIONS TO
HISTORY SHT. 510		
HISTORY SHT. 210		
ARTWORK		
E-REV.		
ASSY. DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.		
CBL DWG.	See below	
S.P.I.		
SPECIFICATION		

CONFORMING AREA	C.E.	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY
				X	X		

CONFORMANCE DATE

APPROVALS

	DATE
ECO CHAIRPERSON	Judy Mulno 4/24/87
DES. ENGRG.	
CUST. ENGRG.	
MFG.	
MTO	
PP&M	
F.C.C.	Michael Pinette 4/15/87
PROD. SAFETY	Jim Pezzella 4/15/87
SECURE SYS.	
ORIGINATOR	Moe Turmel 4/10/87
OTHER	



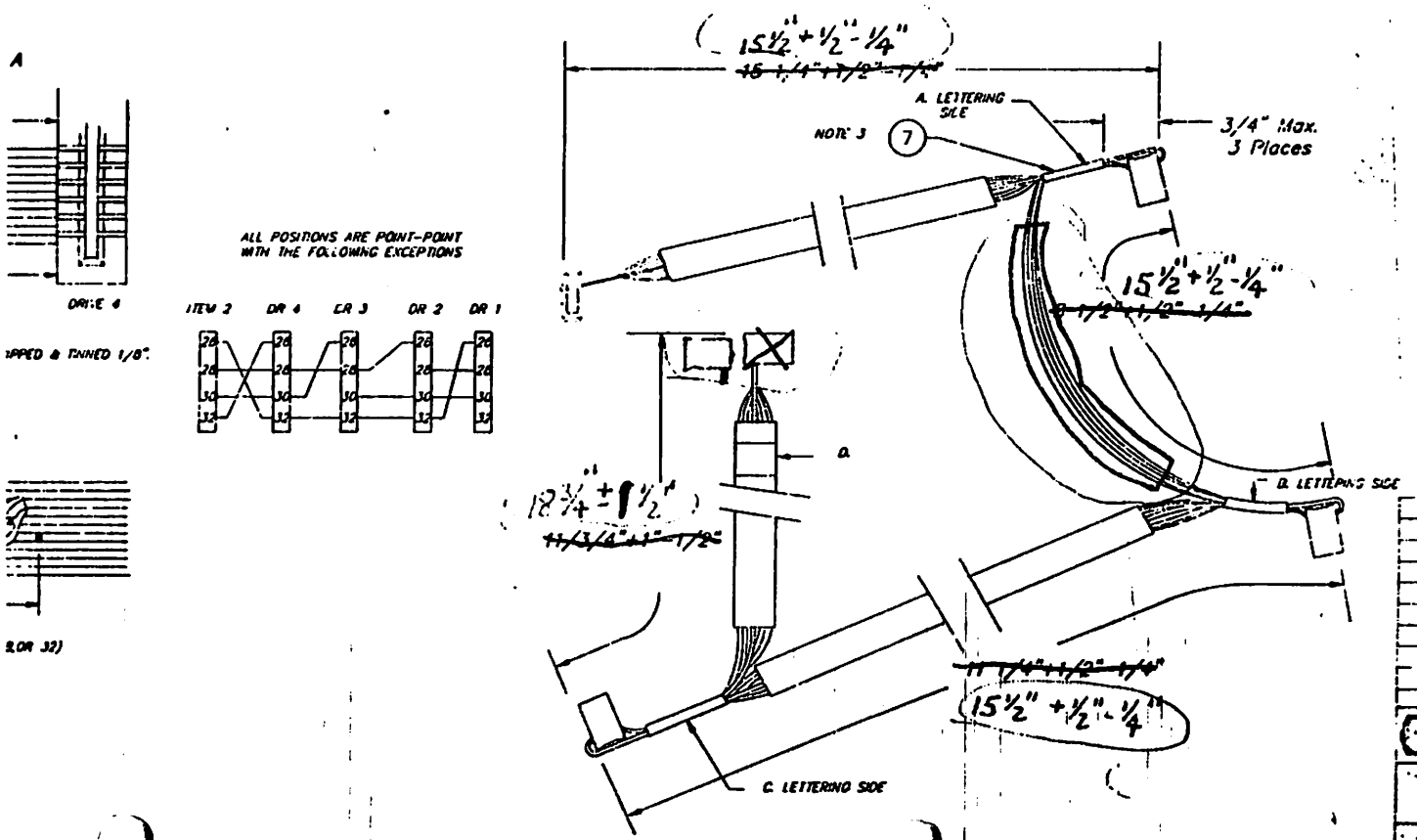
ITEM 2	DRIVE 4	DRIVE 3	DRIVE 2	DRIVE 1
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9
10	10	10	10	10
11	11	11	11	11
12	12	12	12	12
13	13	13	13	13
14	14	14	14	14
15	15	15	15	15
16	16	16	16	16
17	17	17	17	17
18	18	18	18	18
19	19	19	19	19
20	20	20	20	20
21	21	21	21	21
22	22	22	22	22
23	23	23	23	23
24	24	24	24	24
25	25	25	25	25
26	32	32	32	26
27	27	27	27	27
28	28	28	26	N/C
			29	29
29	29	29	23	29
30	26	26	N/C	N/C
		30	30	30
31	31	31	31	31
32	26	N/C	N/C	N/C
33	33	33	33	33
34	34	34	34	34

4424GD

2 3

NOTE:
1) ADD FULL TOLERANCE TO PREF
2) [illegible]
3) MARKING ON LABELS ARE AS FOLL
PER. MARKING
A - DRIVE SELECT 4
B - DRIVE SELECT 3
C - DRIVE SELECT 2
D - DRIVE SELECT 1

2) CABLE MUST NOT PROTRU BEYOND CONNECTOR BO



ALL POSITIONS ARE POINT-POINT WITH THE FOLLOWING EXCEPTIONS

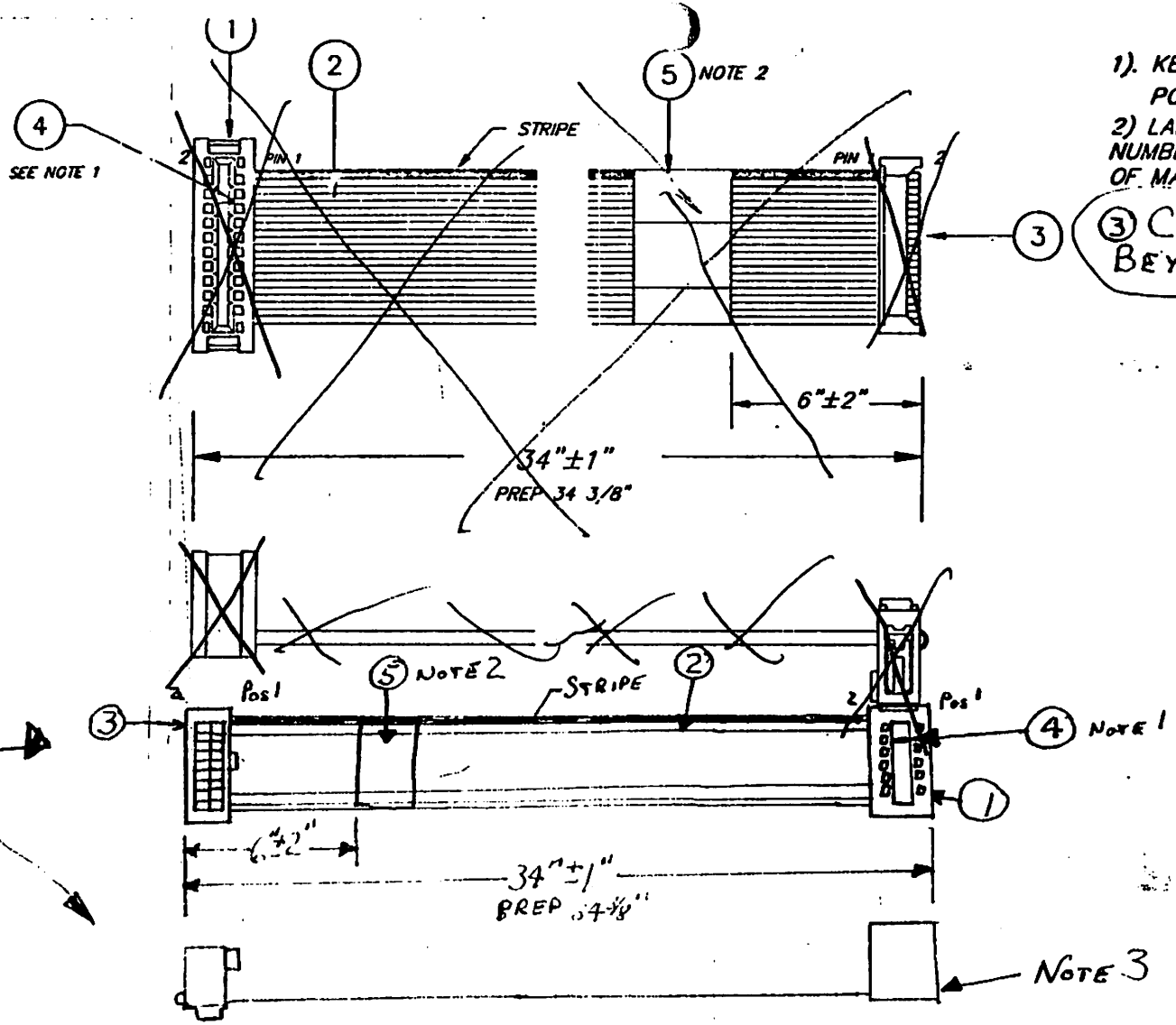
ITEM 2	DR 4	DR 3	DR 2	DR 1
28	28	28	28	28
28	28	28	28	28
30	30	30	30	30
32	32	32	32	32

PPED & TINNED 1/8"

2 OR 32)

9	A/R	600-3000	WIRE, 26 GA. BLACK 1" O.D.G
8	1	615-2700	DATA LABEL, 1 x 2.25
7	3	615-2700	DATA LABEL, 2 x 7.43
6	A/R	605-0022	SHRINK TUBING, 3/32 I.D. x 1/2" LONG
5	4	654-0222	KEYING PLUG
4	3	330-0400	CONN., 34 POS., EDGE CARD, 2 PIECE
3	1	628-1629	D [illegible] 330-3629
2	1	350-0410	CONN., 34 POS., SOCKET
1	A/R	600-0234	CABLE, 34 COND. RND. FLT. 28 GA.

	3000 DS		
		34 POS. SOCKET-(4) CARD E	
		3629	06-82-2295



1). KEY IS TO BE PLACED BETWEEN POSITIONS 3 & 5 ON CONNECTOR.

2) LABEL TO BE MARKED WITH WANG CABLE NUMBER, PLANT CODE, AND CODED DATE OF MANUFACTURE.

③ CABLE MUST NOT PROTRUDE BEYOND CONNECTOR BODY.

44246D

3 3

ITEM	QTY	WANG PART NO	DESCRIPTION
5	1	615-2701	LABEL, 1 x 2.25
4	1	654-0222	CONN, KEY PLUG, EDGE CARD
3	1	350-0409	CONN., SOCKET 20 POSN.
2	A/R	420-0076	20 COND FLAT CABLE
1	1	350-0432	CONN, 20 POS CARD EDGE WO/EARS

WANG LABORATORIES INC. LOWELL, MA. U.S.A.

	BY	DATE	APPROVED BY	DA
DWN	M. PUSKEL		ENG J. [illegible]	
CHK	M. WELCH		MCHN	
PSE	D. MANGERIAN		MFG D. BERSANI	

MATERIAL

MODEL NO. 2200 DS

SEE ENGRG SPECIFICATIONS NO.

TITLE 20 POSN. EDGE CARD-SOCKET

FINISH

TOL. EX. AS NOTED

220-3630 C 6482-2288

TEAC

Engineering Change Request

Request #: Wang-19
Date: Mrach 24, 1987

This ECR (WANG-19) is approved/disapproved (please circle).

Your Name and title:

_____

(Signature) (Date)

TO: Mike Bahia

From: John Tolstead @TEAC x830

F 5D89672125

1. Applicable model

MT-2ST/45D-64 (P/N 19305060-64)
MT-2ST/45S2-65 (P/N 19305060-65)

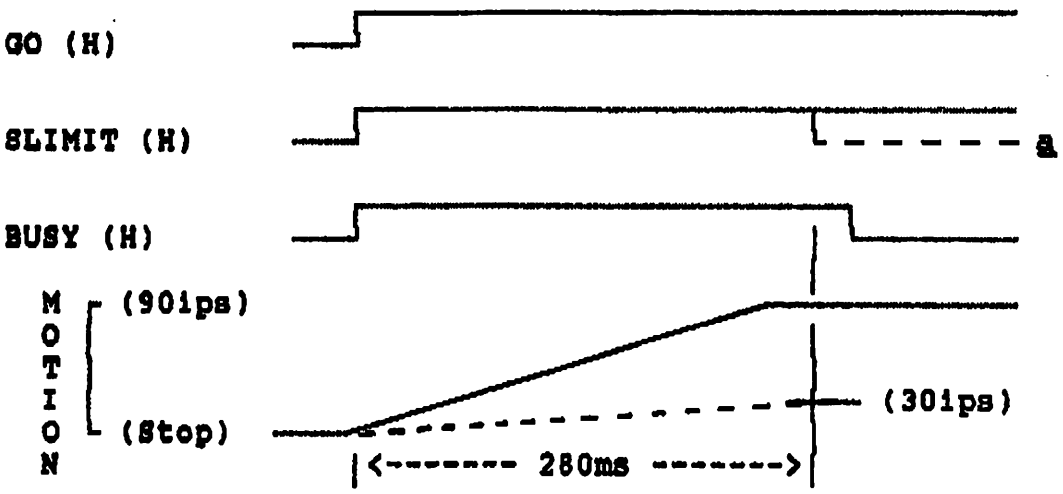
2. Applicable assembly

PCBA Drive Control (P/N 15532074-10)

3. Description of change

A firmware change of U14 (CPU, P/N 13443157-00) on PCBA Drive Control (P/N 15532074-10) is implemented as follows:

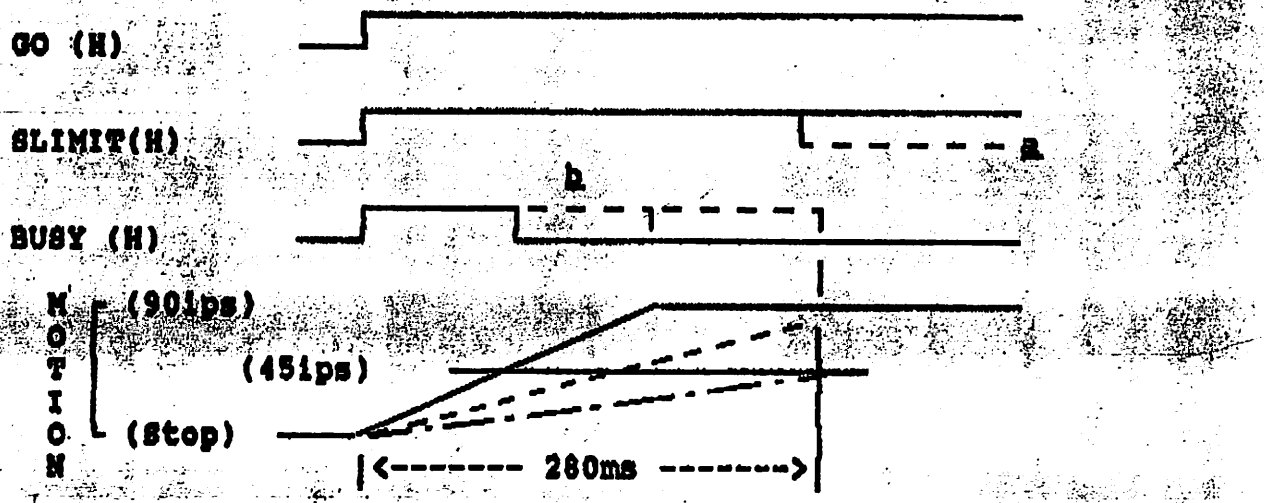
Before



SLIMIT (H): It becomes and remains true as GO (H) becomes true until GO (H) negates. If the tape speed does not reach 30ips within 280ms of GO (H)'s becoming true, SLIMIT (H) goes false (see the dotted line a) to stop the tape.

BUSY: It becomes true as GO (H) becomes true. And it negates 280ms after GO (H) becomes true. It uses the same 280ms software timer to time 280ms as SLIMIT does.

After



SLIMIT (H): It goes and stays true as GO (H) goes true until GO (H) becomes false. If the tape speed does not reach 45ips within 280ms of GO (H)'s becoming true, SLIMIT goes false (see the dotted line a) to stop the tape.

BUSY: It goes true as GO (H) goes true. And it goes false when the tape speed reaches 45ips. Therefore, the duration of the true state of BUSY varies depending on the initial torque of both cassette and reel motors (see the dotted line b). BUSY goes false if SLIMIT goes false in case the tape speed does not reach 45ips within 280ms.

4. Reason(s) for change

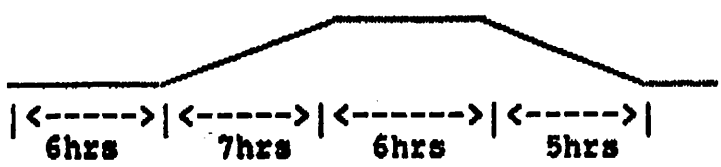
The change is implemented to prevent a stall condition. Because of the start/stop timing variation, a stall condition may occur in case that BUSY is asserted for the tape stop operation before BUSY negates for the tape start operation.

5. Test result

Temperature cycle test I

Test conditions:

1. Temperature (one cycle):



2. Power supply voltages: ±7%

3. Transfer rate: Adjusted so that data transfer occurs immediately after repositioning which repeats every 100 blocks.

4. Test period: About 40 hours

5. # of test drives: Total of six drives, three for +7% and three for -7%

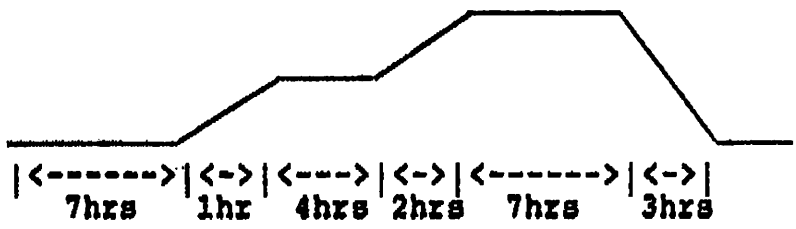
6. Test mode: Repetition of write and read mode

Test result: No problem

Temperature cycle test II

Test conditions:

1. Temperature (one cycle):



2. Power supply voltages: ±7%

3. Transfer rate: Adjusted so that data transfer occurs immediately after repositioning which repeats every 3 blocks.

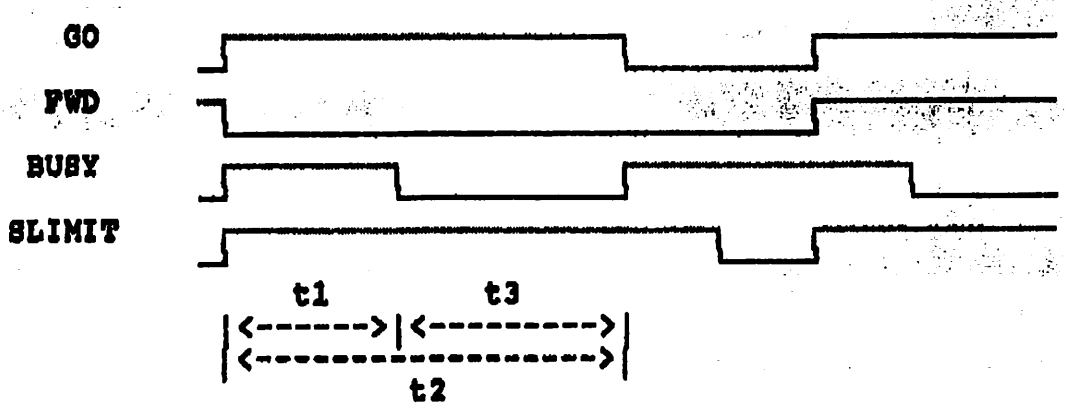
4. Test period: About 40 hours

5. # of test drives: Total of new six drives different from those used in Test I above, Three for +7% and three for -7%

6. Test mode: Repetition of write and read mode

Test result: No problem

Timing summary



Temp.	Power	t1 (BUSY)	t2 (GO)	t3 (GO-BUSY)
50°C	+10%	204ms	460ms	256ms
	0%	170ms	427ms	257ms
	-10%	158ms	410ms	252ms
Ambient	+10%	178ms	434ms	256ms
	0%	155ms	403ms	248ms
	-10%	130ms	381ms	251ms
0°C	+10%	159ms	409ms	250ms
	0%	133ms	384ms	251ms
	-10%	98ms	364ms	266ms

7. Interchangeability

Yes

8. New issue and part number

One-time ROM CPU (P/N 13700087-00): J to K
Mask ROM CPU (P/N 13443157-00) : C to D

Note: A mask ROM CPU (P/N 13443157-00) may be used instead. Rev. K and Rev. D have the same firmware program.

WANG

ECO

ECO NO. 43269.D

SHEET 1 OF 6

ORIGINATOR	Jeff Jelescheff	M/S	014390	EXT. 77234	DATE 02/17/87
WRITTEN BY	Valerie Goguen	M/S	012-18B	EXT. 74313	DATE 02/17/87

PART NO. 510/209-8826	DESCRIPTION 2200 DPU
DWG NO. 8826	
MODEL NO. 2200	PEP #
CLASS I (II) III	

DESCRIPTION OF CHANGE

Change artwork, assembly drawing, fabrication drawing, schematic, parts list and sample board per attached prints and as follows:

Tie J1 pins 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31 & 33 to ground.
Tie J6 pins 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33 to ground.
Tie J4 pins 29,33,34 & 35 to ground.
Tie L63 pin 15 to ground.
Move etch away from mounting hole of J4. (For Revision 1 only)
Cut and lift L74 pin 2.
Tie L18 pin 11 to lifted pin of L74 pin 2.
Tie L63 pin 15 to ground.
When mounting R21 leave leads long and use sleeving to cover leads.

DEVELOPMENT

RECEIVED

FEB 26 1987

REASON/SYMPTOM FOR CHANGE

To correct artwork and schematic errors.
To connect missing grounds.
R21 and R40 are too close to connectors.

PRINT FROM COMPANY CONFIDENTIAL

62

DOCUMENTS

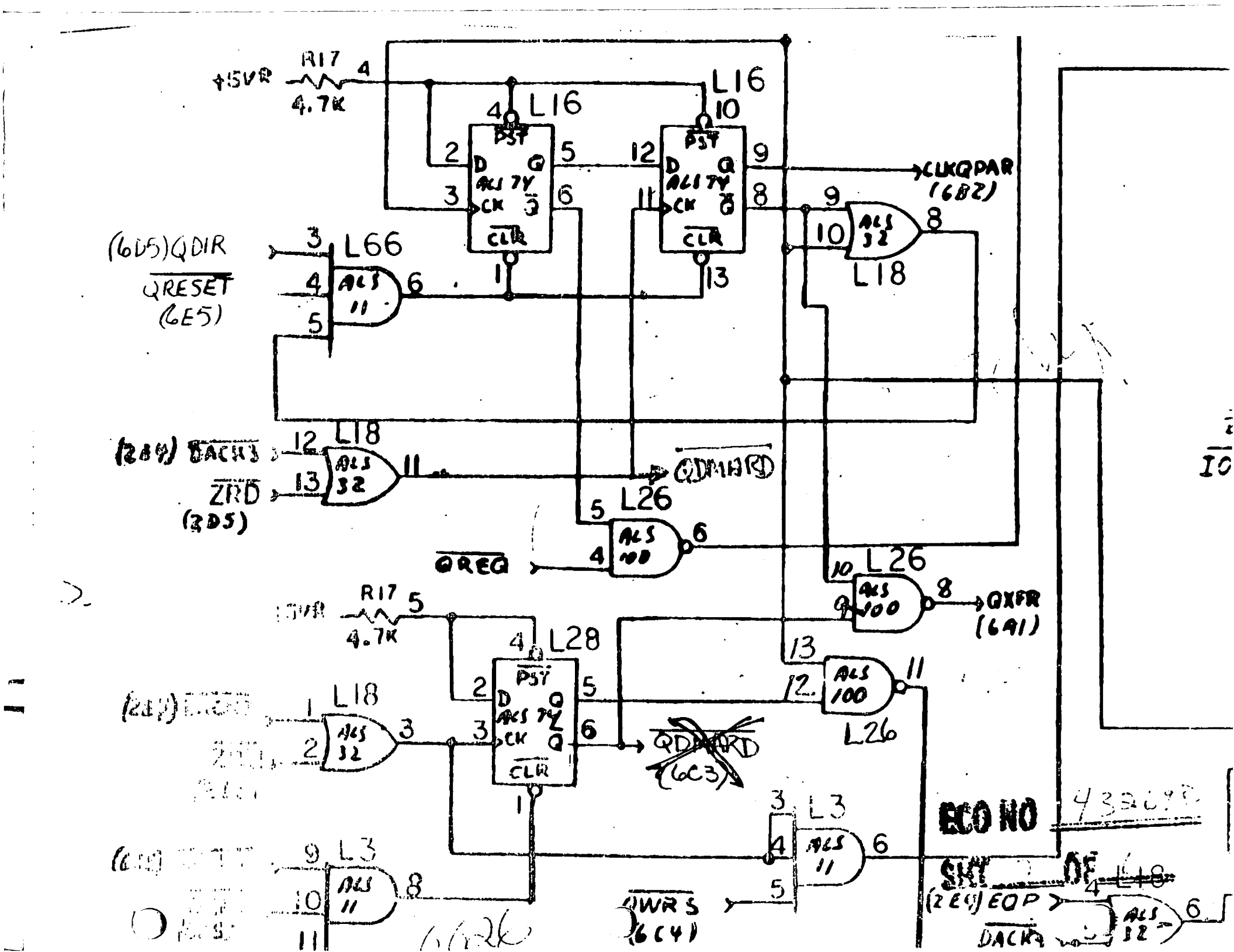
	REVISIONS FROM	TO
HISTORY SHT. 510	0	1
HISTORY SHT. 210	0	
ARTWORK		
E-REV.		
ASSY. DWG.		
DRILL DWG.		
SCHEM DWG.		
MECH. DWG.		
CBL DWG.		
S.P.I.		
SPECIFICATION		

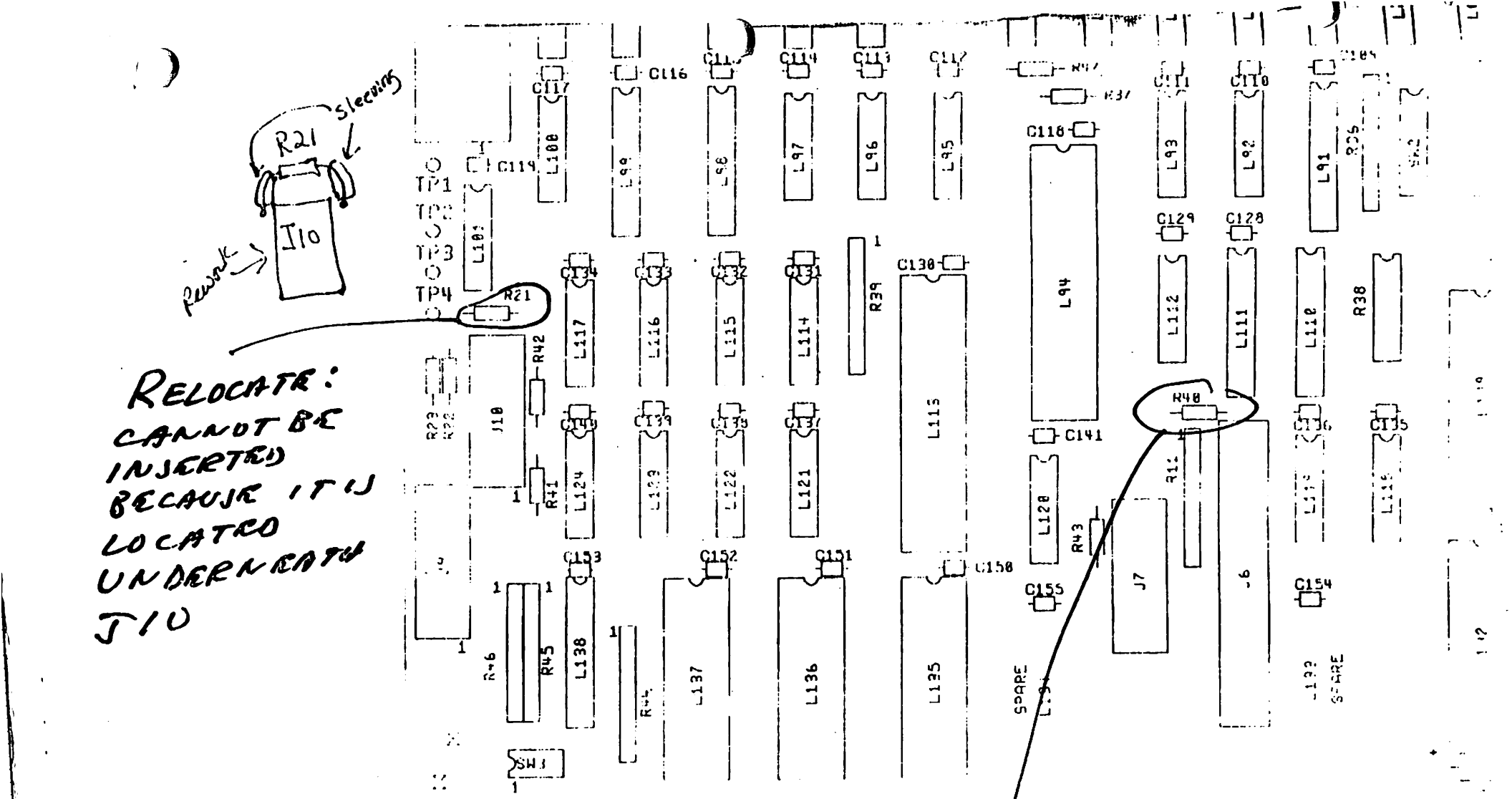
CONFORMING AREA	C.E.	REMFG.	DIST.	FINAL ASSY. AREA	SUB ASSY. AREA	NEXT ORDER	INFO ONLY
					X	X	

CONFORMANCE DATE

APPROVALS

	DATE
ECO CHAIRPERSON	2/23
DES. ENGRG.	2-17-87
CUST. ENGRG.	
MFG.	
MTO	
PP&M	
F.C.C.	2/17/87
PROD. SAFETY	2/17/87
SECURE SYS.	
ORIGINATOR	
OTHER	


+5VR
R17
4.7K
L16
PST
D
Q
ALS 74
CK
CLR
CLKQPAR
(6B2)
(6D5)QDIR
L66
ALS 11
QRESET
(6E5)
L18
ALS 32
(2B4) DACK3
ZRD
(3D5)
QDMARQ
L26
ALS 00
QREQ
QXFR
(6A1)
R17
4.7K
L28
L18
(2A4)
QDWRD
(6C3)
L3
ALS 11
ECO NO
SKT
OF
(2E4)EOP
DACK
QWRS
(6C4)

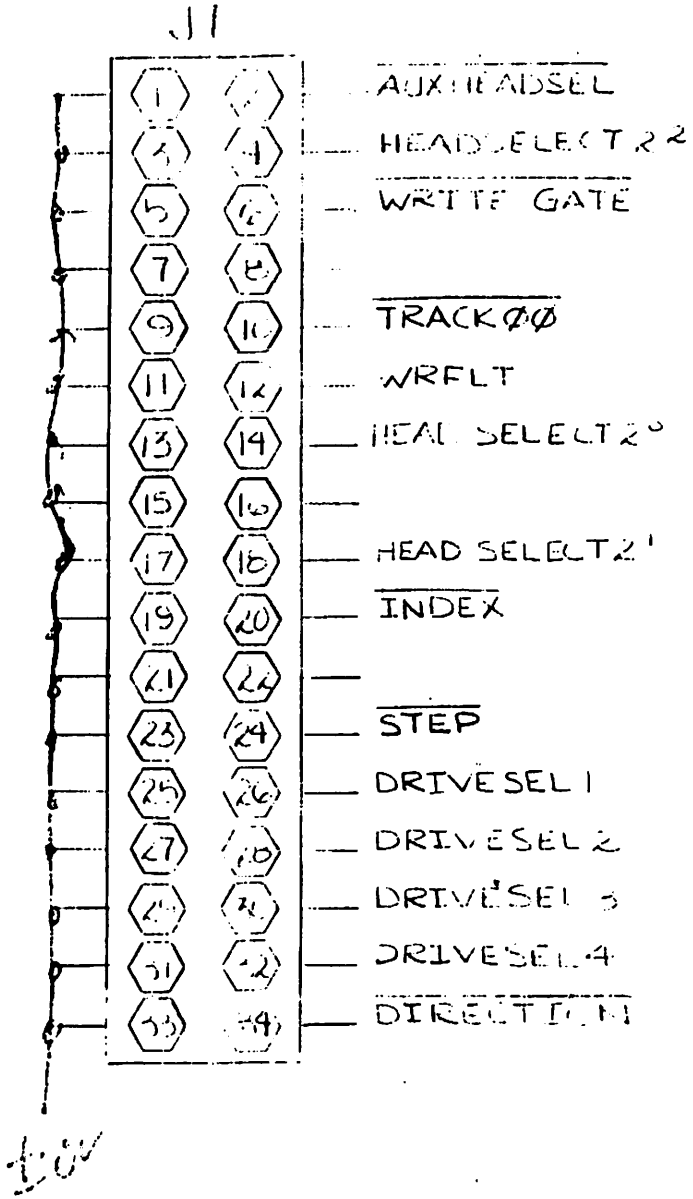


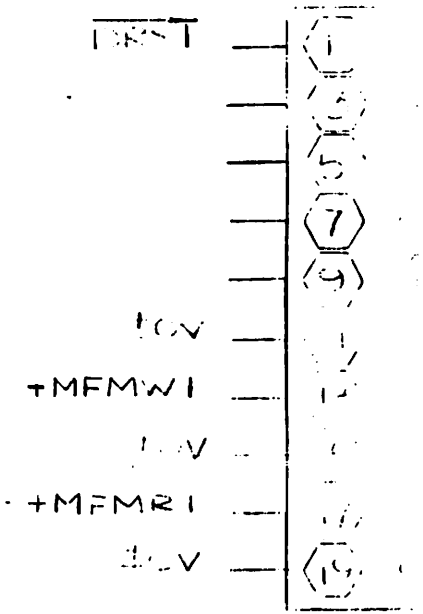
RELOCATE:
CANNOT BE
INSERTED
BECAUSE IT IS
LOCATED
UNDERNEATH
J10

ECO NO 432692
SHT 3 OF 6

RELOCATE: CANNOT BE
inserted IT IS LOCATED UNDERNEATH J

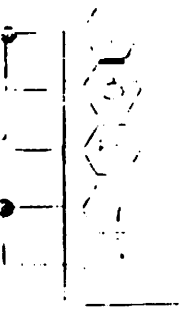
6626



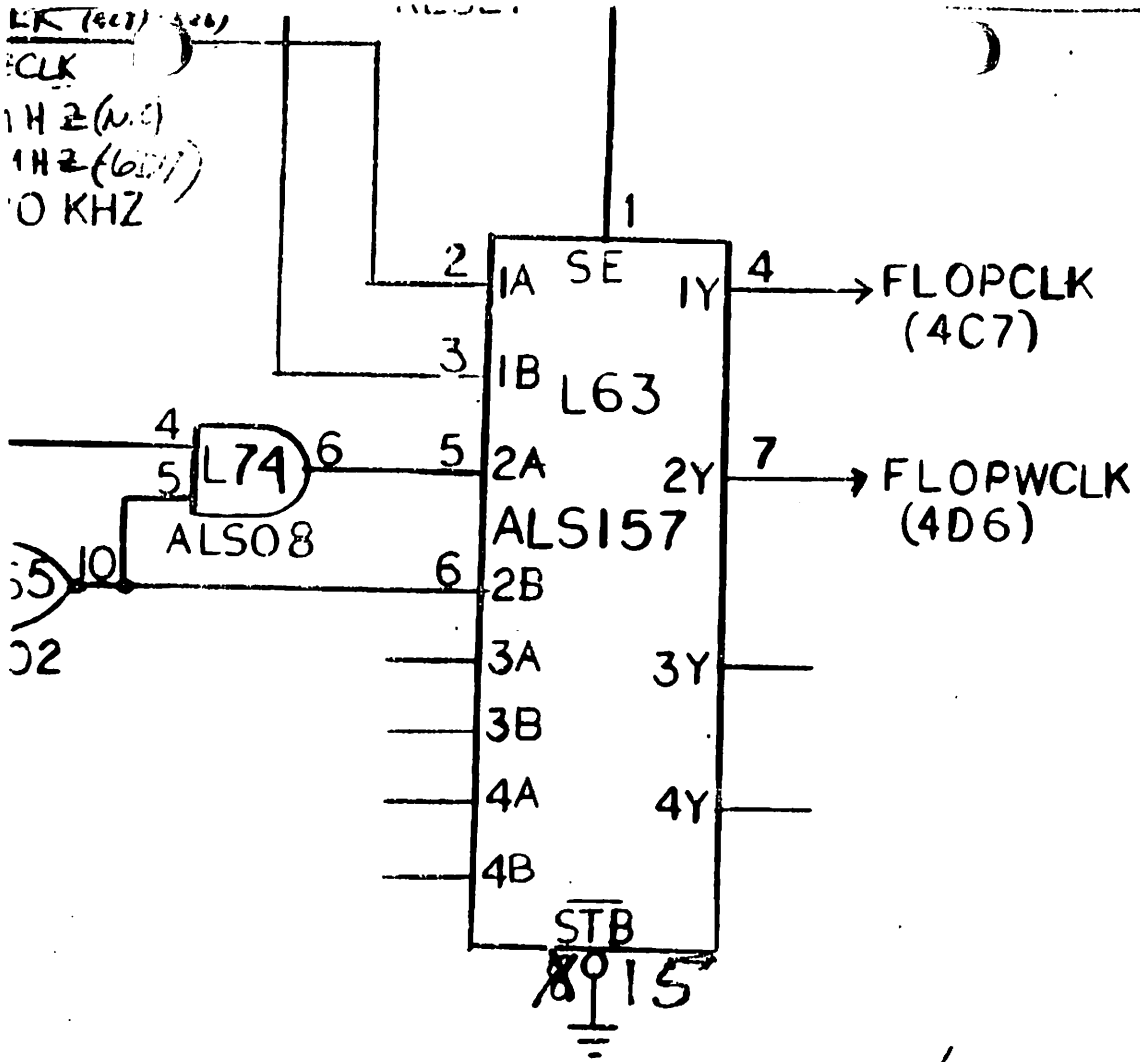


ECO NO 4267

SHT 4 OF 6



620

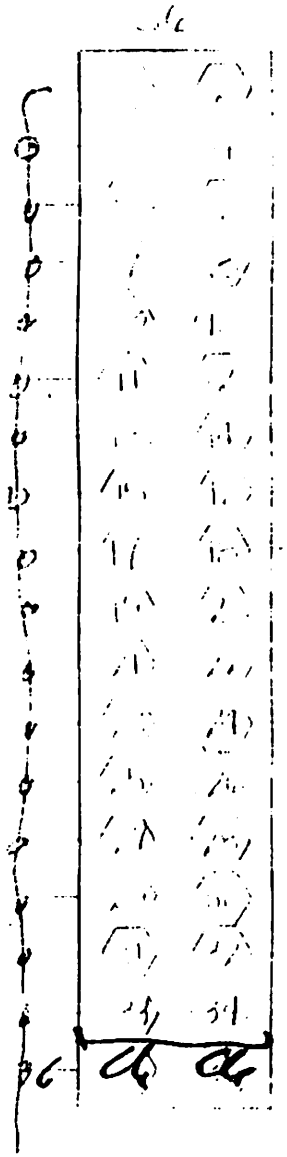


Pin 8 is chip power ground
Leave it connected

ECO NO 83267D

SHT 5 OF 6

6006 Sht 2 of 7



DS Data Storage Cabinet

Disk Performance

February 26, 1987

1.0 Introduction

The following measurements provide you with a performance comparison of the DS Data Storage Cabinet with other popular 2200 disk units. The times shown are approximate and should be used for comparative purposes only. The measurements were done in a single user environment and, thus, do not demonstrate the significant effect of sector caching in a typical multiuser environment.

1.1 Disclaimer

The results shown in this document were in some cases obtained using evaluation disk units and do not commit Wang to any particular disk models or performance criteria.

1.2 Environment

Tests were run using a prototype DS Storage Cabinet attached to a Wang CS system with Preliminary Multiuser BASIC-2 Release 3.0. All tests were performed with only a single partition active and with a 100 sector DS RAM Disk set up, except as noted.

1.3 Disk Units Tested

2270 Diskette (8" SSSD)
2275 Diskette (5 1/4" DSDD)
LVP Diskette (8" DSDD)
DS 1Mb Diskette
DS 320Kb Diskette

2275 10Mb Hard Disk
2275 32Mb Hard Disk
LVP 32Mb Hard Disk
2280 80Mb Disk
DS 10Mb Removable Hard Disk
DS 20Mb Hard Disk
DS 32Mb Hard Disk (Quantum)
DS 64Mb Hard Disk
DS 140Mb Hard Disk

DS Ramdisk (100 sectors of DS data memory)
CS Ramdisk (100 sectors of CS control memory)

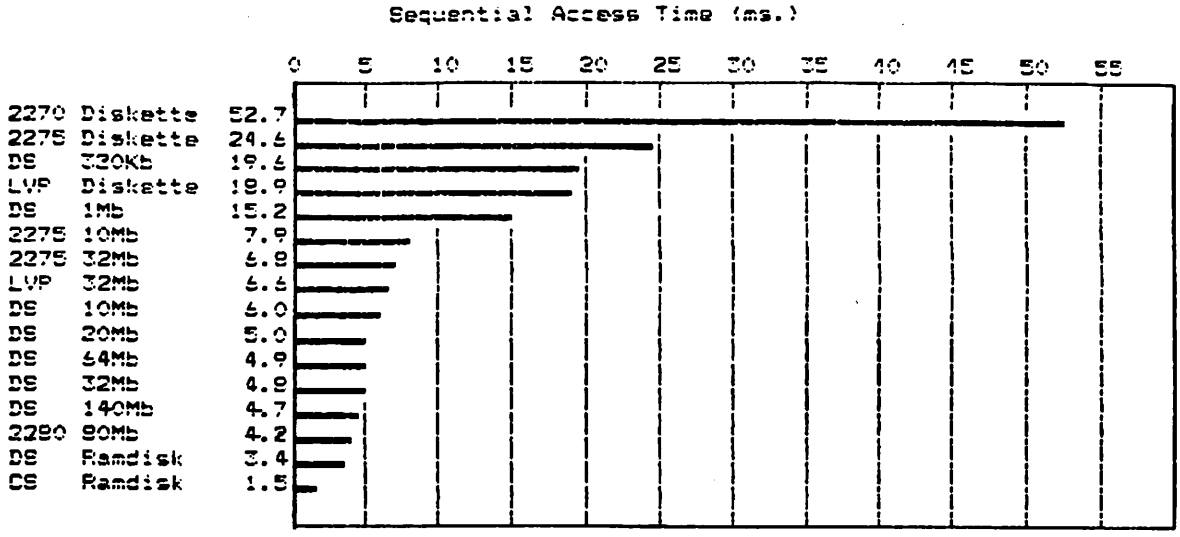
1.4 Test Methodology

A single platter of each of the disks was tested for a duration of approximately 5 minutes using DATALOAD BA statements. The overhead of a comparable test without disk accesses was subtracted from the results in order to determine the actual disk access times. The total disk access time was divided by the number of accesses to provide the average access time for each DATALOAD BA statement. All times shown are the average number of milliseconds for each DATALOAD BA disk access.

2.0 Test Suite

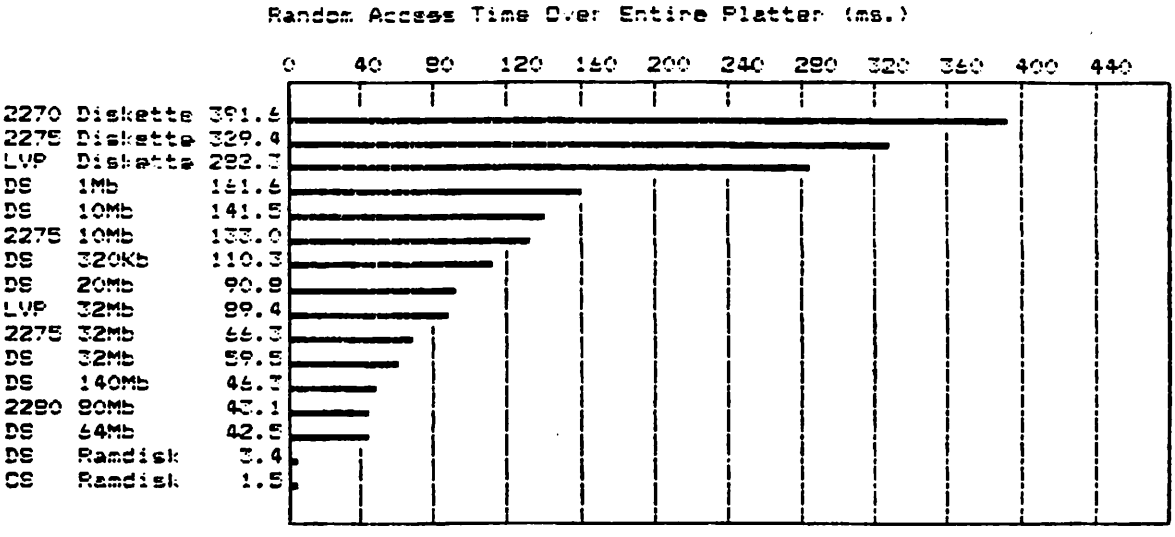
2.1 Sequential Access

The sequential access test consists of sequentially reading each disk from sector zero through the end of the disk. The test is repeated for a period of 5 minutes.



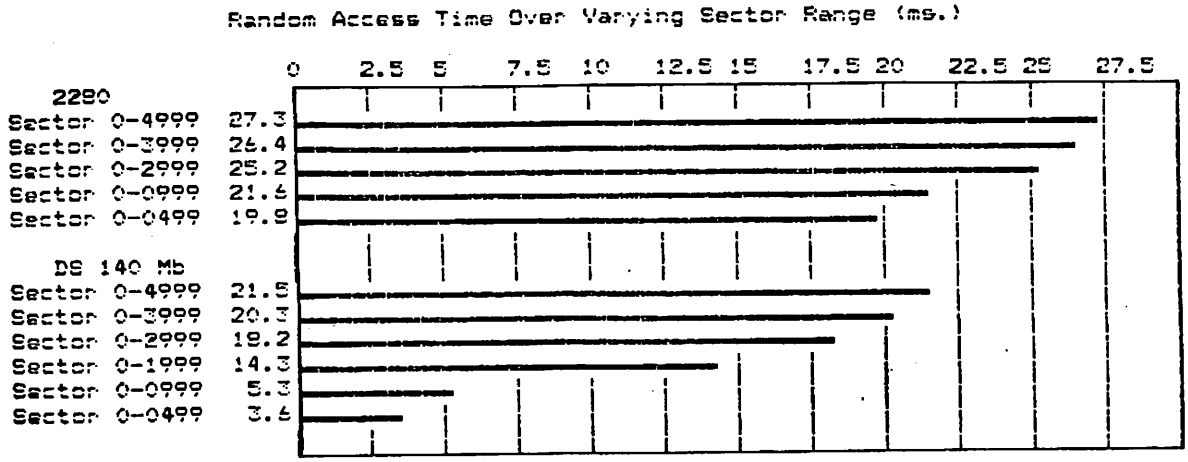
2.2 Random Access Over the Entire Platter

This test consists of randomly accessing sectors over the entire platter of each disk tested. The results do not reflect the varying storage capacities of the disks tested.



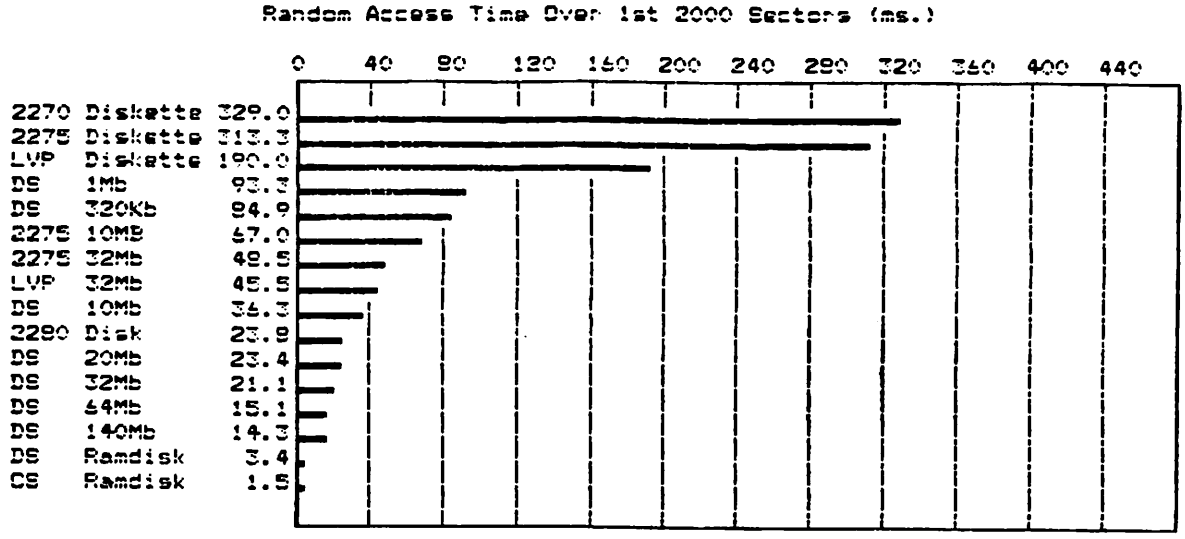
2.5 Random Access Over Varying Sector Range

This test demonstrates the effectiveness of the DS sector cache. As the sector range is reduced, the probability of a cache hit increases significantly reducing access time.



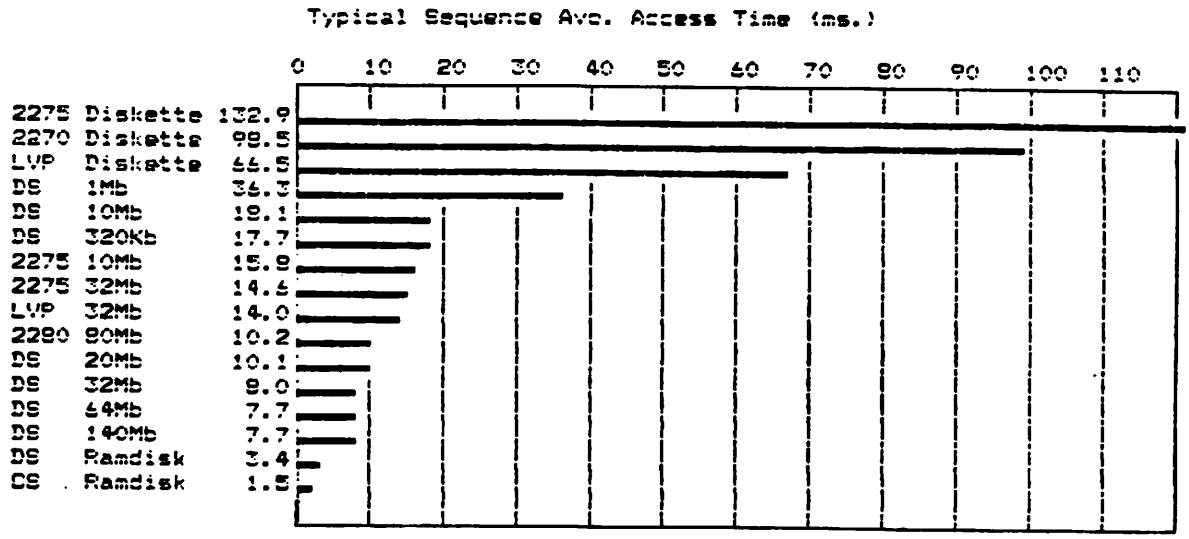
2.3 Random Access Over 2000 Sectors

This test randomly accesses each disk, but only over the 1st 2000 sectors of the disk platter (1000 sectors for the diskettes tested).



2.4 Typical Sequence Access

This test simulates more typical use of a disk than purely sequential or random access. The test simulates opening 2 files located randomly on the disk. The first file is accessed sequentially (this could be a program overlay or sequential data file). 100 sectors are read randomly from a 100 sector range in the second file (this could be a randomly accessed data file). The test is repeated, including reopening the files, for a duration of 5 minutes.



To : Distribution

From: Gene Schulz

Subj: Revised Marketing Requirements For The DS Disk Series And Repackaged CPU

Date: November 6, 1986

Attached are the revised FCS and marketing requirements for the previously designated 2275F, 2275R, 2275S disk drives and 2275T tape streamer. To eliminate the need for the development of a new power supply to power all the above disk and tape devices, and interim packaging for the same, this project will be combined with the repackaged CPU project. Part of the redesigned CPU project calls for a data storage cabinet that compliments the redesigned CPU and that can house 5-6 peripherals. This new data storage cabinet will contain an adequate power supply. Therefore, as the original project completion schedules are so close, it makes sense to combine these two projects into one.

A revised PEP (H0371Z Rev. 2) will be required to replace the two existing PEPs, e.g. one for the 2275F/R and 2275T (H0371Z), one for the 2275S (H0152A) and will include the data storage cabinet, cross-referenced in the repackaged CPU PEP, number H0245A. It is intended that these guidelines be used by R&D to plan product development. This document should accompany the R&D PEP during the approval cycle.

2200/MICROVP/CS DISK STORAGE SYSTEM
AND
REPACKAGED CPU

Requirements Summary

New low cost, high speed Winchester type drives with efficient methods of backup be developed to replace the current 2275 series of disk drives, 2280-3A and 2280N-3A disk drives, and the 22C14 DPU for the 2280. New packaging be developed to house the new VLSI CPU in one cabinet (PEP # H0245A) and in a separate package, the components of the previously designated 2275F/R/S/T disk drive project (one diskette, one 10MB removable disk and three fixed 20, 32 or 64MB Winchesters) and a tape streamer. The new CPU package should be designated as the CS-2/5 (2 = 128KB, 5 = 512KB), the data storage cabinet as the DS. The designation "2275F/R/S/T" is eliminated. The DS will only be offered as a cabinet. The buyer will then have the option of ordering a single 320KB or 1.2MB diskette, single 10MB removable Winchester, single 40MB tape streamer and combinations of fixed 20, 32 and 64MB Winchesters.

Functional Requirements

* To provide a basic data storage cabinet that allows the users to customize the cabinet to their requirements by having the option of adding either a 320KB or 1.2MB diskette, 10MB removable Winchester, 40MB Tape Streamer and combinations of 20, 32, 64MB fixed Winchesters, and in the future, 190MB (142MB formatted) fixed Winchesters

* Provide a low cost, equal in storage capacity and speed alternative to the current 2280-3A and 2280N-3A disk drives, in the price range of current 2275 Winchester drive offerings.

* To decrease response time and increase throughput versus the current 2275 and be equal in performance to a 2280 disk drive

* To provide storage devices price competitive with the Wang look-a-likes

* To increase the price/performance of the current 2275-10, -20, -30 and -60 disk configurations by offering in addition to a 320KB or 1.2MB diskette, an optional 10MB removable Winchester type drive using half-height technology and a method of tape backup (in lieu of or in addition to the 10MB removable option).

* To offer the choice of either a 320KB or 1.2MB (will read 320KB) diskette drive with all disk drives configurations, in order to facilitate software compatibility and the servicing of 2200/MicroVP/CS systems for our customer service reps, versus the 2275-20 and 2275-60 which do not contain a diskette and require an external removable device as the 2229

* To provide disk storage in excess of 576MB, multiplexable from multiple CPUs.

* To provide, via a tape streamer, a more efficient and operator unattended method of backup when disk storage in excess of 64MB is required

* To provide a lower cost solution to multiplexing that doesn't require the use of a $16,500 2280 disk drive.

* To develop a new CPU package utilizing and/or modifying existing packages as the VS5/6 to minimize development, reduce manufacturing costs and when linking a CS-2/5 to a VS via the 2200/VS LCO data-link, for the two CPUs to blend together. The ideal design is to look like a VS5/6. Acceptable is the "as presented" recent design and mock-up

* That when additional CPUs are multiplexed to the disk drives of the data-storage cabinet, the additional CPUs can either be placed with the main CPU and data-storage cabinet and appear visually to be one system or located freestanding away from the main configuration

* To provide for a data-storage package that will accommodate in its maximum configuration, at least 6 peripheral devices. These include 5 disk drives (1 diskette, 1 10MB removable, and 3 fixed disks; two can be up to 64MB, the third can be no larger than 20MB) and a tape streamer. An alternate configuration will be the substitution of the 10MB removable disk and the 20MB fixed Winchester with a third 64MB Winchester and use the tape streamer for backup. The 2200/MicroVP/CS-2/5 must support 3 data storage cabinets per CPU. Easy access to the 10MB removable disk, 320KB or 1.2MB diskette, and the tape streamer (when included) must be provided. Consideration should be given to replacing the 64MB fixed Winchester with a 190MB (unformated) Winchester either prior to announcement or at a later date.

* A user should have the option of ordering a CS-2/5 with a power supply and 9 I/O slots, less the CPU board, in order to use the additional I/O slots as a chassis expansion option. Utilizing the existing PC boards and cable supplied with the Model 9048 Extended I/O Chassis Special Products option, the user would obtain a net add of 7 additional I/O slots for a total 16 I/Os. This would accommodate special situations that require an extraordinary number of I/O slots. For example, you could have a CS-2/5 system with 3 MXEs, 3 disk controllers, 2 printer controllers, 1 TC board and 3-4 2258 boards, for a total requirement of 12-13 I/O slots

Hardware:

With cost reduction in mind, the new disk system should be designed to utilize half-height technology. The cabinet is ordered separately and either a 320KB/1.2MB half-height removable diskette, 10MB removable disk drive and/or a 40MB tape streamer (Teac), to facilitate backup, are optional and ordered separately. Standard cabling should be used to connect the data storage cabinet to existing disk/tape controllers.

The data storage cabinet must be able to utilize the existing 22C32, 22C11 and 22C03 triple, dual and single controllers, and the 2280 and 2275 multiplexer controllers. The new drives should use a ST-506 standard Winchester interface

Hardware needed will be the new packaging and the new disk board with a built in DPU. All existing mother boards, CPU boards, I/O boards and existing and planned peripherals should be accommodated.

Also, it is not uncommon for an installation to have 4-6 CPUs multiplexing common disk files (we will allow 16). In the design of the packaging, consideration must be given on how the additional CPUs will fit functionally and esthetically. For example, If a prospect needs four CPUs multiplexed to a

common disk, provision should be made to allow for the choice of either having separate CPU cabinets away from the first cabinet or attached to the main CPU cabinet. When placed side by side, cables should not be visible. Short versions of existing cables will be needed if not already available.

The following chart illustrates the maximum number and type of fixed Winchesters the data storage cabinet can accommodate in addition to a single diskette. When the 190MB drives are available, the maximum number of 190MB drives accommodated are 2 versus 3 for 64MB:

DISKETTE (1 ONLY)	10MB REMOVABLE	TAPE STREAMER	20MB FIXED WINCH.	32, 64MB FIXED WINCH.		190MB WINCH
1	0	0	1	2	or	2
1	0	0	0	3	or	2
1	1	0	1	2	or	2
1	0	1	1	2	or	2
1	0	1	0	3	or	2
1	1	1	1	2	or	2

Whether ordered with the original DS or as a field upgrade, the previous chart represents the maximum number of drives supported per single data storage cabinet.

The data storage cabinet will be ordered as a "DS". The diskette, removable Winchester, fixed Winchesters and the tape streamer are ordered for initial installation as follows:

DS-320 - 320KB Diskette
DS-1.2 - 1.2MB Diskette
DS-10R - 10MB removable drive
DS-TS - Teac Tape Streamer
DS-20 - 20MB fixed Winchester
DS-32 - 32MB fixed Winchester
DS-64 - 64MB fixed Winchester
DS-142 - 142MB fixed Winchester

When ordered as field upgrades, UJ- is placed in front of the model number and the price will be slightly higher to include CE installation costs. For example:

UJ-DS-320 - 320KB Diskette
UJ-DS-1.2 - 1.2MB Diskette
UJ-DS-10R - 10MB removable drive
UJ-DS-TS - Teac Tape Streamer
UJ-DS-20 - 20MB fixed Winchester
UJ-DS-32 - 32MB fixed Winchester
UJ-DS-64 - 64MB fixed Winchester
UJ-DS-142 - 142MB fixed Winchester

Software:

Software required for the disk drives should be broken into two parts. The first part is the code used to interface with the diskette drive and DMA controllers taken from the existing 2275 microcode. The second part involves

the Winchester drive controller interface and will entail platter addressing, the caching and the commands available to the 2200 CPU. Objectives of the software should include the ability to provide a 2200 type 'D-Zero' disk interface for the 2200 operating system, a high-speed intelligent each to decrease response time and increase throughput, and provide support for all commands offered by the current 2280 disk drive. Software considerations should also be made to allow at a later date, the substitution of the 64MB Winchester with the 190MB Winchester.

To support the tape streamer, microcode to connect the tape drive and interface to the disk board is needed. Backup and recover utilities that interface with the tape microcode for the disks has to be written.

No software changes should be necessary for the repackaged CPU.

Media:

For the DS 320KB diskette to be compatible with the 320KB diskette offered on the current 2275. To have the ability for the 1.2MB diskette to read a 320KB diskette. To provide a DMA compatible 10MB removable disk drive cartridge. For the new CPU package to accommodate all existing and to be announced peripherals and I/O boards.

Performance:

Decrease response time and increase performance when compared to the current 2275 series. To be equal in performance and response time when compared to the current 2280 series. The repackaged CPU should be equal in response time and equal performance when compared to the current MicroVP, freestanding or multiplexed.

Application Requirements:

For all existing software applications to be able to use the new disk system drives without having to change anything other than a device address. For all existing 2200 software applications to be able to run on the CS-2/5 "as is".

Support:

* Customer Service should have all support plans in place by FCS.

* Normal entitlement as provided now should be supported.

* All user manuals should be available FCS.

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.

Announcements:

	U.S.	INT.
Announcement Date	12/31/86	12/31/86
FCS	1/31/87	1/31/87
Volume Ship	2/28/87	2/28/87

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WANG

To : Dr. Wang
Horace Tsiang
Don Dunning
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From: Gene Schulz

Subj: 2280 Phoenix Disk, 2280MUX And 2275 Disk Drive Replacement Business Plan

Date: November 20, 1985

This document outlines the proposed business plan for the 2275F, 2275R and 2275S disk drives and the new 2275MUX. The 2275F/R/S are proposed products to replace the current 2275 and 2280 (including the 22C14 Disk Processing Unit for the 2280) disk drives. The 2275MUX will replace the 2280MUX and allow all 2275 drives to be multiplexed. Currently only the 2280 can be multiplexed.

Below are the objectives of the attached plan:

- To increase the price/performance of current 2200 peripherals by providing Phoenix disk drive capabilities at Winchester prices by offering both a 360Kb diskette and a optional 10Mb removable disk in addition to a 10, 20, 32 or 64Mb fixed disk. The drive should be called the 2275F when it does not include the 10Mb removable drive and the 2275R when it includes the 10Mb removable drive. The 2275S is a 2275 drive without a built-in DPU and is daisy-chained to a F or R drive in order to provide up to an additional 128Mb of storage and efficient back-up

- To provide a more cost effective solution when multiplexing of CPUs is required

- To increase the number of allowed multiplexed CPUs from 4 to 16

- To make the new MicroVP more cost/competitive for our VARs, especially when competing against the micros

- To make Wang peripherals cost/competitive with the Wang "look-a-likes"

This business plan covers three different PEPs. One to cover the 2275F/R drives, the second for the 2275S drives and the third for the 2275MUX.

cc : Steve Michaelides

INTRODUCTION

As a result of the release of the MicroVP and our recent pricing actions, new life has been born into the 2200 product. Our VARs (Value Added Resellers) have evolved into the prime distribution channel for the 2200 and are very pleased with the current state of the product with a few exceptions. One of these exceptions is the high cost of larger disk storage and multiplexing. Our VARs sell in a very cost conscious market where several thousand dollars can mean the difference between winning or losing a sale. If there is a need to multiplex CPUs and/or disk storage greater than 60Mb is required, the VAR must propose a 2280 (13.4Mb fixed, 67Mb removable). The current price for a 2280 including the DPU is $16,500 and the monthly maintenance is $216 per month. We currently offer a MicroVP P package that includes a 128KB CPU, a 2275-10 disk drive and a single workstation for $8000 and the monthly maintenance is $86 per month. As you can see, because of the imbalance of the pricing, our VARs lose their competitive edge if a 2280 must be proposed, especially when competing against the micros. We do offer a 60Mb Winchester for $7,500 but the current 2275-60 cannot be multiplexed, and can only be backed-up by a 2229 Tape cartridge for $4,500.

The 2275F/R/S and the 2275MUX, will offer our users and VARs the following benefits:

- Low cost and efficient back-up through a optional 10Mb removable disk
- Any 2275F/R disk drive can be multiplexed
- If multiplexing is required, an expense disk drive is no longer mandatory
- Up to 16 CPUs can be multiplexed versus 4 and up to 16 CPUs can share six disk drives (3 F or Rs plus an S per F or R)
- Up to 3 2275F/Rs and 3 2275Ss can be attached to a system providing a maximum of 606Mb of disk storage (3 2275R-64s plus 3 2275S-128s)
- Both existing 2275s and the new 2275F/Rs can be connected to the new multiplexer
- Being able to emulate a Phoenix drive with a Winchester type drive, will greatly enhance the price/performance of the 2200

Product Description

Hardware

The 2275F/R/S will be based on the current 2275 hardware. Nine configurations will be offered for the 2275F/R with storage ranging from 9.5 to 127.5 megabytes. The existing 2200 diskette controller (22C03) and cables will be used to communicate between the 2275F/R and the 2200. All configurations will have a 360KB floppy, a built-in DPU and one 10,20,32 or 64Mb Winchester. The 10Mb removable cartridge Winchester will be available as an option on all units containing a floppy. A single or dual 64Mb drive (in lieu of the floppy and the 10 Mb removable) will also be available as a slave unit to the F or R drive. The 2275S is daisy-chained to a 2275F or R and does not contain its own DPU. As the 2275S is primarily used to extend available disk storage, it should be offered as a single or dual 64Mb only in order to simplify disk offerings. The current 2275 board must be modified to support the 10Mb removable

The 2275 Disk Multiplexing Unit is an option board that allows 4 CPUs to share 2 disk units (one F or R plus one daisy-chained S) through a single port. If a customer wishes to multiplex more than 4 CPUs, this can be done by using a **2275MUX Extender**. Each Extender allows 4 more CPUs to be multiplexed. If a user needs to multiplex more than 2 drives, each additional MUX allows 2 additional disk drives to be added. Up to 3 Extenders and 2 MUXs can be added, allowing up to 16 CPUs and 6 disk drives to be multiplexed.

Software

Some of the micro-code from the 2275 can be salvaged for the 2275F/R but most will have to be rewritten. There will be no software changes for the 2275MUX.

Market Analysis

There are estimated to be 64,000 current users worldwide and we are currently selling on the average 200 new MicroVP systems per month. The low selling price of the 2275F/R/Ss will encourage existing users to add more disk drives and for VARs to sell larger configurations to new users.

With lower prices for increased storage, increased flexibility in back-up and low cost multiplexing, we will be able to effectively leverage the corporate Installed Base Program to sell upgrades to existing users.

Market Requirements

Current 2275 and 2280 disk prices and recommended 2275F/R/S replacement prices are as follows:

MODEL	PRICE	REPLACEMENT MODEL	RECOMMENDED PRICE	GPM 2275F	GPM 2275R
2275-10	$3,000	2275F-10	$3,000	61.9	57.9
2275-20	4,000	2275F-20	4,000	67.5	62.7
2275-30	4,500	2275F-32	4,500	60.6	58.0
2275-60	7,500	2275F-64	6,000	65.3	62.2
2280-3A	16,500	2275R-64	7,500	N/A	62.2
2280N-3A	13,000	2275S-64	5,500	N/A	N/A
2280N-3A	13,000	2275S-128	7,500	N/A	N/A

MODEL	PRICE	REPLACEMENT MODEL	RECOMMENDED PRICE	GPM
2280MUX	2,000	2275MUX	1,500	N/A
22C80	500	22C80	500	N/A
N/A	N/A	2275MUX Extender	1,000	N/A

The optional 10Mb removable should increase the selling price by $1,500 and should be called the 2275R. Field upgrades to F drives should be allowed at a recommended price of $2,500. GPMs for the 2275MUX, reworked 22C80, 2275S and the MUX Extender, are not yet available.

Forecasts

FY'85 disk sales were as follows:

MODEL	U.S.	INT.	WW
2275-10	345	583	928
2275-20	138	287	425
2275-30	427	452	879
2275-60	37	75	112
2280-3A	305	325	630
2280-3AN	33	26	59
2280MUX	118	124	242

The following forecast is based on the hypothesis that 2280 sales will be replaced by the 2275R-67. The majority of all drives sold will include the 10Mb removable.

U.S. Forecast

MODEL	Q4 FY'86	Q1 FY'87	Q2 FY'87	Q3 FY'87	TOTAL
2275F-10	30	40	20	10	100
2275R-10	50	60	55	35	200
2275F-20	10	10	20	10	50
2275R-20	20	20	40	20	100
2275F-32	30	35	25	10	100
2275R-32	80	90	100	130	400
2275F-64	10	20	10	10	50
2275R-64	90	100	120	40	350
2275S-64	12	13	12	13	50
2275S-128	12	13	12	13	50
2275MUX	30	50	40	30	150
2275MUX EXTENDER	5	10	5	5	25
22C80	60	100	80	60	300

INT. Forecast

MODEL	Q4 FY'86	Q1 FY'87	Q2 FY'87	Q3 FY'87	TOTAL
2275F-10	60	80	40	20	200
2275R-10	100	120	110	70	400
2275F-20	20	20	40	20	100
2275R-20	40	40	80	40	200
2275F-32	40	40	35	15	125
2275R-32	85	100	110	130	425
2275F-64	10	20	10	10	50
2275R-64	90	100	120	40	350
2275S-64	12	13	12	13	50
2275S-128	12	13	12	13	50

2275MUX	30	50	40	30	150
2275MUX EXTENDER	5	10	5	5	25
22C80	60	100	80	60	300

Announcements

	U.S.	INT.
Announcement Date	3/15/86	3/15/86
FCS	4/15/86	4/15/86
Volume	5/01/86	5/01/86

2275F/R DISK UNIT

FOR THE WANG 2200

SOFTWARE FUNCTIONAL SPECIFICATION

Document Number: MVP-06

Revision 1.6

August 15, 1986

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CONTENTS

i. SUMMARY OF CHANGES

Revision 1.1		
	Section 2.1	The $GIO Enable Floppy Drive Radial Head Alignment command was added.
	Section 2.5	The error handling procedure for when excessive numbers of format errors and/or format errors in cylinder zero was specified.
	Section 5.	The development schedule was updated to reflect the preliminary hardware design.
	Appendix A	Additional references were added.
	Appendix B	The $GIO Enable Floppy Drive Radial Head Alignment command specification was added.
	Appendix B	The location of first and second Winchesters in the 2275S Disk Slave Unit was clarified.
	Appendix B	The Winchester ID Type values were clarified.
	Appendix C	The Customer Engineering Switch used to enable Alternate Sector Map Reading and Floppy Drive Radial Head Alignments was removed.
Revision 1.2		
	All sections	All references to CRC error checks were changed to ECC error checks as this is what will be used over the data fields on the disks.
	Section 1.3	Flexibility to allow for future product growth added as an objective.
	Section 2.1	The $GIO Enable Alternate Cylinders command was added.
	Section 2.5	The error handling procedure for defective drives was modified to be compatible with the Status Message format.
	Section 4.1	The fact that this product will work with the 22C11 Dual and 22C32 Triple controller as well as the 22C03 and the 2275MUX was documented.
	Appendix A	The appropriate Wang disk drive specifications were added as references. Two references to material from the ACM that was not useful were removed.
	Appendix B	The $GIO Status Message was changed to be compatible with that of the 2280 DPU and to increase flexibility.
	Appendix B	The $GIO Enable Alternate Cylinders command specification was added.
	Appendix C	The switch setting for removable Winchesters was changed to be more flexible.
Revision 1.3		
	Section 1.1	The streaming cartridge tape drive was added.
	Section 1.2	The streaming cartridge tape drive was added.
	Section 2.1	Commands needed to support the streaming cartridge tape drive were added.
	Section 2.5	The streaming cartridge tape drive was added.

Section 4.2	Support Utilities were updated to include the streaming cartridge tape drive.
Appendix A	References for the streaming cartridge tape drive were added.
Appendix B	Commands used to interface with the streaming cartridge tape drive were added.
Appendix C	The switch settings were changed to allow specification of the presence of a streaming cartridge tape drive.
Appendix D	Added.
Appendix E	Added

Revision 1.4

All Sections	The special 2275F/R specific $GIO command strings were redefined so as to use different command codes from all previous $GIO disk commands used by other drives.
Section 2.1	The Disable Alternate Cylinder command was added.
Section 2.1	The Disable Radial Head Alignments command was added.
Section 2.1	The Enable Retries command was added.
Section 2.1	The SCTD commands were redefined.
Appendix B	The Disable Alternate Cylinder command was added.
Appendix B	The Disable Radial Head Alignments command was added.
Appendix B	The Enable Retries command was added.
Appendix B	The SCTD commands were redefined.
Appendix C	The switch settings were redefined for greater flexability.
Appendix E	Changed to a list of the SCTD command acknowledgement error codes.
Appendix F	SCTD Self Test Return Codes listing was added.

Revision 1.5

Section 2.1	The Enable/Disable Radial Head Alignment commands were deleted.
Section 2.1	The Write File Mark On The Fly command was deleted.
Section 2.1	The Read File Mark On The Fly command was deleted.
Section 2.1	The Backup Sectors command now writes a file mark after writting the sector data.
Section 2.1	The End Write Block command now writes a file mark after writting the cache data.
Section 2.1	The Space Reverse command was added.
Section 2.1	The Disable Track Offset Read command was added.
Section 2.1	The Enable Track Offset Read command was added.
Section 2.1	The Disable Write Append with Offset command was added.
Section 2.1	The Enable Write Append with Offset command was added.

Section 2.1	The Select Drive command was added.
Section 2.1	The Select Drive/Lock Cartridge command was added.
Section 2.1	The Select Lock command was added.
Section 2.1	The Repeat Last Block command was added.
Appendix B	Appendix B was updated to reflect the changes made in Section 2.1.
Appendix B	The Recover Sectors command protocol was updated.
Appendix B	The Block Search command protocol was updated.
Appendix C	Switch settings for the 32Mb Micropolis and 140Mb Maxtor fixed Winchesters were defined
Appendix D	Drive Information and Defect Byte values for streaming cartridge tape drives were defined.
Appendix E	The command acknowledgement error codes for streaming cartridge tape drives were updated.

Revision 1.6

Section 2.1	The Allocate RAM-Disk command was added.
Section 4.2	A Utility to aid users in the management of the RAM-disk was added.
Section 4.2	A set of utilities to aid Customer Engineering were defined.
Appendix B	The Allocate RAM-Disk command was added.
Appendix B	The response of the tape microcode to encountering a file mark during Recover Sectors and Read Block commands was corrected.
Appendix E	The tape drive command acknowledgement error codes for encountering file marks were clarified.

1. OVERVIEW

1.1 Summary - This software is the 2275F/R Disk Unit resident software and is the interface between the 2200 BASIC-2 Operating System and the disk drives of the 2275F/R. The software also controls the optional 2275S Disk Slave Unit and the 2275T Streaming Cartridge Tape Drive. The 2275S attaches to the 2275F/R and provides a method for two additional fixed Winchesters to be added to the system, no removable media disk drive are allowed in slave units. The 2275T allows for high capacity backup of the 2275F/R/S Winchesters. Services compatible with other type 'D-Zero' 2200 disk units are provided.

1.2 Environment - The 2275F/R is a Z80 based disk controller with 32Kb ROM and 256Kb RAM, a NEC 765A Floppy Disk Controller, a QIC-02 Tape interface, and a Western Digital WD2010 Winchester Disk Controller. This Disk Unit is a peripheral for the Wang 2200 product family and can control one 5 1/4" 360Kb floppy diskette drive, one 10Mb removable cartridge Winchester disk drive, and one fixed Winchester disk drive. If the optional 2275S is attached, two additional fixed Winchester disk drives may also be used. Fixed Winchester drives can range in size from 10Mb to 112Mb. Attaching the optional 2275T to the system allows a Streaming Cartridge Tape Drive to be used as well.

1.3 Objectives - The objective of the 2275F/R software is to:

- Provide a 2200 type 'D-Zero' disk interface for the 2200 BASIC-2 Operating System.
- Provide a large, high speed, intelligent cache to decrease response time and increase throughput.
- Provide support for all commands offered by the 2280 Disk Processing Unit.
- Diagnose and where possible report failure of onboard components.
- Allow high capacity backup and recovery.
- Provide flexibility for future product growth by allowing new Winchesters to be easily added to the system.

1.4 Summary of Improvements - N/A

2. REQUIREMENTS

2.1 Functions - In General, the software of the 2275F/R provides support for the same set of commands as the 2280 Disk Processing Unit. Short descriptions of each of the supported commands follows. Complete descriptions, including the command protocols, are found in Appendix B, Command Definitions. All commands used to support the Streaming Cartridge Tape Drive are to be implemented so as to provide a standard QIC-02 interface to the 2200. The only exceptions are the

Backup/Recover Sectors commands and the Read/Write Blocks commands which are used to move data to and from the tape.

NEED EXAMPLES OF EACH INSTRUCTION

a. Read Sector - The Read Sector command causes the 2275F/R to transfer 256 bytes of data and a one byte LRC (binary add without carry of all data bytes) to the CPU from the specified sector on the requested disk surface.

b. Read Bad Sector - If the 2275F/R returns an ECC error during the execution of a Read Sector command, [the 2200 can obtain the data by requesting it after the error is reported. That is; the 2200 requests the data in the same manner as it would for a successful read operation.] ?

c. Write Sector - The Write Sector command causes the 2275F/R to write the 256 bytes of data sent by the 2200 onto the specified sector of the requested platter. Following the block of data the 2200 sends a one byte LRC which is used to insure that the data received is correct.

d. Compare Sector Command - The Compare Sector command causes the 2275F/R to receive 256 bytes of data from the CPU followed by a one byte LRC. The last sector written is then read from the disk to insure that no ECC errors occur. After reading the sector the 2275F/R will calculate the LRC for the data just read. The LRC transferred from the CPU is then compared against the LCR just calculated, if the two match then the compare is successful. ?

e. Format Platter Command - The Format Platter Command causes the 2275F/R to initialize the requested platter. All defective sectors are identified and alternate sectors assigned. All user accessible data areas are written with zeros.

f. Start Multisector Write Command - The Start Multisector Write command causes the 2275F/R not to write the data from subsequent Write Sector commands until one of the following conditions is met: 1) the cache is full, 2) the end of a track has been reached, 3) an out of sequence write is requested, 4) an End Multisector Write command is received, 5) or a command other than Write Sector is requested. For each of the sectors placed into cache, the 2275F/R will acknowledge a 'good' write even though the sector is not yet written. TO CACHE

g. Verify Sectors Command - The Verify Sectors command causes the 2275F/R Disk Unit to read the requested range of sectors from the disk. A ECC check of each sector is made as it is read from the disk. None of the data that is read is transferred to the 2200. Only the address of the last sector successfully verified and an acknowledgement are returned.

h. End Multisector Write Command - The End Multisector Write command causes the 2275F/R to write the data still in cache from previous Write Sector commands. If there was no Multisector Write in progress, then this command shall cause no action.

i. Disable Retries Command - The Disable Retry command disables all physical retries and ECC correction attempts.

j. Copy Sectors Command - The Copy Sectors Command is used to copy a range of sectors from one location to another within the same disk unit. The locations may be on the same or different platters.

k. Enable Alternate Cylinders Command - The purpose of this command is to allow Customer Engineering to read the Alternate Sector Maps.

l. Status Request Command - The Status Request command causes the 2275F/R to return the contents of its status message buffer to the 2200. All error count fields in the message are set to a value of 0 after the buffer has been transmitted. All values within the message are hexadecimal values except where noted. The status message format is defined in Appendix B.

m. Enable Retries Command - The Enable Retries command causes the 2275F/R to allow up to 10 retries per disk access. ECC correction is also enabled by this command.

n. Disable Alternate Cylinders Command - This command prevents the accessing of the alternate cylinders by the user.

o. Position Tape to BOT Command - The tape cartridge is rewound to the Begining-Of-Tape marker (BOT).

p. Erase Tape Command - This command causes the SCTD to erase the entire tape from BOT to EOT. After reaching EOT, the Erase Bar is turned off and the tape is returned to BOT.

q. Retention Tape Command - The Retention Tape command causes the tape to return to BOT, go from BOT to EOT, and then return to BOT.

r. Backup Sectors Command - This command causes the 2275F/R to retrieve the requested sectors from a disk within the same 2275F/R subsystem and write them onto tape at the current tape position. A maximum of 256 sectors may be moved at a time. If the number of sectors to move is specified as 0, then 256 sectors will be moved. If an odd number of sectors are to be moved, the last one will have a dummy sector of all 00h appended to it so as to satisfy the tape drive's demand for 512 byte blocks. A file mark will be written on the tape following the sector data. This command will not change the contents of the disk drives.

8/22 ✓

s. Write File Mark Command - This command is used to write a file mark on the tape at the current tape position.

t. Recover Sectors Command - The Recover Sectors command reads blocks from the current tape position and writes them to the requested platter within the F/R sub-system starting at the specified sector address. The specified number of sectors will be transferred unless a file mark is encountered. Then only those sectors preceeding the file mark wil be transferred. After reading a file mark, the tape will be left positioned immediately after it. A maximum of 256 sectors may be recovered per operation and these sectors will be written onto the disk sequentially. If the number of sectors to recover is specified as 0, then 256 sectors will be recovered. The first sector transferred will be the first half of the first block read. If an odd number of sectors are to be transferred, the second half of the last block will not be moved. The number of sectors actually transferred will be returned to the 2200.

u. Read File Mark Command - This command moves the tape to the next file mark, starting from the current tape position.

v. Read Tape Drive Status Command - This command causes the 2275F/R to return the standard QIC-02 six status bytes.

w. Write Without Underruns Command - This command causes the tape to be kept running, even when there is no data to be written, until data becomes available or EOT is reached.

x. Write N File Marks Command - This command write 1 to 15 file marks to tape at the current tape position.

y. Seek End of Recorded Data Command - This command instructs the tape drive to find the end of the recorded data and to position the tape to it.

z. Read N File Marks Command - The tape is moved to the Nth file mark by this command. N ranges from 1 to 15.

a1. Self Test I Command - This command causes the SCTD to perform a number of self-test operations. These include; tape drive microprocessor tests, EOT/BOT sensor tests, head positioner tests, capstan motor tests, data buffer tests, and Formatter checksum tests. This test does not modify the loaded tape.

b1. Self Test II Command - This command causes the SCTD to perform a different set of self-test operations from those performed by Self Test I. These include; tape speed tests, load point sensor tests, write tests, read tests, erase tests, and CRC check function tests. The Read Status command is used to obtain the results of the test.

c1. Read Extended Status Command - 64 bytes of vendor unique data is returned by this command. Pending an agreement on a convention to identify the Model and Make of tape drive, this information should only be used for diagnostic purposes with a cross-reference chart provided by the vendor.

d1. Block Search Command - This command causes the tape drive to position to the beginning of the requested block. If the block cannot be found, the tape is rewound and the error flagged.

e1. Write Block Command - This command allows the 2200 to download a block of data (512 bytes) to be written to tape. The 2275F/R can cache up to 128 blocks before filling its cache. Once the cache is full, an error will be returned to the 2200 on any subsequent Write Block commands. The End Write Block command must then be used to dump the cache contents to tape before any more blocks may be downloaded. Once a Write Block command has been received, any commands that cause the tape position to change invalidate the cache contents.

f1. End Write Block Command - The End Write Block command causes the write cache contents to be written to the tape at the current tape position. A file mark will be written to the tape following the cache data.

g1. Read Block Command - This command will cause the tape drive microcode to load its cache with data from the tape until a file mark is reached or cache is full. If a file mark was encountered the tape position will be after the file mark. The first 512 byte block of data will then be transferred to the 2200. Subsequent Read Block commands will be satisfied from cache. Once all the blocks in cache have been sent to the 2200, the next Read Block command will reload the cache. Any commands that cause the tape position to change invalidate the cache contents.

h1. Release Cache Command - This command causes any cache reserved for use by the Streaming Tape Drive to be returned to normal usage within the 2275F/R. Cache allocation is transparent to the user, but since the tape drive can require up to 1/4 of the available cache it is recommended that user utilities free cache as soon as possible to prevent performance degradations.

i1. Space Reverse Command - The Space Reverse command moves the tape back over the previous block after the command has been issued. No data is transferred.

j1. Disable Track Offset Read Command - This command causes all subsequent reads to be at the Mechanical Nominal track position.

k1. Enable Track Offset Read Command - This command causes the tape drive to reposition the head when soft errors are encountered according to the drive internal algorithm.

l1. Disable Write Append with Offset Command - The Disable Write Append with Offset command causes all write append operations to be written at the Mechanical Track Nominal position.

m1. Enable Write Append with Offset Command - This command causes the tape drive to determine a nominal track position prior to appending data.

n1. Select Drive Command - This command allows the host to select one of up to four available drives, uniquely numbered 1 to 4. A LED on the front panel of the selected drive is illuminated during command execution. DOES THIS REWIND TAPE TO BOT.

o1. Select Drive/Lock Cartridge Command - This command performs the functions of a Select Drive command, except the LED is illuminated and remains on until a standard Select Drive command is issued or the drive is reset.

p1. Select Lock Command - The Select Lock command is used with daisy chained formatted drives. It performs the functions of a Select Drive command, except the tapes in both the selected and the deselected drives are not rewound to BOT. This allows one drive to copy to another without rewinding to BOT or seeking the end-of-data position.

q1. Repeat Last Block Command - This command causes the 2275F/R DPU to retransmit the last tape drive data block that was sent to the 2200. It is used to recover from LRC errors occuring during data transmittion.

r1. Allocate RAM-Disk - The 2275F/R DPU allows users to set aside a portion of the cache for use as a RAM-disk. Once the RAM-disk has been set up, it is accessed as a normal disk platter. The RAM-disk is not permanent storage, deallocating it or changing its size causes its current contents to be lost. As many as 992 sectors of cache may be allocated for use in the RAM-disk. If the number of sectors to allocate is specified as 0, then any sectors previously allocated are returned to cache. It should be noted that since the Streaming Cartridge Tape Drive requires 64Kb of cache to operate, that no more than 736 sectors may be allocated to the RAM-disk while the tape drive is being used.

2.2 Performance - Since this product is supposed to replace the 2280 Phoenix it should perform at comparable speeds. The goal is to have the speed of the 2275F/R be at least 90% to 95% of that of the Phoenix when using 64Mb Winchester drives. When 10Mb, 20Mb, or 32Mb Winchester drives are used the 2275F/R performance will be less due to the physical limitations of the drives themselves. To achieve a high level of performance the 2275F/R will have:

- o Read and write routines that are optimized to best take advantage of the capabilities available in the hardware and to execute in the smallest amount of time.
- o 1 to 1 sector interleaving.
- o Intelligent high speed caching that is fine tuned to match capabilities and requirements of the 2200.

2.3 Inputs-Outputs - Inputs to the 2275F/R are the commands listed in section 2.1, the data to be read and/or written, and the setting of the switches on the 2275F/R PC board. The accepted commands are defined in Appendix B, Command Definitions, and the legal switch settings are defined in Appendix C, Switch Setting Definitions. Any unrecognized commands are rejected with no action taken. Illegal switch settings are handled in the same manner as a component failure.

2.4 Operation - Software flow diagrams are unavailable at this time.

2.5 Error Handling - Two forms of errors are possible: hardware errors and execution errors detected during the servicing of a request.

a. Hardware errors - Hardware errors can be separated into two classes: faults found on the 2275F/R PC board and faults found with the disk drives controlled by the 2275F/R. Each of these classes of errors will be handled in a different manner.

a.1 PC Board failures - Any problem discovered with the components on the PC board will cause the 2275F/R to become inoperative. Once it has entered this state it will not respond to any commands or requests. To signal that a problem has been discovered, the 2275F/R will attempt to flash the disk drive LEDs on and off.

a.2 Drive Failures - If the power-on diagnostics detect a problem with one of the disk drives or the streaming tape drive, the defect byte will be set to FFh for that drive. If an excessive number of format errors, or a format error in physical sector zero, are found during the formatting of a platter, then the defect byte shall be set equal to FEh for that platter. Attempts to access any of the platters located within a faulty drive will cause the 2275F/R to return an error code of 01h for the command completion acknowledgement, this corresponds to the BASIC-2 error code 195. Any attempts, other that a format or a status request command, to access an unformattable platter will return an error code of 02h (193 Format Error). In the event of a drive or platter failure, the platter addresses of all platter will remain unchanged.

WHAT ERROR IS SHOWN ON CRT. SHOULD BE 195 or 193.

b. Execution Errors - Execution errors result from logic, media, and transmission faults that prevent the successful execution of a command. For each error that can occur, the 2275F/R returns

an error code. The meaning of an error code is dependent upon whether it is returned during platter/sector address acknowledgement or during command completion acknowledgement. When during the command protocol the error codes are returned to the 2200 is defined in Appendix B, Command Definitions. The possible error codes for disk operations, their meanings and the 2200 BASIC-2 error codes they correspond to are listed below. The error codes associated with SCTD operations are listed in Appendix E.

b.1 Platter/Sector Address Acknowledgement Error Codes

Error Code	Meaning
00h	No error.
01h	Invalid sector address (198).
02h	Invalid platter address (191). DRIVE NOT READY

b.2 Command Completion Acknowledgment Error Codes

Error Code	Meaning
00h	No error.
01h	Seek error, write protect error, or drive failure during power-on diagnostics (195).
02h	Media format error (193).
04h	ECC error during read from disk (196) or LRC error during 2200 to 2275F/R data transmission (197).
08h	Sector compare error (199).
09h	Illegal sector address (198).

2.6 Testing - Due to the fact that proper operation of the 2275F/R is critical to any 2200 system that uses it, and due to the fact that any potential loss of customer data must be prevented, this product should be throughly tested in as many different situations and environments as possible, including both alpha and beta test sites, before it is released.

2.7 Alternative Proposals - N/A

3. USER INTERFACE

3.1 User Profile - The typical user of the 2275F/R will be a typical user of 2200 systems. Only normal familiarity and knowledge of the 2200 environment is assumed.

3.2 Operating Scenario - The user does not directly interface with the 2275F/R other than to load and unload removable media (floppy diskettes and removable Winchester cartridges). All other contact is done through the BASIC-2 Operating System in the same manner as disk drives. The only difference apparent to the user will be in the addresses of available platters and their sizes. The platter

addresses within the 2275F/R Disk Unit and 2275S Disk Slave Unit are as follows: Dx0 - reserved for the floppy drive, Dx1 thru DxE - reserved for fixed Winchester platters, and DxF - reserved for the removable Winchester and the Streaming Tape Drives. All Winchesters will be partitioned into platters of 38912 or 65024 sectors as shown below. All sectors will be 256 bytes in length.

DRIVE TYPE	NUMBER OF PLATTERS	SECTORS/PLATTER
360Kb Floppy	1	1280
10Mb Fixed Winchester	1	38912
10Mb Removable Winchester	1	38912
20Mb Fixed Winchester	2	38912
33Mb Fixed Winchester	2	65024
64Mb Fixed Winchester	4	65024
Streaming Tape Cartridge	1	184320

4. OPERATING ENVIRONMENT

4.1 Equipment - A 2200 system with a 22C03 Diskette Controller, a 22C11 Dual Controller, a 22C32 Triple Controller, or a 2275MUX Multiplexing Disk Controller installed.

4.2 Support Software - Two support utilities have to be developed; the first is a menu-driven platter formatting utility, and the second is a menu-driven utility to backup and restore platter image to and from 10Mb removable Winchester cartridges.

a. Format Utility - Because the 2275F/R can have a wide variety of platter addresses and sizes, a menu driven format utility will be provided to make disk initialization easier for the user. This utility should work with 2275F/R, 2275, 2280, and LVP Winchester drives. In brief, this utility should display the addresses of all of the available platters within the requested disk unit and their sizes. The user would then choose which platter to format, what size of Catalog Index to initialize it with, and whether or not the new hashing algorithm is to be used. This utility could be created by modifying the current @FORMAT utility and should replace it on the 2200 System Platter. This utility will be described in detail in its own functional specification.

b. Backup/Restore Utility - The current @BACKUP and @RESTORE utilities will be modified to support backups between all types of disk units and 10Mb removable Winchester cartridges. A separate utility will be created to also allow backed up to streaming tape cartridges. Full platter images and individual file images may be stored on one cartridge. This utility will be described in detail in its own functional specification.

c. RAM-Disk Utilities - A utility will be provided to help the user determine how allocating cache to the RAM-disk affects performance. This utility will also allow users to create the RAM-disk.

d. Customer Engineering Utilities - A set of utilities that allow easy access to the 2275F/R's status message and alternate sector storage areas will be written for Customer Engineering. Additionally a utility that enables and disables retries will be provided.

4.3 Interfaces - The normal 2200 'D-Zero' type device interface is used between the 2275F/R and the 2200 BASIC-2 Operating System.

4.4 Security and Privacy - N/A

4.5 Summary of Impacts

a. Hardware - The current 2275 is being redesigned to create this product. In addition a new multiplexer/disk controller, the 2275MUX Multiplexing Disk Controller, is being developed to allow the 2275F/R to be shared by as many as 16 2200 CPUs.

b. Software - No changes to existing software should be necessary.

c. Operational Impacts - The backup/restore and formatting procedures will be impacted as platter sizes and addressing has changed. The Format and Backup/Restore utilities presented in section 4.2 are intended to help minimize the extent of this impact.

d. Documentation/Training - Documentation for Customer Engineering, Technical Support, and end users will have to be created to explain the physical set up and logical operation of the 2275F/R, the 2275S, and the 2275T.

e. International - None.

5. DEVELOPMENT SCHEDULE

Not available at this time.

APPENDIX A
REFERENCES

Internal Documentation

Wang 2200 BASIC-2 Language Reference Manual

Wang 2200 BASIC-2 Disk Reference Manual

2200 Disk Command Sequences for 2200 LVP
Max Blomme, Nov. 10, 1980

2200 I/O Bus
Roger M. Kirk Jr., Aug. 1, 1985

2200 LVP Caching Routines
Scott Tagen, 1985

2200 Table Driven Format Utility Functional Specification
author unknown - to be written

2200 Streaming Cartridge Tape Drive Backup/Restore Utility Functional Specification author unknown - to be written

Streaming Cartridge Tape Drive for the WANG PC (Doc. # PC-93)
Al Grant, April 8, 1985

5 1/4 Inch, Half Height, 40 Track (48 TPI) Double Sided Floppy Disk Drive Product Specification
John Strazdes, Aug. 27, 1984

5 1/4 Inch 10 Mb Winchester Disk Drive Product Specification
John Strazdes, Aug. 27, 1984

5 1/4 Inch 10 Mb Removable Winchester Disk Drive Product Specification
John Strazdes, Nov. 29, 1984

3 1/2 Inch 20 Mb Winchester Disk Drive Product Specification
John Strazdes, June 19, 1985

5 1/4 Inch 33 Mb Winchester Disk Drive Product Specification
John Strazdes, Feb. 6, 1984

5 1/4 Inch 85 Mb Winchester Disk Drive Product Specification
John Strazdes, Sept. 10, 1985

1/4" Streaming Cartridge Tape Drive Product Specification
John Strazdes, May 14, 1985

External Documentation

Advanced Micro Devices
MOS Microprocessors and Peripherals Data Book

ANSI
QIC-02 Intelligent Interface Standard - Revision D Sept. 23, 1982

Cipher Data Products
Series 540 Cartridge Tape Drive Product Description

NEC Electronics
Microcomputer Products Data Book

Western Digital
Storage Management Products Handbook
Storage Management Products Handbook Addendum January, 1985

Zilog
Z80 Assembly Language Reference Manual
Z80-CPU Technical Manual
Z80-CTC Technical Manual
Z80-PIO Technical Manual

APPENDIX B
COMMAND DEFINITIONS

B.0 Platter Addresses

All platter addresses used in 2275F/R commands are 5 bits in length and defined as below. All commands check for valid platter addresses, an invalid platter address causes an 191 error to be generated. The signal DN3 (the 40 bit of the platter address) determines which unit, 2275F/R or 2275S Disk Slave, the platter is in. If DN3 is false the platter is in the Disk Slave Unit, if it is true the platter is in the 2275F/R.

ADDRESS	PLATTER
10h[1]	floppy drive/RAM-disk
00h	1st fixed Winchester platter
01h	2nd fixed Winchester platter
02h	3rd fixed Winchester platter
03h	4th fixed Winchester platter
04h	5th fixed Winchester platter
05h	6th fixed Winchester platter
06h	7th fixed Winchester platter
07h	8th fixed Winchester platter
08h	9th fixed Winchester platter
09h	10th fixed Winchester platter
0Ah	11th fixed Winchester platter
0Bh	12th fixed Winchester platter
0Ch	13th fixed Winchester platter
0Dh	14th fixed Winchester platter
0Eh[2]	Removable Winchester/Streaming Tape Drive

[1] If DN3 is true the address refers to floppy drive of the 2275F/R, else it refers to the RAM-disk.

[2] If DN3 is true the address refers to the optional removable cartridge Winchester of the 2275F/R, else it refers to the Streaming Cartridge Tape Drive

B.1 Sector addresses

Any command requiring a sector address will validate that address. An invalid sector address shall cause an 198 error to be generated. The exception to this is the Verify command. If the ending sector address specified in a verify command is beyond the end of the platter, then the 2275F/R shall verify up to the end of the platter and flag the last sector + 1 as bad. That is, if the last sector on the platter is number 38911 and the 2275F/R is asked to verify sectors 0 through 40000, then sectors 0 through 38911 shall be verified and sector 38912 shall be flagged with an error.

B.2 Read Command

NEED INSTRUCTION EXAMPLES

The Read Sector command causes the 2275F/R to transfer 256 bytes of data and a one byte LRC (binary add without carry of all data bytes) to the CPU from the specified sector on the requested disk surface.

THIS ENTRIRE APPENDIX MEANS VERY LITTLE TO ME AS SHOWN. NEED INSTRUCT EXAMPLES FOR MORE INFO ON HOW TO SEE OR LOCATE BYTE

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	000ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	xx	CPU/Unit	high byte of sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of sector address
WR/OBS/echo	xx	CPU/Unit	low byte of sector address
WR/IBS	yy	Unit	platter/sector address acknowledgement 00 - both valid 01 - sector address invalid (I98) 02 - platter address invalid (I91)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement of read 00 - no error 01 - seek or write protect error (I95) 02 - format error (I93) 04 - ECC error (I96)
WR/IBS	yy		
.	.	Unit	data - 256 bytes
.	.		
WR/IBS	yy		
IBS	yy	Unit	LRC

B.3 Read Bad Sector

If the 2275F/R returns an ECC error during the execution of a Read Sector command, the 2200 an obtain the data by requesting it after the error is reported. That is; the 2200 requests the data in the same manner as it would for a successful read operation.

B.4 Write Command

The Write Sector command causes the 2275F/R to write the 256 bytes of data sent by the 2200 onto the specified sector of the requested platter. Following the block of data the 2200 sends a one byte LRC which is used to insure that the data received is correct.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	010ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	xx	CPU/Unit	high byte of sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of sector address
WR/OBS/echo	xx	CPU/Unit	low byte of sector address
WR/IBS	yy	Unit	platter/sector address acknowledgement 00 - both valid 01 - sector address invalid (I98) 02 - platter address invalid (I91)
WR/OBS	xx		
.	.		
.	.	CPU	data - 256 bytes
.	.		
WR/OBS	xx		
WR/OBS	xx	CPU	LRC
WR/IBS	yy	Unit	acknowledgement of write 00 - no error 01 - seek or write protect error (I95) 02 - format error (I93) 04 - ECC error (I96)

B.5 Compare Command

The Compare Sector command causes the 2275F/R to read then requested sector and then receive 256 bytes of data from the CPU followed by a one byte LRC. The data read from the disk is then compared against the data received from the CPU, if two match then the compare is successful.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	100ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	xx	CPU/Unit	high byte of sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of sector address
WR/OBS/echo	xx	CPU/Unit	low byte of sector address
WR/IBS	yy	Unit	platter/sector address acknowledgement 00 - both valid 01 - sector address invalid (I98) 02 - platter address invalid (I91)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement of read 00 - no error 01 - seek or write protect error (I95) 02 - format error (I93) 04 - LRC error (I97)
WR/OBS . . . WR/OBS	xx . . . xx	CPU	data - 256 bytes
WR/OBS	xx	CPU	LRC
WR/IBS	yy	Unit	acknowledgement of compare 00 - no error 08 - compare error (I99)

B.6 Format Command

The Format Platter Command causes the 2275F/R to initialize the requested platter. All defective sectors are identified and alternate sectors assigned. All user accessible data areas are written with zeros.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	02	CPU/Unit	command byte
WR/OBS	xx[1]	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement of format 00 - no error 01 - seek or write protect error (195) 02 - format error (193) 04 - ECC error (196)

[1]A start signal of 01 will format floppy diskettes in the same manner as does the PC. All other devices are formatted in the 2200 manner regardless of the start signal used.

B.7 Start Multisector Write Command

The Start Multisector Write command causes the 2275F/R not to write the data from subsequent Write Sector commands until one of the following conditions is met: 1) the cache is full, the end of a track has been reached, an out of sequence write is requested, an End Multisector Write command is received, or a command other than Write Sector is requested. For each of the sectors placed into cache, the 2275F/R will acknowledge a 'good' write even though the sector is not yet written.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	10	CPU/Unit	command byte
WR/OBS	00	CPU	signal Unit to start operation

B.8 Verify Command

The Verify Sectors command causes the 2275F/R Disk Unit to read the requested range of sectors from the disk. A ECC check of each sector is made as it is read from the disk. None of the data that is read is transferred to the 2200. Only the address of the last sector verified and an acknowledgement are returned.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	12	CPU/Unit	command byte
WR/OBS/echo	xx	CPU/Unit	high byte of starting sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of starting sector address
WR/OBS/echo	xx	CPU/Unit	low byte of starting sector address
WR/IBS	yy	Unit	starting sector address acknowledgement 00 - both valid 01 - sector address invalid (I98). 02 - platter address invalid (I91)
WR/OBS/echo	xx	CPU/Unit	high byte of ending sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of ending sector address
WR/OBS/echo	xx	CPU/Unit	low byte of ending sector address
WR/IBS	yy	Unit	ending sector address acknowledgement 00 - both valid 01 - sector address invalid (I98)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	high byte last verified sector address
WR/IBS	yy	Unit	middle byte last verified sector address
WR/IBS	yy	Unit	low byte last verified sector address
WR/IBS	yy	Unit	acknowledgement of verify 00 - no error 01 - seek or write protect error (I95) 02 - format error (I93) 04 - ECC error (I96) 09 - beyond limits error (I98)

B.9 End Multisector Write Command

The End Multisector Write command causes the 2275F/R to write the data still in cache from previous Write Sector commands. If there was no Multisector Write in progress, then this command shall cause no action.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	11	CPU/Unit	command byte
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement of writes 00 - no errors 01 - seek or write protect error (195) 02 - format error (193) 04 - LRC error (197)

B.10 Disable Retries Command

The Disable Retry command disables all physical retries and ECC correction attempts.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	17	CPU/Unit	command byte
WR/OBS	00	CPU	signal Unit to start operation

B.11 Copy Command

The Copy Sectors Command is used to copy a range of sectors from one location to another within the same disk unit. The locations may be on the same or different platters.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	01	CPU/Unit	command byte
WR/OBS/echo	xx	CPU/Unit	high byte of starting sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of starting sector address
WR/OBS/echo	xx	CPU/Unit	low byte of starting sector address
WR/IBS	yy	Unit	starting sector address acknowledgement 00 - both valid 01 - sector address invalid (I98) 02 - platter address invalid (I91)
WR/OBS/echo	xx	CPU/Unit	high byte of ending sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of ending sector address
WR/OBS/echo	xx	CPU/Unit	low byte of ending sector address
WR/IBS	yy	Unit	ending sector address acknowledgement 00 - both valid 01 - sector address invalid (I98) 02 - platter address invalid (I91)
WR/OBS/echo	000ppppp	CPU/Unit	3 bit dummy command identifier & 5 bit destination platter address
WR/OBS/echo	xx	CPU/Unit	high byte of destination sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of destination sector
WR/OBS/echo	xx	CPU/Unit	low byte of destination sector address
WR/IBS	yy	Unit	destination sector acknowledgement 00 - both valid 01 - sector address invalid (I98) 02 - platter address invalid (I91)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement of copy 00 - no errors 01 - seek or write protect error (I95) 02 - format error (I93) 04 - ECC error (I96)

B.12 Enable Alternate Cylinders Command

The Enable Alternate Cylinders command allows the cylinders reserved for alternate sectoring to be read and written as if they are normal cylinders. The alternate cylinders are addressed starting with sector 0 and each sector is numbered sequentially.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	21	CPU/Unit	command byte
WR/OBS	00	CPU	signal Unit to start operation

B.13 Status Request Command

The Status Request command causes the 2275F/R to return the contents of its status message buffer to the 2200. All error count fields in the message are set to a value of 0 after the buffer has been transmitted. All values within the message are hexadecimal values except where noted. The status message format is defined in Appendix D.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	16	CPU/Unit	command byte
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	count of bytes in status message to follow (in hexadecimal)
WR/IBS	yy		
.	.		
.	.	Unit	status message
.	.		
WR/IBS	yy		

B.14 Enable Retries Command

The Enable Retry command restores all physical retries and ECC correction attempts.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	24	CPU/Unit	command byte
WR/OBS	00	CPU	signal Unit to start operation

B.15 Disable Alternate Cylinders Command

The Disable Alternate Cylinders command stops the cylinders reserved for alternate sectoring from being read and written as if they are normal cylinders.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit platter address
WR/OBS/echo	20	CPU/Unit	command byte
WR/OBS	00	CPU	signal Unit to start operation

B.16 Position Tape to BOT Command

This command positions the tape to the BOT mark. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	30	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.17 Erase Tape Command

This command erases the entire tape from BOT to EOT and then repositions the tape to BOT. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	31	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.18 Retention Tape Command

This command causes the tape to return to BOT, go from BOT to EOT and then return to BOT. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	32	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.19 Backup Sectors Command

The Backup Sectors command causes the 2275F/R Disk Unit to copy the requested range of sectors from the disk onto tape at the current tape position. A file mark is written after the sector data. If an error is encountered during the write to tape, then the cache contents are invalidated as the tape is defective. The error codes used are specified in Appendix E.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	33	CPU/Unit	command byte
WR/OBS/echo	xx	CPU/Unit	5 bit source platter address
WR/OBS/echo	xx	CPU/Unit	high byte of starting sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of starting sector address
WR/OBS/echo	xx	CPU/Unit	low byte of starting sector address
WR/IBS	yy	Unit	starting address acknowledgement 00 - both valid 01 - sector address invalid (198) 02 - platter address invalid (191)
WR/OBS/echo	xx	CPU/Unit	number of sectors to backup
WR/IBS	yy	Unit	number of sectors acknowledgement 00 - valid 01 - sector address invalid (198)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement of backup

B.20 Write File Mark Command

This command writes a file mark at the current tape position. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	34	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.21 Recover Sectors Command

The Recover Sectors command causes the 2275F/R Disk Unit to copy the requested range of sectors from the current tape position onto disk at the specified location. The error codes used are specified in Appendix E.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	35	CPU/Unit	command byte
WR/OBS/echo	xx	CPU/Unit	destination platter address
WR/OBS/echo	xx	CPU/Unit	high byte of starting sector address
WR/OBS/echo	xx	CPU/Unit	middle byte of starting sector address
WR/OBS/echo	xx	CPU/Unit	low byte of starting sector address
WR/IBS	yy	Unit	starting address acknowledgement 00 - both valid 01 - sector address invalid (I98) 02 - platter address invalid (I91)
WR/OBS/echo	xx	CPU/Unit	number of sectors to recover
WR/IBS	yy	Unit	number of sectors acknowledgement 00 - valid 01 - sector address invalid (I98)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	number of sectors recovered
WR/IBS	yy	Unit	acknowledgement of recover

B.22 Read File Mark Command

This command moves the tape to the next file mark starting from the current tape position. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	36	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.23 Read Tape Drive Status Command

The Read Tape Drive Status command transfers the standard 6 status bytes as defined in section 5.0 of revision D of the ANSI QIC-02 specification. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	37	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	06	Unit	count of bytes in status message to follow (in hexadecimal)
WR/IBS . WR/IBS	yy . yy	Unit	status message

B.24 Write Without Underruns Command

This command keeps the tape moving when there is no data to be written. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	38	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.25 Write N File Marks Command

The Write N File marks command will write 1 to 15 file marks starting at the current tape position. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	39	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS/echo	xx	CPU	number of file marks to write
WR/OBS	00	CPU	signal to start operation
WR/IBS	yy	Unit	acknowledgement

B.26 Seek End of Recorded Data Command

This command instructs the tape drive to position the tape to the end of recorded data. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	3A	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.27 Read N File Marks Command

The Read N File Marks command will read 1 to 15 file marks starting at the current tape position. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	3B	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS/echo	xx	CPU	number of file marks to read
WR/OBS	00	CPU	signal to start operation
WR/IBS	yy	Unit	acknowledgement

B.28 Self Test 1 Command

This command causes the SCTD to perform a number of self-test operations. A tape must be loaded to run this test, but it is not modified. The results of the test stored in the third byte of the status message and are obtained by way of the Read Status command. The codes returned through the status message are specified in Appendix F. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	3C	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.29 Self Test II Command

This command causes the SCTD to perform a number of self-test operations that are different from those of Self Test I. A scratch tape must be loaded as this test writes to the tape. The results of the test stored in the third through fifth bytes of the status message and are obtained by way of the Read Status command. The codes returned through the status message are specified in Appendix F. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	3D	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.30 Read Extended Status Command

The Read Extended Status command returns 64 bytes of vendor specific data. For the contents of the message returned by the Cipher SCTD see Table 13 in the Series 540 Cartridge Tape Drive Product Description. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	3E	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	40	Unit	count of bytes in status message to follow (in hexadecimal)
WR/IBS	yy	Unit	status message
.	.		
WR/IBS	yy		

B.31 Block Search Command

The Block Search Command causes the tape drive to position to the beginning of the requested block. If the block cannot be found the tape is rewound and the error flagged. The error codes that are used are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	3F	CPU/Unit	command byte
WR/IBS	yy	Unit	platter acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS/echo	xx	CPU/Unit	most significant byte of block address
WR/OBS/echo	xx	CPU/Unit	.
WR/OBS/echo	xx	CPU/Unit	.
WR/OBS/echo	xx	CPU/Unit	least significant byte of block address
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.32 Write Block Command

The Write Block command allows the 2200 to download a 512 byte block of data to the 2275F/R to be written to tape. Blocks will be cached until a End Write Block command is received. Following the block of data the 2200 sends a one byte LRC which is used to insure that the data received is correct. Once any of the cache has been loaded, any commands that cause the tape position to change invalidate the contents of the cache. If there is no room left in cache an error will be returned.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	48	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS	xx		
.	.		
.	.	CPU	data - 512 bytes
.	.		
WR/OBS	xx		
WR/OBS	xx	CPU	LRC
WR/IBS	yy	Unit	acknowledgement

B.33 End Write Block Command

This command causes the current contents of the SCTD write cache to be written to tape at the current tape position. A file mark is written after the cache data. If the write to tape fails, then the cache contents are invalidated as the tape is defective. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	49	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.34 Read Block Command

The Read Block command causes the 2275F/R to transfer 512 bytes of data and a one byte LRC (binary add without carry of all data bytes) to the CPU from the current tape position. If the SCTD cache is empty, then it will be loaded from the tape until a file mark is read or the cache is full. Subsequent Read Block requests will then be satisfied from cache for as long as possible. Once the cache has been loaded, any commands that cause the tape position to change invalidate the contents of the cache. If a filemark is encountered then the tape will be positioned after the filemark. The error codes used as the command acknowledgement are specified in Appendix E.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	4A	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement
WR/IBS	yy		
.	.		
.	.	Unit	data - 512 bytes
.	.		
WR/IBS	yy		
IBS	yy	Unit	LRC

B.35 Release Cache Command

This command causes the any cache currently being used by the SCTD microcode to be de-allocated. Since the SCTD can use as much as 1/4 of the available cache, it is recommended that user utilities free cache as soon as possible to help prevent performance degradations. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	4B	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.36 Repeat Last Block Command

The Repeat Last Block command causes the 2275F/R to retransfer the last 512 bytes of data and a one byte LRC (binary add without carry of all data bytes) sent to the CPU. This command is used by the CPU to recover from LCR transmission errors. The error codes used as the command acknowledgement are specified in Appendix E.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	4C	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement
WR/IBS	yy		
.	.		
.	.	Unit	data - 512 bytes
.	.		
WR/IBS	yy		
IBS	yy	Unit	LRC

B.37 Space Reverse Command

The Space Reverse command moves the tape back over the previous block after the command has been issued. No data is transferred. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	40	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.38 Disable Track Offset Read Command

The Disable Track Offset Read command causes all subsequent reads to be at the Mechanical Nominal track position. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	41	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.39 Enable Track Offset Read Command

The Enable Track Offset Read command causes the tape drive to reposition the head when soft errors are encountered according to the drive internal algorithm. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	.CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	42	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.40 Disable Write Append with Offset Command

The Disable Write Append with Offset command causes all write append operations to be written at the Mechanical Track Nominal position. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	43	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.41 Enable Write Append with Offset Command

The Enable Write Append with Offset command causes the tape drive to determine a nominal track position prior to appending data.all write append operations to be written at the Mechanical Track Nominal position. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	44	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (191)
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.42 Select Drive Command

The Select Drive command allows the host to select one of up to four available drives, uniquely numbered 1 to 4. A LED on the front panel of the selected drive is illuminated during command execution. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	45	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS/echo	xx	CPU/Unit	drive number
WR/IBS	yy	Unit	drive number acknowledgement
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.43 Select Drive/Lock Cartridge Command

The Selct Drive/Lock Cartridge command performs the functions of a Select Drive command, except the LED is illuminated and remains on until a standard Select Drive command is issued or the drive is reset. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	46	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS/echo	xx	CPU/Unit	drive number
WR/IBS	yy	Unit	drive number acknowledgement
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.44 Select Lock Command

The Select Lock command is used with daisy chained formatted drives. It performs the functions of a Select Drive command, except the tapes in both the selected and the deselected drives are not rewound to BOT. This allows one drive to copy to another without rewinding to BOT or seeking the end-of-data position. The error codes that are used as the command acknowledgement are defined in Appendix E

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit tape drive address
WR/OBS/echo	47	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS/echo	xx	CPU/Unit	drive number
WR/IBS	yy	Unit	drive number acknowledgement
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement

B.45 Allocate RAM-Disk

The Allocate RAM-Disk command causes as many as 992 sectors of cache to be set aside for use as a RAM-disk. If the number of sectors to allocate is specified as 0, then any sectors previously allocated are returned to cache. If the size of the RAM-disk is changed, or if it is deallocated, then its contents are lost. Since the Streaming Cartridge Tape Drive requires 64Kb of cache to operate, that no more than 736 sectors may be allocated to the RAM-disk while the tape drive is being used.

STROBE	BYTE(S)	SENT BY	DESCRIPTION
IOB WR/OBS	A0	CPU	start of operation
IBS	D0	Unit	acknowledgement/protocol type identifier
IOB	40	CPU	start of command
WR/OBS/echo	001ppppp	CPU/Unit	3 bit command & 5 bit RAM disk address
WR/OBS/echo	25	CPU/Unit	command byte
WR/IBS	yy	Unit	platter address acknowledgement 00 - valid 02 - platter address invalid (I91)
WR/OBS/echo	xx	CPU/Unit	high byte, number of sectors to allocate
WR/OBS/echo	xx	CPU/Unit	low byte, number of secotrs to allocate
WR/OBS	00	CPU	signal Unit to start operation
WR/IBS	yy	Unit	acknowledgement 00 - no error 01 - not enough memory

APPENDIX C
SWITCH SETTING DEFINITIONS

C.0 Switch Banks - There are two banks of eight switches each on the 2275F/R PC board. Bank 1 is used to define the configuration of the 2275F/R and the 2275T. Bank 2 is used to indicate if a 2275S Disk Slave Unit is present, and if so to identify its configuration.

C.1 Switch Bank 1 - Switch 1 is reserved for future use. It is planned that it will be used to indicate what kind of floppy drive (360Kb or 1.2Mb) is attached to the 2275F/R. Currently only the 360Kb floppy is supported. Switches 2 thru 4 are used to define the removable Winchester in the 2275F/R. Switches 5 through 8 are used to define the fixed Winchester in the 2275F/R. The switch usage for bank 1 is shown below.

Switch Usage Bank 1

switch setting 8 7 6 5 4 3 2 1	description
x x x x x x x q	floppy drive ID*
x x x x q q q x	removable Winchester drive ID*
q q q q x x x x	fixed Winchester ID*

*IDs are defined in sections C.3, C.4, and C.5

Symbol Meanings
x - don't care
q - drive identifier bit

C.2 Switch Bank 2 - If there is no 2275S attached to the 2275F/R then all of the switches in bank 2 shall be set to OFF. Otherwise they are used to indicate the configuration of the 2275S. Switches 1 through 4 identify the type of fixed Winchester present in the first (bottom) slot of the 2275S Disk Slave Unit. Switches 5 through 8 are used to identify the type of Winchester in the second (upper) slot. Another way of describing the drive locations in 2275S Disk Slave Unit is that the first Winchester is the one furthest from the WANG logo on the front of the unit, and the second Winchester is the one closest to the logo. The switch settings for bank 2 are shown below.

Switch Settings Bank 2

switch setting 8 7 6 5 4 3 2 1	description
0 0 0 0 0 0 0 0	No 2275S Disk Slave Unit attached
x x x x q q q q	4 switches used to indicate the ID of the first fixed Winchester*
q q q q x x x x	4 switches used to indicate the ID of the second fixed Winchester*

*fixed Winchester drive IDs are defined in section C.3.

Symbol Meanings

0 - switch OFF
1 - switch ON
x - don't care
q - drive identifier bit

C.3 Fixed Winchester Drive IDs - Each of the different types of fixed Winchesters used in the 2275F/R and 2275S are identified by a unique 4 bit identifier. These identifiers are equivalent to the switch settings used to identify the different types of drives. The identifiers and their associated drives are defined below.

Identifier Switch Setting	Disk Drive Type
0 0 0 0	No Drive Present
0 0 0 1	10Mb Winchester
0 0 1 0	20Mb Winchester
0 0 1 1	32Mb Quantum Winchester
0 1 0 0	64Mb Winchester
0 1 0 1	140 Mb Maxtor Winchester
0 1 1 0	32 Mb Micropolis Winchester
0 1 1 1	reserved for future use
thru	reserved for future use
1 1 0 1	reserved for future use
1 1 1 0	reserved
1 1 1 1	reserved

C.4 Removable Winchester Drive IDs - Each of the different types of removable Winchesters used in the 2275F/R are identified by a unique 3 bit identifier. At this time, only a 10Mb removable is planned for.

Identifier Switch Setting	Disk Drive Type
0 0 0	No Drive Present
0 0 1	10Mb Winchester
0 1 0	reserved for future use
thru	reserved for future use
1 1 1	reserved for future use

C.5 Floppy Drive IDs - The capacity of the floppy drive is indicated using switch 1 of switch bank 1. When turned OFF it indicates that a 360Kb floppy is attached to the system and the ON position is used to indicate the presence of a 1.2Mb floppy drive. Currently only the 360Kb floppy is supported.

APPENDIX D
STATUS REQUEST MESSAGE FORMAT

NEED EXAMPLES OF HOW TO REQUEST STATUS & HOW IT IS SEEN

DESCRIPTION	LENGTH IN BYTES
DPU information	
2275F/R Disk Unit type, low byte (ASCII)	1
2275F/R Disk Unit type, high byte (ASCII)	1
Protocol level (ASCII)	1
PROM revision number, low byte (ASCII)	1
PROM revision number, high byte(ASCII)	1
Disk Drive information	
# of sectors/platter, high byte	1
# of sectors/platter, medium byte	1
# of sectors/platter, low byte	1
number of data errors corrected by ECC	2
number of data errors uncorrectable by ECC	2
number of data error corrected by retry	2
number of addressing errors	2
defect byte	1

D.1 2275F/R DISK UNIT TYPE VALUES - The value of the high byte of this field will always be an ASCII '3'. This will distinguish the 2275F/R from the 2280 and the LVP Winchester (which set this field to '1') and the 2275 (which sets this field to '2'). The low byte of this field will always be to the switch setting used to define the drive containing the platter in question. The only exceptions to this are the floppy drive who causes Fh, and the Streaming Tape Drive which causes Eh, to be returned as the low byte.

D.2 PROTOCOL LEVEL VALUE - The value of the Protocol Level field will always be an ASCII '1'.

D.3 DEFECT BYTE VALUES - The defect byte may have the following possible values for disk drives: 00h - no defect, FEh - format defect, and FFh physically defective. For streaming tape drive the following values are used: 00h - no defect and FFh - not present.

D.4 DRIVE INFORMATION FOR STREAMING TAPE - The drive information for streaming cartridge tape drives differs from that of disk drives and is as follows.

DESCRIPTION	LENGTH IN BYTES
Streaming Cartridge Tape Drive information	
# of sectors/platter, high byte	1
# of sectors/platter, medium byte	1
# of sectors/platter, low byte	1
number of data errors retries (bus parity errors)	1
unused	7
defect byte	1

APPENDIX E
STREAMING CARTRIDGE TAPE DRIVE
COMMAND ACKNOWLEDGEMENT ERROR CODES

There are two classes of acknowledgement error codes used. The first class all have a value of less than 10h and are generated by the controlling microcode. The second class has error codes in the range of 10h to 1Fh, these error codes are generated by the tape drive itself. For a complete explanation of the second class of error codes see sections 5.3 and 5.4 of revision D of the ANSI QIC-02 specification.

CODE	MEANING
00	no error
01	disk seek, write protect, or failure error
02	disk format error
04	ECC during disk read, or LRC during data transmission error
08	disk compare error
09	illegal sector address
10	no cartridge present
11	no drive present
12	write protect
13	end of media
14	read or write abort
15	read error, bad block transfer
16	read error, filler block transfer
17	read error, no data
18	read error, no data and end of media
19	read error, no data and beginning of media
1A	file mark read, no error
1B	illegal command
1C	power on/reset
1D	marginal block detected
1E	write cache full
1F	write cache empty
20	invalid number of file marks specified
21	file mark encountered, operation truncated
22	file mark encountered, operation not performed
23	insufficent cache TAPE DRIVE?

APPENDIX F
STREAMING CARTRIDGE TAPE DRIVE
SELF TEST RETURN CODES

NEED EXAMI

F.1 Self Test I

The results of Self Test I are returned through byte 3 of the status message. After the self test is complete, a Read Tape Drive Status command is used to retrieve the results. The results codes used are vendor specific except for 00h and 11h. The return codes used by the Cipher drive are as shown below.

CODE	MEANING
00	test not performed
11	test complete, no error
12	basic drive microprocessor error
13	I/O error
14	EOT/BOT sensor error
15	head positioner error
22	read/write error
23	capstan motor error
24	formatter checksum error
25	data buffer error

F.2 Self Test II

Unlike Self Test I, all of the return codes for Self Test II are vendor dependant. These return codes are retrieved from the Cipher SCTD through the status message, bytes 3, 4, and 5. The value of each of these bytes, as used by Cipher, depends on the test in progress at the time of failure or completion. If the tests are run to completion with no error, then byte 3 will contain 11h. In the event of self test failure, byte 4 contains the number of the test that failed and bytes 3 and 5 specify what the failure was. The actual codes are specified below.

Self Test Complete, No Error
- byte 3 = 11h
- byte 4 = 07h
- byte 5 = 00h

Speed Test Failure
- byte 3 = 23h
- byte 4 = 01h
- byte 5 = n/a

Sensor Test Failure
- byte 3 = 23h
- byte 4 = 02h
- byte 5 = n/a

Write Test Failure (16 block test)

byte 3 = 22h
byte 4 = 03h
byte 5 = 01 - speed or sensor error
03 - write timeout error

Read Test Failure

byte 3 = 22h
byte 4 = 04h
byte 5 = 01 - speed or sensor error
02 - overrun detector error
03 - read timeout error
04 - unable to read
05 - unable to read file mark
06 - gap detect failure

Erase Test

byte 3 = 22h
byte 4 = 05h
byte 5 = 01 - speed or sensor error
03 - erase error

Write Test Failure (single block test)

byte 3 = 22h
byte 4 = 06h
byte 5 = 01 - speed or sensor error
03 - write timeout error

CRC Test Failure

byte 3 = 22h
byte 4 = 07h
byte 5 = 01 - speed or sensor error
02 - positioner error
03 - CRC error

J Volpini
NOV 19, 1986

The following is a list of CSO concerns generated as the result of the 2200 DS Cabinet design review held on Nov 18. This list is not intended to criticize the Design Engineering group or the individuals that have worked on this product. This list does, however, document the serious CSE concerns relative to the maintainability/installability of this product in the marketplace - and in front of the customer. It should also be noted that each of these issues is compounded by the fact that the cabinet will be located under a desk in an office environment - not a computer room site.

I Backcover issues:
- A Removal of 16 screws with 3 different tools
- B The backcover screws must not be self-tapping.
- C Redesign backcover to install/deinstall the same as the frontcover
- D Difficult to install screws into power supply
- E I/O connector assembled into backcover is potential for breaking connector or DPU board.
- F Provide an inner fan guard

II Frontcover issues:
- A Make openings in frontcover for FH Winchester units.
  - 1 Allows visibility to Winchester LEDs
  - 2 Provides airflow to Winchester front vents
- B Should provide bugcatcher type filter (the unit will be on the floor/under a desk)
- C Move on/off switch to top front of cabinet

III Respin of DPU board and cable concerns:
- A Design all connectors and switches to back of PCB where they will be accessible
- B Label all connectors and switches as well as provide a map of same
- C All peripherals should be capable of having cables installed / deinstalled while device is mounted in the cabinet
- D Increase length of most cables to allow better cable dressing

IV Miscellaneous issues:
- A Floppy and 10 MB Winchester cannot be mounted together in the same 5 1/4" slot (operator problems with device levers)
- B Need more room on side of 10 MB removable Winchester to access cable connectors
- D Better support for DPU board - has potential for shipping damage
- E Power Supply/DPU grounding with rear panel off

This version NOT sent to Yvonne or Jack — This version updated 6/23/86 — (the last page)

TO: YVONNE CHEN, JACK LI

CC: WAYNE JUSTASON

FROM: JACK VOLPINI

DATE: JUNE 18, 1986

SUBJECT: COMMENTS ON RELIABILITY/MAINTAINABILITY GUIDELINES & REFERENCES

Please consider the following as suggestions for inclusion into the Disk Drive section of the Reliability and Maintainability Guidelines and References, dated February, 1986. I have also returned my copy of the Guideline to you with additional hand-written comments.

A- Air filters (bug catcher type) should be customer serviceable.

B- On-board diagnostics should be down/up line triggerable with reports to the system console.

C- Physical location within the cabinet as well as within the site can influence performance. Disk drives are, by nature, sensitive to temp, contamination, shock/vibration, electrical noise, ESD, and magnetic interference.

D- The system environmental spec (operating, non-operating and shipping) will probably be determined by the disk units.

E- Use only vendor approved shipping containers for HDA as well as TLA. Shipping containers should be identified on the Maintenance Plan and be available for field use.

F- Does cabinet or chassis provide environmental protection (shock, vibration, temp, etc) for disk drives? Has testing been done to prove acceptable protection?

G- Hardware write protect switch?

H- Limited shelf life for HDA? (Shelf maintenance requirements?)

J- Guaranteed defect free tracks for Media Defect List?

K- Dedicated tracks for diagnostics?

L- On board overtemperature sensing. Software/hardware allows graceful death if spec is exceeded. (Prevents potential thermally offset tracks)

M- Maintenance log w/ housekeeping features should provide detailed info. relative to errors, locations (physical as well as logical), frequency, TOD, log fillup warning, appropriate operator messages,..... etc. This log should be driven and maintained by the operating system.

N- The manufacturer's supplied Media Defect List should be included in formatting functions. This data, along with any defect growth addresses should be stored in a guaranteed defect free track on the disk. This "living" data should be available to the C. E. for any future formatting functions to be performed in the field. (see attached notes on disk formatting)

DISK FORMATTER/DIAGNOSTIC --MISC NOTES

FUNCTIONS:

VERIFY NO WRITE:	Identifies media defects only. Does not map, does not log into Media Defect List. Does not require backup.
VERIFY:	Identifies defects and logs address into MDL as unmapped defect but does not map. Does not require backup.
VERIFY MAP:	Identifies defect, updates MDL, and maps to new location. Will multiple try to read data field from original sector and if successful, no backup is necessary.
FORMAT:	Formats, using MDL. Always requires data backup.

COMMANDS: Added 6/23/82

RANGE:	Allows any function within a range of tracks, cylinders, sectors, heads, etc.
ADD or SUBTRACT:	Allows declaration of any address into or out of MDL as an unmapped or unmapped defect.
SAVE MDL:	Allows current MDL to be used during format process for defect address identification. (probably default command)
IGNORE MDL:	Ignores current MDL to be used during the format process. A dangerous command..... should flash warning to operator.
LIST MDL	Identify to the operator, the contents of the MDL. List both physical and logical addresses and flag if mapped or unmapped.
BADLIST:	Identify to the operator, the addresses of the mapped sectors as well as their respective alternate sectors.

Please do not assume this memo as representing a comprehensive list of requirements from my department. It is simply a few potential maintenance guideline "bullets" that may warrant further discussion.....particularly in the disk formatting area.

Feel free to contact me if you have any comments or questions.

WANG MANUFACTURING TEST PROCEDURE	STAMP ORIGINAL (RED) WANG 1	PART NO 278-4033/725-0142-G	REV 1	SHEET 6/6
DESCRIPTION 5 1/4 " 360 KB FLOPPY DISK DRIVE		TEST TYPE TEST PROCEDURE		

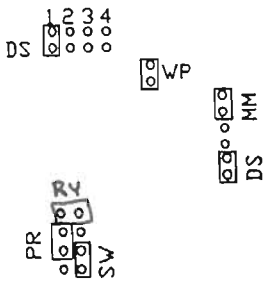
278-4033/725-0142 360K FLOPPY DRIVE

JUMPER CONFIG

SHUGART 455-2/455-3

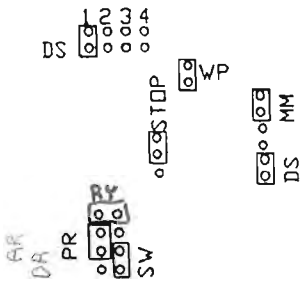
* IF JUMPER IN MX POSITION, FLOPPY LED ALWAYS ON BUT WORKS OTHERWISE.

PANASONIC JU-455-5

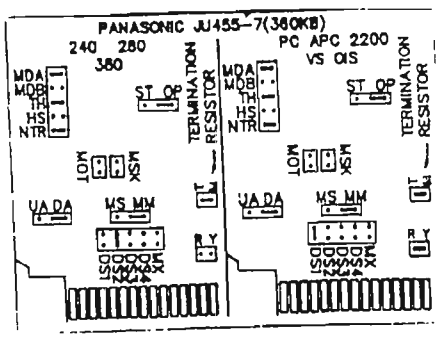


RY MUST BE IN, OTHERWISE WHEN CHANGE DISKETTE, CACHE IS NOT CLEARED. WHEN LIST 1 DISK → ANOTHER, STILL SEE 1ST DISK.

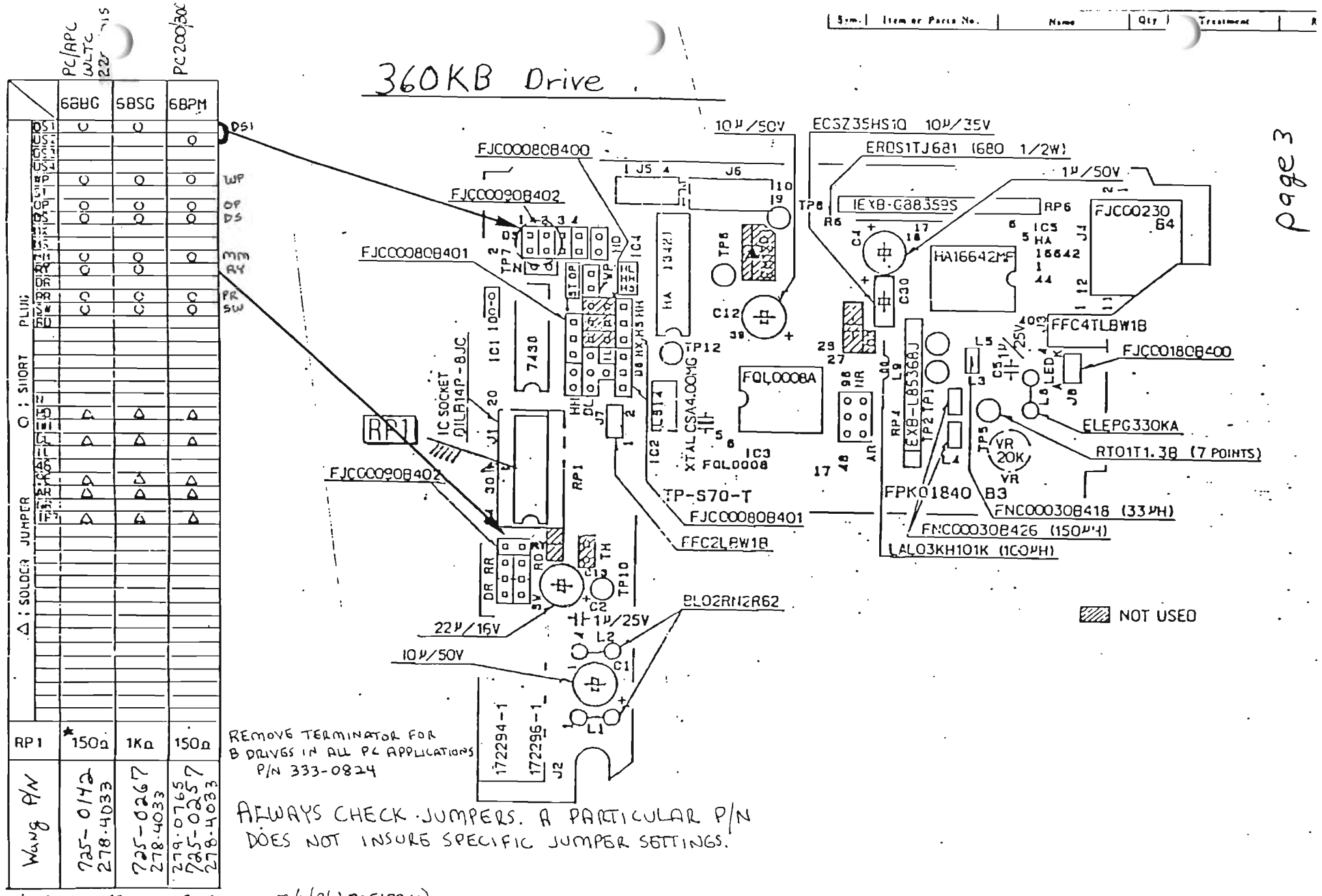
PANASONIC JU-455-6



PANASONIC JU-455-7



360KB Drive



Sym.	Item or Parts No.	Name	Qty	Treatment	R

Date	Revision	Sign	Checked

		FPK0184083		Type	JU-455-E
Material & Size		Process	Remark	DWG Name	CIRCUIT BOARD
Scale	Design	Drawn	Checked	Approved	DWG or Part No.
		NUNATA			F3602820

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9942 REPLACES: _____ DATE: 01/23/95 PAGE 1 OF 2

MATRIX ID. 3110 PRODUCT/RELEASE# VS5/6/75E/5000/6000 & 2200 CS-D/DS

TITLE: VS/2200 5 1/4" 1.2MB Floppy Drive Compatibility & Configuration Issues

PURPOSE:

To alert the Field to possible configuration problems with the 5 1/4" 1.2MB floppy drive used with the VS and 2200 due to an incorrect jumper which may be soldered in or to a switch change required on the VS5000/6000 RCU Brd when changing drive manufacturers, and to provide specific information on which drives are compatible and how to jumper those drives.

EXPLANATION:

There are several different 5 1/4" 1.2MB Floppy Drives that are usable with the VS (2270V7) and also with the 2200. The jumper configuration is the same for both product lines. Several part numbers have been associated with these drives. Those part numbers include:

278-4055	tested drive with black bezel
725-0232	vendor part # with black bezel (replaced by 278-4055)
725-0258	vendor part # with black bezel (replaced by 278-4055)
725-0258G	vendor part # with gray bezel
270-5162	tested drive with gray bezel
725-5083VS	vendor part # with gray bezel (replaced by 270-5162)

Under any of these part #s, there are only 4 specific models numbers that should be found. Any other models from these Manufacturers or any other companies including Chinon are not compatible. The 4 models are:

Panasonic JU-475-1xxx
Panasonic JU-475-2xxx
Panasonic JU-475-3xxx
Mitsubishi MF504C-327Ux Rev P only

Recently a large number of 1.2M drives have been returned to stock, taken from hardware returned to Asset Recovery. As these and similar drives are also used in many PCs which may require different jumper settings, the model numbers and jumpers need to be checked carefully when replacing.

CORRECTIVE ACTION:

PANASONIC JU-475-1xxx Jumpers: p/n 278-4055/725-0258G

A problem was found with several Panasonic JU-475-1xxx drives. A soldered jumper, DR, had to be cut. With the DR jumper in, the 'door closed' signal is tied to 'drive select'. This causes the floppy LED to stay on and the spindle to continuously spin if the door is open on power up. The drive is then inaccessible. On a 2200 system the symptom is the same if the door is open, but with a diskette installed & the door closed, the drive will pass the power up self-test and appear to work ok. Be sure when replacing this drive to check this jumper and cut it if it's closed.

OVER

GROUP: Continuation Engineering MAIL STOP: 027-G1D

CORRECTIVE ACTION (cont):

The DR jumper is found between rows 'A' & 'B' and chips 4 & 5, next to the DD jumper. The correct jumpers settings are:

DS1 in, DS2,3,4 out	DS/MX - DS
DO in, DC,LR out	BX/CX - BX
AX/AT - AX	SP,IX,DD all out
IRD out	MM,DA in, MS,OA,UA out
HA out	

150 OHM Terminator Chip in at location C1 (next to the I/O cable conn)

** VS5000/6000: if replacing a Mitsubishi, RCU Sw Bk 2, sw **6** must be set to ON

PANASONIC JU-475-2xxx Jumpers: p/n 278-4055/725-0258G

DS1 in, DS2,3,4 out	DS/MX - DS
DO in, DR,DC,LR,RD all out	AX/AT - AX
IRD out	SP out
BX/CX - BX	MM,DA in, MS,HA,OA,UA all out

150 OHM Terminator Chip in (located next to the I/O cable connector)

** VS5000/6000: if replacing a Mitsubishi, RCU Sw Bk 2, sw **6** must be set to ON

PANASONIC JU-475-3xxx Jumpers: p/n 278-4055/725-0258G

DS1 in, DS2,3,4,MX all out	PH/HH - PH
DA in, PA,UA,HA,LA,IM all out	TM in (jpr for termination)
MS/MM MM	TH in, MDA,MDB,DD out
BX in	NAX in

** VS5000/6000: if replacing a Mitsubishi, RCU Sw Bk 2, sw **6** must be set to ON

MITSUBISHI MF504C-327U REV P Jumpers: p/n 270-5162/725-5083VS

The Mitsubishi drives have a silver label on either the top or bottom edge near the rear with the Mitsubishi name, model #, and revision. Only the P rev drives with a special terminator sip are usable with the VS or 2200. There are other floppy drives that fall under the 725-5083 part #, but only the Mitsubishi MF504C-327U Rev P can be converted. If you have a 270-5162 or 725-5083VS, it should be jumpered correctly with the right terminator. If it is jumpered incorrectly you should assume it is a 725-5083 and has the wrong terminator. These incorrect terminators can be used by cutting pin 4 & soldering a wire to pin 2 that inserts into the hole for pin 4. The new terminator is p/n 333-0988, has no missing legs, and is marked 4609X-N74. The correct jumper settings are:

MX in, DS3,0,1,2 out	TPA out
SS in, ND,SB,SG,IP out	
SR,RD,RI,IU,IR,MM,IS,HR in, DC,MS,IL,DD out	

Terminator Sip, p/n 333-0988, in (located next to the I/O cable conn)

** VS5000/6000: RCU Sw Bk 2, sw 6 OFF (ON for Panasonic). Min @MCRCU@ 1.06.03

For questions concerning this TSB contact: Mike Bahia 508-858-7095

ASSEMBLY PROCE S

S HERE

PART NO.	270-5162	DESCRIPTION	1.2MB FLOPPY VS 5K/6K		
OPER. NO.	1.0	OPERATION	INSERT PROM / VERIFY SHUNTS	SHT. 1 OF 1	REV. 0

A.
1. 725-5083-VS 1.2MB DRIVE
2. 333-0988 SIP 4609X-N74
3. 350-4506 SHUNTS (4)

REMOVE THE VENDOR SIP IN ITEM 2 LOCATION.INSERT THE SIP ITEM 2 INTO THE CONNECTOR WHERE SHOWN. THER SHOULD BE (4) VENDOR SHUNTS INSTALLED INTO THE **MM, RI, RD & DC** PINS. REMOVE THE SHUNT IN THE **DC** CONNECTOR PINS & INSTALL IT INTO THE **SR** CONNECTOR PINS AS SHOWN. INSERT THE THE (4) SHUNTS SUPPLIED INTO THE **HR, IS, IR & IU** PIN CONNECTORS.

IN THE FOUR ROW HOUSING REMOVE THE VENDOR SUPPLIED SHUNT IN THE SB LOCATION & INSERT IT INTO THE SS LOCATION. IN THE FIVE ROW HOUSING REMOVE THE VENDOR SUPPLIED SHUNT LOCATED IN THE 2ND ROW OF PINS & INSERT IT INTO THE 4TH ROW OF PINS, MX LOCATION.

B. VERIFY ALL SHUNTS ARE INSTALLED PROPERLY.

FIG. 1.

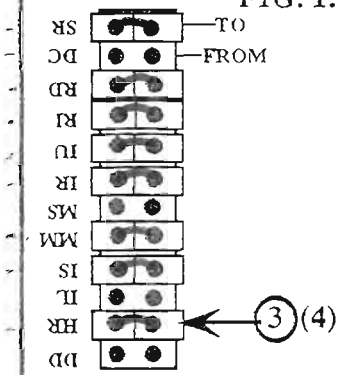


FIG. 2.

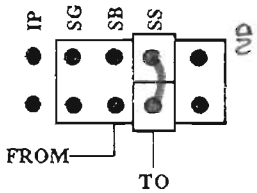
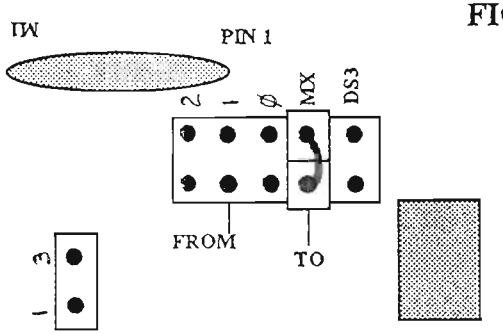
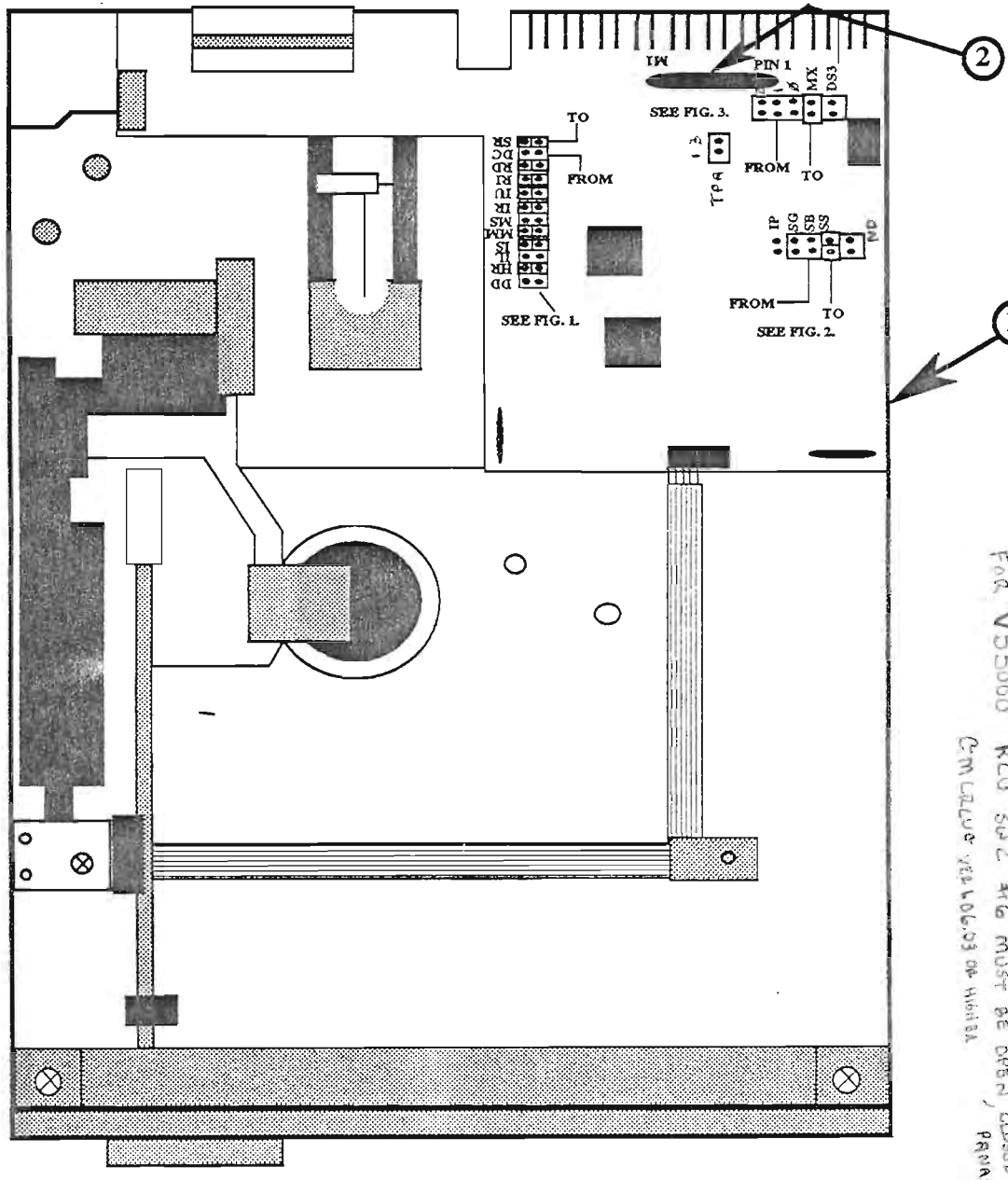


FIG. 3.





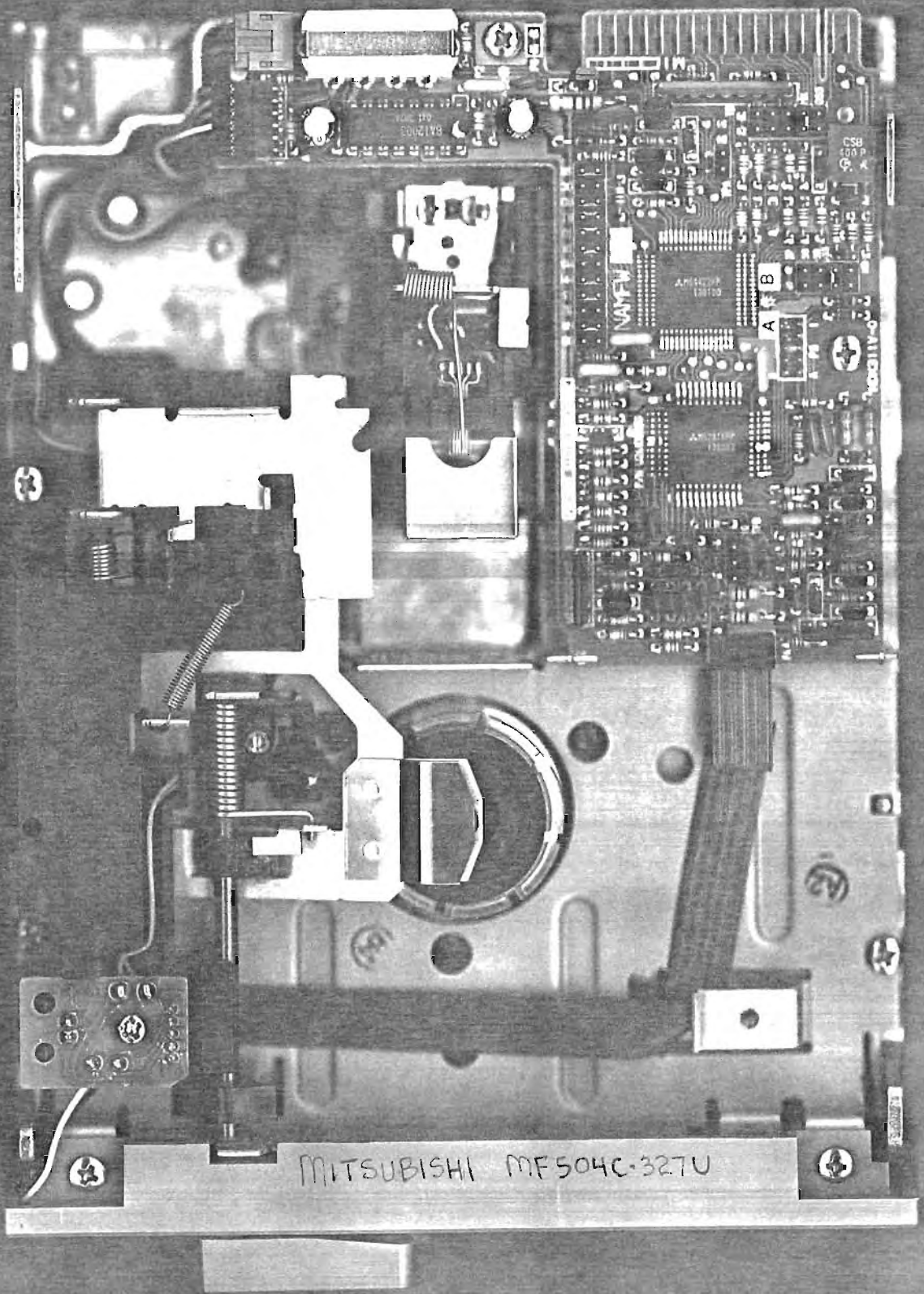
MITSUBISHI MF504C-327U

FOR V55000 RCU 642 #6 MUST BE OPEN / CLOSED
COMPUTER VERIFIED 06.93 DK HONDA

FOR PRODUCTION

V5A

4609X-N74 SIP
TERMINATOR



XEROX

270-5162

1.2 MEG FLOPPY

278-4055

J0475-1

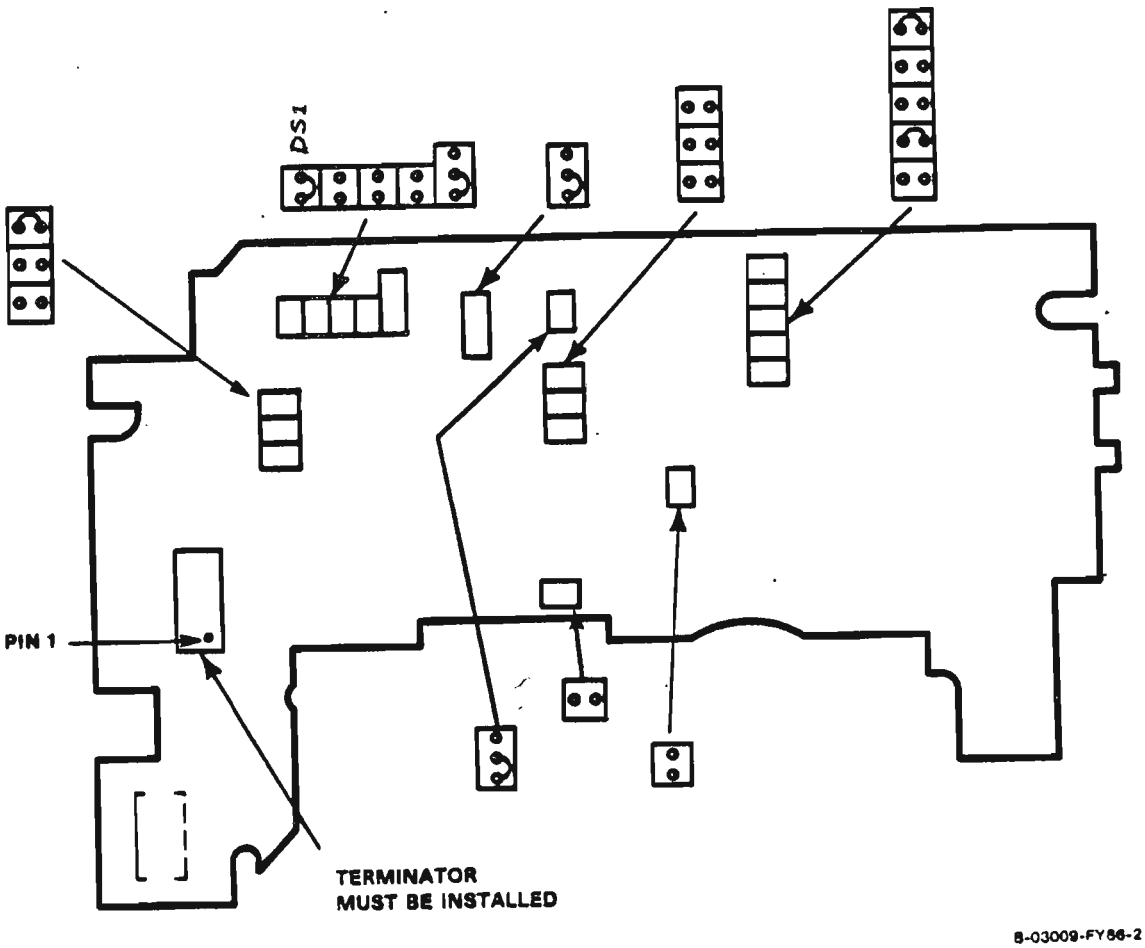
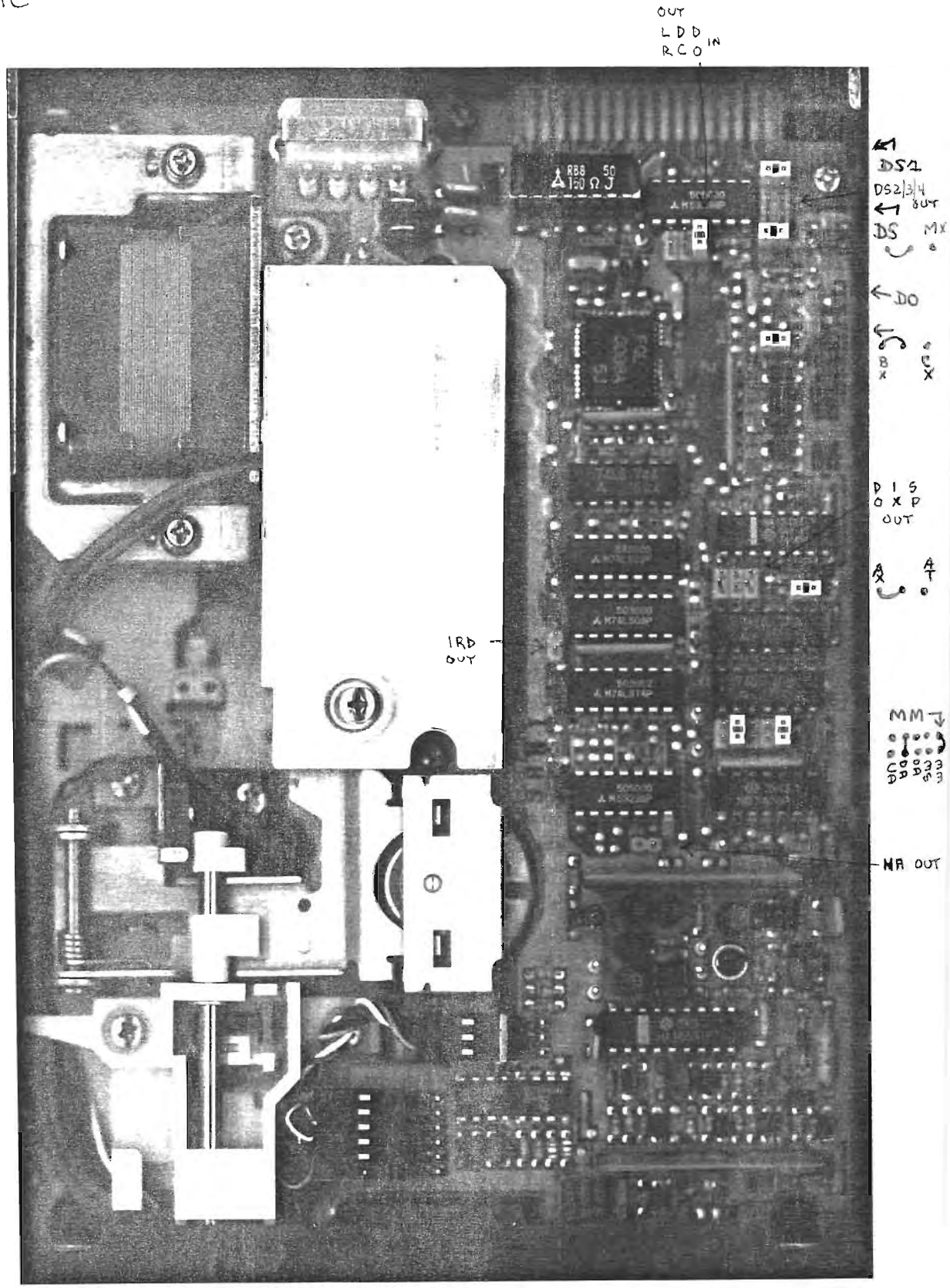


Figure 7-23. 1.2M Floppy Drive Terminator/Jumper Locations

1.2 MEG FLOPPY
PANASONIC

JU475-1



1.2 MEG FLOPPY JU475-1

278-4055

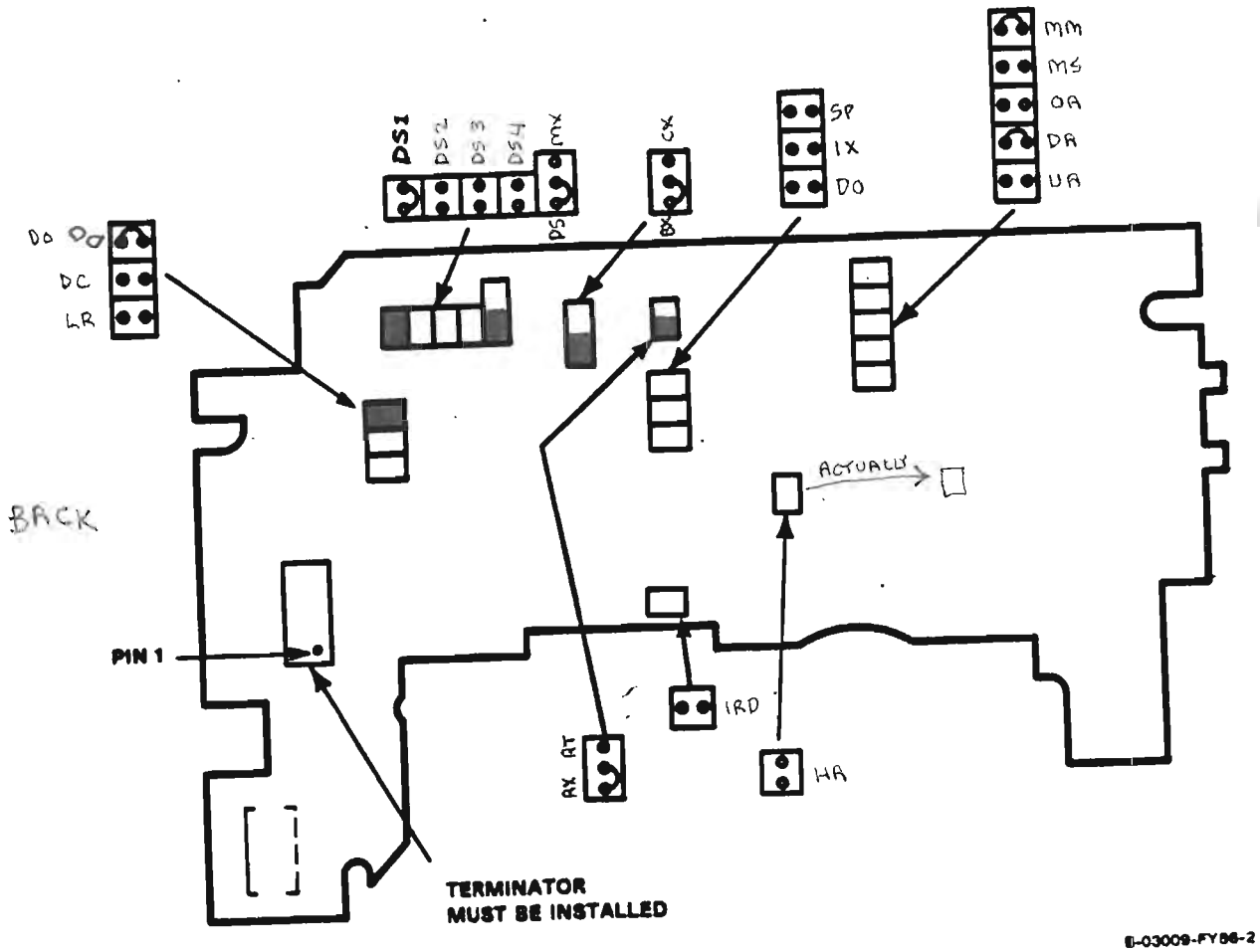


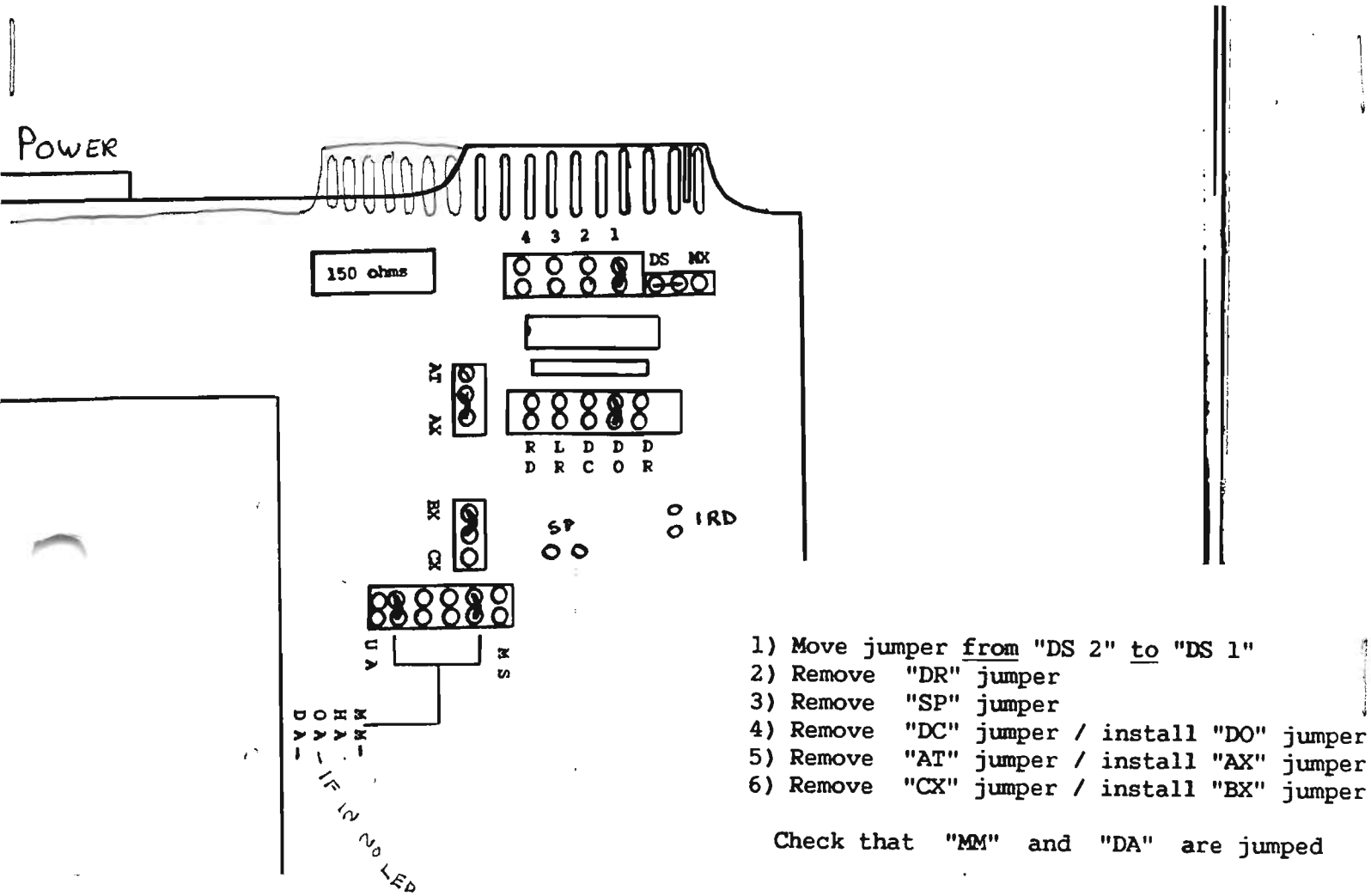
Figure 7-23. 1.2M Floppy Drive Terminator/Jumper Locations

JJ NEW 1.2 Meg 7 floppy

Panasonic # JU475-2 BGM

VISUAL AIDS: Amber led - no snowflake / also: PCB IS ½ THE NORMAL SIZE.

DRIVE SAYS 1.2 ON FRONT



1) Move jumper from "DS 2" to "DS 1"
2) Remove "DR" jumper
3) Remove "SP" jumper
4) Remove "DC" jumper / install "DO" jumper
5) Remove "AT" jumper / install "AX" jumper
6) Remove "CX" jumper / install "BX" jumper

Check that "MM" and "DA" are jumped

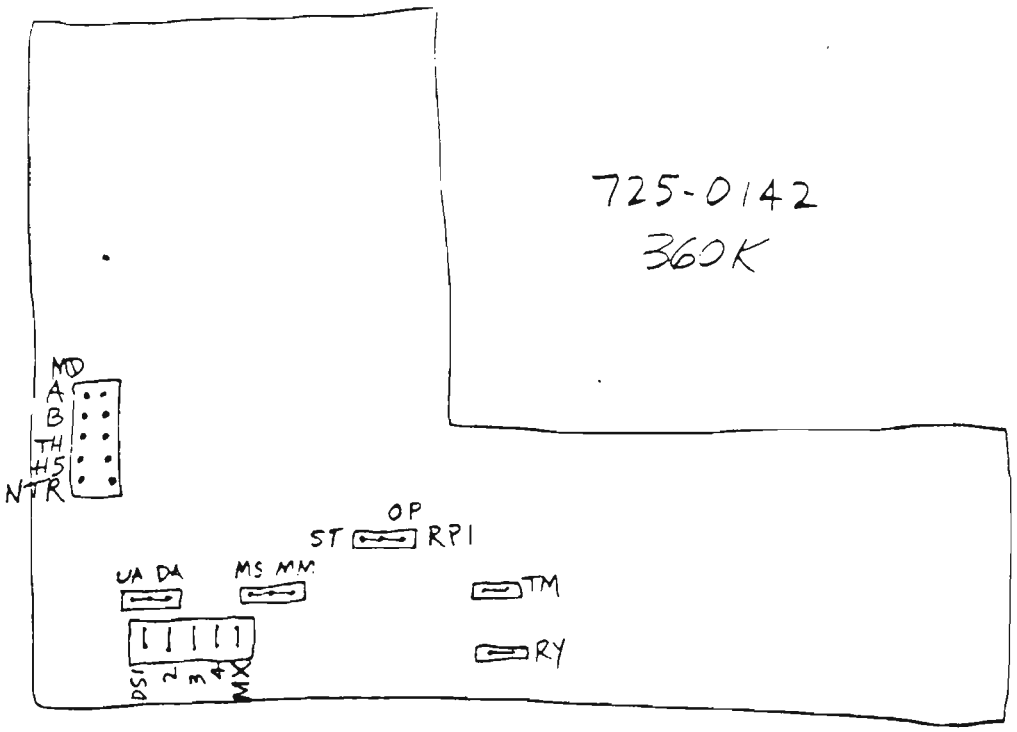
THIS FLOPPY IS BEING USED IN DS NOW

IMPROPER JUMPERS WILL GIVE I93 + WON'T READ AS A 360KB OR 1.2

FLOPPY LITE DOES NOT COME DURING POWER UP SELF-TEST IF JUMPERS DA & OA ARE INCORRECT.

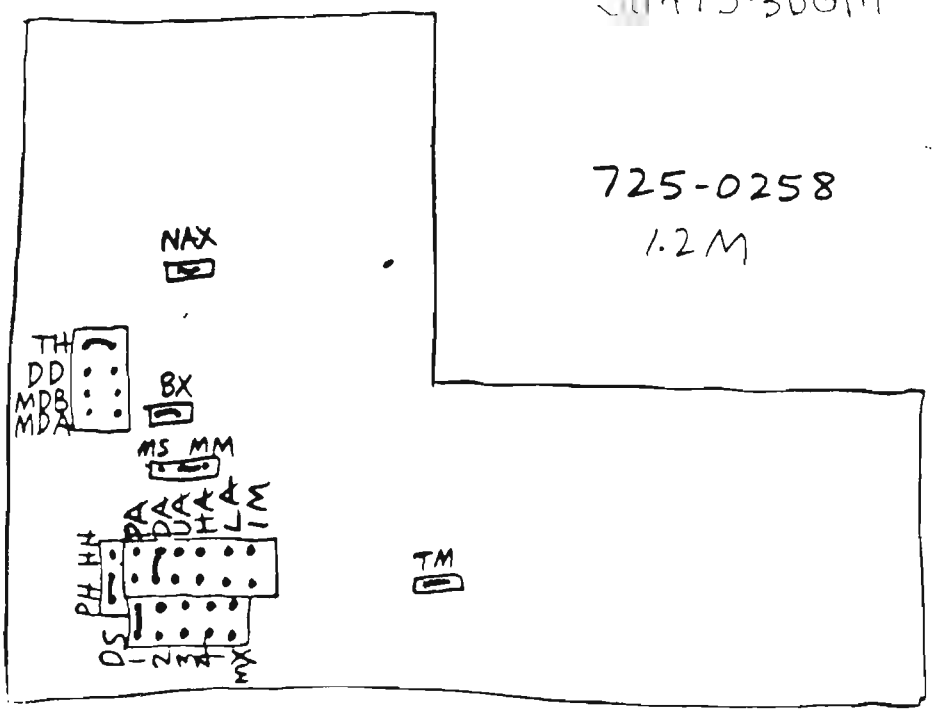
NEW PANASONIC FLOPPY DRIVES

FRONT



FRONT

JU475-3BGM



1.2 M IBM to Wang Conv

Remove MDB

Move DS-2 to DS-1

Add TH
BX
NAX

360K Wang to IBM Conv.

Move DS-1 to DS-2

Remove RY

NEW PANASONIC FLOPPY DRIVES

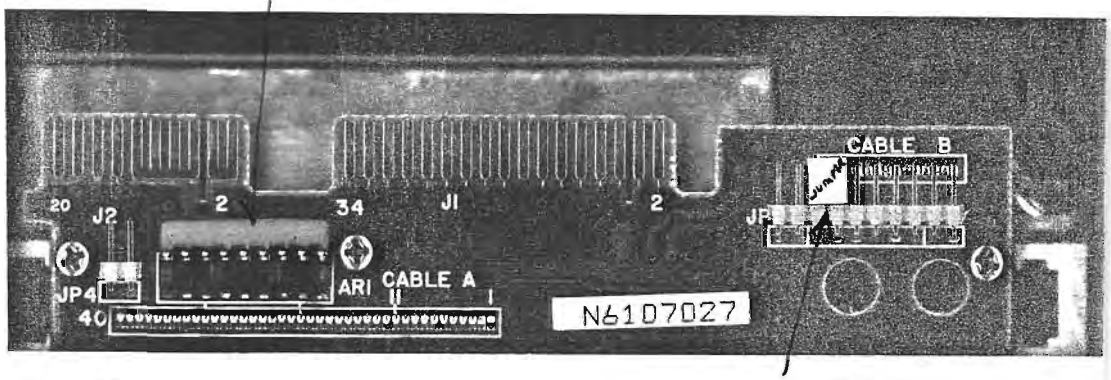
360K			1.2M JU475-3BGm	
WANG	IBM		WANG	IBM
MDA	MDA			MDB
TH	TH		MM	MM
NTR	NTR		DA	DA
DA	DA		PH	PH
MM	MM		DS-1	DS-2
TM*	TM*		TM*	TM*
DS-1	DS-2		TH	
RY			BX	
OP	OP		NAX	

Listed positions are the ones in which shunts must be installed

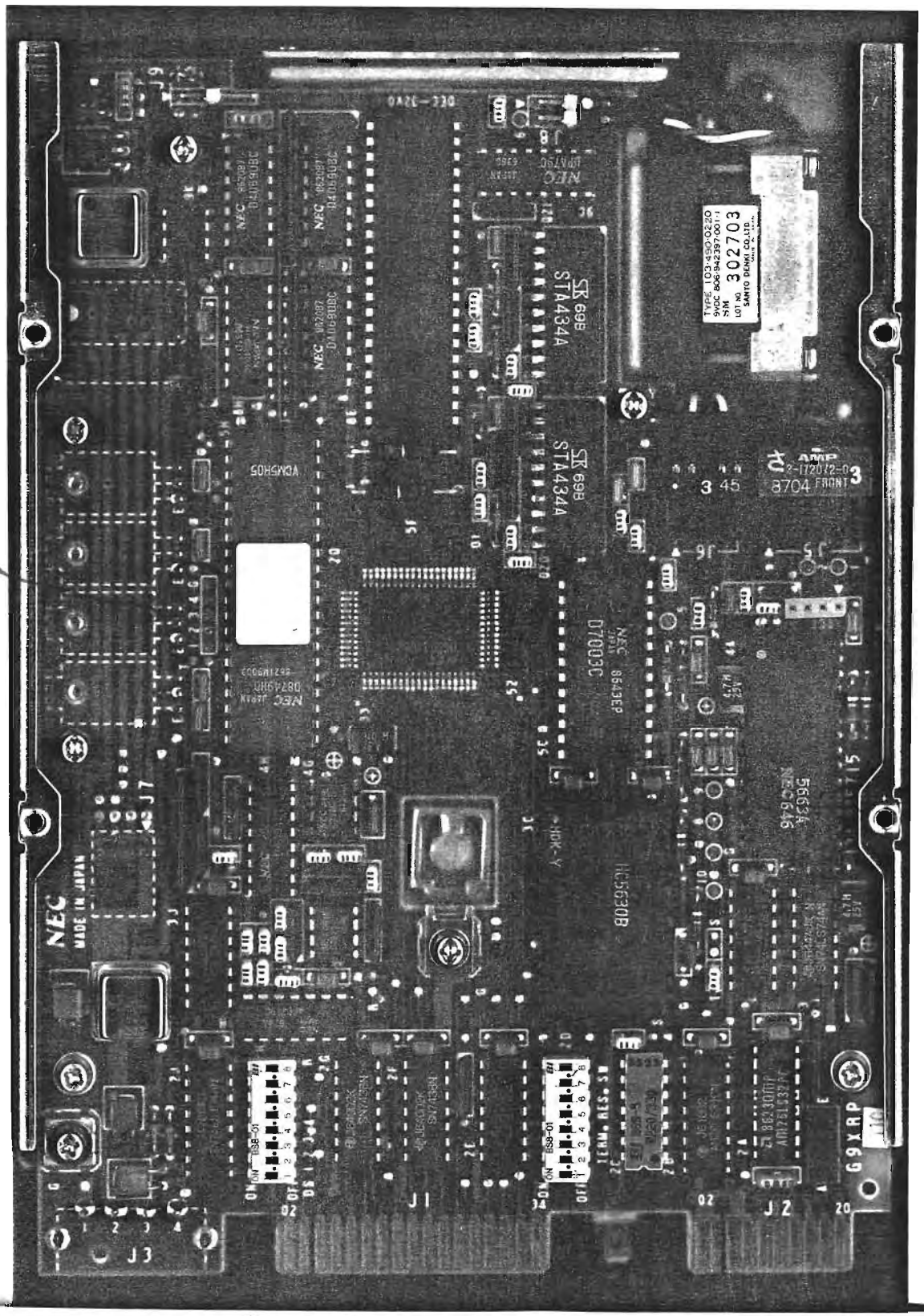
* Removing TM shunt takes the 150 Ω terminators out of the circuit

10 MEG REMOVABLE

RICO RH5130



NEC D5126 20 MEG 278-4062



1 2 3 4 G (ALL OPEN)

G 9 X R P (ALL OPEN)

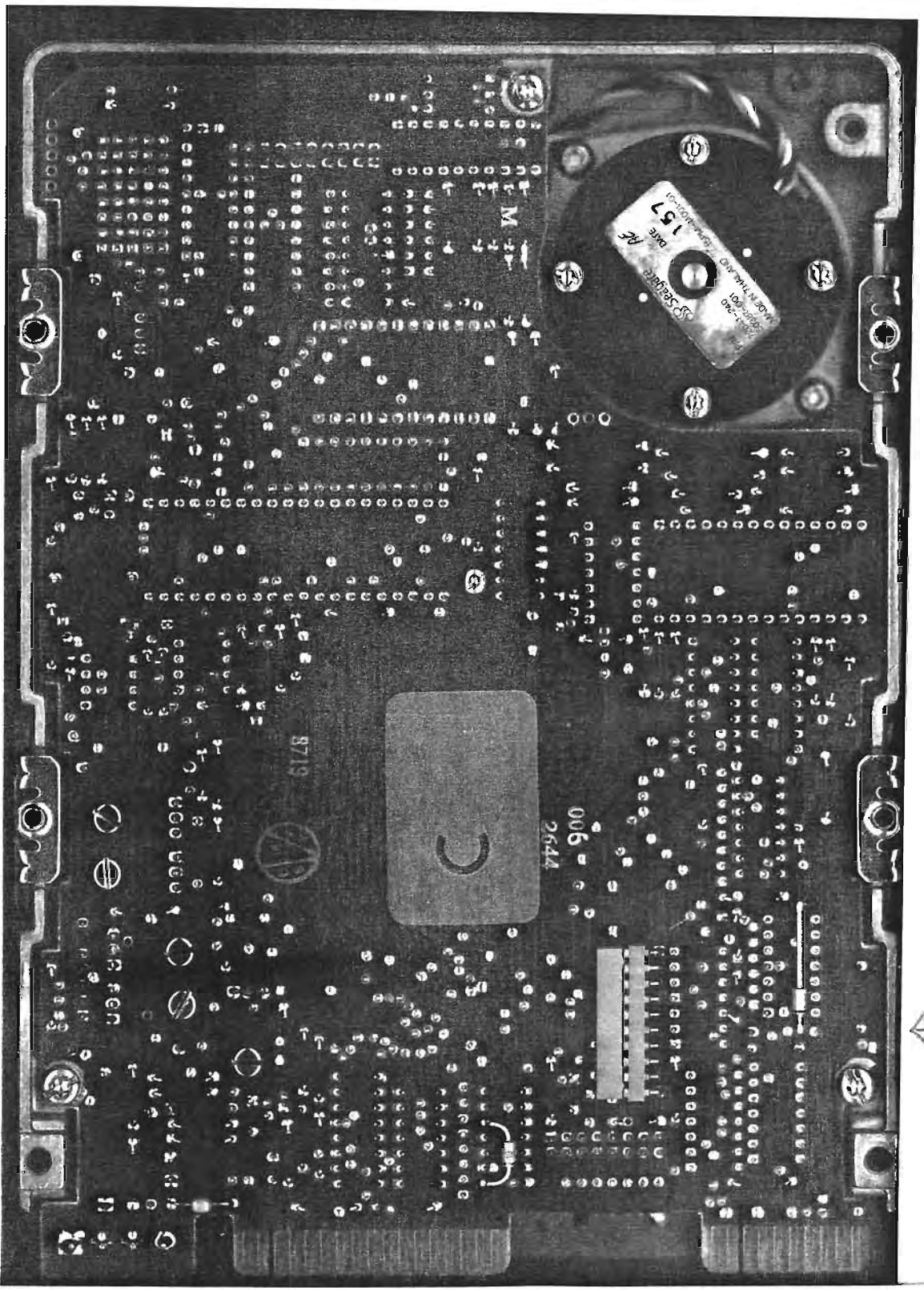
DS1-ON

TERMINATION

ALL ON TO TERMINATE

ALL OFF OTHERWISE

SEAGATE ST-225 20MEG 725-0242



← TERMINATOR

POWER IN

8/30/94 IF JUMPERS REVERSED WONT WORK AS ANYTHING BUT 1ST DRIVE & PREVENTED 64M FROM WORKING IF NOT 1ST DRIVE.

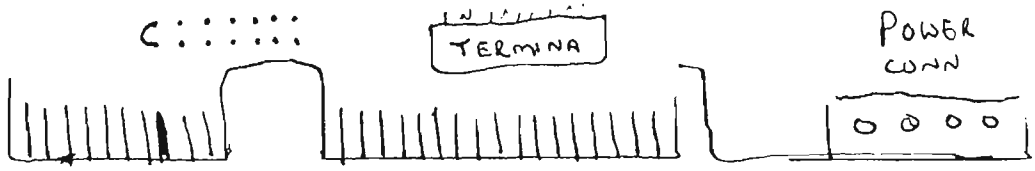
CDC MAGNETIC PERIPHERALS 42 MEG HALF HEIGHT

MN #: 94205-53

PART # 725-3493 ?

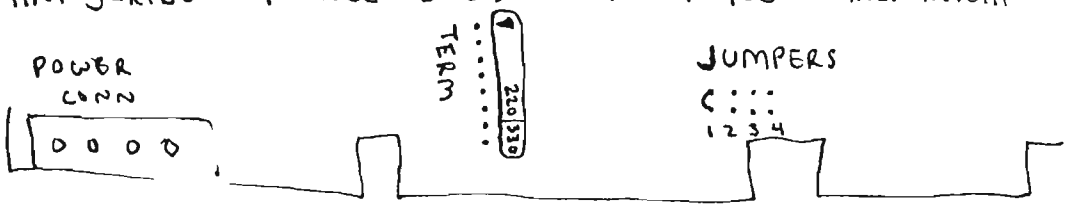
TERM BEHIND LARGE CONNECTOR

JUMPERS



MINI SCRIBE MODEL 3053 42 MEG HALF HEIGHT

PART # ?

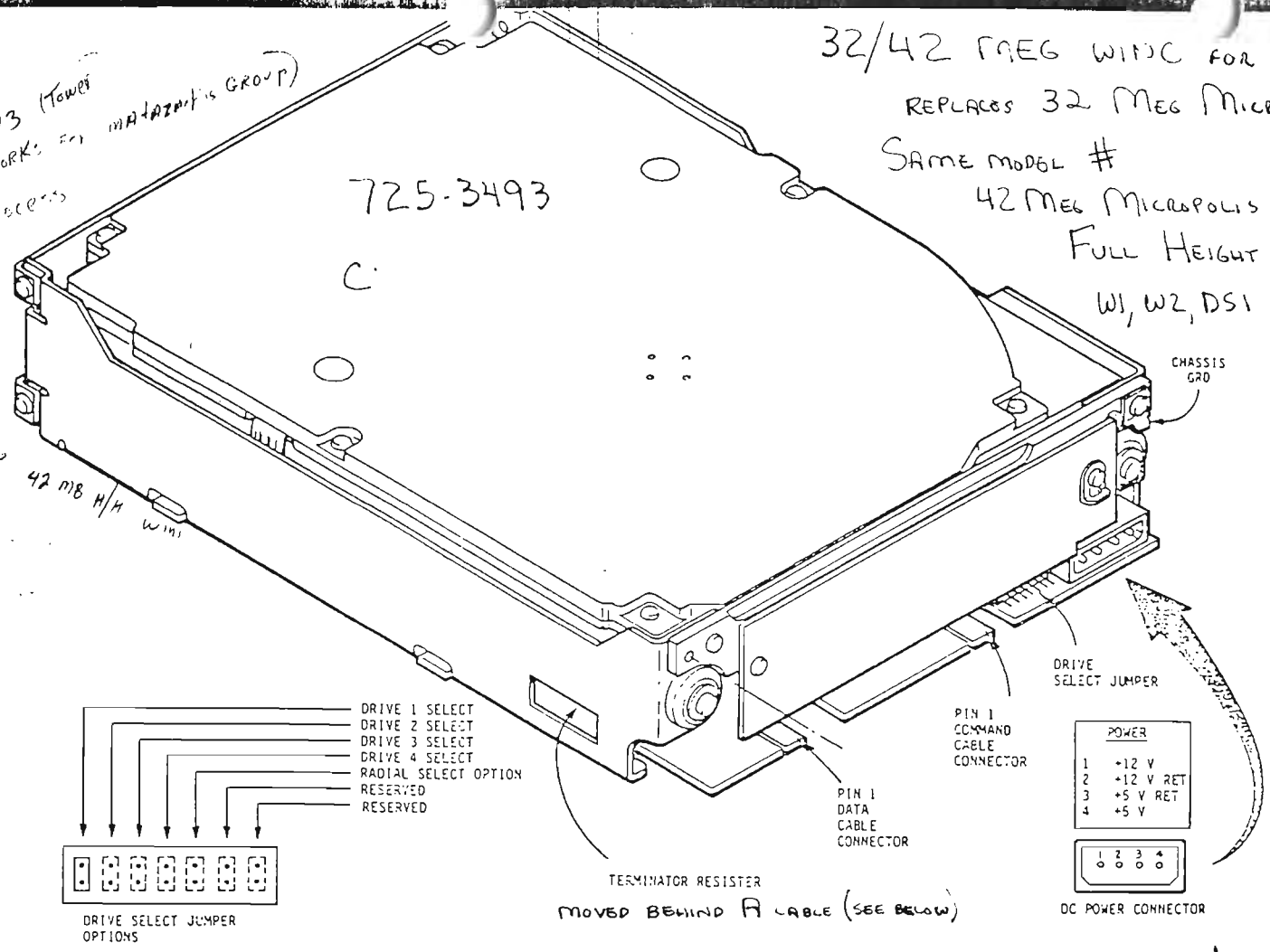


Phase in planned
For July 8th.

Tom Clarke Y77493 (Tower
DHUR Across (works for MAINTAINIT GROUP)
Test for in process

32/42 MEG WIDC FOR 2200 DS
REPLACES 32 MEG MICROPOLIS 1323
SAME MODEL #
42 MEG MICROPOLIS 1323
FULL HEIGHT
W1, W2, DS1 IN

289-0850 option
33MB FH WINI To the
42 MB H/H WINI
725-3493



11X

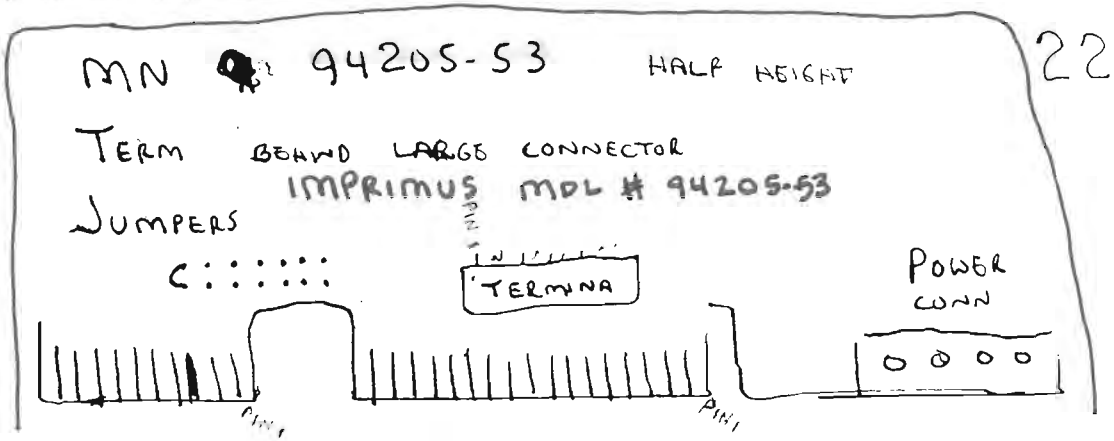
MOVE DRIVE SELECT TO 2

PC/2200/0IS

MOVE DRIVE SELECT TO 1

NOTE: TERMINATOR RESISTOR HAS BEEN RELOCATED.

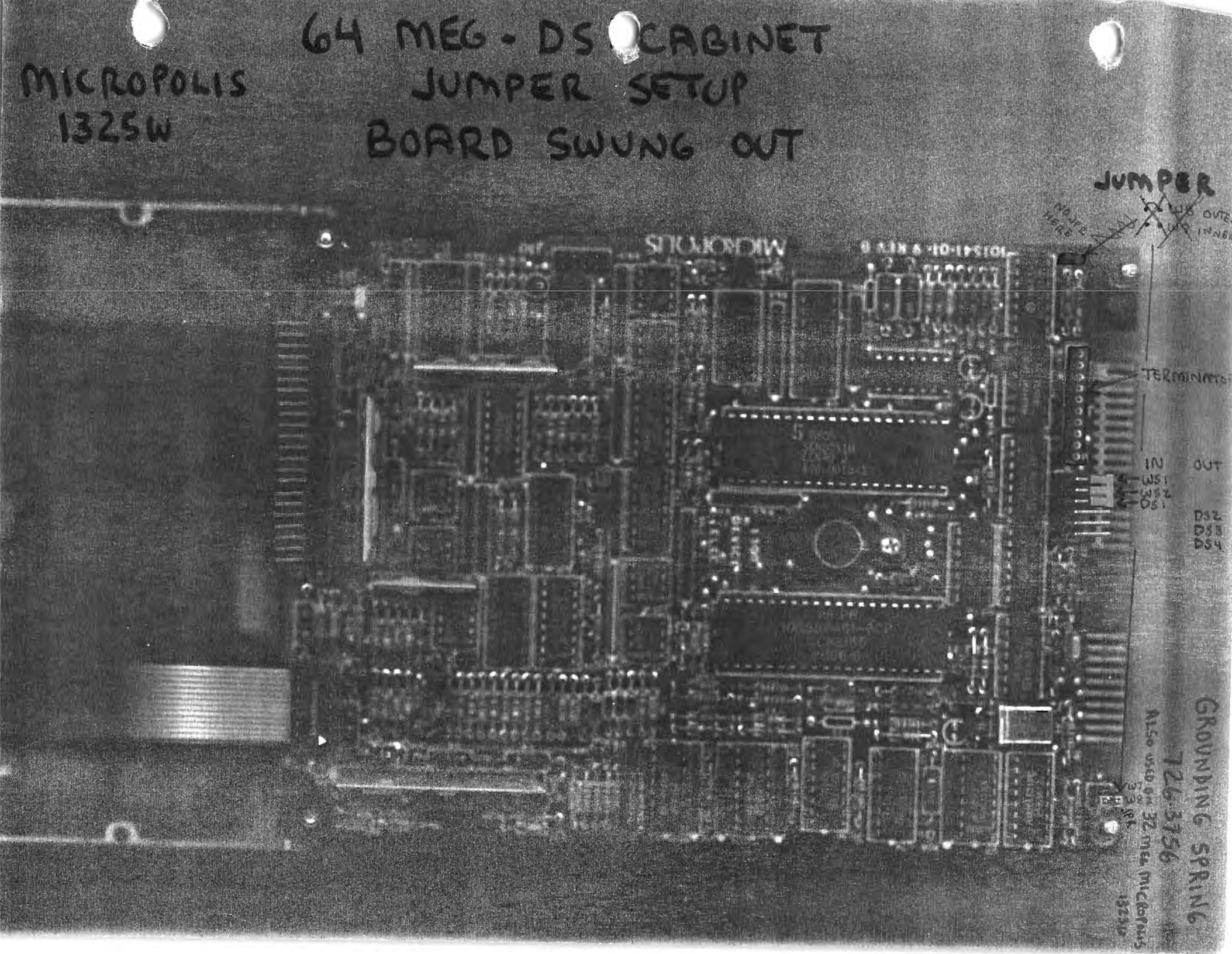
CDC MAGNETIC PERIPHERAL 42 MEG



2200 DS
725-3493
REPLACES 32 MEG
([redacted] WILL USE 32 MEG MICROPOLIS
SW SETTINGS, [redacted])

MICROPOLIS
1325W

64 MEG - DS CABINET
JUMPER SETUP
BOARD SWUNG OUT



Board Member

Thurston County Auditor
Board Service Desk
Thurston County Courthouse
2000 Lakeridge Dr SW
Olympia, WA 98502

ST4096

730-7671MVPS

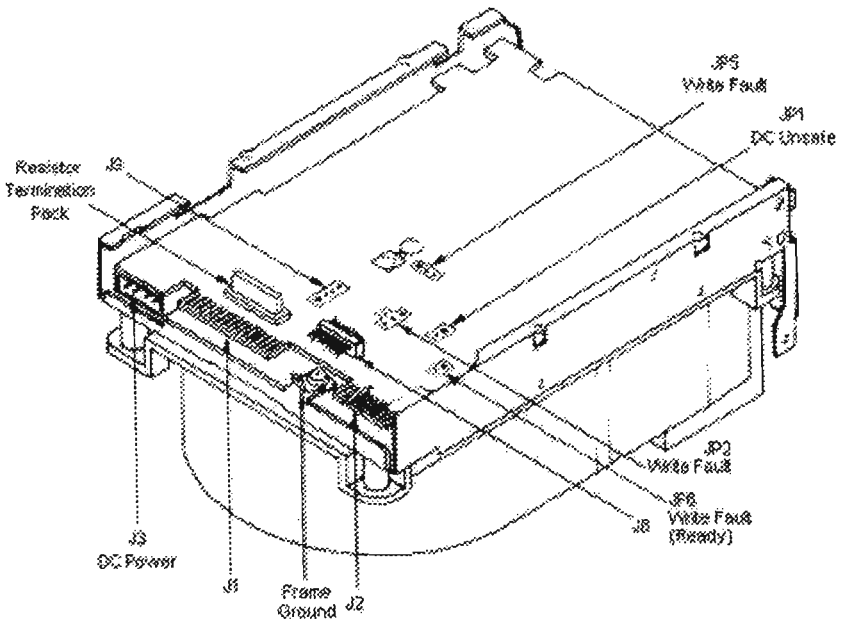
WILL WORK IN PLACE OF 64M

ST412 Family

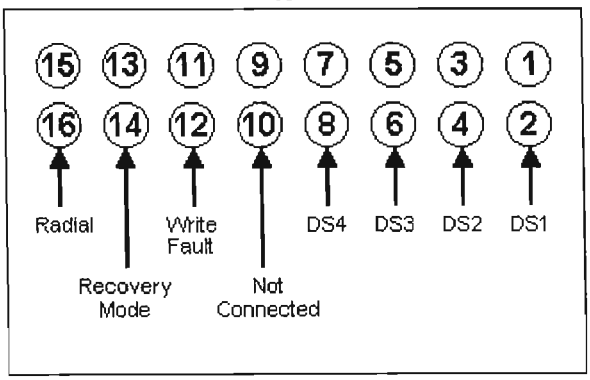
Spec Sheet

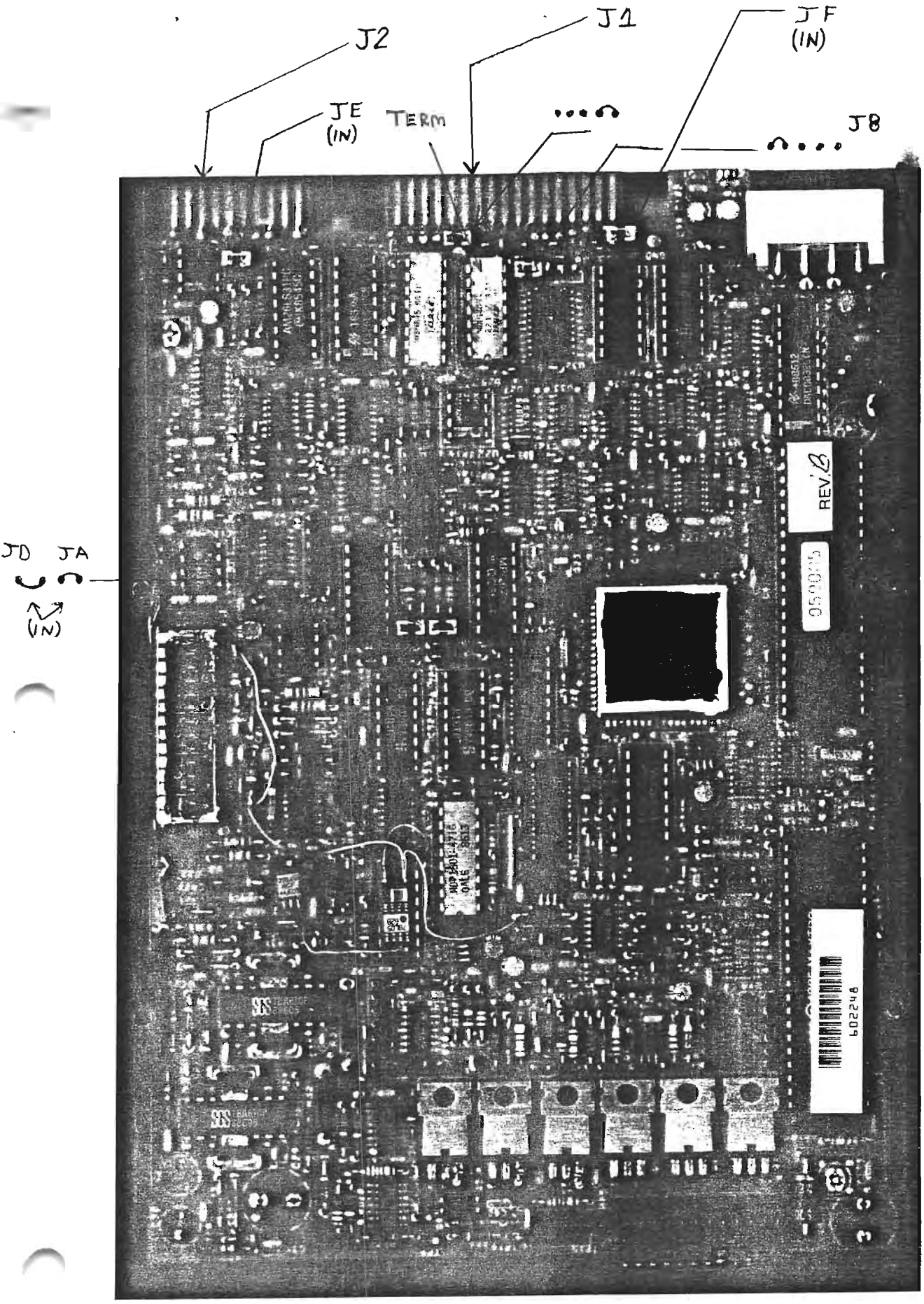
Cylinders: 1024
Heads: 9
Sectors: 17

Capacity: 80.2 MB
Speed: 3600 rpm
Seek time: 28 ms avg
SeaFAX#: 4096



J8





MAXTOR DR. #

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT REPLACES: HWT 9942 DATE: 10/05/95 PAGE 1 OF 2

MATRIX ID. 3110 PRODUCT/RELEASE# VS5/6/75E/5000/6000 & 2200 CS-D/DS

TITLE: VS/2200 5 1/4" 1.2MB Floppy Drive Compatibility & Configuration Issues

PURPOSE:

To alert the Field to possible configuration problems with the 5 1/4" 1.2MB floppy drive used with the VS and 2200 due to an incorrect jumper which may be soldered in or to a switch change required on the VS5000/6000 RCU Brd when changing drive manufacturers, and to provide specific information on which drives are compatible and how to jumper those drives.

EXPLANATION:

There are several different 5 1/4" 1.2MB Floppy Drives that are usable with the VS (2270V7) and also with the 2200. The jumper configuration is the same for both product lines. Several part numbers have been associated with these drives. Those part numbers include:

278-4055	tested drive with black bezel
725-0232	vendor part # with black bezel (replaced by 278-4055)
725-0258	vendor part # with black bezel (replaced by 278-4055)
725-0258G	vendor part # with gray bezel
270-5162	tested drive with gray bezel
725-5083VS	vendor part # with gray bezel (replaced by 270-5162)

Under any of these part #s, there are only 4 specific models numbers that should be found. Any other models from these Manufacturers or any other companies including Chinon are not compatible. The 4 models are:

Panasonic JU-475-1xxx
Panasonic JU-475-2xxx
Panasonic JU-475-3xxx
Mitsubishi MF504C-327Ux Rev P only

Recently a large number of 1.2M drives have been returned to stock, taken from hardware returned to Asset Recovery. As these and similar drives are also used in many PCs which may require different jumper settings, the model numbers and jumpers need to be checked carefully when replacing.

CORRECTIVE ACTION:

PANASONIC JU-475-1xxx Jumpers: p/n 278-4055/725-0258G

A problem was found with several Panasonic JU-475-1xxx drives. A soldered jumper, DR, had to be cut. With the DR jumper in, the 'door closed' signal is tied to 'drive select'. This causes the floppy LED to stay on and the spindle to continuously spin if the door is open on power up. The drive is then inaccessible. On a 2200 system the symptom is the same if the door is open, but with a diskette installed & the door closed, the drive will pass the power up self-test and appear to work ok. Be sure when replacing this drive to check this jumper and cut it if it's closed.

OVER

MATRIX ID. 3110 PRODUCT/RELEASE# VS5/6/75E/5000/6000 & 2200 CS-D/DS

TITLE: VS/2200 5 1/4" 1.2MB Floppy Drive Compatibility & Configuration Issues

CORRECTIVE ACTION (cont):

The DR jumper is found between rows 'A' & 'B' and chips 4 & 5, next to the DD jumper. The correct jumpers settings are:

DS1 in, DS2,3,4 out
DO in, DC,LR out
AX/AT - AX
IRD out
HA out
DS/MX - DS
BX/CX - BX
SP,IX,DD all out
MM,DA in, MS,OA,UA out

150 OHM Terminator Chip in at location C1 (next to the I/O cable conn)

** VS5000/6000: if replacing a Mitsubishi, RCU Sw Bk 2, sw 6 must be set to ON

PANASONIC JU-475-2xxx Jumpers: p/n 278-4055/725-0258G

DS1 in, DS2,3,4 out
DO in, DR,DC,LR,RD all out
IRD out
BX/CX - BX
DS/MX - DS
AX/AT - AX
SP out
MM,DA in, MS,HA,OA,UA all out

150 OHM Terminator Chip in (located next to the I/O cable connector)

** VS5000/6000: if replacing a Mitsubishi, RCU Sw Bk 2, sw 6 must be set to ON

PANASONIC JU-475-3xxx Jumpers: p/n 278-4055/725-0258G

DS1 in, DS2,3,4,MX all out
DA in, PA,UA,HA,LA,IM all out
MS/MM MM
BX in
PH/HH - PH
TM in (jpr for termination)
TH in, MDA,MDB,DD out
NAX in

** VS5000/6000: if replacing a Mitsubishi, RCU Sw Bk 2, sw 6 must be set to ON

MITSUBISHI MF504C-327U REV P Jumpers: p/n 270-5162/725-5083VS

The Mitsubishi drives have a silver label on either the top or bottom edge near the rear with the Mitsubishi name, model #, and revision. Only the P rev drives with a special terminator sip are usable with the VS or 2200. There are other floppy drives that fall under the 725-5083 part #, but only the Mitsubishi MF504C-327U Rev P can be converted. If you have a 270-5162 or 725-5083VS, it should be jumpered correctly with the right terminator. If it is jumpered incorrectly you should assume it is a 725-5083 and has the wrong terminator. These incorrect terminators can be used by cutting pin 4 & soldering a wire to pin 2 that inserts into the hole for pin 4. The new terminator is p/n 333-0988, has no missing legs, and is marked 4609X-N74. The correct jumper settings are:

MX in, DS3,0,1,2 out
SS in, ND,SB,SG,IP out
SR,RD,RI,IU,IR,MM,IS,HR in, DC,MS,IL,DD out
TPA out

Terminator Sip, p/n 333-0988, in (located next to the I/O cable conn)

** VS5000/6000: RCU Sw Bk 2, sw 6 OFF (ON for Panasonic). Min @MCRCU@ 1.06.03

For questions concerning this TSB contact: Mike Bahia 508-858-7095

GROUP: Continuation Engineering MAIL STOP: 027-G1D

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9862 REPLACES: HWG 9085 DATE: 01/25/94 PAGE 1 OF 4

MATRIX ID. 3107 PRODUCT/RELEASE# DS & CS-D (VLSI/386/Turbo)

TITLE: DS R4 Prom - Three Byte Addressing

PURPOSE:

To inform the Field that the R4 prom for the DS and CS-D Disk devices is available and the concerns and requirements for 3 Byte addressing.

EXPLANATION:

The R4 prom for the DS has been available since May of 1993. It provides the following features:

- any fixed winchester can be configured with from 1 to 14 addresses defined in size by the user via a Utility program provided.
- disk space is addressed in a cylinder by cylinder format instead of surface by surface providing potentially as much as a 10% improvement in disk response. However, any improvement in disk performance would be dependent on physical positioning of the data on the disk and therefore will vary from site to site.
- Three Byte Addressing (disk address w/ more then 65535 sectors) supported with Turbo. Min O/S 1.30.01/1.25 required. See page 2 for more information.

For additional detailed information on the prom including critical information on setup and servicing please see TSB HWT 9764 from 3/2/93. Refer to page 2 of this TSB for the latest information and requirements for Three Byte Addressing. It contains material that supercedes information in TSB HWT 9764.

The prom must be ordered through Wang Telesales. The model number is:

	200-DSR4UJ	$99.50	
includes	DS R4 Prom		379-8500-R4
	Disk Utilities 1.1 Software on 5 1/4" 360K Diskette		731-8015D
	Basic-2 Utilities Reference Manual		715-3949A
	DS R4 Prom Upgrade Cover Letter (Read Me First)		714-A012A

Telesales can be reached via 1-800-NEW-WANG.

OVER

TITLE: DS R4 Prom - Three Byte Addressing

Three Byte Addressing:

Three Byte Addressing is an alternative disk indexing scheme that provides the extra address bytes needed to create and utilize a disk address with more than 65535 sectors. It is only supported on the Turbo with minimum O/S release 1.30.01 or 1.25. Read on for specific information and precautions which must be used for proper operation.

For a better understanding of the 3 Byte concept, look at the 3 following SCRATCH commands and the resulting index bytes created. The 16 bytes displayed are the first 16 bytes of sector 0 of the disk.

```
Type 0: SCRATCH DISK T/Dxx, LS=24, END=65024
          byte      0   1     2 3       4 5         6 7 8 9 A B C D E F
                   00  18    0018      FE00        00000000000000000000
Type 1: SCRATCH DISK ' T/Dxx, LS=24, END=65024
          byte      0   1     2 3       4 5         6 7 8 9 A B C D E F
                   01  18    0018      FE00        00000000000000000000
3 Byte: SCRATCH DISK & T/Dxx, LS=24, END=65024
          byte      0   1 2     3 4 5       6 7 8         9 A B C D E F
                   02  0018    000018      00FE00        00000000000000
```

Legend:

Index Type	= Byte 0.	(00 = type 0, 01 = type 1, 02 = 3 byte)
Index Sectors	= Byte 1 for type 0 and 1.	(18 hexadecimal = 24)
	Byte 1&2 for 3 byte.	(0018 hexadecimal = 24)
Current End	= Byte 2&3 for type 0 and 1.	(0018 hexadecimal = 24)
	Byte 3,4&5 for 3 byte.	(000018 hexadecimal = 24)
End Cat. Area	= Byte 4&5 for type 0 and 1.	(FE00 hexadecimal = 65024)
	Byte 6,7&8 for 3 byte.	(00FE00 hexadecimal = 65024)
Undefined	= Bytes 6-F for type 0 and 1.	Bytes 9-F for 3 byte.

With a 3 byte index maximum 'Index Size' is increased from 255 to 65535.
Type 0&1 (1 byte field) FF = 255 3 byte (2 byte field) FFFF = 65535
Maximum 'End Catalog Area' is increased from 65534 to 16,777,215.
Type 0&1 (2 byte field) FFFE = 65534 3 byte (3 byte) FFFFFE = 16777214

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9862 REPLACES: HWG 9085 DATE: 01/25/94 PAGE 3 OF 4

MATRIX ID. 3107 PRODUCT/RELEASE# DS & CS-D (VLSI/386/Turbo)

TITLE: DS R4 Prom - Three Byte Addressing

The first 2 index types, type 0 and type 1, are standard indices currently used on 2200 disk drives. Type 0 was the original index format. Type 1 was introduced with Basic-2 Multiuser O/S Release 2.5 and provided a new more efficient indexing structure for locating file names.

With the LIST command you can always identify the index type. A type 1 index will display a hash mark one position to the right of the index sectors. Three byte displays the & to the right of the index sectors.

WARNING: Changing the index structure may create problems with some programs possibly resulting in data integrity errors. Certain BASIC-2 programs directly utilize specific bytes of the disk index. For those programs that do, changes would likely be needed to insure proper operation. Before changing the index type, a careful analysis of the programs to be used at that address should be made to determine if any direct utilization of the index bytes is being used. Additionally, if any BIN or VAL commands are used to manipulate this indexing data, they would need to be expanded in size for 3 byte addressing for proper calculations. BIN and VAL work from left to right and would therefore ignore the low order byte if currently set for 2 bytes. Proper use of a new command, SELECT 3 ON/OFF, is also critical to error-free operation. Please read the next paragraph on SELECT 3 ON/OFF for details. Backups should always be done before any changes are made.

Whenever 3 byte addressing is to be used, the command SELECT 3 ON must be executed. When using a standard type 0 or type 1 index, it is recommended SELECT 3 be OFF. SELECT 3 ON allows certain disk related instructions such as DATA LOAD BA, COPY, VERIFY, etc. to accept addresses greater than 65535. If SELECT 3 is off, only the SCRATCH command when used with the '&' flag to explicitly create a 3 byte address will accept an address beyond 65535. Most importantly, if alphavariables are used with disk commands to provide a sector address, SELECT 3 ON tells the O/S to load a 3 byte field. Subsequently, SELECT 3 must be OFF if using an alphavarible for a 2 byte sector address. This is the most critical need for the SELECT 3 command. If alphavariables are not used for sector addresses, the status of SELECT 3 becomes somewhat of a moot point when working with standard type 0 and type 1 indices. SELECT 3 is turned ON and OFF for each partition individually.

NUMBER: HWT 9862 REPLACES: HWG 9085 DATE: 01/25/94 PAGE 4 OF 4

MATRIX ID. 3107 PRODUCT/RELEASE# DS & CS-D (VLSI/386/Turbo)

TITLE: DS R4 Prom - Three Byte Addressing

To determine if '3 byte' addressing is turned on for a particular partition, use the LIST SELECT command from that partition. It is used to show the status of all the available SELECT command options. The proper syntax for these commands is as follows:

SELECT 3 ON SELECT 3 OFF LIST SELECT

Additional Information:

The MOVE and COPY commands will normally recreate the same index type for the output disk as found on the input regardless of the status of SELECT 3. An enhancement to the MOVE command however provides the option of changing the index type of the output disk by use of the ' or & flag. Syntax is as follows:

MOVET/Dxx,TO&T/Dxx creates a 3 byte index at the output address
MOVET/Dxx,TO'T/Dxx creates a 2 byte Type 1 index at the output address

Requirements for Three Byte Addressing:
1. Turbo CPU.
*** 2. Turbo O/S Release 1.30.01 or 1.25. (Serious problems could result from earlier releases of the O/S. Contact Product Support if this is an issue at one of your sites.) ***

Known Anomalies with 3 Byte Addressing with Turbo O/S 1.30.01 or 1.25:
1. Cannot boot the system from a 3 byte address if the CPU boot files are out beyond sector 65535.

Note: The following 2200 utility programs do not support 3 Byte Addressing:

MENU pick	FILENAME
Move File	@MOVEFIL
Backup Disk Platters to Disk Drive	@BACKUP
Restore Disk Platters from Disk Drive	@RECOVER
System Install	@INSTALL
Moving a Selected List of Files	@TO.CREF

If you have any questions please contact:
Mike Bahia, 2200 Product Support 508-656-0256

GROUP: Sustaining Engineering MAIL STOP: 019-690

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWG 9085 REPLACES: _____ DATE: 05/28/93 PAGE 1 OF 1

MATRIX ID. 3107 PRODUCT/RELEASE# DS & CS-D

TITLE: DS R4 Prom Upgrade now available

PURPOSE:

To inform the Field that the R4 prom for the DS and CS-D Disk devices is now available as an upgrade through Wang Express.

EXPLANATION:

The R4 prom for the DS announced in TSB HWT 9764 from 3/2/93 is now available as an upgrade to any DS or CS-D enclosed hard disk device. The new prom provides the following features:

- any fixed winchester can be configured as determined by the user with from 1 to 14 addresses defined in size by the user. This is done through a Utility program provided with the upgrade.
- disk space is addressed in a cylinder by cylinder format instead of surface by surface. For some users this has provided as much as a 10% improvement in disk response. However, any improvement in disk performance would be dependent on physical positioning of the data on the disk and therefore will vary from site to site.
- Three Byte Addressing supported with Turbo. Specific procedures and precautions must be used. (Some open issues currently exist.)

For additional detailed information on the prom including critical information on setup and servicing please see TSB HWT 9764.

This upgrade can be ordered through Wang Express. The model number is:

	200-DSR4UJ	$99.50	
includes	DS R4 Prom		375-8500R4
	Disk Utilities v1.1 Software on 5 1/4" 360K Diskette		731-8015D
	Basic-2 Utilities Reference Manual		715-3949A
	DS R4 Prom Upgrade Cover Letter (Read Me First)		714-A012A

Wang Express can be reached via 1-800-TEL-WANG.
639. WANG NEW

If you have any questions that are not answered in this TSB or HWT 9764 from March 2nd, 1993, please contact:

Mike Bahia, 2200 Product Support 508-656-0256

GROUP: Sustaining Engineering MAIL STOP: 019-690

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9764 REPLACES: _____ DATE: ~~02/25~~ 3/2/93 PAGE 1 OF 8

MATRIX ID. 3107 PRODUCT/RELEASE# DS & CS-D

TITLE: New R4 Prom for the 2200 DS and CS-D DPU Boards

PURPOSE:
To inform Field personnel about the new R4 prom for the DS & CS-D DPU boards and the new procedures critical for proper installation.

EXPLANATION:
ECO 60975 has been approved to release the new R4 prom for both the DS and CS-D DPU boards. With this prom any fixed winchester drive can be configured with from 1 to 14 addresses defined in size by the user. Unlike R3 and earlier proms, addresses and data are laid out in a cylinder by cylinder fashion as opposed to track by track, surface by surface. For some this could provide an enhancement to performance dependent on physical positioning of data on the disk. In reading and writing with cylinders, normally less head movement is needed. Additionally, with the proper Operating System release, surfaces greater than the current 16 Meg (65536 sectors) maximum size allowed can be created and used. Three Byte Addressing as this is referred to, is currently only supported on the Turbo with minimum release 1.1. Specific software procedures and precautions must be used for proper use.

R4 Prom Features:
- any fixed winchester can be configured with from 1 to 14 addresses defined in size by the user.
- disk addressed in a cylinder by cylinder format.
- Three Byte Addressing supported with Turbo. Specific procedures and precautions must be used.

The R4 prom unlike all previous proms used with the DS (210-8826) and CS-D (212-7113) DPU boards requires the use of a configuration program to setup the fixed winchester addresses. In the past, switches on the applicable DPU board identifying the drive type would automatically result in a pre-defined configuration of 10 or 16 Meg addresses. Each address only needed to be formatted to be usable. With the R4 prom, the user must define how many addresses for each fixed winchester and the sector size for each. The configuration must then be applied and then each surface formatted to become usable. The program to do this is part of the Disk Utilities that ship with all new DS & CS-D orders. It will also be included with all future releases of the 2200 Operating Systems.

! IMPORTANT: For critical service notes please see page 8, ADDITIONAL INFO. !

GROUP: Sustaining Engineering MAIL STOP: 019-690

EXPLANATION (cont'd):

Ordering: April 19, 1993 is the scheduled conformance date when all new orders for DS Cabinets, CS-D CPUs, and CS-N to CS-D Upgrades (UJ6047) will ship with the R4 prom. As the R4 prom is not compatible with earlier proms as far as the fixed Winchester drives are concerned, separate part numbers have been created. This will allow you to order a board with either the R3 prom or the R4 prom. There are no other differences between the boards.

210-8826A	DS DPU Board with R3 Prom
210-8826B	DS DPU Board with R4 Prom
212-7113	CS-D DPU Board with R3 Prom
212-7113-1	CS-D DPU Board with R4 Prom

No FCO is planned. At this time we expect this prom to be purchasable either through Wang Express or Customer Engineering, but this has not been finalized. This information will be in the TSB when formally published.

Installation: To install a DS or CS-D with an R4 prom, you must have a copy of the DS Utilities, rev 3.0, or rev 1.0 of the new Disk Utilities. These utilities are also included as part of the Turbo Operating System.

beta release	DS Utilities version 3.0
731-8015B	Disk Utilities version 1.0 (recommended)

!WARNING: If upgrading existing winchester drives to the R4 prom, all data! ! on the winchesters must be backed up to either tape, an external! ! device, or floppy. Data written with older proms cannot be read! ! with the R4 prom or vice versa. Additionally all winchester ! ! addresses created with the R4 prom must be formatted before use.!

Checking the Prom Revision and the Current Configuration

1. Check the prom revision and the current configuration using the DS Configuration menu pick with either the DS Utilities 3.0 or the Disk Utilities. These utilities are also included with any complete version of the Turbo O/S. Use terminal 1 if available.

   a. If using diskette, install 1 of the following:

Disk Utilities	731-8015B
DS Utilities ver 3.0	beta release
Turbo O/S (1.2M)	734-8446x
Turbo O/S Disk 2 (360K)	731-8027x

EXPLANATION (cont'd):

b. Select the disk address from where the Disk or DS Utilities are to be loaded by typing in the following command:
SELECT DISK Dxx ret (where xx is 10/20/30 for floppy.)

c. Load the main menu by typing in the following command:
LOAD RUN return

d. If using ver 3.0 DS Utilities disk go to step f. Otherwise, use the space bar to highlight either the DS Utilities or Disk Management Utilities pick.

e. If using Turbo O/S Disk 2, remove it and insert Turbo O/S Disk 3 (731-8028x) and/or otherwise key the following:
RUN return (loads the DS or Disk Management Menu)

f. Select the DS Configuration pick which should be high-lighted.
RUN return (loads the configuration program)

g. The base address for the disk unit is requested. Key in:
D10 or D20 or D30 return (whichever applies)

h. The current prom revision is displayed in the lower left corner. Level 40 or 3F (beta release) indicates the R4 or equivalent is installed. Along the left margin the current drives installed should be displayed. If using an R3 or earlier prom or if already configured for the R4, the winchester drives will show each address currently assigned to it as well as the number of sectors associated with that address. If not already documented, it would be a good idea to either print out or make note of the prom level, the winchester drives installed, the addresses associated with each drive, and the number of sectors at each address. This information may be needed when creating a new configuration with the R4 prom, or should a problem occur, recreating the original configuration.

!Note: On the lower right corner of this screen the following message!
! should be seen: "'15 - Start Setup" !
! If the 'Start Setup' pick is not shown, your software is of an !
! older release and you will not be able to configure the drives !
! with it. !

If step 1h indicates the R4 prom is installed and all drives are properly recognized, go to pg 5, otherwise go to 4 to setup hardware.

EXPLANATION (cont'd):

Hardware Preparation (if the R4 prom is already properly installed as indicated by step 1h, proceed to page 5.)

2. Backup all data on any existing Winchester drive/s in the unit where the R4 prom is to be installed to either tape, an external device, or floppy.
3. Insure all users are off the system and all jobs have completed. Power down the system, disk units first.
4. DS - remove the I/O cable and back cover to expose the 210-8826 DPU Board. Either replace the prom at L135 with the R4 prom or replace the DPU board with the 210-8826B.

OR

CS-D - remove the 212-7113 DPU Board in the last I/O slot and either replace the prom at L36 of the 9558 board with the R4 prom or install the new 212-7113-1 board. Before reinstalling the board see step 5.

5. If a Maxtor Drive (725-0271) is installed, the switch settings must be set for a 140 Mb configuration. The 112 Mb switch configuration is not recognized by the R4 prom. Switch settings for the DS can be found on a label on the inside of the back panel. For the CS-D, a switch setting label is attached to the inside of the right side cover. Change the switch settings if necessary.

!Note: The same drive configuration rules still apply as far as cabling. !
! - If only using 1 winchester, this drive must be terminated and must !
! be connected to Drive Select 1 (last connector on the A cable). !
! - With a DS with multiple winchester drives, you must have a drive !
! select 1 and it must be the only winchester drive terminated. !
! - Do not use B cable connector J7 with fixed winchesters. J7 is for !
! the 10 Meg Removable only. If using a 10 Meg Removable it must be !
! drive select 1 and it must be the only winchester terminated. !
! - The drive type switch settings must match exactly with the drive !
! configuration installed. !

6. Install the DPU board if removed and reconnect all cables. Boot the system. Before closing up the unit you may want to bring the system up and run the configuration utility as indicated in step 7.
7. Repeat step 1 to insure the prom & drives are properly recognized.

EXPLANATION (cont'd):

Running the Configuration Utility to Configure Your Winchester Drives

!Note 1: The following procedure is documented in greater detail in: !
! BASIC-2 Utilities Reference Manual (715-3949A), chapter 10 !
! DS User's Manual (715-0740A), chapter 1 !
! CS User's Guide (715-2364B), chapter 3. !

!Note 2: Before proceeding you should find out from the customer if a !
! specific configuration is wanted. If this is the case, you will need!
! to know how many addresses to assign to each drive and the sector !
! size for each. This is something that they may want to discuss with !
! their programmer. If you are unfamiliar with the drives, the utility!
! program will aid you by supplying the available sectors for each !
! drive and providing default picks for standard size addresses. If a !
! specific configuration is not required, you can recreate the same !
! configuration that would have automatically been created with the !
! older proms by responding yes to the DS Defaults prompt (step 9). !
! Although creating a new configuration takes only minutes, it requires!
! reformatting all surfaces which is a very lenghty process. Creating !
! the correct configuration the first time will save a lot of time. !

8. You should now be coming from step 1.h. Use terminal 1 if available. Configurations can be created on any terminal but can only be applied from terminal 1. Proceed as follows:
key SF'15 to Start Setup.

9. The available addresses, the winchester drives, and the available sectors for each drive are displayed. You are prompted:
"Use DS Defaults? Y" key return to create the same address configuration created with older proms. If this option is chosen go to step 13 or key N to create your own configuration.

!Note: If you use the Defaults with the DS 3.0 Utility, the message !
! "ILLEGAL DEFAULT" may occur. This can be circumvented by !
! changing the address at the end of line 4132 from 4384 to 4390. !

!Note 3: In creating your own configuration the following rules and !
!restrictions apply: !
! - A configuration can only be applied from terminal 1 (step 19). !
! - any fixed Winchester can be assigned from 1 to 14 addresses max. !

EXPLANATION (cont'd):

! - all drives are configured in order of their position on the Drive Select 'A' cable (Drive Select 1 is first, last connector in chain). !
! - a drive is restricted to either Master or Slave addresses. !
! - addresses must be assigned consecutively starting with either the first Master or first Slave address. !
! - it is recommended to assign Master addresses to the 1st winchester to maintain consistency with older units and to minimize confusion. !
! - addresses with 65537 sectors or more are only supported on Turbo. Certain rules and restrictions apply. Min Turbo O/S 1.1 required. !
! - if any drive has a change to it's configuration, the entire drive will need to be reformatted to insure data integrity. !
! - if adding a new drive to an existing configuration, re-enter the entire configuration including the new drive. Only apply the configuration (step 21) to those drives to which a change has been made. Drives will not be affected unless you answer yes to apply for that drive. All data should be backed up as a precaution. !

10. The program prompts:
"Master or Slave? M" Master should be used for the first drive. Key M or S then return.
11. The bottom of the screen is updated prompting you to assign a sector size to the current address. Key B,C, or D for standard 1.2M, 10M, or 16M sizes or key in a specific sector value. This step repeats until all sectors have been assigned or until a blank or 0 entry is entered. Steps 10 and 11 are repeated for each drive.
12. Once all entries for the last winchester are made the program prompts:
"All entries made and acceptable? Y/N" if the displayed configuration is correct, key Y and return, and move to step 13. If there is a problem, key N and return. You will be sent back to the Base Address screen (step 1g, page 2) to restart.
13. "Configuration file name @DEFAULT" is displayed. This step saves the configuration created to disk at the default address (step 1b).

!WARNING: With older versions of the utility, be sure not to use an existing filename as it will be overwritten without warning. This file should be kept & a copy made to provide an easy means of recreating the configuration should a drive be replaced. !

EXPLANATION (cont'd):

Use @DEFAULT or enter a new filename beginning with @ and key return.

14. The following prompt is displayed:
    "Key Reset and SF'10 to apply"
    At this point you must be on terminal 1. If yes, key Shift/RESET then SF'10 and proceed to step 15. If not on terminal 1, move to terminal 1 and repeat steps 1b through 1g, then Shift/RESET & SF'10.
15. The program prompts to enter the system PASSWORD. 'SYSTEM' is the default password used by Wang. This is the password created when @GENPART is executed when booting. Enter the password and return.
16. The program now asks for the filename created in step 13. Enter the filename used and return.
17. The screen displays the configuration and allows you to create a printout. Enter a printer address (215,216,217,or 204) for a hard copy (recommended) or use 005 (screen) and key return.
18. A prompt appears to enter a remark to be used to help identify the hard copy printout if used. Enter a remark and key return.
19. The following prompt is displayed:
    "Apply Y or N _" Recheck the configuration displayed and if ok key Y and return. Entering N and return sends you back to the Base Address screen (step 1g) to start again.
20. With the newest version of the software you will be warned that any drive being reconfigured or configured for the first time must have all addresses reformatted, existing data will be lost. Key Y and return to proceed. Entering N and return takes you to the Base Address screen (step 1g). If you do not get this warning the message still applies. Go to step 21 to continue.
21. A hex file is displayed representing the configuration created for the first drive followed by the following prompt:
    "Apply Y or N _" Enter Y and return only if reconfiguring or configuring for the 1st time the drive in question. The drive number is displayed near the top right. If you do not want to make any changes to the drive in question key N and return.

This step repeats for each fixed drive configured. After responding for the last drive, a message, "Procedure completed." displays.

NUMBER: HWT 9764 REPLACES: _____ DATE: 02/23/93 PAGE 8 OF 8

MATRIX ID. 3107 PRODUCT/RELEASE# DS & CS-D

TITLE: New R4 Prom for the 2200 DS and CS-D DPU Boards

EXPLANATION (cont'd):

22. Hit any key. This returns you to the Base Address screen (step 1g).
23. Re-enter the base address of the unit just configured and key return to visually verify the new configuration.
24. All addresses at any drive to which a configuration was applied (step 21) must now be formatted before using. Failure to format an address at a drive which has been configured or reconfigured can result in data integrity problems.

ADDITIONAL INFORMATION:

With the release of the R4 prom it becomes critical when servicing the fixed winchester drive/s in a DS or a CS-D to know exactly how each drive is configured if you need to replace it. If a customer has multiple fixed drives and indicates errors are occuring at address D11, you can no longer be sure that it is drive select 1 (last drive on A cable) as would have been the case with the older proms. Drive select 1 could also start with the first winchester slave address, D51. You must know exactly what addresses are assigned to each drive and the sector size for each. If you replace a drive and do not create the same addresses for it, data on other drives may end up being overwritten because of an address conflict. If the address size is smaller, the customer may not be able to restore their data to it. To avoid these problems the following steps should be used:

1. Carry your own DS or Disk Utility disk. See item 1a, page 2 for part numbers. Otherwise be sure the customer has these diskettes readily available on site.
2. Always check the configuration before making any changes. Use steps 1a through 1h on page 2 and 3.
3. Encourage the customer to make a hard copy of their configuration and post it near the disk unit for reference. This is easily done when creating the configuration with steps 17 & 18 on page 7. To create a hard copy after the fact, use steps 1b-1g, then 14-18.
4. A backup of the config file created in step 13 should be made to a floppy and readily available. The MOVE FILE utility included on the main menu can be used.

For help or additional information call Mike Bahia, Prod Support (508)656-0256.

GROUP: Sustaining Engineering MAIL STOP: 019-690

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9788 REPLACES: _____ DATE: 02/13/93 PAGE 1 OF 1

MATRIX ID. 3107 PRODUCT/RELEASE# DS & CS-D

TITLE: New 1.2M 5 1/4" Floppy Drive for DS and CS-D

PURPOSE:

To inform the field that a new 1.2M drive (270-5162) is being phased in to replace the current drives (725-0258-G) no longer available.

EXPLANATION:

The Panasonic/Mitsubishi Model JU475-x has been our single source for all 2200 1.2M floppy drives (725-0258G/725-0232/278-4055) to date. These drives had a unique feature, a door open switch, not commonly available on 1.2M floppies. The door open switch was used to signal the system the disk may have been changed resulting in a reset of cache for the floppy.

This drive unfortunately is no longer available but there is a replacement. With minor modifications the Mitsubishi Model MF504C-3 can be used. The drive must be ordered properly pre-configured under part # 270-5162 (also used in VS5000/VS6000). This drive will be shipped as a direct replacement should the Model JU475 (725-0258G/725-0232/278-4055) be out of stock. To verify the drive is properly configured:

1. Behind the A cable connector a 9 pin 150 ohm terminator SIP, 333-0988, must be installed. If the part # cannot be verified, ohm out pin 2-4, it should be a short. Pin 1 is closest to the corner of the drive. If the jumpers below are incorrect, the SIP is probably incorrect.

2. The jumpers must be set as follows:
   6 pair group (in front of SIP near corner) - MX in only
   all others (DS3, others unmarked) out

   single 2 pin jumper (1" in from ctr of A conn - out (unmarked)

   4 pair group (1 3/4" in from A conn along side) - SS in only
   all others (SG, SB, & one other unmarked) out

   12 pair group (along inner edge of brd) - SR,RD,RI,IU,IR,MM,IS,HR in
   all others (DC,MS,IL,DD) out

New Mitsubishi Model MF504C-327U 5 1/4" Floppy Drive - 270-5162

For help or additional information call Mike Bahia, Prod Support (508)656-0256.

GROUP: Sustaining Engineering MAIL STOP: 019-690

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

WANG

NUMBER: HWT 9524 REPLACES: _____ DATE: 12/04/90 PAGE 1 OF 2

MATRIX ID. 3107 PRODUCT/RELEASE# 2200 DS & CS-D TEAC Tape Drive

TITLE: Backup problem with 500/600' tapes & other tape related info.

PURPOSE:

To inform the field of a problem using 500' or 600' tapes with the 45 Meg TEAC Tape Drive, and to provide some information on the 150 Meg Tape Drive.

EXPLANATION:

A problem can occur using 500' or 600' tapes with the 45 Meg TEAC Tape Drive. The symptom is for the tape drive to hang during 'backup' with the message "Positioning to last block" on the screen. This only happens when adding a 2nd backup to a tape where the first address backed up was approximately 22500-26000 sectors long. The problem is fixed with a new prom on the drive. This problem does not occur on the 150 Meg Tape Drive.

With the 45 Meg Tape Drive, the tape is divided into 9 serial tracks, 1 used for a directory and 8 for data. The directory track details the disk address, name if desired, and starting and ending sectors/blocks for each address stored. When Backup is selected, the user must decide to either erase or append to the tape. On a blank tape, an erase is always done. The initial backup then starts on the 1st data track. If the end of tape is reached, tape movement reverses and writing starts on the 2nd track. Once track 2 is full, direction again reverses and track 3 begins and this continues until the backup is completed. Once all data from an address is copied, an entry is made in the directory. If more data is to be stored on the same tape, the directory is checked. The last directory entry indicates where the backup ended and the tape is positioned there to start the new backup. Originally, tapes used with this drive were 450'. The problem occurs with 600' and some 500' tapes if the first address saved has approximately 22500-26000 sectors and a 2nd address is added. A 600' tape can save about 26000 sectors on the 1st track. The drive was programmed to start looking at the beginning of the 2nd track for the end of data after 22526 sectors. When it finds no data at the start of the 2nd track, the drive times out and hangs with the message, "Positioning to last block". A 500' tape will probably only fail if the 1st address stored is in the 22500-23000 sector range while the 600' tapes could fail anywhere from 22500 to approximately 26000. The exact number of sectors to cause a problem can vary between tapes of the same length because of variances with actual physical tape length and the number of bad blocks.

GROUP: 2200 Product Support MAIL STOP: 014-A3A

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

WANG

NUMBER: HWT 9524 REPLACES: _____ DATE: 12/04/90 PAGE 2 OF 2

MATRIX ID. 4103 PRODUCT/RELEASE# 2200 DS & CS-D TEAC Tape Drive

TITLE: Backup problem with 500/600' tapes & other tape related info.

CORRECTIVE ACTION:

There are several circumventions as well as a fix to this problem. TEAC is currently in the process of implementing the fix for Wang and 25 drives should be in CE stock by the time this TSB is published. The fix involves replacing a 28 pin prom usually soldered in at location U3 of the PCBA-IC board. The good drives will have a 'D' on the prom, problem drives a 'C'.

Corrected Drives: U3 PCBA-IC Board - D 0067-01
Problem Drives: U3 PCBA-IC Board - C 0067-01

Due to the limited nature of this problem, drives should be replaced on a problem only basis. To insure getting an updated drive domestically, orders should be sent to Lowell as Second Level Centers are not purged.

Circumventions: If using the standard DS Utility Backup:

1. Select a surface with less than 22500 or more than 26000 sectors to be the 1st backup. Surface size can be checked by listing each disk & noting the "CURRENT END" sector: LISTDCT/xxx (xxx = disk address).
2. Change the end sector on the 1st Backup from the 22500-26000 range to 27000. This will use additional tape writing blanks and a few more seconds of time, but will be otherwise transparent to the user.
3. One line change to @DSTAPEB. Contact Mike Bahia, 508-656-0256.

ADDITIONAL INFORMATION:

150 Meg Tape Drive: The only requirement is the R3 prom. Prom rev can be checked using the DS Utility Disk & selecting the Configuration pick from the main menu. Switch settings & cabling are identical to the 45 Meg.

150 Mg TEAC Tape Drive (MT-2ST/N65 - 4" drive on HH assy) 725-4893
45 Meg TEAC Tape Drive (MT-2ST - true half height device) 725-1481
R3 Prom FCO 1375 for DS/FCO 1376 for CS-D 728-0386/0387

Tape Compatibility: There has been some confusion over the tapes used with the 45 & 150 Meg TEAC Tape Drives. The following table should help:

600' Extra Density Tape (read/write - 150 Meg Drive only) 725-7548
600' High Density Tapes (r/w - 45 Meg; read only - 150) 725-4055-1
450'/500' High Density (r/w - 45 Meg; read only - 150) 725-1482-1

Write Protect: To write, the hole toward the end of the tape inserted into the drive first must be covered. With the slide version the tab must be toward the corner. Writing to a protected tape should give an error T12. With a 150 Meg you may incorrectly see a T1B error (Illegal command). A fix should be in the next release of the DS Utility after 2.0.

GROUP: 2200 Product Support MAIL STOP: 014-A3A

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9192 REPLACES: _____ DATE: 06/06/89 PAGE 1 OF 1

MATRIX ID. 3107 PRODUCT/RELEASE# 2200 DS/CS-D

TITLE: New CDC (Imprimus) Magnetic Peripherals 42 MB HH Winc Disk Drive

PURPOSE:

To provide the field with the necessary information to install this drive properly in the 2200 DS Disk Cabinet or in the CS-D CPU.

EXPLANATION:

A new 42 Meg drive from CDC (Imprimus) Magnetic Peripherals (MN 94205-53) is now being shipped to the field as a replacement for the 32 Meg full height drives (Quantum Q540 and the Micropolis 1323). Although the drive has 42 Meg, it is being used as a 32 Meg (2 16 Meg addresses with 65024 sectors). The following information should allow successful installation:

Drive Type Switch Settings: same as 32 Meg Micropolis

DS 210-8826A DPU Brd, Sw Bk 1 &/or 2 - 8 Off, 7,6,5 On for DR1 or DR3
4 Off, 3,2,1 On for DR2 or DR4

CS-D 212-7113 DPU Brd, Sw Bk 3 - 8 Off, 7,6,5 On (1-4 off, n/a)

NOTE: The 32 Meg Quantum Q540 has different switch settings which will not work with the CDC (Imprimus) Magnetic Peripherals 42 Meg drive.

Jumpers: Drive 1 Select only in all cases. A series of 7 jumpers are located behind the A & B cable connectors. The Drive Select 1 jumper is on the end, B Cable side, farthest from the power plug.

Terminator: IN for CS-D or DR1 in DS. REMOVE for DR2, DR3, & DR4 in DS. DR1/DR2/DR3/DR4 (Drive Select 1/2/3/4) refer to the connector position on the A cable. The Terminator is located behind A Cable Connector.

Addressing: 2 addresses, each with sectors 0-65023.

Part Numbers:

CDC Magnetic Peripherals MN 94205-53 Half Height 42 Meg - 725-3493
Micropolis 1323 Full Height 32 Meg - 725-0254/278-4069
Quantum Q540 Full Height 32 Meg - 725-0144/278-4034

Once installed properly, it would be transparent to the user which winchester was being used.

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

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9187 REPLACES: _____ DATE: 06/06/89 PAGE 1 OF 1

MATRIX ID. 3110 PRODUCT/RELEASE# 42MB Winchester Disk Drives

TITLE: Drive Failures on WLI 725-3493

PURPOSE:

To inform the field of defective EXAR Monochips that may cause drives to fail to spin up or become ready.

EXPLANATION:

A defective chip at location U32 of the drive Read/Write and Control Board has been reported by Imprimis (formally CDC). This chip can cause the drive to fail, by not spinning up or by spinning up but not becoming ready. Lot numbers effected by this failure mode are lots 8810 thru 8848. Drives purchased by Wang within these lot numbers were shipped beginning 07/01/88. Lot numbers can be located on the white label on the HDA portion of the drive just under the drive serial number. This drive is supported on all PCs, VS and OIS systems as a replacement for past ST506 type drives.

CORRECTIVE ACTION:

Due to the projected failure rate of 3 to 7% out of the installed base of lots 8810-8848 over a three year timeframe, these drives will remain as a whole unit swap on failure for this problem. All spares stock has been purged by Purge #890053.

GROUP: Desktop Systems/Peripherals Group MAIL STOP: 001-140

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WRITTEN B. FISH

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 8122 REPLACES: _____ DATE: 07/26/88 PAGE 1 OF 1

MATRIX ID. 3107 PRODUCT/RELEASE# 2200DS Data Storage Cabinet

TITLE: "A" Cable Restrictions With 10 Meg Removable Drive

PURPOSE:

To inform the field of a possible problem with the "A" cable (WLI# 220-3629) in Data Storage Cabinets using a 10 Meg Removable drive (WLI# 278-4049) in the top drive bay of a 2200DS cabinet with any full height winchester in the lower drive bay.

EXPLANATION:

Drive Select Plug 1 of the "A" cable is always assigned to the 10 Meg Removable drive if present. If a full height Winchester is used as the second drive, and plugged into Drive Select Plug 2, the cable will be stretched tight between the drives. The resultant strain on the cable caused by media insertion and withdrawal can cause premature cable failure.

The solution is to use Drive Select Plug 3 of the "A" cable for the second drive. A diagram of cable routing can be found in the 2200 DS Maintenance Manual (WLI# 741-1806).

WRONG NO NO NO

WITH (10 Meg R) USED AT DRIVE SEL 1 = D1F
Next FIXED DRIVE AT SEL 2 = D11 → WHATEVER
" " " AT D-SEL 3 = D51 → "

SKIP DRIVE SELECT 2 CONNECTOR
AND GOING OVER TO DRIVE SEL 3 THE ADDRESSES ARE NOW SLAVE ADDRESSES.

Joe Scoglio

GROUP: Peripherals Support MAIL STOP: 001-140

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 8108 REPLACES: _____ DATE: 07/12/88 PAGE 1 OF 1

MATRIX ID. 3110 PRODUCT/RELEASE# 42 MB Half-height Wini

TITLE: 42 MB HH Winchester Replacements

PURPOSE:

To inform the field of the introduction of a Control Data Corporation 42 Megabyte Half-height Winchester Disk Drive.

EXPLANATION:

To take advantage of the new trends in technology and the reduction of the cost per megabyte in winchester drives, Wang will be phasing in for sales, the CDC 42 MB Half-height Drive (725-3493) This is a direct replacement drive in new units shipped from distribution, for the Micropolis Full-height 30MB (725-0254) and 42 MB Drives (725-0255).

TSO logistics will continue to ship Micropolis drives to the field until the depletion of existing stock necessitates ordering new drives. The gradual phasing in of the CDC 42 MB for CE support will begin in July 1988.

The CDC drives are fully plug compatible with the Micropolis drives. However, a full-height to half-height replacement kit (286-0037) will be necessary when replacing a Micropolis with a CDC drive.

GROUP: Peripherals New Products MAIL STOP: 001-140

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ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 617/459-5000, TWX 710-343-6769, TELEX 172108

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

WANG

NUMBER: HWT 8087 REPLACES: _____ DATE: 06/07/88 PAGE 1 OF 2

MATRIX ID. 4203 PRODUCT/RELEASE# 2200 DS

TITLE: Issues and Information on the 2200 DS Disk Cabinet

PURPOSE:
To inform the field of possible problems with the 2200 DS Cabinet.

EXPLANATION:
The following is a list of possible problems that may be encountered in the field concerning the 2200 DS Cabinet.

1. A problem has been found with formatting the Winchester drives. If a previously formatted drive had alternate sectors assigned, and one of these alternate sectors went bad, a subsequent format could complete OK without correcting for the alternate sector that went bad. This would cause errors on VERIFY after a seemingly successful format. New proms for the DS board are being worked on to correct this problem.

2. The 140/112 Meg Maxtor Drive (725-0271) must be installed in the lower horizontal slots in the DS cabinet. The drive should not be mounted on its side in an upper slot as this could cause premature problems with the drive.

3. There has been an abnormal number of problems with the power supply used in the DS. Steps are being taken in manufacturing to improve quality. The building of the supply is now under the supervision of one group, more care is being taken in assembly, and improved testing as an assembly is now being done.

4. The newest style 1.2 Meg floppy drive, the Panasonic JU 475-2 BGM, is still being sent to the field with the incorrect jumper settings. Jumpers DS1, DS, AX, DO, BX, DA, and MM should be in and the rest out. See TSB HWT 8006, Matrix 3110 from 1/26/88 for more details.

5. Connector J7 on the DS board is for use with the 10 Meg Removable Winchester only. The only difference between J7 and the 3 Fixed Winchester B cable ports, (J2, J9, and J10), is J7 has a sense line for door open. Although J7 may seem to work fine with a Fixed Winchester, it is not supported and has seemed to be the cause of problems in the past.

112/140 MB MAXTORS WON'T WORK W/ J7. 64MB WILL

GROUP: VS On-Line Support MAIL STOP: 001-260

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

WANG

NUMBER: HWT 8087 REPLACES: _____ DATE: 06/07/88

MATRIX ID. 4203 PRODUCT/RELEASE# 2200 DS

TITLE: Issues and Information on the 2200 DS Cabinet

EXPLANATION (cont'):

6. There are 2 different 32 Meg Winchester drives used with the DS. Although under system use there is no difference, the switch settings on the DS board are different (due to different head & surface layout) and the drives have different part numbers.

725-0144 Quantum Q540 sw settings for DR 1 or 3 - 7 on, 5,6,8 off
sw settings for DR 2 or 4 - 3 on, 1,2,4 off

725-0254 Micropolis 1323 sw settings for DR 1 or 3 - 5,6,7 on, 8 off
sw settings for DR 2 or 4 - 1,2,3 on, 4 off

Note: SWITCH SETTINGS AS SHOWN ON THE BACK PANEL OF THE DS CABINET ARE CORRECT.

7. Some DS Cabinets were built with the wrong stand-offs for the I/O cable. The stand-offs were too short and made it difficult to properly attach the I/O cable. Should this be a problem order the correct stand-offs, part number 462-0611.

8. The intermittent I90 problems during heavy sorts with the 2275MUX board, part number 210-8824, have been resolved. See TSB HWT 7262, Matrix 4202 from 12/8/87, The problems were due to some noisy chips and improper signal termination. The board is currently at an E-Rev 4. The board should be at least an E-Rev 3 to correct the I90 during heavy sorts with the DS. Under normal accessing an E-Rev 1 board will not fail. An unmarked E-Rev 3 board can be identified by the following:

a. 10 pin terminators soldered to the etch side of connector J5 and to pins 1 thru 9 of chip L55.
b. Chips L13, L46, L55, L58, and L59 must be LS chips and not ALS chips as seen in the number on the chip.

9. Extra care must be taken in routing the cables to the 10 Meg Removable Winchester. There have been reports of the cables coming off and even wearing thru to the point of shorting out due to the need to extend the drive outward to remove the disk cartridge. If you have cables that show wear from moving the drive in and out, please call the TAC center at 1-800-822-1122 and open a call. We would like to have the cables sent in for evaluation. Inspection of these cables could expedite a resolution.

GROUP: VS On-Line Support MAIL STOP: 001-260

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

WANG

NUMBER: HWT 8012 REPLACES: _____ DATE: 02/09/88 PAGE 1 OF 1

MATRIX ID. 3110 PRODUCT/RELEASE# Ricoh 10 Megabyte Removable Drive

TITLE: 10 Meg Removable Damage Prevention and Failure Policy

PURPOSE:

To inform the field of the handling and installation procedures necessary to prevent premature drive failure and to outline the customer's responsibility in preventing damage to the drive through correct operating procedures.

EXPLANATION:

The following procedures apply when replacing defective Ricoh 10 Meg Removable drives (WLI# 278-4049, 289-0391, 725-0195) at a customer site.

1. After the new drive has been installed and powered up, but before inserting a cartridge, open the drive door and inspect the heads to make sure that they have not slipped off the rails during shipment.

2. Always store and transport the drive in the original shipping container to prevent shipping damage. Even though the large size of the container makes storage and handling difficult, the packaging is absolutely essential to prevent damage to the drive. (The packaging consists of an inner box (WLI# 685-1544) and an outer box with packing (WLI# 685-0565). A new, smaller shipping container is under investigation at present.

3. The emergency interlock release lever, located behind the clear window near the door latch is to allow emergency removal of the media with the power off. Use of the interlock release lever results in damage to the drive and media, therefore this feature is not to be used except in emergencies where destruction of the drive and media is of secondary importance.

   Replacement of any drive where the emergency interlock release has been used should be billed to the customer. The Model 75PC-PM21CT Removable Disk Drive User's Guide specifies on page 2-10 that damage caused by the use of the emergency interlock release is not covered under warranty or maintenance agreement. Documentation Update 715-0374.01 gives further details.

GROUP: Desktop Systems/Peripherals Support Group MAIL STOP: 001-140

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WANG

TECHNICAL SERVICE BULLETIN

SECTION: HardWare Technical

NUMBER: HWT 8006 REPLACES: _____ DATE: 01/26/88 PAGE: 1 OF 1

MATRIX ID.:3110 PRODUCT/RELEASE#:2200 DS Cabinet / VS 5/6

TITLE: New (278-4076) 1.2 Meg floppy jumper configuration JU475-2

PURPOSE:

To inform the field of a possible jumper problem on the new 1.2 MB Floppy Drive now being shipped for 2200 DS and VS 5/6 product lines.

EXPLANATION:

A new 1.2 Meg floppy drives is now being shipped to the field. Unfortunately these drives were shipped with the incorrect jumper settings. In the 2200 DS, this has caused hangs, I90 and I93 errors and failure to lite the floppy led during power up self-test. Drives exhibiting this problem can be identified by this vendor model number (JU 475-2 BGM) and 1 of two visual characteristics:

1. 1.2 MB - is embossed on the front face plate of the drive.

or

2. * - an asterisk or snow flake is embossed on the front face plate.

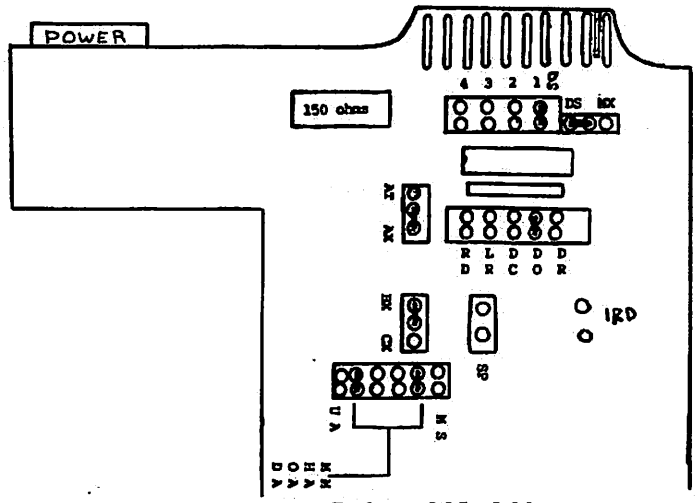
Wang part # of the drive is either 278-4076 , 278-4055 , 725-0258 or 279-0760.

CORRECTIVE ACTION:

Listed below are the proper jumper locations:

1) Jumper ON "DS 1"
2) Jumper ON "DS"
3) Jumper ON "AX"
4) Jumper ON "DO"
5) Jumper ON "BX"
6) Jumper ON "MM"
7) Jumper ON "DA"

**All other jumper locations should be open.



GROUP: VS/2200 On-Line Support MAIL STOP: 001-260

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 7262 REPLACES: _____ DATE: 12/08/87 PAGE 1 OF 1

MATRIX ID. 4202 PRODUCT/RELEASE# 2200/CS

TITLE: Problem with the 2275MUX Board

PURPOSE:
To make the field aware of a problem with the 2275MUX Board (210-8824).

EXPLANATION:
There is a hardware design problem with the 2275MUX. Under heavy usage such as a large Sort program, intermittent I90 errors can occur. The problem seems most prevalent with the DS Cabinet. Those sites experiencing problems have reported from 1 error a week to 2 or 3 a day.

R&D has a fix that is currently being beta tested and an ECO is in the process of being documented. ECO 47059 is expected to be released sometime in December.

CORRECTIVE ACTION:
Should a site exhibit these symptoms with a 2275MUX, please call the TAC Center at 1-800-822-1122 and open a call. A program will be given to test the 2275MUX for the problem. Once the 2275MUX is verified as the problem, you will be asked to send it in, and a beta board will be made available.

Should the problem occur with a Phoenix drive with a 2280MDPU, it is suggested the 2275MUX be replaced with the 210-7717 and a 210-7715 as a temporary solution. The 7717 is installed in the MDPU in the first slot to the left of the 210-7422 board, and the 7715 is installed in the master CPU. There should already be a 210-7715 in the secondary CPU. Both 7715's would be cabled to the top 2 ports of the 7717 in the MDPU using the existing cables. A small cable, 220-0257, is then used to connect the bottom port of the 7717 to the 7421 board in the DPU completing the configuration. The 7717 is a known good mux set-up and can get the customer running error-free until the ECO is released and an updated 2275MUX can be installed.

GROUP: VS On-Line Support MAIL STOP: 001-260

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WANG

TECHNICAL SERVICE BULLETIN

SECTION: HardWare Technical

NUMBER: HWT 7118 REPLACES: _____ DATE: 06/02/87 PAGE 1 OF 1

MATRIX ID. 3107 PRODUCT/RELEASE# 2200DS Cabinet

TITLE: 2200DS / 10 MB Removable Disk Hardware Installation Changes

PURPOSE:

Changes to 10 MB Removable Disk mounting hardware to eliminate potential binding of slide mechanism.

EXPLANATION:

Initial shipments of the 2200DS Cabinet were delivered with device mounting hardware that included (4), 6/32" x 3/8" (part # 650-3120) device mounting screws.

These screws are too long and could protrude through the nylon mounting bracket and into the disk drive itself. If the configuration includes a 10 MB Removable Disk drive, the long screws could result in a binding slide mechanism making it difficult to install/deinstall the disk cartridges.

CORRECTIVE ACTION:

Substitute four 6/32" x 1/4" mounting screws to install any 10 MB Removable Disk drives. Current 2200DS units are being shipped with (4), 6/32" x 1/4" mounting screws, part # 650-3080.

GROUP: Desktop Systems/Peripherals Group MAIL STOP: 001-140

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TECHNICAL SERVICE BULLETIN

WANG

SECTION: HardWare Technical

NUMBER: HWT 7083 REPLACES: _____ DATE: 04/07/87 PAGE 1 OF 1

MATRIX ID. 3107 PRODUCT/RELEASE# 2200DS Cabinet

TITLE: 2200DS Cabinet New Product Announcement

PURPOSE:

To inform the field of the new 2200DS (Data Storage) Cabinet.

EXPLANATION:

Starting in late April, and in limited quantities, WANG will be shipping a new under-the-desk Data Storage Cabinet for 2200 users. Included with each cabinet will be a DPU Board, a cooling fan and a power supply. The cabinet will house up to six magnetic storage devices including: (A) 320KB or 1.2MB Floppy HH, (B) 10MB Removable Disk HH, (C) 40MB Streaming Cartridge Tape HH, (D) 20MB Winchester HH, (E) 32MB Winchester FH, and (F) 64 MB Winchester FH. Each cabinet must be ordered with a Floppy. All other magnetic devices are options and are to be installed into the cabinet by CSO at the customer site.

There is no formal training on this product. A Maintenance Manual with service procedures, parts breakdown, etc, will be shipped to Branches supporting the early shipments. Microfiche documentation will be available at a later date.

A label will be installed on the inside of the rear panel. This label will document cable connections, switch settings and device terminator information.

The power supply is equipped with an A/C input configuration switch which must be set to 115 or 220 VAC before power is applied.

The operating system for this product is 2.7 or higher.

A/C power cord length will be 6 feet and the plug type is 5-15 IG.

GROUP: Desktop Systems/Peripherals Group MAIL STOP: 001-140

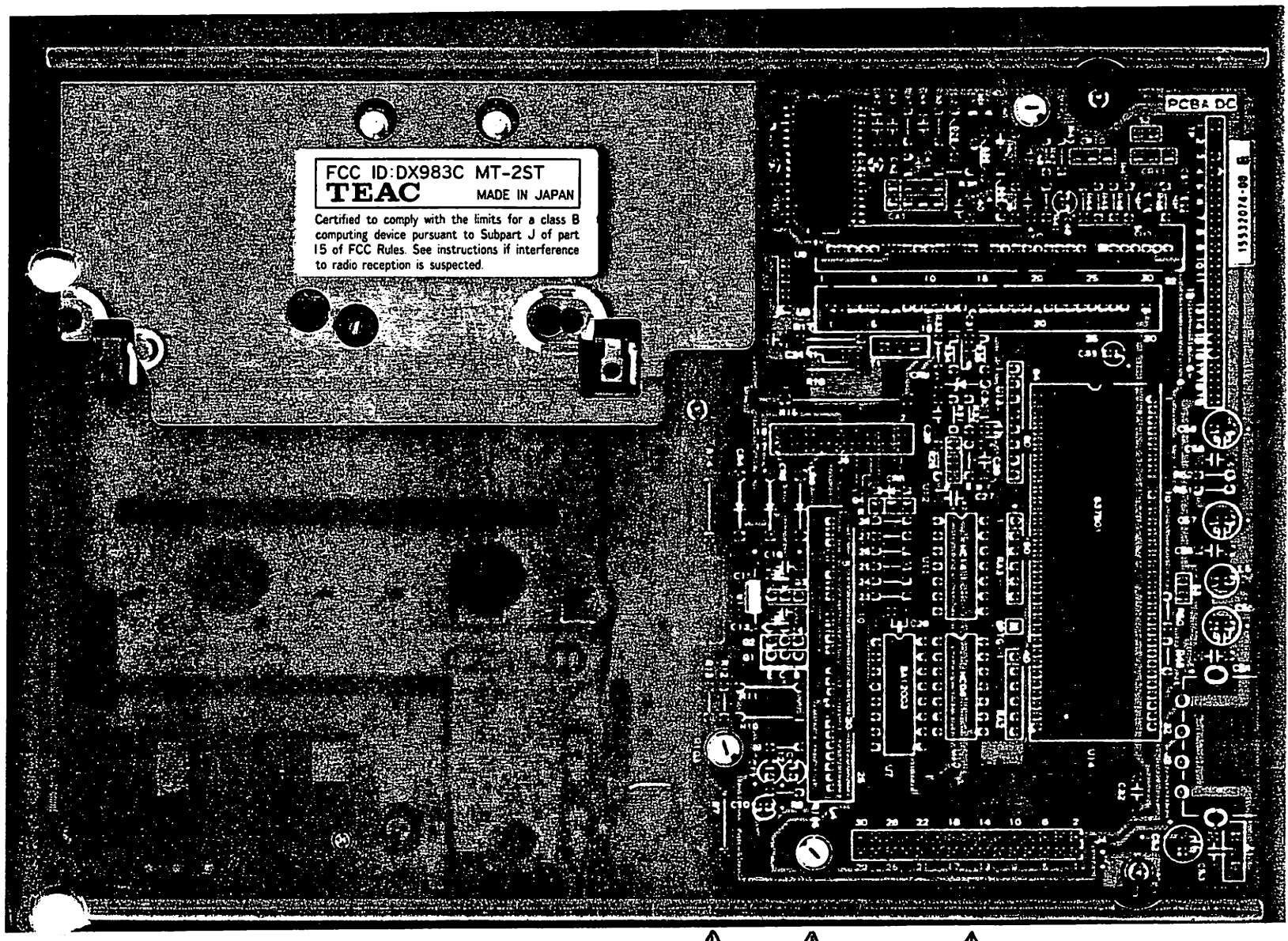
① Ck 12V - set to 12V even

② Using a scope attach a probe to J4, PIN 12. (Should see ⎍ wave)

Hanging Tape drive will read about 110 µsec.

Adj Pot R103 for 128 µsec

TAPE



TAPE

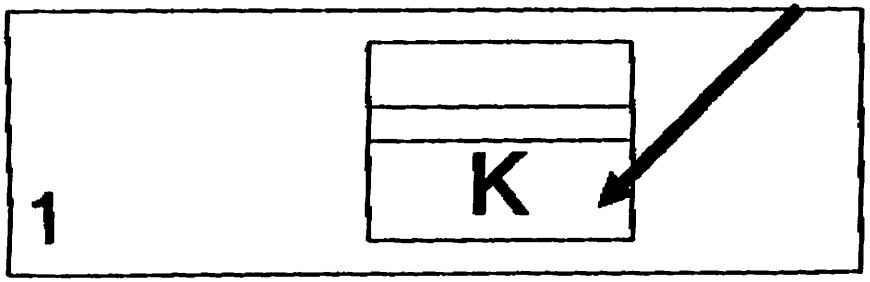
6560446

TEAC Supplementary information For ECR No. WNG-19

Except for some interim drives, a revision of the firmware on PCBA Drive Control will be marked as was before.

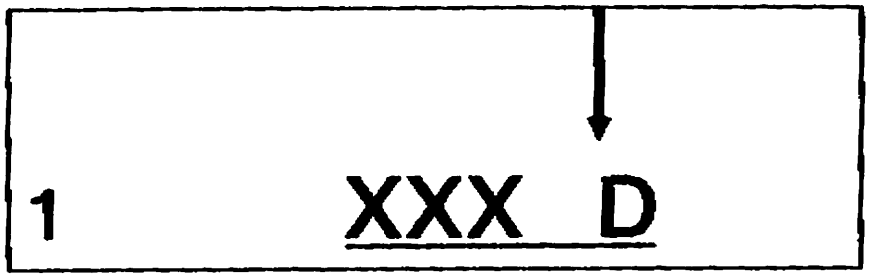
1. **CPU with one-time ROM**

Stamped on the label



2. **CPU with mask ROM**

Printed after the ROM number "XXX"



)0PRT

WANG LABORATORIES, INC.

MANAGEMENT INFORMATION SYSTEMS

REGIONAL SUPPORT CENTER CALL TRACKING SYSTEM

CALL HISTORY

TRACK NO: E403683 CONTACT: PHILLIPS ALTO

COMPANY: PHILLIPS ALTON G PHONE (205) 926-4806

CALL SOURCE: T CALL STATUS: 190 PHONE ANL/CLOSED

CALLER TYPE: 03 START DATE: 06/25/96 ACCOUNT PRIOR

PRODUCT LINE: HOVS 2200 05 START TIME: 16:39 PRODUCT TYPE:

REPEAT CALL: N PTR XREF:

REPEAT XREF: EMPL-NUMBER: 4019

ANALYST ID: MB1 BAHIA 87095 MIKE

PROBLEM DESC: CSE WOULD LIKE TO TALK TO MIKE BAHIA
INT FAILS BACK UP W/ MAXELL TAPES. (150M TEAC TAPE DRIVE)

PROBLEM DESC: PAGER - 205-869-2443 (SAME PROD - T24 INT W/ HIGH DENSITY MAXELL TAPES - HARRY LAVOIE)

PROBLEM PRTY: 1

TRX DATE TIME USER CALL STARTED ON 06/25/96 ON 16:39

06/25/96 16:39 JXH ST 000 CALL DIRECTOR ELAP 0

06/25/96 16:42 JXH ST 110 PHONE ANAL GROUP ELAP 523

06/25/96 18:48 MB1 ANALYST: NEW MB1 OLD PRODUCT LINE: NEW OLD

06/25/96 18:49 MB1 CALLED SITE AT 6:30. CE HAD LEFT 15 MIN EARLIER. WILL C IN AM.

06/26/96 9:21 MB1 PAGED CE THIS AM AT 9:05.

06/27/96 13:51 MB1 CE TESTED W/ TAPE SENT DOWN. RAN OVERNIGHT, 35 PASSES NO ERRORS. CUST NEEDS TAPES. GAVE # FOR TEAC.

08/06/96 16:14 MB1 PAGED CE FOR CURRENT STATUS.

08/14/96 13:31 MB1 PROBLEM DESCRIPTION CHANGE. OLD DESCRIPTION WAS:
CSE WOULD LIKE TO TALK TO MIKE BAHIA

08/14/96 13:31 MB1 PAGED CE FOR CURRENT STATUS.

08/29/96 13:51 MB1 PAGED CE FOR CURRENT STATUS.

09/16/96 9:09 MB1 CE CALLED IN TODAY. CUSTOMER ORDERED NEW TAPES & THAT RESOLVED THE PROBLEM. TAPE DRIVE TESTED OUT GOOD W/ TAPE I SENT. BAD TAPES CAME FROM TONER. GOOD TAPES CAME FROM ANOTHER SOURCE. CLOSE CALL /CE.

09/16/96 9:09 MB1 ST 190 PHONE ANL/CLOSED ELAP 0

WANG MANUFACTURING TEST PROCEDURE	STAMP	PART NO	REV	SHEET
		725-4893	1	1/3
DESCRIPTION 150MB TEAC CASSETTE TAPE DRIVE		TEST TYPE TEST PROCEDURE		
BUSINESS ENGINEER Gary Marcotte		BUSINESS MANAGER J. Munaco		

REVISION HISTORY

REV	DATE	MPC/ECO	SHT	DESCRIPTION	CHANGED BY
0	12/92			NEW RELEASE PER ISO 9002	GARY MARCOTTE
1	09/94	08048		UPDATE PER MPC # 08048	GARY MARCOTTE

DIST: REPAIR

1. PURPOSE:
   1.1 To describe the process for performing Data reliability testing on 725-4893 'TECH CASSETTE DRIVES'.

2. EQUIPMENT REQUIRED:
   2.1 PC SYSTEM - 177-8103 WITH PRINTER
   2.2 PC EXTENDED MEMORY BOARD - 177-8009
   2.3 PC SCTD BOARD - 210-9079
   2.4 SCTD CABLE - 220-0541
   2.5 SCTD P/S - 725-2905
   2.6 600' EXTRA DENSITY CASSETTE TAPE - 725-7548
   2.7 PC DIAG. SOFTWARE REV 2800 WITH SCTD REV 19A4
   2.8 HEAD CLEANING SOLVENT - 726-8018 OR EQUIV.

3. PROCEDURE:
   3.1 Carefully inspect drive for physical damage and ensure latch mechanism works properly. Clean head using head cleaning solvent.

   3.2 Attach 4 pin power connector from 725-2905 and I/O cable from PC (210-9079) to drive to be tested.

   3.3 Insert Diag. software into drive A: and turn ON PC.

   3.4 Insert scratch tape (725-7548) into U.U.T. and turn power ON.

   3.5 From "Wang PC/APC Diagnostic Menu" use space bar to select "MPG. RUN-IN" and "SELECT BY OPTION CARDS" then press EXEC.

   3.6 At the "Option Selection" screen select "SCTD CONTROLLER CARD" ONLY then press EXECUTE. (When system prompts "Delete error log".) Press EXECUTE.

   3.7 Testing will begin. Be sure to enable printer by pressing PF14 (ARROW) key.

3. PROCEDURE:(cont'd)

3.8 After approximately 3 - 3.5 hours the test will be complete and printer will print results. Then loop and continue testing. There should be 0 miscompares. Anything else is a failure. Any write retries beyond what are allowable for the test tape is also a failure.

EXAMPLE: TAPE IS KNOWN TO HAVE ABOUT 50 - 60 WRITE RETRIES WITH THE REFERENCE DRIVE. TEST DRIVE RESULTS ARE 65 - 70 WRITE RETRIES. THIS IS A GOOD DRIVE BUT IF TEST RESULTS YIELD'S 150 WRITE RETRIES WITH THE SAME TAPE, DRIVE IS BAD.ALSO, DRIVE IS BAD IF READ RETRY COUNT EQUALS OR EXCEEDS WRITE RETRY COUNT. ASSURE EXTENDED STATUS BYTE 0 ON TEST PRINTOUT IS "97".

3.9 After at least one loop press CANCEL and power OFF unit and remove tape.

3.10 Attach Wang Serial number if drive does not have one.

3.11 Attach Weshop Label and place in bubble bag with pride label and ship to good stock failures should have green RTV label attached and be shipped RTV.

CC: Mike Bahia W0000600 6FLT3
From: Mike Bahia Security: Limited
Subject: Feedback backup problem Date 09/08/93

Torbjorn,

Thanks for the feedback. It is appreciated. We are now working on the Turbo O/S and should be looking at your KFAM bug this week. We keep you posted.

I am also testing a CS/386 Rel, 1.30, which will be ready for beta testing by next week the latest. I will send you a copy which will include release notes indicating fixes, enhancements, and known anomalies.

Best regards,
Mike

---------- Original Memo ----------
To: Mike Bahia From: Torbjorn Sagner
Subject: Feedback backup problem Date Sent: 09/08/93

Mike,
Here are some feedback from my phone request for support last week.
about backup problem, error TAPE COMAND ERROR.
The problem was sw related, the programer (not Wang) had changed the start procedure so the system always started with HOG ON selected. When we discovered this and select HOG to be OFF the the bockup program worked ok.

Regards
Torbjorn

To: Mike Bahia W0000600 6FLT3
From: Werner Heinzel Security: Limited
Subject: 725-1481 Tape Drive Probl Date 08/26/93

Mike,
we have tested the Tape (with D-PROM) and the new Disk-Utilities,
we have " no Problem found "
Wolfgang Borke (ALEC Dortmund) tested this in the next time by
different Customer!

Best Regards
Werner Heinzel

---------- Antwort ----------

An: Werner Heinzel Von: Mike Bahia
Betreff: 725-1481 Tape Drive Probl Datum 25.08.93

Werner,
Have you tested out the Tape drive with the new Disk Utilities? Did it resolve the problem?

Regards, Mike

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

CC: Mike Bahia From: Mike Bahia
Subject: 725-1481 Tape Drive Probl Date Sent: 07/28/93

Werner,
Have you had an opportunity to test out the tape drive problem with the Disk Utilities? Incidentally, there may be a file missing from that disk, @DSAPPLY. It is used to apply a drive configuration if using the R4 prom. This program has not been changed so if you already have it on another disk it can be MOVEd over.

Best regards,
Mike

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

To: Mike Bahia From: Werner Heinzel
Subject: 725-1481 Tape Drive Probl Date Sent: 06/30/93

Mike,
please send me the lastest DS Utilities.
The mailing address:

WANG Deutschland GMBH
Industriestrasse 29
44892 Bochum-Langendreer
Germany

Regards
Werner Heinzel

---------- Antwort ----------

An: Werner Heinzel Von: Mike Bahia
Betreff: 725-1481 Tape Drive Probl Datum 29.06.93

Werner,

Have you tested out the tape drive with the current utilities, either the DS Utilities 3.0 or preferrably the Disk Utilities, rel 1.0, p/n 731-8015B? If there is any problem in getting these please let me know and I will mail or Wang Office (need 8" DSDD Archiver) a copy. Please provide me with a mailing address if needed.

Best regards,
Mike Bahia

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

CC: Mike Bahia From: Mike Bahia
Subject: 725-1481 Tape Drive Probl Date Sent: 06/02/93

Werner,

Received a FAX today from Wolfgang Borke indicating basically what you have said in your message to Patrick. Tested both the 500 and 600' tapes here with the newest backup program and had no problem. The start and end sectors for the 1st address were 0-25000 followed by 6 addresses of 0-500. Wolfgang did indicate that @DSTAPEB rel 2.h was being used for testing. With rel 2.0, no problem. With the latest release he tried, a bug existed preventing multiple disk entries to be put in. It looks like the problem may be due to the @DSTAPEB program being used. Provide me with your address and I will send you the latest DS Utilities which I have been using. There have been several bugs fixed. If you have a 9" VS Archiver I can send the utilities with COPY2200. We have not been able to get this to work properly using a PC archiver, so it would be better to mail if you don't have the 9" Archiver.

Best regards,
Mike

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

CC: Mike Bahia From: Werner Heinzel
Subject: 725-1481 Tape Drive Probl Date Sent: 06/01/93

Hallo Patrick,
at 25. may we have make a test with Wolfgang Borke by the customer ALEC, Dortmund.
we to employ

1. Tape Drive 725-1481 (with 0067-01 D prom)
2. 600' tapes
3. the WANG Prog. "@DSTAPEB"

we make a backup to a tape from sector 25000 forward by steps of 500 sectors. By sector 27500 we have the error T14 " unrecoverable data error" by 5 tests with a other tape (600') we have always the error on the same position.

Regards
Werner Heinzel

Package Subject: 725-1481 Teac tape drive

Item Title: 725-1481 Teac tape drive

Thanks Patrick for the update. The problem the prom fixes is very unique and it seemed unlikely to be a problem with many customers. I will write a FAX to ALEC making it clear the prom is not the cause of the problem they are having nor is it likely to be a down rev tape drive.

Regards,
Mike Bahia
2200 Product Support

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

To: Mike Bahia From: Patrick Galle
Subject: 725-1481 Teac tape drive Date Sent: 05/26/93

Following are the conclusions of the evaluation done on the Teac tape drive 725-1481.

We could not simulate the problem with a 500' tape,we only had one 500' tape to do the test.(500' tapes are replaced by the 600' tapes) The problem will not always show up with 500' tapes,it depends on the exact lenght of the tape.

A second test was done with 600' tapes.The problem occured immediately with a tape drive configured with a 0067-01 C prom and was parmanent.The tape drives configured with 0067-01 D proms did not give problems.The same test was done with the tape drive sent to me by Werner Heinzel.The tape drive is not failing in our test system.

The tape drives returned after repair have the 0067-01 D prom mounted and do not give any problems.The drives in our stock are updated.

It looks like the problem at customers site is not related to the prom revision.I suggest to check the controller pcb and the tape type used by the customer.

Please do not hesitate to contact us if we can be of any further help to solve the customers problem.

Kind Regards,

Patrick Galle

Package Subject: TEAC tape 725-1481

GERMANY UNABLE TO GET TAPE DRIVES WITH LATEST PROM.

Item Title: Cover Memo

Guenter,
Thanks for updating me. Sounds like this problem will be put to bed.
Best regards,
Mike

---------- Next Memo ----------

Item Title: TEAC tape 725-1481

The prom level revision information has been adressed to the appropriate repair source.They promised us to have the 0067-01 D prom installed from the next shipment on.
I will personally check the shipment before distribution.

Kind Regards,

Patrick Galle

VS OFFICE Wednesday 02/10/93 03:27 pm Page: 1

To: Mike Bahia W0000600 6FLT3
From: Guenter Peck Security: Limited
Subject: 45MB Teac Tape Drive Date 02/04/93

Hi Mike.
I'll get in contact with Josef Heinz, he is the coordinator of WANG Germany logistics.
Regards
Guenter

---------- Antwort ----------
An: Guenter Peck Von: Mike Bahia
Betreff: 45MB Teac Tape Drive Datum 04.02.93

Guenter,
We need to go back to your Logistic people to find out why the latest versions of this drive are not being sent out. Where were these drives sourced from? Do you have a Logistic Manager's name whom we can contact? Did you get some updated drives from the US?
Regards, Mike

---------- Original Memo ----------
To: Mike Bahia From: Guenter Peck
Subject: 45MB Teac Tape Drive Date Sent: 02/04/93

Hi Mike,
in the meantime I have ask the branch manager (Peter Puetz) about the situation and he told me, they have orderd 3 Tape drive's and all three have arrived with the old revivison prom. What can we do now?
regards
Guenter

PS: Thank's for the TSB

Package Subject: 725-1481 DOAs

Item Title: TEAC 45M Tape drive

Guenter,

If there is a problem getting a good drive with a D prom from your logistic people, that problem needs to be addressed. Any 45 Meg Teac Drive (725-1481) going through the repair cycle should come back with the new D prom. If that is not happening, we need to talk to someone who is responsible for this product. If you have a name or could have someone in the repair center call me hopefully the issue could be resolved.

In the meantime if you need a couple of drives to begin addressing the needs of your customers, home office logistics can probably help you. Joan Hanley usually handles these problem here in Lowell. Jean-Marie Coppens is the logistic co-ordinator in Belgium who normally makes these arrangements with Joan.

I do not have any of these proms readily available to me and normally they are soldered in. Please let me know how this works out.

Best regards,
Mike Bahia
2200 Product Support

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

o: Mike Bahia From: Guenter Peck
Subject: TEAC 45M Tape drive Date Sent: 01/05/93

Hi Mike,
I contact you because Paul Gorecki has left the company. But there is still a problem left open regarding the TEAC 45M Tape. It seems to be very difficult in Germany to get the good drive's with the D-PROM. We have a customer who needs about 35 (Drives or PROMS). If we could get a PROM form you we can then duplicate it over here.
Thanks in advance
Guenter

?ackage Subject: 725-1481 DOAs

Item Title: 725-1481 DOAs

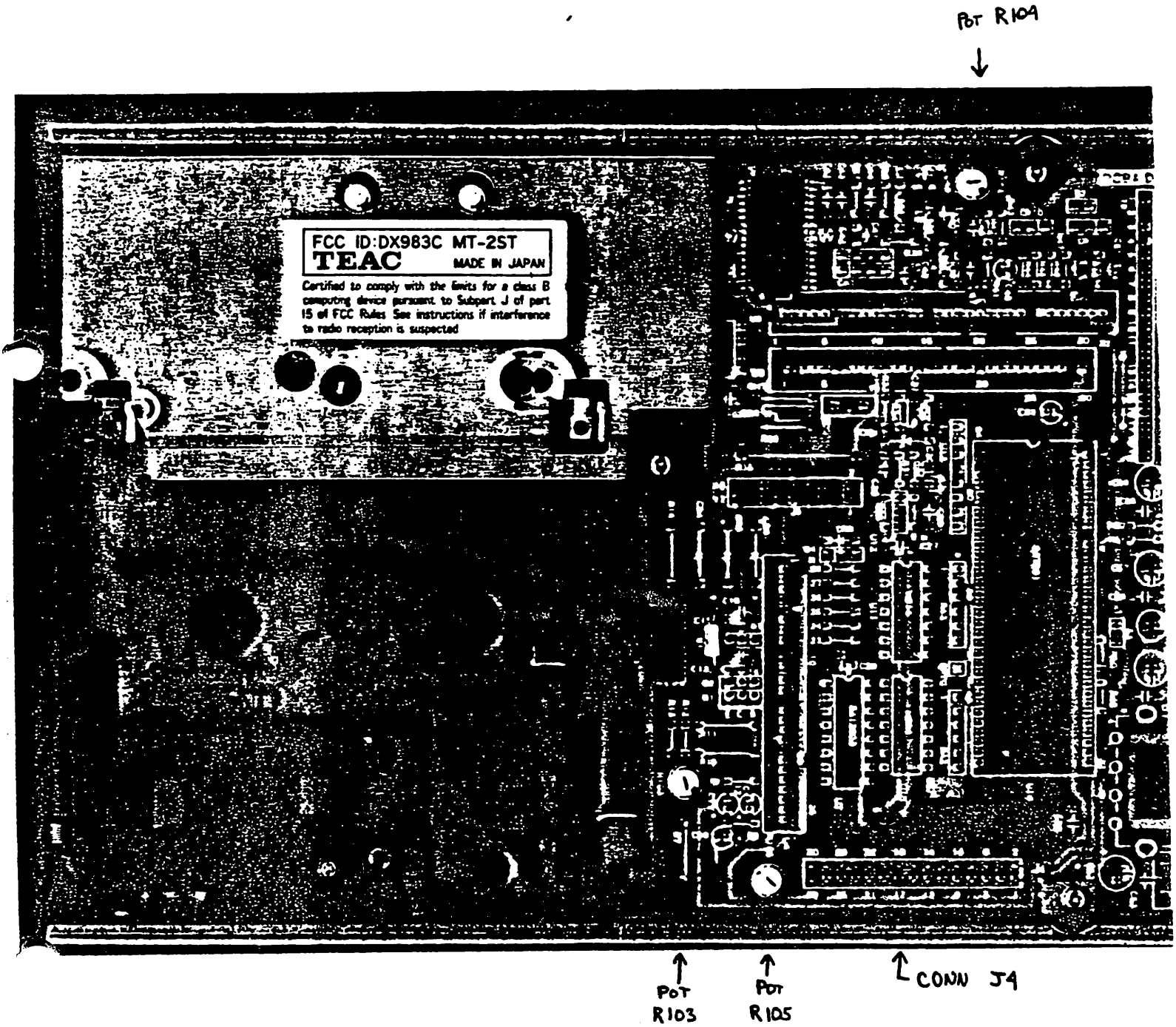
'at
There is a serious quality problem with DS tape drives coming out of repair.
We have received 2 duds in the past few weeks.
1- tape drive sn 672080 with repair sn = B080855 is breaking tapes after 3-4 backups.
2- tape drive sn 702346 with no apparent indication of repair would'nt work atall giving T27 error without rewinding the tape. This tape drive contained PROM 0065-001 and when I put a 0067-001 PROM from another drive in it the drive started working. I also had problems with breaking tape DOAs in the past.
I dont have to say what a nuisance getting DOAs of any type is- waste of time, money, engineer usage, irate customer etc etc .....
Perhaps you could pass this on to the revelant people and it could be looked into - Tks Francis

DS TAPE

① Set Power Supply in DS. 12V even

② Using a scope attach a probe to J4, PIN 12. (See ⌐¬) ← WHILE RUNNING A BACKUP
128 μsec

* Hanging tape drive will read about 110 μsec
Adj. Pot R103 for 128 μsec.



45 MEG TAPE STORAGE CAPABILITIES w/ DS UTILITIES 3.0

DS UTILITIES 3.0

PROGRAM CDSTAPEB — DISK TO TAPE BACKUP

LINE 1050 — BØ = START SECTOR — EØ = END SECTOR

LINE 1100 — J = BØ TO EØ

J = SECTOR COUNT

★★ 450' TAPE

TURBO	13.8 56472	13.8 56472	13.8 56472	1.4 5540	1.4 5540	44.1 MEG 180496
NEW BUS						
1ST BACKUP	✓	✓	✓	✓	J=2304	177260 [2]
2ND BACKUP	✓	✓	✓	✓	J=2304	177260 [2]
OLD BUS						
1ST BACKUP	✓	✓	✓	✓	J=3040	177996 [1]
2ND BACKUP	✓	✓	✓	✓	J=2784	177740
386						
1ST BACKUP	✓	✓	✓	✓	J=2304	177260 [2]
2ND BACKUP	✓	✓	✓	✓	J=2304	177260 [2]
VLSI						
1ST BACKUP	✓	✓	✓	✓	J=2560	177516

450' TAPE is 5400"

[1] (5400/177996) X 256 = 7.766" FOR EACH 256 BLOCK OF SECTORS

(5400/177260) X 256 = 7.798" FOR EACH 256 BLOCK OF SECTORS

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9524 REPLACES: _____ DATE: 11/ /90 PAGE 1 OF 2

MATRIX ID. 3107 PRODUCT/RELEASE# 2200 DS & CS-D TEAC Tape Drive

TITLE: Backup problem with 500' & 600' tapes & other tape related information

PURPOSE:

To inform the field of a potential problem when using 500' and 600' tapes with the 45 Meg TEAC Tape Drive, how to correct it, and to provide additional information concerning the 150 Meg Tape Drive.

EXPLANATION:

A problem can occur using 500' or 600' tapes with the 45 Meg TEAC Tape Drive. The symptom is for the tape drive to hang during 'backup' with the message "Positioning to last block" on the screen. This only happens when adding a 2nd backup to a tape where the first address backed up was approximately 22500-26000 sectors long. The problem is fixed with a new prom on the drive. This problem does not occur on the 150 Meg Tape Drive.

With the 45 Meg Tape Drive, the tape is divided into 9 serial tracks, 1 used for a directory and 8 for data. The directory track details the disk address, name if desired, and starting and ending sectors/blocks for each address stored. When Backup is selected, the user must decide to either erase or append to the tape. On a blank tape, an erase is always done. The initial backup then starts on the 1st data track. If the end of tape is reached, tape movement reverses and writing starts on the 2nd track. Once track 2 is full, direction again reverses and track 3 begins and this continues until the backup is completed. Once all data from an address is copied, an entry is made in the directory. If more data is to be stored on the same tape, the directory is checked. The last directory entry indicates where the backup ended and the tape is positioned there to start the new backup. Originally, tapes used with this drive were 450'. The problem occurs with 600' and some 500' tapes if the first address saved has approximately 22500-26000 sectors and a 2nd address is added. A 600' tape can save about 26000 sectors on the 1st track. The drive was programmed to start looking at the begining of the 2nd track for the end of data after 22526 sectors. When it finds no data at the start of the 2nd track, the drive times out and hangs with the message, "Positioning to last block". A 500' tape will probably only fail if the 1st address stored is in the 22500-23000 sector range while the 600' tapes could fail anywhere from 22500 to approximately 26000. The exact number of sectors to cause a problem can vary between tapes of the same length because of variances with actual physical tape length and the number of bad blocks.

GROUP: 2200 Product Support MAIL STOP: 014-A3A

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 9524 REPLACES: _____ DATE: 11/ /90 PAGE 2 OF 2

MATRIX ID. 4103 PRODUCT/RELEASE# 2200 DS & CS-D TEAC Tape Drive

TITLE: Backup problem with 500' & 600' tapes & other tape related information

CORRECTIVE ACTION:

There are several circumventions as well as a fix to this problem. TEAC is currently in the process of implementing the fix for Wang and 25 drives should be in CE stock by the time this TSB is published. The fix involves replacing a 28 pin prom usually soldered in at location U3 of the PCBA-IC board. The good drives will have a 'D' on the prom, problem drives a 'C'.

Corrected Drives: U3 PCBA-IC Board - D 0067-01
Problem Drives: U3 PCBA-IC Board - C 0067-01

Due to the limited nature of this problem, drives should be replaced on a problem only basis. To insure getting an updated drive domestically, orders should be sent to Lowell as Second Level Centers are not purged.

Circumventions: If using the standard DS Utility Backup:

1. Select a surface with less than 22500 or more than 26000 sectors to be the 1st backup. Surface size can be checked by listing each disk & noting the "CURRENT END" sector: LISTDCT/xxx (xxx = disk address).
2. Change the end sector on the 1st Backup from the 22500-26000 range to 27000. This will use additional tape writing blanks and a few more seconds of time, but will be otherwise transparent to the user.
3. One line change to @DSTAPEB. Contact Mike Bahia, 508-656-0256.

ADDITIONAL INFORMATION:

150 Meg Tape Drive: The only requirement is the R3 prom. Prom rev can be checked using the DS Utility Disk & selecting the Configuration pick from the main menu. Switch settings & cabling are identical to the 45 Meg.

150 Mg TEAC Tape Drive (MT-2ST/N65 - 4" drive on HH assy)	725-4893
45 Meg TEAC Tape Drive (MT-2ST - true half height device)	725-1481
R3 Prom FCO 1375 for DS/FCO 1376 for CS-D	728-0386/0387

Tape Compatibility: There has been some confusion over the tapes used with the 45 & 150 Meg TEAC Tape Drives. The following table should help:

600' Extra Density Tape (read/write - 150 Meg only)	725-7548
600' High Density Tapes (r/w - 45 Meg; read only - 150)	725-4055-1
450'/500' High Density (r/w - 45 Meg; read only - 150)	725-1482-1

Write Protect: To write, the hole toward the end of the tape inserted into the drive first must be covered. With the slide version the tab must be toward the corner. Writing to a protected tape should give an error T12. With a 150 Meg you may incorrectly see a T1B error (Illegal command). A fix should be in the next release of the DS Utility after 2.0.

GROUP: 2200 Product Support MAIL STOP: 014-A3A

CIRCUMVENTION FOR DS UTILITY HANG (POSITIONING TO LAST BLOCK WHEN APPENDING TO A 600' TAPE ON A 45 MEG TAPE DRIVE)

IF CURRENT END IS APPROX 12500 BLOCKS OR 25000 SECTORS

FIX

PROGRAM @DSTAPEB

CHANGE LINE 1020 AS SHOWN

1020 M$ = "POSITIONING TO LAST BLOCK" : GOSUB '201 (M$) : STR(G$,3,3) = C$: IF C$ < HEX (003C00) THEN ~~1030~~ STR(G$,3,3) = HEX(000000) : IF C$ > HEX(000000) THEN STR(G$,3,3) = SUBCHEX (000001) : $G10 SEEK BLOCK : IF STR ——

SHOULD B

1020 M$: "Positioning To Last Block : GOSUB '201 (M$) : STR(G$,3,3) C$
: IF C$ > HEX(000000) THEN STR(G$, 3, 3) : SUBCHEX(000001)
: IF C$ < HEX(000000) THEN STR(G$, 3, 3) = HEX(000000)
: $G10 SEEK BLOCK

OR IF C$ < HEX(002C00) THEN STR(G$,3,3) = HEX(000000)

DS-TS150

PREVIEW
There seems to be little info available for this new CS/DS 150MB tapedrive.
The ATC Microsystems group in the Netherlands has tested this drive and want to give you 2200/CS technicians in Europe relevant information.
There is for as far as we know no MP or technical update available yet.

HIGHLIGHTS DS-TS150
* 150 MByte
* 3 1/2" drive in 5 1/4" unit
* Performance is equal to the DS-TS (45 MByte streamer)
* Drive can read 45 MB tapes but can not write to it
* Can fit in a slot of the DS, CS-D and CS386-D
* Needs a 379-8500-R3 Prom in DPU interface (FCO 1375 for DS and FCO 1376 for CS-D and CS386-D)
* Needs to work with Extra Density Cassette Tapes (725-7548)
* Demands min. OS Basic II release 3.0 for CS units and min. OS Basic/2 release 1.0 for CS386 units.
* Demands min. DS Utilities release 2.0.
  Also change line 1010 in the tapebackup utility (@DSTAPEB) from
  CONVERT VAL (C$,3) TO C5$,(#####) into
  CONVERT VAL (C$,3) TO C5$,(######)

PARTNUMBERS

Logistics:

Tape Drive Unit	725-4893
50 Pins cable	220-3628
FCO 1375 (R3 prom DS)	728-0386
FCO 1376 (R3 prom CSxxx-D)	728-0387

Supplies:

Extra Density Cassettes 600'	725-7548

REMARKS
1. Diverend from the old DS-TS, you can reverse the tape cassette in the new 150 MB drive, there is no mechanical stop.
   The backup/recovery tools register a wrong placed tape cassette after the rewind instruction with the message "ERROR T10: No Cassette".
   By reversing the tape there is no problem.
2. When the backup utility doesn't back up more than 80 MByte you have to adjust line 1010 in the @DSTAPEB program file (see highlights DS-TS150).
3. The DS Utility Configuration Utility still gives 163840 sectors (same as the DS-TS), it also lists a DS Prom revision level 30. This doesn't influances the utility.
4. In the DS-TS150 upgrade is no R3 Prom and DS Utilities delivered.
   You have to provide theme yourself.
5. FCO 1375 and 1376 have identical Proms, the documentation is diverend (diverend boards, so diverend locations to put the prom in).
6. Use Extra Density Tapes (600') in the 150MB drive and use High Density Tapes (500' or 600') in the 45MB drive.
   You will get unreliable data or strange tape errors when you mix them.
   45MB tapes can be read in a 150MB drive.

Regards

TAPE DRIVE PROBLEM

CROWL LUMBER MELVERN, OHIO EVERY 10TH BACKUP
2ND DRIVE & DS BRD 3RD DRIVE 12.25 DTS FRANK KROESEN

~~GULF WELDING HATTIESBURG, MS HANGS ONCE A WEEK~~
~~OTHER DRIVE 10C 12.3V CE WAYNE ANDERSON~~

BOSTON CAB BOSTON, MA HANG EVERY 2-3 WEEKS
BM DAVE THIBEAULT

ROWE CONTRACTING REVERE ONCE EVERY 3 WEEKS
DTS JOHN FORBES

MOUNT TAPE CASSETTE DS UTIL REV 2 + NEW STUFF 810

```
620 REM %REWIND TAPE:GOSUB '201
```

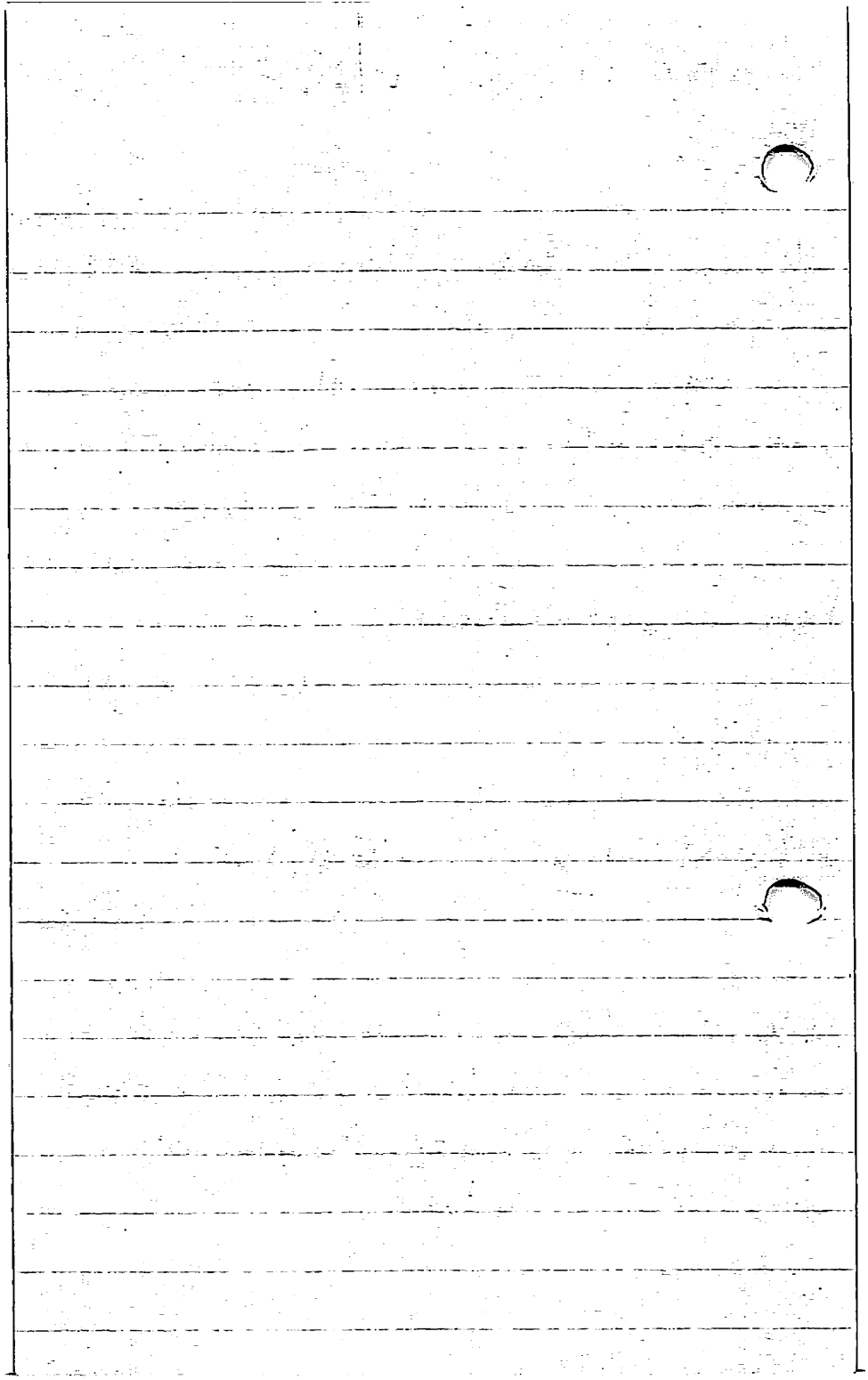
1340

```
1100 REM %BACKUP DONE: Q=Q+1: PRINT
"PASS =";Q: GOTO 620: GOSUB '201 ("BACKUP
COMPLETED"): PRINT HEX(07);: GOTO 1520
```

1.0

630

1090



WANG MODE 17 TRACKS & 1 DIRECTORY TRACK 150 MEG
7 TRACK & 1 DIRECTORY TRACK 45 MEG

REWIND - AUTOMATICALLY SETS TO WANG MODE AS OPPOSED TO INDUSTRY MODE
MUST SET MODE AT LOAD POINT

LOAD PT
RETENTION - GO TO END OF TAPE

WHEN BUFFER FOR TAPE IS FULL, WRITE STARTS
WRITES 512 BYTES AT A TIME (512 BYTES / BLOCK)
IF WRITE TAPE MARK WILL ALSO CAUSE WRITE & CLEAR BUFFER W/OUT BUFFER HAVING TO BE FULL.
WRITES TO DIRECTORY AFTER WRITING ALL SECTORS

To: Mike Bahia MS0126/LOWELL
From: Frank R. Kroesen
Subject: 2200DS/150MB tape drive Date: 03/23/90

Distribution:

Not Requested

Hi Mike,
The change to the 2.0 DS utility program was the fix. Everything now works! Thanks for all help.

---------- Reply ----------
To: Frank R. Kroesen From: Mike Bahia
Subject: 2200DS/150MB tape drive Date Sent: 03/22/90

Frank,
The DS Utility Configuration program shows the size as it would apply to the 45 Meg as the 150 Meg was not known about at the time the utility was written. That has no factor in how many sectors can be backed up. That should just be ignored. We may not be able to distinguish between the 150 & 45 Meg units so the sector value may be removed in future releases.
The 2nd problem with the Backup stopping on line 1010 is referred to in TSB SWT 9225 from 12/26/89, item 14. Adding the extra # inside the parenthesis should resolve that. Check that out & let me know what happens.
Regards,
Mike

---------- Reply ----------
To: Mike Bahia From: Frank R. Kroesen
Subject: 2200DS/150MB tape drive Date Sent: 03/21/90

Hi Mike,
The 150 meg streamer now works. We had a bad DPU bd in DS. We are using the correct drive, 600 ft tape, and R3 proms. Now we are having a problem running backup using DS Utilities release 2.0 and 3.3 O.S. The programs will copy 4 platters and die at statement 1010. The C.E. said 1010 is a IF THEN statement. This is 260092 sectors or about 67 meg. Another strange thing is the config screen. The screen has the tape drive size as 163840 sectors or the same size as the 45 meg streamer. Do you have any ideas. Is 2.0 DS Utiliies correct for a 150 meg streamer? Operator error? Thanks.
Frank

---------- Reply ----------
To: Frank R. Kroesen From: Mike Bahia
Subject: 2200DS/150MB tape drive Date Sent: 03/20/90

Frank,
There are no other requirements. We have had a problem w/ Redshaw. They may have been sent the wrong tape drive. The correct p/n is 725-4893. Also m

---------- Reply ----------
To: Mike Bahia From: Frank R. Kroesen
Subject: 2200DS/150MB tape drive Date Sent: 03/20/90

Hi Mike ,
What release O.S. do I need to support the 725-4893 150 streamer on the 2200DS ? I am aware of FCO 1375 or R3 proms. One of the C.E.'s can't get this new drive to work. If your aware of any other requirements please let me know. Thanks.

WANG LABORATORIES, INC.
ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 617/459-5000, TWX 710-343-6769, TELEX 172108

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 8188 REPLACES: _____ DATE: 10/11/88 PAGE 1 OF 1

MATRIX ID. 3107 PRODUCT/RELEASE# TEAC Streaming Cassette Tape Drive

TITLE: Replacement of "H" Interim Drives

PURPOSE:
To inform the field when to replace the TEAC "H" Interim Cassette Tape Drive (WPN 725-1481).

EXPLANATION:
The TEAC Cassette Streaming Cassette Tape Drive (WPN 725-1481) is used to backup the winchester disks in the 2200 Data Storage Cabinet. This unit currently has three types of motor driver boards approved by R&D. The first has a board with an "H" CPU chip with additional components and jumpers which will be called the "H" Interim. The TEAC part number of the motor driver board is 15532074-10B. The second and third both have the board part number of 15532074-10C. These have either a white "K" label on the CPU chip or an "XXD" stamped on the CPU chip, but are functionally the same.

A fully functional unit, even though it is an "H" Interim, SHOULD NOT be changed out for the sole reason of being an "H" Interim. It should only be changed if it has a failure. If a unit is received through Logistics, it should be installed in the DS to see if it corrects the original fault encountered. The only unit to be returned without installing would be an "H" unmodified drive (board part number 15532074-00K or 15532074-10A). A Logistics Purge #880013 was issued to remove these, and only these from stock. The only units which were approved by R&D have a suffix of -10B or -10C.

GROUP: Desktop Systems/Peripheral Group MAIL STOP: 001-140

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 8089 REPLACES: _____ DATE: 06/14/88 PAGE 1 OF 1

MATRIX ID. 3107 PRODUCT/RELEASE# TEAC Streaming Cassette Tape Drive

TITLE: Announcement of "K" Rev CPU Chip

PURPOSE:

To inform the field that TEAC Cassette units (Wang part number 725-1481) with the "K" Rev. CPU chip are now available from stock. This chip corrects the hang problem during BACKUP with the 2200DS Cabinet.

EXPLANATION:

Logistics is now receiving units from TEAC with the new "K" revision CPU chip installed. To verify that you have a unit with the "K" revision chip, you can check the suffix of the TEAC part number on the bottom board (one with CPU chip installed), which should be -10C. The external blue jumpers and components found on updated drives with the "H" revision chip WILL NOT be present on the "K" rev. units. Boards with a suffix of -10B have the "H" revision chip with the Interim fix, and ones with -10A are the original unmodified drives. Another way to verify it is by removing the board and looking at the chip itself. There will either be a "K" stamped on the chip or a "D" following the ROM number.

If at any time the potentiometers on the original unit were adjusted to make it work (not hang), then the customer's backup tapes will have to be verified on the new unit to ensure compatibility. If incompatibility exists, then the customer's data will have to be restored onto disk and backed up to the new unit.

The unit can be ordered through normal Logistics channels by using the same Wang Part Number (725-1481).

GROUP: Peripherals Support MAIL STOP: 001-140

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 8056 REPLACES: _____ DATE: 04/19/88 PAGE 1 OF 2

MATRIX ID. 3107 PRODUCT/RELEASE# 2200DS Data Storage Cabinet

TITLE: Tape Backup Problems

PURPOSE:

To inform the field of Purge #880013, and a fix for hangs during Tape Backup using the TEAC Cassette Tape Drive within the 2200DS.

EXPLANATION:

Recently, a modification to the TEAC Cassette Tape Drive #MT-2ST (WPN 725-1481), used in the 2200DS Data Storage Cabinet, was certified by R&D. This modification will bring the revision of the CPU chip from "H" to "K" (located at U14 on the DC PCBA board), and corrects the problem of hangs during tape backup. Until this drive is available from the vendor (which should be mid-May, 1988), there will be a drive available with what is termed an "Interim" change. This unit has the "H" Rev. CPU chip, but has been modified with additional wiring and components to simulate the changes incorporated in the Rev. "K" chip.

A Logistics purge (#880013) was performed which stated that any drive with a CPU chip Rev. "H" should be returned to H.O. for rework (the serial number range for drives with the Rev. "H" chip is 697901-730040). It also states that the new CPU chip will be Revision "J". There will not be a "J" Rev. chip in the drive, as the Rev. "K" design proved to be superior during evaluation. The following describes how to determine which drive you have:

Problem Drive:	Rev. "H" - No label/sticker on CPU Chip, no added wiring or components on solder side of DC-PCBA board (cartridge side of unit). (Serial #'s 697901-730040)
Interim Drive:	Rev. "H" w/additional wiring and components (3 jumpers, 1 cap., 2 resistors and 1 diode) on solder side of the DC PCBA board. (Serial #'s 697901-730040)
Rev. "K":	Rev. "K" CPU chip. It will have a Label/Sticker on the CPU Chip to designate it as the Rev. "K". The additional wiring and components referenced above will not be present on the solder side of the DC PCBA board. This drive is due sometime in mid-May.

GROUP: Peripheral Support MAIL STOP: 001-140

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TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 8056 REPLACES: _____ DATE: 04/19/88 PAGE 2 OF 2

MATRIX ID. 3107 PRODUCT/RELEASE# 2200DS Data Storage Cabinet

TITLE: Tape Backup Problems

EXPLANATION (cont'):

If you are experiencing the problem of hangs while performing the Tape Backup, there are a few workarounds that can be used to substantially reduce the failures until a modified drive can be obtained.

NOTE***:

Under no circumstances should the drive have any alignments performed on it. If the drive hangs or malfunctions in any way, it should be replaced as a whole unit. Any alignments performed could cause potential compatibility problems and possible loss of customer data.

The following are the workarounds that can be done as an interim solution until the replacement drive is received and installed:

(1) Isolate the DC power to the tape drive. There are three DC power cables within the cabinet. Make sure the tape drive is on a separate power cable from the fan and floppy drive.
(2) Isolate the DC power cables from the data cables (make sure they are not intertwined).
(3) Adjust the +12 volts in the DS cabinet to +12.25/+12.35 volts. (This is on the higher end of the spec., but still within it).
(4) As a last resort, if the above items fail to eliminate the symptom, remove the screws holding the rear panel to the chassis, and move the panel back 1" (the I/O connector and power supply should still be connected to the panel). Insure that excessive pressure is not applied to the connector by the weight of the back panel by making sure the panel is straight and not at an angle. Electrical noise generated within the cabinet significantly increases the occurrence of hangs, and by moving this panel back, the noise in the cabinet is reduced.

Once a modified drive is received, this cover should be restored to its original position so the drive can be tested in the cabinet in its original configuration.

GROUP: Peripheral Support MAIL STOP: 001-140

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TECHNICAL SERVICE BULLETIN

SECTION: HardWare Technical

NUMBER: HWT 7140 REPLACES: _____ DATE: 06/30/87 PAGE 1 OF 1

MATRIX ID. 4201 PRODUCT/RELEASE# 2200DS Cabinet

TITLE: 2200DS DPU Board PROM Rev to operate Streaming Cartridge Tape Drive

PURPOSE:

To inform the field of PROM revision necessary to operate the Streaming Cartridge Tape option in the 2200DS Cabinet.

EXPLANATION:

Early shipments of the 2200DS Cabinet were made with Rev 00 PROM installed in the DPU Board. This Rev will not allow operation of the Streaming Cartridge Tape Drive.

CORRECTIVE ACTION:

If installing a Streaming Cartridge Tape Drive option on a 2200DS Cabinet, check the Rev of the PROM on the DPU Board. This can be done by running "config" off the utility diskette or by visually checking the markings on the PROM chip at location L135 on the DPU Board. The PROM should be Rev 01 in order to operate the Tape Drive on this subsystem.

If necessary, the PROM can be ordered via WPN 379-8500 Rev 01.

GROUP: Desktop Systems/Peripherals Group MAIL STOP: 001-140

PAGE 1 W/A仕様 MT-25T/45DW 対策必要なものの本体機番リスト.

LST_NAME=HITOM168
UPDATE 02/05/88

H Rev Chip Drives

*** 8709 カラ 8801 TCA ヘンコウ ジッセキ ****

ケイサンコウYM	インレキNO	スウリョウ
8709/17	IP87-1145	200
8710/13	IP87-1279	300
/20	IP87-1322	80
8711/19	IP87-1480	20
/20	IP87-1489	100
/27	IP87-1517	330
8712/11	IP87-1581	50
/17	IP87-1607	300
/21	IP87-1642	200
8801/21	IP88-0087	310
/26	IP88-0111	350
TOTAL		2,240

NO. 697901～698100
702051～702230, 702251～702370
702231～240, 702371～430
702401～50
713101～200
713201～530
713531～580
723551～850
713581～590. 713591～600, 723851～4030
724031～724050, 729401～729690
729691～730040
} TCA (?)

SER # IS ON SIDE OF DRIVE UNDER SLIDE BRACKET. SAME SIDE AS EJECT BUTTON.

PCBA DC BRD - U14 IS CHIP IN QUESTION

IF BRD IS STAMPED -10A IT HAS NOT BEEN ECO'D, -10B HAS BEEN ECO'D

課長 63.2.-5 竹本

TEAC (DS)

The following information is provided in addition to TSB HWT8056 "Tape Backup Problems".

The TEAC Streaming Cassette Tape Drive used in the 2200DS Cabinet is now being shipped with an interim fix. This fix uses the existing "H" Rev CPU chip along with component and wiring changes to bring the timing closer to specification. Originally, the drives we received into stock had been modified in TEAC's California facility. These drives had the components and jumper wires attached to the solder side of the board. The drives we are receiving now have been modified in Japan, and have the components and jumpers attached to the component side of the board(with the exception of one blue jumper wire). In either case, if the vendor board number is 15532074-10B, then this drive has been modified with the interim fix. The unmodified board has a suffix of -10A. It has not determined whether the "K" Rev CPU chip will cause the suffix to go to -10C at this time. When this is determined, I will inform you via WangOffice.

Best Regards,
Lew Mayhugh
Product Line Engineer
DeskTop Systems/Peripheral Support Group

WANG LABORATORIES, INC.
ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL: 617/459-5000, TWX 710-343-6769, TELEX 94-7421

TO: Ed Kalil

FROM: R. L. Beaudette

DATE: February 29, 1988

SUBJECT TEAC ECO-#WANG-10 APPROVAL (WANG P/N 725-1481)

This memo is to confirm the approval of ECO-Wang-10 (Phase "A" only) for Teac tape drive Model MT-2ST/45D-64 (P/N 19305060-64) "interim fix"

The purpose of the change is to eliminate a stall condition in the drive control circuitry of the CPU.

TEAC has recommended a two phase change.

a. Modify existing printed circuit boards to delay the ramp timing in the drive.
b. Modify the CPU timing from 280 ms. to 230 ms. as a final fix on new product.

Twenty drives were tested with the interim change on Wang P.C.'s and Wang 2200 systems without any drive failures. therefore, I recommend that the fifty field service devices with the interim modifications be tested in Pawtucket Boulevard and shipped to stock. The additional devices in Teac, California should be brought in the same way to fulfill this quarters requirements in time for incoming testing at P.B.

"ALL" current stock of drives be purged and returned to Teac for modification.

Teac will be asked to provide twenty additional drives with the final CPU modification for engineering test and approval in order to provide continuity after all existing stock has been modified.

cc:

Wang	Customer Service	Teac
W. Braun	L. Mayheux	P. Chedekal
L. Cornaro	K. Thompson	K. Ishujima
G. Carrier		S. Kakimotto
R. Kirk		
P. Manzer		
T. Masoud		
A. Matysczak		
S. Michaelides		
J. Mower		
C. Nevin		
M. Riley		
G. Rossi		
S. Tagen		

Total Interim Fix Install
10 < 20 - R+D
< 50 - Spares
200 - Quarter NP.
270.

RLB:bjg/51-2

D405402R

Long 10 mg R

SEND WEDNESDAY 09/16/87 08:48 AM

TO:
SUBJECT: DS UNIT (TAPE UTILITY)

TO: MIKE BAHIA FROM: GARY LOPER
SUBJECT: DS UNIT (TAPE UTILITY) DATE SENT: 09/09/87

MIKE, JUST FOR YOUR INFOMATION, ALL THE DS UNITS WITH TAPE UNITS ARE BEING RECEIVED WITHOUT THE UTILITIES. ALSO, IS THE 3.0 O.S. FINALLY RELEASED??

GARY LOPER

--- REPLY ---

GARY,

THE TAPE UTILITIES SHOULD BE SHIPPED OUT WITH THOSE UNITS PURCHASED WITH A TAPE UNIT. O/S 3.0 STARTED SHIPPING NO LATER THAN JULY AND SHOULD BE AVAILABLE FROM WHATEVER SOURCES NORMALLY WOULD HAVE IT.

MIKE BAHIA

W A N G L A B O R A T O R I E S I N C .

PROBLEM TRACKING AND REPORTING
CUSTOMER COMPLETE DETAIL REPORT
H E A D E R I N F O
CUSTOMER PROBLEM NUMBER C900005037

PROBLEM NUMBER:	C900005037	CUST NAME:	HUTCHISON PAGING LTD
PRIORITY	P2	CUST NUMBER:	HH 00000001370
PROBLEM TYPE:	INFW	CUST CONTACT:	VICTOR LAU
LINK TO PROB NO:	NOT LINKED	CUST CONT PHONE:	88-047-26 -
		CUST ADDRESS 1:	
		CUST ADDRESS 2:	
SYSTEM MODEL NO:	CS/386-10N	CUST ADDRESS 3:	
GEN SYST MODEL:	2200 CS 386 CPU	CUST CITY:	
O. S. VERSION:	01 1C	CUST ST/PROV:	
HW MODEL NUMBER:	DS-TS150	CUST ZIP:	- CUST RDB: H9906
SW MODEL NUMBER:	DS	CUST COUNTRY:	
SW VERSION:	02 00		
		RDB ASSIGNED:	8760
		PERSON ASSIGNED:	BAHIA MICHAEL E
PART NUMBER:		ORIG NAME:	LAU VICTOR
PART NUM REV:		ORIG EMPL NO:	HH-99123
SERIAL NUMBER:		ORIG PHONE:	- - -
		ORIG RDB:	H9906
CALL TRKG DATE:	00/00/00 00:00	NETWORKED:	N
CALL TRKG NO:		RES DEPLOYED:	
ORG ACT/SYM/ACN:		DATE ENTER PTR:	04/23/91
STATUS DATE:	07/05/91	DATE TO R&D:	019910510
STATUS CODE:	S 0 318	WKDAYS IN R&D:	67.16
STATUS ABBREV:	INFORMATON	TOT WKDAYS OPEN:	105.07
STATUS DESC:	INFORMATION PROVIDED		

PROBLEM SUMMARY :LAU VICTOR DATE: 04/23/91 TIME: 23:04

PROB: When backup data from hard disk to tape by DS Util, the disk is hogged

1) Is it possible to backup data to tape sector by sector and hog disk ON & OFF instead of in a whole batch and hog disk before complete. (Ignore the file integrity of data inside the tape)
2) If it is unavailable on the DS-Utiltiy, is it feasible to achieve by user programming?

H/W: DS (1.2M floppy + DS-TS150 tape, 112M x2, R3 PROM), CS/386-10N
S/W: CS/386 OS 1.1C, DS Utility 2.0
(User application is 24 hr non-stop, can't do the offline backup.)

RESOLUTION TEXT :BAHIA MICHAEL E DATE: 07/05/91 TIME: 09:57

SC318. The hogging of the entire DS cabinet and the number of sectors transferred are factors set by the DS Utility Program. The program can be changed by the customer or a programmer if wanted. Wang however will not customize the program for 1 user or support any changes. Those making the changes take full responsibility for those changes.

ASSIGNED: CHUI SIMON DATE: 09/17/91 TIME: 22:25
Michael, pls de-escalate the call as field agreed to close it on 8/13.Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 09/06/91 TIME: 15:19
Can this call be closed?

ASSIGNED: BAHIA MICHAEL E DATE: 07/31/91 TIME: 08:47
Changes cannot be made.

ASSIGNED: LAU VICTOR DATE: 07/17/91 TIME: 21:10
Can any changes made to DPU PROM or ECO such that the DS is not hogged g
during erase or retension ?

ASSIGNED: BAHIA MICHAEL E DATE: 07/11/91 TIME: 17:04
Talked to our software people. During Erase & Retention the DS cabinet is hogged automatically without choice. This cannot be changed. This is controlled by the DPU Brd.

ASSIGNED: LAU VICTOR DATE: 07/10/91 TIME: 02:16
Testing with OS 1.1t and new DS utility, after delete the $OPEN command of statement line 800 of the program @DSTAPEB, other partition can access the disk during tape backup.
However during the erasing operation in backup with erase option, or during the retention operation in backup with append option, whole DS was hogged for 3 minutes. Other operation such as position to tape directory took 40 second . This can not be tolerated for user's on-line information enquiry.
Is there any modification that can be made to the BACKUP program such that the DS will not be hogged during the erasing, retention and position operatio n during tape backup?

ASSIGNED: BAHIA MICHAEL E DATE: 07/05/91 TIME: 10:01
Information requested provided. Sending call back to field as requested.

ASSIGNED: CHUI SIMON DATE: 07/04/91 TIME: 04:59
Michael, Pls de-escalate the call back to us and we will monitor in our level
Will keep in touch if there is any query after verification.
Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 07/01/91 TIME: 13:26
Do not understand update. Original questioned concerned unhogging the DS during DS Utility Backup. This can be changed by the customers programmer if wanted. Wang does not modify these utilities for customers. It supplies the DS Utilities as easy way to get backups done. If user wants to change Backup that is fine, but this is not a problem and we should not have to keep a call open.

ASSIGNED: LAU VICTOR DATE: 06/30/91 TIME: 21:54
No 150M tape drive in office, have to test on user' site. Will test later after user come back from trip.

ASSIGNED: BAHIA MICHAEL E DATE: 06/26/91 TIME: 11:24
Please update this call. Is there any reason this call cannot be closed?

ASSIGNED: BAHIA MICHAEL E DATE: 06/19/91 TIME: 09:45
Please respond. Can we close this call?

ASSIGNED: BAHIA MICHAEL E DATE: 06/12/91 TIME: 16:04
Can we close this call?

ASSIGNED: BAHIA MICHAEL E DATE: 05/30/91 TIME: 13:03
Do you have any other questions on this? Can we close this call?

ASSIGNED: BAHIA MICHAEL E DATE: 05/17/91 TIME: 13:13
The read disk & write tape is done with 1 command on line 1130 with a GIO for internal backup moving 256 sectors at a time. It is advised not to change this as we don't know what affect the change would have. External backup does 2 sectors at a time. When less than 256 sectors remain again the remain is read 2 sectors at a time. This should answer your question.

ASSIGNED: BAHIA MICHAEL E DATE: 05/17/91 TIME: 11:04
When the Backup is done data is moved from the disk to the tape buffer. When the buffer is full, tape is written to. Believe the 45 Meg Tape Drive has a buffer that is 256 sectors long. Not sure on the buffer size on the 150 Meg. Would imagine a programmer could change the block transfer size to the buffer without much difficulty. It would not be easy to change when to write to ta pe or to write less than a full buffer. If that was done the read program ma y also need to be changed. Have you tested the backup program with the HOG off as I don't believe the 150 Meg has a buffer bigger than 500 sectors.

ASSIGNED: LAU VICTOR DATE: 05/15/91 TIME: 03:46
From CS-D user guide p 9-7, the DS utility 2.0 can backup disk data by r sector range, but it seemed that the sector range is supposed to be whole disk platter or at least a large portion of the disk platter. As to the user requirement, the user situation can't afford to backup data more than 500 sectors at one time, as this may cause the operators's screen appeared to freeze during normal operation. Is there any practical method to implement the user's intention as stated in 13/5 update and any recommendation about the enqueries in the update.

ASSIGNED: BAHIA MICHAEL E DATE: 05/14/91 TIME: 16:24
The DS Utility Disk, version 2.0, can be easily changed so that it will not hog the entire cabinet. Wang does not support any changes & the customer or

ASSIGNED: BAHIA MICHAEL E DATE: 05/14/91 TIME: 10:24
software vendor must be responsible for these changes. The program "@DSTAPEB " is the Backup program. If this program is listed there are comments to explain how to make this change, unhog the cabinet, and others. To simply unhog the DS, the $OPEN command on line 800 should be removed. This would allow writing to all addresses in the DS including the surface being restored during backup. From the main menu however a surface can be write protected by using the 'Protest/Unprotect DS Surfaces' menu pick. A 'hard' or 'soft' protect can be done to any disk address within the DS Cabinet. A hard protec t will require the DS to be powered off to clear, while a soft protect can be cleared by rerunning the utility. Again any change made to the utility shoul d be made by the customer or the VAR. If the surface being backed up is soft protected you would obviously be unable to write to it. Does this answer your questions?

ASSIGNED: LAU VICTOR DATE: 05/13/91 TIME: 04:33
(contunue)
a) Will it be limited by the hardware limitation (eg tape buffer, streaming tape operation mechanism, tape retention for every write operation etc)
b) If it is possible, is every 100 sectors counted as a data block or every 100 sectors counted as a data set (ie file mark for every 100 sectors) & located by the directory entry? Should the user's application skip on file mark or skip on data block?
c) Any other information about the DS tape besides the CS-D User Guide Chapter 10?

ASSIGNED: LAU VICTOR DATE: 05/13/91 TIME: 04:14
Hogging platter only during backup is helpful.
The user intention is use the tape as the secondary backup besides the image disk. The user want to use the tape like a disk, ie.
1) Hog a particular platter
2) Backup say 100 consecutive sectors from disk to tape
3) Dehog the disk for a while for other partition disk access
4) Reprocess step 1 to 3 again for next 100 consecutive sectors until end of platter.

In case of restore
5) Hog a particular platter
6) Skip number of block to search for a particular data file.
7) Restore say 100 consecutive sector from tape to disk
8) Dehog the disk for a while for other partition disk access
9) Reprocess step 5 to 8 again for next 100 consecutive sectors until end of file (not disk platter).

No machine for testing and not sure of the tape backup operation, (continue)

ASSIGNED: BAHIA MICHAEL E DATE: 05/10/91 TIME: 18:48
Yes the currently utility intentionally hogs the entire device. The DS utili

ASSIGNED: BAHIA MICHAEL E DATE: 05/10/91 TIME: 18:48
ty I am sure can be modified to change that. I would assume you would want t o hog the disk surface being backed up. Is this correct? Assuming the surfa ce to be backed up will be hogged, do you want me to find out what changes wo uld need to be made to the backup utility to allow shared access to the DS during the backup procedure?

ASSIGNED: CHUI SIMON DATE: 04/25/91 TIME: 00:35
Initial escalate to R&D for advice.

ASSIGNED: CHUI SIMON DATE: 04/24/91 TIME: 20:42
To HKCSO:Call ack'd.

ASSIGNED: YEUNG ADA DATE: 04/24/91 TIME: 02:11
To: CSO/HK, PTR is accepted in ASC at Apr 24, 91.

ASSIGNED: LAU VICTOR DATE: 04/23/91 TIME: 23:04
Solid

TAC

Information Call

Control Number 08320003

Contact Name FRANK KROESEN Position CE
Rdb # 3310 Tdx # Phone # 216 642 2839 Ext #

System Type 2200 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 CROWL LUMBER Phone #
Address 3M19 City MALVERN State OH
On Site Contact Name

Question (*) / Answer (+)

*EMP#2705
*DSP#N/A
*NEED INFO. ON THE TEACE TAPE DRIVE AWARE OF HWT 8087
11/15/88: GETTING INTERMITTENT HANGS, T27, OR T14. HAPPENS ONCE EVERY 7-10 BACKUPS. HAS CABLES ISOLATED & 12V SET TO 12.25. THE TAPE DRIVE HAS BEEN REPLACED & THE DS BRD WAS CHANGED YESTERDAY. IF STILL FAILING MOST LIKELY TAPES. EXPLAINED HOW TO CHANGED BACKUP PROG TO CONTINUALLY LOOP ON BACKUP. WILL LOOK INTO GETTING NEW 3 PC MAXELL TAPES. (15MIN) MIKEB
>GOT TAPES FROM LM. WILL TEST 1 TAPE OVERNITE & IF RUNS SUCCESSFULLY WILL SEND OUT FOR TESTING AT THIS SITE. INFORMED DTS OF STATUS. (15MIN) MIKEB
11/30/88: TESTED TAPES IN SHOP. CUST TAPE WOULD NEVER RUN MORE THAN 2 HRS. W/ NEW TAPE RAN TESTS FOR 8 HRS & 20 HRS. WILL NOW TEST ON SITE. (5MIN) MIKEB
12/8/88: NEW TAPE WORKS GREAT. WANTS TO KNOW WHEN WILL BE AVAILABLE & IF WANG WILL EXCHANGE OLD TAPES FOR NEW. LM OUT OF TOWN TIL MON. WILL TALK TO HIM WHEN GETS BACK. (10MIN) MIKEB
+TAPES NOW AVAILABLE THRU WANGDIRECT. NEED TO TALK W/ CHAS
+COOPERDRIVER & EXPLAIN THAT HAVE PROB W/ OLD TAPES. DTS
+WILL INFORM BM. CLOSE CALL.
1/16/89 (10MIN) MIKEB

TAC

Problem Call

Control Number A8145000

Contact Name PETER LIEFTING Position
Rdb # 9911 Tdx # 649 Phone # 796 372 1111 Ext #

System Type 2200DS Device Type DPU
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 EGLEY Phone #
Address J City WELLINGTON State AA
On Site Contact Name *2200 JP2

Problem (*) Solution (+)

*WITH USING STANDARD DC POWER SUPPLY WITH MODIFIED HARNESS.
#10/13/88: DOWNGRADE CALL TO "PROBLEM" TYPE.
@11/23/88:IN REGARD TO THE AIRFLOW CONCERNS THAT YOU HAVE
@ WITH THE DS CABINET. R&D, THE PERIPHERALS GROUP, &
@ TSO UNDER HENRY SCHINNAGEL ARE ALL IN AGREEMENT,
@ THIS IS A DEAD ISSUE. R&D HAS LOOKED AT YOUR CON-
@ CERNS & DOES NOT CONSIDER IT A PROBLEM. AS LONG AS
@ YOU HAVE THE CORRECT FANS (400-1046 FOR THE CABI-
@ NET & 400-1049 IN THE PS) THE UNIT SHOULD BE
@ FUNCTIONING AS DESIGNED. THE AIRFLOW COMING THRU
@ THE TAPE DRIVE & FLOPPY IS NOT A PROBLEM. AS THE
@ 3 PC TAPES WHICH HAVE BEEN TESTED OUT BOTH HERE &
@ BY YOURSELF SEEMED TO HAVE CLEARED ANY REMAINING
@ PROBLEMS, YOUR AIRFLOW CONCERNS BECOME MORE OF A
@ MOOT POINT. IF YOU STILL FEEL IT IMPORTANT, A DRC,
@ DESIGN REQUEST CHANGE, FORM SHOULD BE FILLED OUT &
@ SUBMITTED. A DRC CAN ONLY BE SUBMITTED BY THE
@ FIELD. MIKEB

A8145002

10/4/88 "BY USING "K" REV DRIVE

TAC

Problem Call

Control Number A8138001

Contact Name PETER LIEFTING Position
Rdb # 9918 Tdx # 649 Phone # 796 372 1111 Ext #

System Type 2200 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 ALL SITES Phone #
Address 3M07 City AUCKLAND State
On Site Contact Name

Problem (*) Solution (+)

*AIRFLOW IN 2200 DS CABINET IS WRONG. THE UPPER FAN IS SO
*STRONG THAT A VENTURI EFFECT IS CREATED AT THE BOTTOM FRONT
*AIR INLET NEAR THE POWER SUPPLY AIR INLET, CAUSING THE
*POWER SUPPLY AIRFLOW TO GO IN THE OPPOSITE DIRECTION TO
*ITS FAN ROTATION. THE OTHER PROBLEM IS THAT AIR IS SUCKED
*THROUGH THE TEAC TAPE SLOT, CAUSING DUST AND DIRT BUILDUP
*ON THE TAPE HEADS AND SPOOL DRIVER MECHANISM.
*FREQUENCY/IMPACT: WHENEVER UPPER FAN IS RUNNNING.
*PRELIMINARY DIAGNOSIS: UPPER CABINET FAN IS TO HIGH A
*RATING AND/OR EXTRA BAFFLES NEED TO BE INCORPORATED IN
&CABINET AND/OR FRONT COVER AIR INLET BAFFLES NEED TO BEND
&DOWN, NOT UP.
&HARDWARE ENVIRONMENT: 2200 DS CABINET
&SOFTWARE VERSIONS: NOT APPLICABLE
&DIAGNOSTIC INFO: NOT APPLICABLE
&PROBE REFERENCES: NONE FOUND
&ANALYST NAME: PETER LIEFTING - NEW ZEALAND (17/5/88)
&5/17/88: PETER HANG IN THERE I PRINTED OUT THIS CALL AND
& WILL INVESTIGATE. WHAT IS THE UPPER FAN SIZE
& THAT IS BEING USED IN YOUR DS UNITS? JOE S
&! UPDATE QUEUED TO FIELD OFFICE
&!CALL SUCCESSFULLY SENT TO FIELD SYSTEM
$19MAY88 JOE, TOP FAN IS 0.22 AMP, BOTTOM (POWER SUPPLY)
$ FAN IS 0.14 AMP. THEY ARE BOTH 12V DC FANS OF
$ SAME PHYSICAL SIZE FROM SAME MANUFACTURER.
$ (PETER LIEFTING)
&5/19/88: SENDING COPY OF CALL TO R & D . JOE
& CLOSING CALL AS INFORMATION WILL BE PASSED ALONG.
$06/01/88:JOE, ITS NICE OF YOU TO PASS THE INFO ON, BUT
$PLEASE DO NOT CLOSE THIS CALL - YOU WILL NEED IT TO TELL ME

```
$WHAT IS GOING TO BE DONE (PETER LIEFTING)
$06/01/88:JOE, ITS NICE OF YOU TO PASS THE INFO ON, BUT
$PLEASE DO NOT CLOSE THIS CALL - YOU WILL NEED IT TO TELL ME
$WHAT IS GOING TO BE DONE (PETER LIEFTING)
$30JUN88  JOE, APPEARS THAT MY 1 JULY UPDATE MAY NOT HAVE
$         MADE IT TO YOU. IT ASKED THAT YOU KEEP CALL OPEN
$         TO LET ME KNOW WHAT WAS TO BE DONE. IS THERE ANY
$         NEWS? (PETER LIEFTING).
&6/30/88: HAVEN'T  GOT UPDATE FROM  R & D YET.  WILL CALL
&         THEM TODAY.                          JOE
&7/20/88:  PETER  ORDER A   DC FAN ASSY #400-1046.
&           THIS FAN SHOULD BE A .55A -LET ME KNOW    JOE
$27JULY88 JOE, ROSS PARKES HERE, AM LOOKING AFTER THIS CALL
$         FOR PETER IN HIS ABSENCE. HAVE CHECKED STOCK AND
$         HAVE 400-1046 (NIDEC) RATED AT .39 AMPS NOT .55.
$         WHAT ARE WE TRYING TO ACHIEVE HERE? DOES R&D
$         RECOMMEND THAT THE POWER SUPPLY FAN BE REPLACED
$         AND IF SO WITH WHAT?  WON'T THE EFFECT OF PUTTING
$         A LARGER FAN ON THE POWER SUPPLY ONLY RESULT IN A
$         GREATER OVERALL CABINET AIRFLOW AND THEREFORE
$         RESULT IN A BIGGER BUILD UP OF DIRT IN THE TAPE
$         DRIVE AREA? PLEASE ADVISE WHAT ACTION YOU WANT ME
$         TO TAKE HERE.  (ROSS PARKES).
$9AUG88   OUR SPARES SYSTEM SHOWS 400-1046 HAS BEEN REPLACED
$         BY 270-3440. WE HAVE SOME IN STOCK AND THEY ARE
$         .39 AMP DC FANS. I DON'T UNDERSTAND YOUR UPDATE.
$         WHAT ARE WE SUPPOSED TO DO WITH THE FAN? THE
$         PROBLEM AS WE SEE IT IS THAT TOO MUCH AIR IS BEING
$         DRAWN THROUGH THE DRIVES, THE TAPE DRIVE
$         PARTICULARLY, DEPOSITING DIRT, BECAUSE THE TOP
$         CABINET FAN IS EITHER TOO LARGE (.22 AMP) OR THE
$         AIR INTAKE IS TOO SMALL. ALSO AIRFLOW THROUGH THE
$         POWER SUPPLY IS REDUCED TO A TRICKLE IN THE WRONG
$         DIRECTION FOR THE SAME REASON. ALL CABINETS HAVE
$         THE SAME PROBLEM SO ANY FIX NEEDS TO BE AN FCO.
$         FITTING A LARGER FAN TO THE POWER SUPPLY WILL
$         PROBABLY FIX THE AIRFLOW PROBLEM THROUGH THE
$         SUPPLY BUT WILL INCREASE THE AIRFLOW THROUGH THE
$         TAPE DRIVE. I AM TAKING OVER THE CALL FOR PETER
$         LIEFTING WHO IS IN THE US.  (NICK ASHMAN)
&8/12/88: LEFT MESSAGE AT R &D WAITING FOR REAR FAN SIZE
&     INFO.  TWO OF OUR DS HAVE .55 FAN ON THE TOP.
&SENT A COPY OF THE CALL TO MIKE R AFTER SOME DISCUSSION
&I'M TOLD THERE ARE NO ISSUES PENDING.               JOE
$5OCT88   THIS ISSUE IS BEING ADDRESSED IN CRITICAL TAC
$          CALL A8145000.  (NICK ASHMAN).
```

MacNeil 76855 Lab #

1 Erase

2 write w/o Erase
30D6$_4$ BLOCKS

3. Rewind.

4. Locate part 4
~~SOD~~ 30D5$_4$

drive hangs

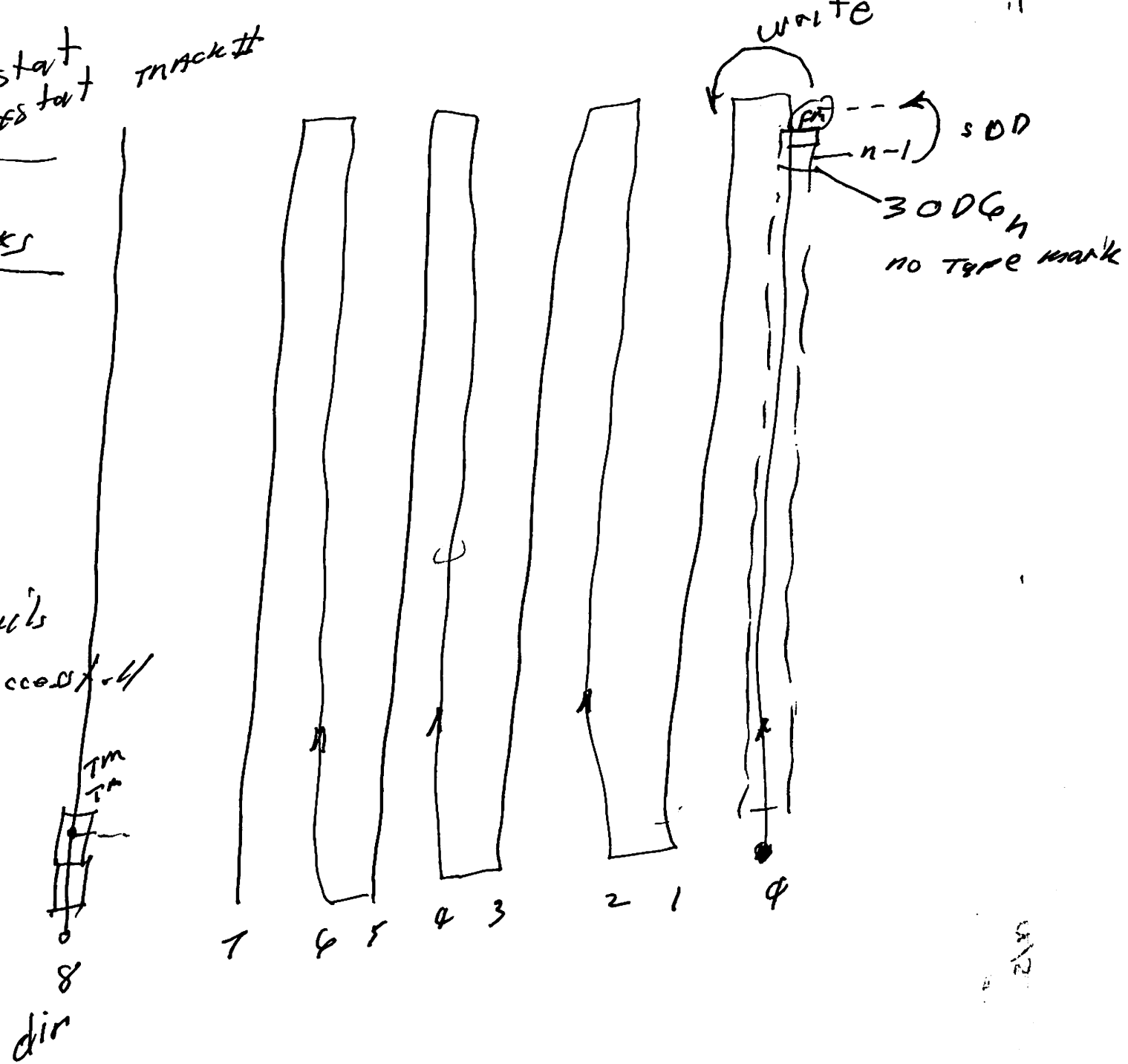
30D4
.. D3

2C04 fails

2BFF successful

2BFF SUCCESSFUL
23039 SECTORS

2C00 FAILS
23040 SECTORS



DRIVE A

S/N
~~Drive~~ 650293 cassette #4

Erase
write w/o erase 3006 BLOCKS xSTAT TRK 4
ERR —
UDR

Rewind
Locate 4, 3004

Drive Hung No Rdy
No Exec.

Drive B S/N 650388 cassette #4
pre-written on drive A

Read status, xstatus
rewind
Locate 4, 3004
hang no rdy
NU Exc

manually unload cassette
read status
xstatus

DRIVE B cassette X

Rewind
Erase
write w/o erase 3000 ft
Rewind
Locate ϕ, 3000 ft
Print

Manually
Remove Cassette
Load Cassette

Read
Status: STA, CNI, WRP,
Extstatus: FBS, BOT (BLOCK 3000)

Rewind
SUCCESS

DRIVE C ~~Cassette~~

S/N 65-4665 cassette #4
pre written on Drive A

Locate 0, 3005 fail

DRIVE ~~B~~ A
S/N 65-0243

Erase tape
write w/o erase 3005, Blocks
Rewind
seek 0, 3000, fail

Drive B Cassette 5

Erase
write w/o erase 3005 Err 1
Rew
Locate 0, 3,000.
Hung ——— fail

manually rel media
~~stat~~ xstat FSB, BOT

Package Subject: Chinon FR506 1.2M Floppy

Item Title: Cover Memo

Linked with Disk Locke, Peripheral Mgr for Disk Drives. It appears the Chinon FR506 drive you received under part # 725-0258-G was a logistical error. This drive should not be distributed under the 725-0258-G part number. Hopefully this was a one time error. This memo is also being forwarded to Logistics so that they may check their stock. Let me please know should this problem reoccur.

Regards,
Mike

---------- Next Memo ----------

Item Title: 725-0258-G

Don,

Could someone check the 725-0258-G stock to insure there are no Chinon drives mixed in. This caused a problem at a site today. Please see the attached memo. If there are any problems or if you have any questions please let me know. Thanks.

Regards,
Mike Bahia
2200 Product Support
x60256/60105

Package Subject: Micropolis 67/64 MB Drive

Item Title: Micropolis 67/64 MB Drive

TO: Lew Mayhugh March 29, 1993

Pertaining to this issue, what were your results with the Micropolis drives you got a while ago? Do you think it would be beneficial to get the drive that Torbjorn has?

Regards,

Tom Masoud

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

To: Thomas John Masoud From: Torbjorn Sagner
Subject: Micropolis 67/64 MB Drive Date Sent: 03/10/93

Hi Thomas, CC Mike Bahia
I now have a fulty 278-4054 drive again, with read problems are you stil intersted in investigate, if so please give me the ful address where to send it.
Regards Torbjorn

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

Kop: Torbjorn Sagner Fran: Thomas John Masoud
Ärende: Micropolis 67/64 MB Drive Avsänt: 93-02-04

Mike: February 4, 1993

Many 278-4054 drives we receive back from the field exhibit the spin up problem. We almost always find it is due to the crash stop problem I previously discussed. Therefore, I do not think we need to evaluate more drives for that problem.

However, the read problems I would like to further investigate. This drive is not known to have a common deficiency with respect to data reliability. If you can obtain some, I would like a small

Package Subject: Micropolis 67/64 MB Drive

number of 278-4054 drives which exhibit the I96 problem.

Regards,

Tom Masoud

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

To: Thomas John Masoud From: Mike Bahia
Subject: Micropolis 67/64 MB Drive Date Sent: 02/04/93

Thanks Tom for the quick and thorough response. I96 is a read error trying to read data from the disk. 90% of the time the problem is the drive as opposed to the interface.

Do the drives with the spin up problem require any special attention or should they just be returned through the normal routine?

Thanks,
Mike

Package Subject: Micropolis 67/64 MB Drive

Item Title: Micropolis Drives

[illegible],

The problem you describe is a "Classic" failure on the 1300 series Micropolis drive. We have been repairing this problem for about 1-1/2 years here in Tewksbury.
I will try my best to describe the problem as I see it, and the fix.
The 1300 series drive has 2 crashstops inside the HDA which keep the headstack from moving too far on I.D. and O.D. of disks. The O.D. stop generally never gets touched by bumper on headstack as it is set a few tracks away from track zero.
The I.D. stop has a second purpose. When the drive is powered off, the headstack moves to the landing zone on the inner diameter of the disks, they rest on the crashstop. Then the head lock solenoid dis-engages, and the lock mechanism closes to hold heads in place. This inner diameter crashstop takes a lot of abuse, and is the cause of the vast majority of spin problems.
When the drive spins up, it waits for max speed, 3600 RPM. Next, the drive tries to find the servo info on cylinder in landing zone. This can be observed by the headstack physically moving toward crashstop on I.D. The crashstop has a rubber pad which is the contact point. By design this pad allows the headstack to move across a few tracks to find the servo info, then the headstack moves to the O.D. to find track zero.
The spin down comes from a couple of root causes. The first is less common, that is when the force of headstack moving to landing zone moves the stop and then servo info can't be found on subsequent spin ups, causing the spin down. The second reason is from the rubber pad actually deteriorating or getting too pliable. The force of the heads once again move off the servo signal, and the [illegible]ve spins down. This stop must be replaced, in opposition to one which just requires re-adjustment.
About 2 years ago, when I first started looking into this common problem and it's solution, I ran it by Tom Masoud and John White. There were several concerns that needed to be addressed. First and formost was opening the HDA. We do own a class 100 clean bench where all research of problem and repair is performed on these drives. This was accepted at that time.
The second concern was that Micropolis never indicated this problem to Wang, and if this was a manufacturing defect, we should be entitled to credit. Micropolis did admit that during a certain time in manufacturing, an improper solvent was used, causing the deterioration of the rubber stop. They also confirmed that there was no out gassing. I believe this means that the HDA will not get contaminated.
I do not have any formal documentation on this info from Micropolis, but we may be able to get something from Tom or Johns' files.
We see app 60 to 70 drives a month with this problem in various stages of the "disease". When we need to replace the stop, we have been buying refurbed ones from Data Exchange or salvaging them from excess scrap 1300 series drives.
Most of the higher capacity drives are from VS installs and are good examples of a case where data could be saved for the customer.
I think we need to stress firmly that this repair can not be done in the field as it requires a class 100 environment, special tools, and experience to

Package Subject: Micropolis 67/64 MB Drive

properly repair this problem.
Please contact me if you require any more assistence with this problem.

Regards;
John Carney EX 87706

cc: Tom Masoud
Steve Maglio

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

To: John J Carney From: Lew Mayhugh
Subject: Micropolis Drives Date Sent: 11/17/92

John,

I have a PTR Escalation call regarding excessive failures on the Micropolis Disk Drives (30, 40, 67, 72 & 145MB's) with motor startup problems. The report is that they start, then stop after about 1 minute. Have you seen this? If so, is there an ECO or fix for this?

Regards,
Lew Mayhugh
Product Support

CC: Tom Masoud

Package Subject: Micropolis 67/64 MB Drive

Item Title: 64MB Micropolis

..rbjorn,

Tom Masoud is the Engineer in the Peripherals Group for this drive. I left him a message this morning but he has not got back to me yet. Will try and reach him tomorrow.

regards, Mike

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

To: Mike Bahia From: Torbjorn Sagner
Subject: 64MB Micropolis Date Sent: 02/03/93

Thanks Mike,
I think it would be a very good idea if some of your disk drive specialists could have a look at a faulty one.
Please give me the address where to send it and to whom?
best reg.
Torbjorn

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

Till Torbjorn Sagner Fran: Mike Bahia
Ärende: 64MB Micropolis Avsänt: 93-02-02

Torbjorn,

Talked with our repair people for this drive and there are no unusual problems with it that they have noticed. If you wanted I could probably get one of our disk drive people to take a look at a couple of your failed drives see if something can be found. Let me know. My manager met with Mike Riley about the Turbo O/S bugs last Thursday I believe. Hopefully something will be worked out shortly. My manager needs to sit down with Mike Runge so that a decision can be made. Will keep you posted.

Best regards,
Mike

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

To: Mike Bahia From: Torbjorn Sagner
Subject: 64MB Micropolis Date Sent: 02/02/93

Hi Mike,

We have lot of DS-cabinets configured with 64mb disk's (WPN 278-4054) and there are two types of problem that occures frekvently in this configurations.

1. I96 after a year or two, normaly can the problem only be resolved by changing the disk. If you just do $FORMAT and a restore of backup very often the I96 is back after a couple of day's. Is it a local problem for sweden or is it the same for the rest of the world? Is there a solution or fix avalible?

Package Subject: Micropolis 67/64 MB Drive

2. An other problem with the 64mb disk is that the disk will NOT start after power down, we have tracked the problem down to be a "Motor spin problem" this problem only occures on 64mb micropolis. Unfortianitly the problem has occured during prventive maintenace, after power down DS the disk never come up again. This problem has happend six or seven times sence a year back. One of the dives could we start after that we had cold it down. I have the manifactoring numbers for three of the faulty drives, if it cold be to any help.

M/N 1325W	M/N 1325W	M/N 1325W
S/N 7091220482	S/N 8022210182	S/N 60240323
P/N 900528-01-9G	P/N 900528-01-9H	P/N 900528-01-9C

Do you have a clue ?

Best regards

Torbjorn

Package Subject: Micropolis 67/64 MB Drive

Item Title: Micropolis 67MB Drive

TO: Mike Bahia February 3, 1993

FROM: Tom Masoud

The spinup problem with this drive is well known to us. The entire Micropolis 1300 model family is inherently prone to it. The cause is deterioration of a rubber crash stop inside the HDA which causes the heads to park offtrack from necessary servo information needed during spin up. I have attached an excellent summary of this problem recently published by John Carney of our drive repair division in Wang Tewksbury. We are currently considering the possibility of replacing every crash stop on field returned drives in the future.

I assume the I96 fault is some type of fatal read or write error reported by the 2200. I would like to have some sample drives which exhibit this problem.

Note that this drive has an ST-506 interface. This means that the data recovery controller is in the host. Consequently, data reliability problems with ST-506 drives can either be caused by a bad drive or a bad contoller board. A marginal controller board could be overly critical of the phase margin of the read data from an ST-506 drive. In this case, replacing and/or reformatting the drive may or may not alleviate the data reliability problem or may alleviate the problem for only a short time.

Regards,

W A N G L A B O R A T O R I E S I N C .

PROBLEM TRACKING AND REPORTING
COMPLETE DETAIL REPORT
H E A D E R I N F O

PROBLEM NUMBER M200016878

PROBLEM NUMBER:	M200016878	CUST NAME:	
PRIORITY	P2	CUST NUMBER:	
PROBLEM TYPE:	ESC	CUST CONTACT:	
LINK TO PROB NO:		CUST CONT PHONE:	- - -
		CUST ADDRESS 1:	
		CUST ADDRESS 2:	
SYSTEM MODEL NO:	CS-386	CUST ADDRESS 3:	
GEN SYST MODEL:	2200 CS 386 CPU	CUST CITY:	
O. S. VERSION:	01 1B	CUST ST/PROV:	
HW MODEL NUMBER:	CS-386/DS	CUST ZIP:	- CUST RDB:
SW MODEL NUMBER:	OS	CUST COUNTRY:	
SW VERSION:	01 1B		
		RDB ASSIGNED:	8760
		PERSON ASSIGNED:	BAHIA MICHAEL E
ALL INFO. AVAILABLE:	Y	ORIG NAME:	BAHIA MICHAEL E
		ORIG EMPL NO:	00-04238
SERIAL NUMBER:		ORIG PHONE:	- - -
		ORIG RDB:	8760
CALL TRKG DATE:	00/00/00 00:00	DATE ENTER PTR:	01/08/91
L TRKG NO:		RES DEPLOYED:	
STATUS DATE:	02/12/93	DATE TO R&D:	01/08/91
STATUS CODE:	S C 595	WKDAYS IN R&D:	155.00
STATUS ABBREV:	PERM FIX	TOT WKDAYS OPEN:	766.00
STATUS DESC:	PERMANENT FIX - GENERAL RELEASE		

PROBLEM STATEMENT :BAHIA MICHAEL E DATE: 01/08/91 TIME: 17:28
When SELECT H is used to hog a surface from CPU A, not only is that surface inaccessable to CPU B which is normal, but a related slave address is also hogged. For example, if CPU A hogs address D11 which is MUX'd to CPU B, CPU B cannot access D11 or D51. All other addressses are accessible. Other terminals on CPU A can access D61. Only other CPus are affected.

PROBLEM NO: M200016878
STATUS CODE: S C 595 STATUS ABBR: PERM FIX DATE ENTERED: 04/17/91

ORIGINAL	MODEL NUMBER	GENERIC MODEL		VERSION
SYSTEM :	CS-386	2200 CS 386 CPU	O.S:	01 1B
HARDWARE:	CS-386	2200 CS 386 CPU		
SOFTWARE:	OS	WANG VS OS SYST	SWR:	01 1B

		VERSION
	O.S:	01 1B
	SWR:	01 1B

RESOLUTION TEXT :RILEY J MICHAEL DATE: 04/17/91 TIME: 15:45
This will be fixed in Rev. 1.2 of the CS386 O.S. JMR
PROBLEM NO: M200016878
STATUS CODE: S C 595 STATUS ABBR: PERM FIX DATE ENTERED: 02/12/93

ORIGINAL	MODEL NUMBER	GENERIC MODEL		VERSION
SYSTEM :	CS-386	2200 CS 386 CPU	O.S:	01 1B
HARDWARE:	CS-386	2200 CS 386 CPU		
SOFTWARE:	OS	WANG VS OS SYST	SWR:	01 1B

		VERSION
	O.S:	
	SWR:	

RESOLUTION TEXT :BAHIA MICHAEL E DATE: 02/12/93 TIME: 09:45
SC595. ECO 60975 was signed off 2/4/93 which will result in all new DS & CS-D units starting 4/19 to be built with the R4 prom which corrects this problem. The prom I believe is part # 379-8500-R4. It can be obtained by ordering either a 210-8826B for the DS or a 212-7113-1 for the CS-D. The R4 prom requires the use of the DS Configuration program to configure the winchester addresses. See TSB HWT 9764 for additional information. The R3 prom will still be availabe with the the 210-8826A for the DS and 212-7113 for the CS-D due to compatibility issues between the 2 prom types.

P R O B L E M D E T A I L

PROBLEM NUMBER M200016878

ASSIGNED: BAHIA MICHAEL E DATE: 01/12/93 TIME: 10:42
ECO 60729 originally written to release the R4 prom has been obsoleted and replaced with ECO 60975. ECO 60975 will release the R4 prom and is in the ECO review stage at this time.

ASSIGNED: BAHIA MICHAEL E DATE: 11/17/92 TIME: 15:57
210-8826-B version DS board & a 210-9558-B CS-D DPU Dbrd have been created & are currently at item status 1. Now in process of creating a 212-7113-1 CS-D DPU board which will have the B version dbrd. This will allow the CE's to still order the standard version boards with R3 proms or the new boards with the R4 proms.

ASSIGNED: BAHIA MICHAEL E DATE: 09/10/92 TIME: 09:50
ECO 60729 was written to create the R4 prom as replacement for R3. Looking into creating different part # for the DPU boards with R3 proms to eliminate confusion. John Proulx to look into & call me back on this.

ASSIGNED: BAHIA MICHAEL E DATE: 07/01/91 TIME: 12:57
This problem was corrected with the R3E (R4) Prom. It was installed on a live site on June 7, 1991. There have been no problems since that time. See PTR C90004381. Unlinking customer call for purpose of transfering back to old for closing.

ASSIGNED: BAHIA MICHAEL E DATE: 01/08/91 TIME: 17:44
Sending to RDB 8332 for resolution.

ASSIGNED: BAHIA MICHAEL E DATE: 01/08/91 TIME: 17:28
From CPU A
10SELECT H ON
20SELECT#1/D11
30$OPEN#1
40PRINT"ABC";:GOTO40
On CPU B
LIST DCT/D51 and a hang will occur until the hog is reset.

H E A D E R I N F O
PROBLEM NUMBER M900007386

PROBLEM NUMBER:	M900007386	CUST NAME:	HUTCHISON PAGING LTD
PRIORITY	P1	CUST NUMBER:	HH 00000001370
PROBLEM TYPE:	ESC	CUST CONTACT:	VICTOR LAU
LINK TO PROB NO:		CUST CONT PHONE:	88-047-26 -
		CUST ADDRESS 1:	
		CUST ADDRESS 2:	
SYSTEM MODEL NO:	CS/386-800N	CUST ADDRESS 3:	
GEN SYST MODEL:	2200 CS 386 CPU	CUST CITY:	
O. S. VERSION:	01 18 Z	CUST ST/PROV:	
HW MODEL NUMBER:	CS/386-800N	CUST ZIP: -	CUST RDB: H9906
SW MODEL NUMBER:	OS	CUST COUNTRY:	
SW VERSION:	01 18 Z		
		RDB ASSIGNED:	8760
		PERSON ASSIGNED:	BAHIA MICHAEL E
ALL INFO. AVAILABLE:	Y	ORIG NAME:	LAU VICTOR
		ORIG EMPL NO:	HH-99123
SERIAL NUMBER:		ORIG PHONE:	- - -
		ORIG RDB:	H9906
CALL TRKG DATE:	00/00/00 00:00	DATE ENTER PTR:	08/26/92
L TRKG NO:		RES DEPLOYED:	
STATUS DATE:	08/26/92	DATE TO R&D:	09/10/92
STATUS CODE:	S 0 495	WKDAYS IN R&D:	133.00
STATUS ABBREV:	NEW PROBLM	TOT WKDAYS OPEN:	148.00
STATUS DESC:	NEW PROBLEM		

PROBLEM STATEMENT :LAU VICTOR DATE: 08/26/92 TIME: 01:59
PROB: 2 CS/TURBO multiplexed to 2 DS, each CPU config with 32 partition, 3 WS other are background partition running the disk R/W program in C9-7385. After a while, the DS is faulty, (judged from blinking floppy) the background partition is hang up by the faulty disk. Then power OFF DS, no " 19x " error prompt. CPU hang, pressing RESET at all 3 WS, no response (ie. can't clear screen to get back the READY BASIC prompt)
H/W: CS/386-800N x2, 2275MUX x2, 22C80 x2, DS x2 (1.2M+140M+R3E PROM)
S/W: OS 1.18z

PROBLEM NO: M900007386
STATUS CODE: S 0 495 STATUS ABBR: NEW PROBLM DATE ENTERED: 01/21/93

	ORIGINAL MODEL NUMBER	GENERIC MODEL		VERSION
SYSTEM :	CS/386-800N	2200 CS 386 CPU	O.S:	01 18 Z
HARDWARE:	CS/386-800N	2200 CS 386 CPU		
SOFTWARE:	OS	WANG VS OS SYST	SWR:	01 18 Z

	VERSION
O.S:	
SWR:	

RESOLUTION TEXT :BAHIA MICHAEL E DATE: 01/21/93 TIME: 13:48
SC640. Problem where DS intermittently would hang with floppy lite blinking resolved by replacing DS DPU board. Call can be closed.

P R O B L E M D E T A I L

PROBLEM NUMBER M900007386

ASSIGNED: LAU VICTOR DATE: 01/19/93 TIME: 20:46
The problem was resolved by replacing the DS DPU board, call can be closed.

ASSIGNED: BAHIA MICHAEL E DATE: 01/12/93 TIME: 10:26
Has then problem been resolved? If yes, what was wrong? Let's get this problem corrected and closed.

ASSIGNED: BAHIA MICHAEL E DATE: 11/05/92 TIME: 16:14
Would like to know the cause of the problem in case it should come up again. For that reason would like to keep the call open until the problem is resolved. Have seen 2 systems recently with problems where the DS floppy LED would blink back and forth with the 10 Meg Removable LED. In both cases termination problems existed. At 1 site a fixed Winchester was added which still had the terminator in and at the 2nd the 10 Meg Removable was not terminated and both fixed winchesters were. Only Drive Select 1 should be terminated which is the end of the A cable. Do not use the J7 B cable connector with any Fixed Winchester. It is to be used with only the 10 Meg Removable drive. Why the delay in correcting this problem?

ASSIGNED: CHUI SIMON DATE: 11/05/92 TIME: 06:00
To R&D: Michael, per discussion with Victor, would like to close this call as this unexpected problem only happen when the controller malfunction. Believe this will not be happened after replacing the failure unit.

ASSIGNED: BAHIA MICHAEL E DATE: 10/23/92 TIME: 15:02
What is the current status of this problem? Has the DS board been replaced or anything done to the DS? Has this occurred with any other DS units? Please update.

ASSIGNED: BAHIA MICHAEL E DATE: 09/17/92 TIME: 11:25
It appears the Turbo cannot properly handle whatever problem may exist with the DS. If a new DS board fixes the problem then Duncan would probably need to have this board to correct issue. It is probably not worth the effort unless this problem starts occurring with other boards. R&D has too many other open issues with the Turbo that are more critical. Where it is only 1 board I think we should just fix the DS and close the call. Is this agreeable?

ASSIGNED: LAU VICTOR DATE: 09/15/92 TIME: 21:37
It is sure the DS is bad, but it seems abnormal press RESET after hang at WS can't get back the READY BASIC prompt.

ASSIGNED: CHUI SIMON DATE: 09/15/92 TIME: 02:11
Mike, only one of the DS encountered fault at that time.

PROBLEM NUMBER M900007386

ASSIGNED: BAHIA MICHAEL E DATE: 09/11/92 TIME: 15:17
See previous comment. Unable to reproduce. See comment in C9/7385. Sometimes when system hung had to power off to clear but never saw floppy light blink. May have problem in DS. Have you seen this problem with more than 1 DS? If not you may need to troubleshoot DS. Tested with both 1.18 & 1.18Q. Need to have PTR P2/17629 resolved before we can go any farther on this type problem.

ASSIGNED: BAHIA MICHAEL E DATE: 09/10/92 TIME: 09:37
Will try to duplicate. Did this happen with more than 1 DS?

ASSIGNED: LAU VICTOR DATE: 08/26/92 TIME: 01:59
FREQ: Solid

CC: Mike Bahia W0000600 6FLT3
From: Eugene Schulz Security: Limited
Subject: 725-0258-G Date Received: 02/06/92

2200 related unit sales were/are as follows:

	US	INT	WW
FY'91	76	130	206
FY'92 (6 mos.)	13	27	40

based on past sles trends, plus the announcement of the 2200 TURBO, which should increase activity, and our migration to SCSI, we need enough units to take us into June of FY'93 (1 1/2 yrs) - 150-200 units.

---------- Original Memo ----------
To: Eugene Schulz From: Steve Murdock
Subject: 725-0258-G Date Sent: 02/05/92

TO: Jeff Pancoast/Gene Schulz

From: Steven Murdock

Date: 2/5/92

Subject: 725-0258-G End of Life

****

Panasonic has informed me today that they will discontinue production on the 725-0258-G (JU455-3B35). Charlie Matteo, the salesman from Panasonic, has indicated that he will send out a letter this week explaining the Last Time Buy situation. It is critical that each platform that has requirements for this drive review the current status of their products to determine what their Last Time Buy requirements will be. Panasonic has stated that after this buy they will not accept any new orders so it is critical that each platform order enough for the life of their product or enough to last until a re-design is completed and implemented. Panasonic has requested that Wang provide them with the Last Time Buy quantity ASAP. Please review your current needs and send them to me via Wang Office. If you have any questions or require additional information please contact me at X64484.

Thank You,
Steven Murdock

CC: Michael Bahia MS014-A3A/LOWELL
From: Michael Bahia Security: General
Subject: CS QUERY! Date Received: 12/05/91

Giancarlo,
A one time by of 50 of these drives was made to be used exclusively with Tempest products. Unfortunately some of those drives (the JU455-8 which do not have a door switch) some how got misdirected and obviously ended up in the hardware you are receiving. Talked with Dick Locke of the Perip[heral group & his group will write a TSB warning of the problem. As these drive come back for repair they will probably be junked as Dick does not see a need to create a new part number for just these 50 drives. These drives were purchased because those with the door lock were not available at the time.

Regards,
Mike Bahia
2200 Support

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

To: Michael Bahia From: Giancarlo Ceresini
Subject: CS QUERY! Date Sent: 12/05/91

Hello Mike,
do you have any news about this problem?
We are installing another CS shipped with one of those drives and, like the previous one, does not work.
Best regards,
Giancarlo Ceresini

Oliver,
Have just talked to the Peripheral people as the JU455-8AAG is also new to me. Apparently this drive does not have a door open switch which we require on 2200. It therefore cannot be used. Could you confirm for us that there is no door open switch? If that is the case, this drive will either have to be purged from stock or given a different part number. It currently has the same part number as the correct drives, 725-0142. The Peripheral group is in the middle of sorting this out. A TSB will probably be written shortly to inform the field.
In the meantime, Italy will need to get a JU455-7 or less. The drive may need to be hand picked off the shelf to insure another JU455-8 is not sent. Please get back to me on what happens in the field and on whether the door switch is present.

Regards,
Mike Bahia
2200 Support

Package Subject: CS QUERY!

Item Title: CS QUERY!

Hello Gene,
Perhaps you could me with a customer problem in Wang Italy...

Have we changed the 320KB floppy drive?

There previous unit had a Panasonic number JU455-6BBM but now they notice that the Panasonic number is JU455-8AAG. They customer is having trouble setting it.

They need to know if the switch setting has been changed.

Can you please advise?

Thanks in advance.

Oliver

VS OFFICE Thursday 12/12/91 08:44 am 1

Package Subject: CS QUERY!

Item Title: Cover Memo

Oliver,
Have just talked to the Peripheral people as the JU455-8AAG is also new to me. Apparently this drive does not have a door open switch which we require on 2200. It therefore cannot be used. Could you confirm for us that there is no door open switch? If that is the case, this drive will either have to be purged from stock or given a different part number. It currently has the same part number as the correct drives, 725-0142. The Peripheral group is in the middle of sorting this out. A TSB will probably be written shortly to inform the field.
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Regards,
Mike Bahia
2200 Support

Package Subject: CS QUERY!

Item Title: Cover Memo

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In the meantime, Italy will need to get a JU455-7 or less. The drive may need to be hand picked off the shelf to insure another JU455-8 is not sent. Please get back to me on what happens in the field and on whether the door switch is present.

Regards,
Mike Bahia
2200 Support

---------- Next Memo ----------

Item Title: CS QUERY!

Hello Gene,
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Have we changed the 320KB floppy drive?

There previous unit had a Panasonic number JU455-6BBM but now they notice that the Panasonic number is JU455-8AAG. They customer is having trouble setting it.

They need to know if the switch setting has been changed.

Can you please advise?

Thanks in advance.

Oliver

CC: Michael Bahia
From: Michael Bahia
Subject: CS QUERY!

MS014-A3A/LOWELL
Security: General
Date Received: 11/14/91

Recipients:
Oliver Hayes
CC: Michael Bahia
CC: Paul R. Nolan
CC: Lew Mayhugh
CC: Eugene Schulz
CC: Mike Riley
CC: Eugene Roy (V)
CC: Richard Locke

W A N G L A B O R A T O R I E S I N C .

PROBLEM TRACKING AND REPORTING

CUSTOMER COMPLETE DETAIL REPORT

H E A D E R I N F O

CUSTOMER PROBLEM NUMBER C900007317

PROBLEM NUMBER:	C900007317	CUST NAME:	HUTCHISON PAGING LTD
PRIORITY	P1	CUST NUMBER:	HH 00000001370
PROBLEM TYPE:	ESC	CUST CONTACT:	VICTOR LAU
LINK TO PROB NO:	NOT LINKED	CUST CONT PHONE:	88-047-26 -
		CUST ADDRESS 1:	
		CUST ADDRESS 2:	
SYSTEM MODEL NO:	CS/386-800N	CUST ADDRESS 3:	
GEN SYST MODEL:	2200 CS 386 CPU	CUST CITY:	
O. S. VERSION:	01 18	CUST ST/PROV:	
HW MODEL NUMBER:	DS	CUST ZIP:	- CUST RDB: H9906
SW MODEL NUMBER:		CUST COUNTRY:	
SW VERSION:			
		RDB ASSIGNED:	8760
		PERSON ASSIGNED:	BAHIA MICHAEL E
PART NUMBER:		ORIG NAME:	LAU VICTOR
PART NUM REV:		ORIG EMPL NO:	HH-99123
SERIAL NUMBER:		ORIG PHONE:	- - -
		ORIG RDB:	H9906
CALL TRKG DATE:	00/00/00 00:00	NETWORKED:	N
TRKG NO:		RES DEPLOYED:	
ORG ACT/SYM/ACN:		DATE ENTER PTR:	08/07/92
STATUS DATE:	08/07/92	DATE TO R&D:	019920811
STATUS CODE:	H O 495	WKDAYS IN R&D:	39.58
STATUS ABBREV:	NEW PROBLM	TOT WKDAYS OPEN:	42.84
STATUS DESC:	NEW PROBLEM		

PROBLEM SUMMARY :LAU VICTOR DATE: 08/07/92 TIME: 01:08

PROB: In normal case, the time taken to verify a disk platter of 65024 sector of a DS-140 drive of 2200DS is around 45 sec. But it was found that there were few platters took 2.5 min to complete platter verification. During the disk verifing, there were many retries judged from the sound generated from disk head movement. In one special case, it took 30 sec to verify only ONE sector!! Verified that particular sector sereral times, it completed the verfication every time and never prompted an error, although each time it took 30 sec to complete verify one sector.

$FORMAT the whole disk with R3E PROM intended to set aside the suspected bad sector. After $FORMAT, same symptom, the suspected bad sector could not be eliminated.

$FORMAT the disk again with another DS with R3 PROM, same symptom. There are 3 out of 8 drives take more than double time to complete disk platter verification.

Can the R4 PROM eliminated bad sector? Whether the jumpers on DS-140 can fix the problem?

PROBLEM NO: C900007317
STATUS CODE: H O 495 STATUS ABBR: NEW PROBLM DATE ENTERED: 10/06/92

ORIGINAL	MODEL NUMBER	GENERIC MODEL		VERSION
SYSTEM :	CS/386-800N	2200 CS 386 CPU	O.S:	01 18
HARDWARE:	DS	MEDIUM STORAGE		
SOFTWARE:			SWR:	

RESOLUTION	MODEL NUMBER	GENERIC MODEL		VERSION
SYSTEM :	CS/386-800N	2200 CS 386 CPU	O.S:	01 18
HARDWARE:	DS	MEDIUM STORAGE		
SOFTWARE:			SWR:	

PART NO. PART NO. REVISION

RESOLUTION TEXT :BAHIA MICHAEL E DATE: 10/06/92 TIME: 17:02
HC122. Drive taking extended time to verify isolated to some type of issue with the drive. Suggested solution is to replace drive although the drive gives no errors.

ASSIGNED: CHUI SIMON DATE: 10/05/92 TIME: 22:45
To R&D: Michale, pls de-escalate the call back, thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 09/23/92 TIME: 13:59
Prom code for DS R4 prom sent out via Wang Office today. Can ew close this call?

ASSIGNED: LAU VICTOR DATE: 09/17/92 TIME: 20:30
Mike, I mean the PROM image.

ASSIGNED: LAU VICTOR DATE: 09/17/92 TIME: 20:29
Mike, can you send me the version B through WANG OFFICE ?

ASSIGNED: BAHIA MICHAEL E DATE: 09/17/92 TIME: 12:17
Currently in process of releasing prom. We are going to create B versions of both the DS board, 210-8826A, and the CS-D DPU Brd 210-9558A. The A version will have the R3 prom, the B version the R4 prom. All new hardware shipped to customers will have the B version. There is a possibility a cost may be associated with the prom so I am not sure how that may affect having an FCO to upgrade the A boards to B. At any rate the prom should become available some time next month. That should have nothing to do with this call. Can we ...se this call?

ASSIGNED: LAU VICTOR DATE: 09/15/92 TIME: 22:01
Mike, does DS R4 PROM exist, if not, would you send me the R3F PROM image so I can retest again.

ASSIGNED: BAHIA MICHAEL E DATE: 09/11/92 TIME: 16:06
Cannot find any resources to get further info on this situation. At any rate would like to close this call. Problem is fixable by replacing disk. No error occurs. Fix is to replace drive. Are you agreeable to closing call?

ASSIGNED: BAHIA MICHAEL E DATE: 08/18/92 TIME: 10:43
Have not been able to get any additional information on Format that may better explain what is happening. Logically there must be multiple bad blocks at those addresses. You could probably identify these by running the following program and watching the screen.

```
10 FOR X = 0 to 65023
20 PRINT X
30 VERIFYT/Dxx,(X,X)
40 NEXT X
50 STOP
```

If you run this program with no one on the system the numbers should run right down the screen. If there is a hesitation the number will remain on the screen momentarily. Write it down. There is probably several areas or 1 large area where you will see a slow down. Check the bad block list that

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ASSIGNED: BAHIA MICHAEL E DATE: 08/18/92 TIME: 10:43
usually is found on the drive. You may be able to relate it. Reformat & rerun program again if want to make comparison. Slow downs should occur in same areas.
Are you ordering replacement drives?

ASSIGNED: LAU VICTOR DATE: 08/13/92 TIME: 21:52
Order new drives not quaranted not exhibit the same syptoms. As 3 out of 8 have this problem for new drives for new installation.
Recall in past installation, had experienced after format disk and completed OK, then immediately verify the disk platter, it shown sector error even complete OK in disk format.

ASSIGNED: BAHIA MICHAEL E DATE: 08/12/92 TIME: 12:07
Received Wang Office indicating that on the 3 problem drives there are a total of 4 addresses experiencing what appears to be multiple retries on VERIFY. If these 4 addresses have all been reformatted and the problem has not changed would suggest we just replace those drives. Possibly the alternate sector track for the surfaces in question may be full. Trying to get more info from developers but problem does not seem to be serious enough to do more than replace the drives. We have not had any other calls on this and it would not be cost effective to spend R&D time looking at it.

ASSIGNED: BAHIA MICHAEL E DATE: 08/11/92 TIME: 14:47
Not having any problems with our drives in the lab. All 10 Meg surfaces take around 45 seconds, 16 Meg surfaces around 1 min 10 sec. On the 3 drives which are exhibiting the problem, how many addresses take the 2 minutes 30 seconds & how many complete in normal time? Tested here with both the R3F & the R3 proms & no problem addresses. May need to get a drive to properly analyze the problem.

ASSIGNED: CHUI SIMON DATE: 08/10/92 TIME: 03:06
Initial escalate to R&D for technial assistance. Pls advise.

ASSIGNED: CHUI SIMON DATE: 08/09/92 TIME: 22:04
To HKCSO: Call ack'd.

ASSIGNED: LAU VICTOR DATE: 08/07/92 TIME: 02:08
User's application is disk access time critical.

ASSIGNED: LAU VICTOR DATE: 08/07/92 TIME: 01:08
H/W : CS/386-800N x4, 2275MUX x4, 22C80 x4, 2236MXF x8
2200DS x2 (1.2M + 150M tape + DS-140 + DS-140 + R3E PROM)
S/W : CS/TURBO OS 1.18
DUP : Verify disk with suspected bad sectors.

H E A D E R I N F O

PRODUCT PROBLEM NUMBER P200016609

PROBLEM NUMBER:	P200016609	NUMBER OF RELATED	
PRIORITY	P2	CUSTOMER PROBLEMS:	0
PROBLEM TYPE:	ESC	PRODUCT PROBLEMS:	0
PRE-RELEASE PROB:		LINKED TO PROBLEM:	
SYSTEM MODEL NO:	CS-10	ORIGINATOR NAME:	BAHIA MICHAEL E
GEN SYST MODEL:	2200 CS CPU	ORIG EMPLOYEE NO:	00-04238
O.S. VERSION:	03 4	ORIGINATOR PHONE:	- - -
HW MODEL NUMBER:	DS	ORIGINATOR RDB:	8760
SW MODEL NUMBER:			
SW VERSION:	03 4		
PART NUMBER:		RDB ASSIGNED:	8332
PART NUM REV:		PERSON ASSIGNED:	RILEY J MICHAEL
STATUS DATE:	10/29/91 17:47	DATE ENTER PTR:	11/06/90
STATUS CODE:	H C 122	DATE TO R&D:	000000000
STATUS ABBREV:	DEV REPLAC	WKDYS IN R&D:	
STATUS CLOSE LVL:	ALL	TOT WKDYS OPEN:	
STATUS DESC :	DEVICE REPLACEMENT		

PROBLEM SUMMARY :BAHIA MICHAEL E DATE: 11/06/90 TIME: 17:29
If the floppy door is opened while accessing a Winchester drive in a program that also accesses the floppy an I90 can occur. Have R3 prom on DS brd.

RESOLUTION TEXT :RILEY J MICHAEL DATE: 10/29/91 TIME: 17:37
This will be fixed in Rev. 4 PROM of the DS... JMR

ASSIGNED: BAHIA MICHAEL E DATE: 09/09/91 TIME: 12:25
R3.A prom installed on 8/27. Problem resolved per field. This call can be closed. Please send back for closing.

ASSIGNED: BAHIA MICHAEL E DATE: 08/07/91 TIME: 14:13
Prom still not installed. Expecting to intall at end of this month.

ASSIGNED: BAHIA MICHAEL E DATE: 07/12/91 TIME: 17:01
Field has received proms & have tested in office. Fix looks good but has not yet been installed at the cust site.

ASSIGNED: BAHIA MICHAEL E DATE: 06/21/91 TIME: 09:45
Tested 2 R3.A proms over last weekend & fix looks good. Mailed 2 proms to customer early in week for testing on-site.

ASSIGNED: BAHIA MICHAEL E DATE: 06/05/91 TIME: 14:36
Update acknowledged. Can we get a timetable on a fix or action plan?

ASSIGNED: RILEY J MICHAEL DATE: 06/05/91 TIME: 09:18
I am having R&D looking at it now.. JMR

ASSIGNED: BAHIA MICHAEL E DATE: 04/23/91 TIME: 11:18
We need to set an action plan for this problem!!!!!

ASSIGNED: BAHIA MICHAEL E DATE: 04/08/91 TIME: 09:30
When can we expect this fix?

ASSIGNED: RILEY J MICHAEL DATE: 04/05/91 TIME: 08:55
This bug will get fixed in the next release of the DS PROM... JMR

ASSIGNED: BAHIA MICHAEL E DATE: 04/04/91 TIME: 16:55
Need action plan to resolve this problem!

ASSIGNED: BAHIA MICHAEL E DATE: 03/22/91 TIME: 10:39
The fix for this problem is not in the R4 currently being tested. What is the current action plan to address this matter.

ASSIGNED: BAHIA MICHAEL E DATE: 02/11/91 TIME: 16:18
Still awaiting fix. Customer call is almost 4 months old. When can fix be expected?

ASSIGNED: BAHIA MICHAEL E DATE: 11/21/90 TIME: 15:21
This problem occurs with 360K or 1.2 Meg floppys on VLSI CPU's.

ASSIGNED: BAHIA MICHAEL E DATE: 11/13/90 TIME: 17:48
Did additional testing. On my 2 DS units the problem is more intermittent than thought. Both have 1.2 Meg floppys, but 1 has a 3.0 prom, the other a 3 .2. By running the program given both failed 3 out of 10 times if RESET was used before rerunning. If powered off after every failure the R3.2 DS did not fail in 5 attempts, the R3 failed 2 out of 5. When replaced the R# prom with R1 had 0 failures in 10 attempts.

P R O B L E M D E T A I L

PRODUCT PROBLEM NUMBER P200016609

ASSIGNED: BAHIA MICHAEL E DATE: 11/13/90 TIME: 17:48

	DS with R3 Prom	DS with R3.2 (2.0A) Prom
RESET used between attempts	3 fails in 10	3 fails in 10
Power Off between attempts	2 fails in 5	0 fails in 5
	Installed R1 Prom	
	0 fails in 10	

ASSIGNED: BAHIA MICHAEL E DATE: 11/06/90 TIME: 17:50
Sending to R&D for resolution.

ASSIGNED: BAHIA MICHAEL E DATE: 11/06/90 TIME: 17:29
Problem was duplicated with the following program. Does not fail on a 386 brd.

```
10DIMA$(256)1,B$(256)1
20FOR I = 1 TO 200
30PRINT "FLOPPY SECTOR=",I
40DATALOADBAT/D10,(I,J)A$()
50NEXTI
60FORX=1 TO 824
70PRINT ,,"WINC SECTOR=",X
80DATALOADBAT/D11,(X,Y)B$()
90NEXT X
GOTO20
```

If you run this program and open the floppy door after the floppy lite goes out while accessing the Winchester, an I90 will result.

W A N G L A B O R A T O R I E S I N C .

PROBLEM TRACKING AND REPORTING
CUSTOMER COMPLETE DETAIL REPORT
H E A D E R I N F O
CUSTOMER PROBLEM NUMBER C900004123

PROBLEM NUMBER:	C900004123	CUST NAME:	CTC
PRIORITY	P1	CUST NUMBER:	HJ 90000000000
PROBLEM TYPE:	INFW	CUST CONTACT:	MANABU FUKAMACHI
LINK TO PROB NO:	NOT LINKED	CUST CONT PHONE:	01-813-770-9748 NONE
		CUST ADDRESS 1:	25 KOWA BLDG.
		CUST ADDRESS 2:	3-8-7 CHIYODA-KU
SYSTEM MODEL NO:	CS-2	CUST ADDRESS 3:	TOKYO 102
GEN SYST MODEL:	2200 CS CPU	CUST CITY:	JAPAN
O. S. VERSION:	3 30	CUST ST/PROV:	
HW MODEL NUMBER:	~~CS-2~~ DS	CUST ZIP:	- CUST RDB: H9919
SW MODEL NUMBER:	OS	CUST COUNTRY:	
SW VERSION:	3 30		
		RDB ASSIGNED:	8760
		PERSON ASSIGNED:	BAHIA MICHAEL E
PART NUMBER:		ORIG NAME:	FUKAMACHI MANABU
PART NUM REV:		ORIG EMPL NO:	HJ-99405
SERIAL NUMBER:		ORIG PHONE:	- - -
		ORIG RDB:	H9919
CALL TRKG DATE:	00/00/00 00:00	NETWORKED:	N
CALL TRKG NO:		RES DEPLOYED:	
ORG ACT/SYM/ACN:		DATE ENTER PTR:	10/23/90
STATUS DATE:	04/24/91	DATE TO R&D:	019901102
STATUS CODE:	S O 333	WKDAYS IN R&D:	220.48
STATUS ABBREV:	REPRODUCED	TOT WKDAYS OPEN:	227.86
STATUS DESC:	PROBLEM DUPLICATED AND WORKING WITH ESCALATI		

PROBLEM SUMMARY :FUKAMACHI MANABU DATE: 10/23/90 TIME: 01:33
SYSTEM CONF: 2200CS, DS-1.2MB, DS-64MB, DS-TS, DS-10R
S/W VERSION: Multi User OS 3.30
PROBLEM: After read the data from DS-1.2 and open the disk drive's door of
DS-1.2 while reading DS-64, 'Error I90' occurs in DS-64's address.
If the DS-1.2's door is opened after reading over 1024 sector which is the
size of the cache memory of DS-64, the error does not occur.
This problem seems to be related to the firmware of DS DPU.
DS DPU 210-8826 A PROM 379-8500R3. Pls advice..
Inicial Escalation T. ASC. By WANG CTC.

RESOLUTION TEXT :BAHIA MICHAEL E DATE: 09/09/91 TIME: 11:37
SC590. Problem resolved with maintenance release 3.A of the DS prom. Close
call per field.

ASSIGNED: BAHIA MICHAEL E DATE: 09/06/91 TIME: 15:17
Any feedback yet?

ASSIGNED: FUKAMACHI MANABU DATE: 09/05/91 TIME: 21:09
Testing by CTC was successful. Pls close this call. Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 08/28/91 TIME: 11:04
Update acknowledged. Awaiting test results.

ASSIGNED: WONG TAK LAM DATE: 08/27/91 TIME: 21:50
Manabu, Ack'd update thanks. (Simon Chui)

ASSIGNED: FUKAMACHI MANABU DATE: 08/27/91 TIME: 20:34
CTC installed PROM on customersite at AUG. 27. Will try test and check.
Pls wait my update. Thanks.

ASSIGNED: WONG TAK LAM DATE: 08/21/91 TIME: 20:40
Manabu, Ack'd update, thanks. Pls keep us informed after installation.

ASSIGNED: FUKAMACHI MANABU DATE: 08/21/91 TIME: 19:40
CTC will install the PROM on customersite at next week. Thanks.

ASSIGNED: WONG TAK LAM DATE: 08/20/91 TIME: 22:37
Manabu, is there any schedule to install the prom at the user site?
(Simon Chui)

ASSIGNED: BAHIA MICHAEL E DATE: 08/06/91 TIME: 12:52
Update acknowledged.

ASSIGNED: FUKAMACHI MANABU DATE: 08/06/91 TIME: 02:43
We will try our best, But it is in very difficult conditions. If I explain
everything to you, It will be a super long story. Pls understand. Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 08/05/91 TIME: 14:16
Proms were received on June 27th. Should take less than 30 minutes down time
to install and test DS. Can't we get the prom in before the end of the month
. Would like verification from customer that prom fixed problem before
de-escalating. Please if possible try to move up installation.

ASSIGNED: BAHIA MICHAEL E DATE: 08/05/91 TIME: 14:08
If

ASSIGNED: WONG TAK LAM DATE: 08/05/91 TIME: 04:25
To H.O.: Michael, you can de-escalate this call back for our own monitoring.
Thanks!

ASSIGNED: FUKAMACHI MANABU DATE: 08/04/91 TIME: 19:16
To H.O.: Mike, Will install PROM on customersite at Aug. 26 - Aug. 30.
Pls wait my update (Maybe September). Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 07/29/91 TIME: 12:13
Update acknowledged. Can we expect to hear back on test results shortly? Can we set a date?

ASSIGNED: FUKAMACHI MANABU DATE: 07/23/91 TIME: 20:03
Still waiting for verification result from CTC.

ASSIGNED: CHUNG STEPHEN DATE: 07/23/91 TIME: 02:37
To: Manabu Fukamachi/Japan,
Please advise verification results.
Regards.

ASSIGNED: BAHIA MICHAEL E DATE: 07/12/91 TIME: 16:26
Update acknowledged.

ASSIGNED: FUKAMACHI MANABU DATE: 07/11/91 TIME: 19:55
It is testing now and still not installed at customer site. Have a nice vacation, result might be come out when you're back!

ASSIGNED: BAHIA MICHAEL E DATE: 07/11/91 TIME: 17:24
Have proms been installed or tested yet? On vacation for 2 weeks stating July 13th. Please update.

ASSIGNED: BAHIA MICHAEL E DATE: 06/28/91 TIME: 14:31
Excellent. Will await your feedback.

ASSIGNED: FUKAMACHI MANABU DATE: 06/27/91 TIME: 20:53
To H.O.: I've received PROMs R3.A and checking now. Pls wait my update.
Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 06/27/91 TIME: 08:51
Update acknowledged. Please update when received. If not received by Monday will try to trace them down.

ASSIGNED: FUKAMACHI MANABU DATE: 06/26/91 TIME: 19:19
We have not received yet.

ASSIGNED: BAHIA MICHAEL E DATE: 06/26/91 TIME: 10:52
Have proms been received yet?

ASSIGNED: FUKAMACHI MANABU DATE: 06/20/91 TIME: 00:18
To H.O.: Update acknowledged.

ASSIGNED: BAHIA MICHAEL E DATE: 06/19/91 TIME: 09:10
Two R3.A proms were mailed last night, Misc Shipping Order 354814. Hopefully you should have them sometime next week. Please update the call when received. These proms will work in a DS cabinet or on the CS/D DPU board.

ASSIGNED: FUKAMACHI MANABU DATE: 06/18/91 TIME: 02:21
To H.O.: RDB Number is 9919. ... Thanks.

ASSIGNED: FUKAMACHI MANABU DATE: 06/18/91 TIME: 02:18
To H.O.: Mike, SOUNDS GOOD!!!
My address is MEISEI BLDG. 1F
8-9 SAKURAGAOKA-CHO, SHIBUYA-KU,
TOKYO 150 JAPAN
Tel: 03-3780-7350. Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 06/17/91 TIME: 17:45
Tested new prom today & fix looks good. Please provide mailing address & RDB for proms to be sent to.

ASSIGNED: BAHIA MICHAEL E DATE: 06/12/91 TIME: 16:00
Good news. R&D has found a problem & has made a fix. Expect to have a prom by next week which I will verify fixes the problem & if so forward to you.

ASSIGNED: BAHIA MICHAEL E DATE: 05/30/91 TIME: 12:06
We have someone identified to hopefully fix this problem. Now trying to work out some kind of a time schedule.

ASSIGNED: BAHIA MICHAEL E DATE: 05/07/91 TIME: 17:50
Nothing has been specifically planned yet. In training class till end of wee k. Will continue to pursue this matter.

ASSIGNED: WONG TAK LAM DATE: 05/07/91 TIME: 01:20
To H.O.: Michael, any plan to fix problem yet ?

ASSIGNED: BAHIA MICHAEL E DATE: 04/23/91 TIME: 09:31
Sorry for the delay. We have been having problems with the system. Currently we do not have a resource to fix this problem. We are expecting to bring in an outside contractor to resolve this problem. Trying to get a commitment of some type from management to make action plan.

ASSIGNED: WONG TAK LAM DATE: 04/17/91 TIME: 21:00
Michael, any status update ?

ASSIGNED: BAHIA MICHAEL E DATE: 04/03/91 TIME: 12:11
The fix for this problem has been delayed because it appears to be quite invo lved. Trying to get an action plan on this problem at this time.

ASSIGNED: BAHIA MICHAEL E DATE: 03/22/91 TIME: 11:02
The fix for this problem has not been incorporated in the new prom currently being tested for the DS. Will address this issue at our group meeting with management on Tuesday to determine what action will be taken to resolve this.

ASSIGNED: BAHIA MICHAEL E DATE: 03/11/91 TIME: 14:44
Person working on prom was working under contract which has expired. Bugs were found in prom mentioned from 2/26 and a those problems were addressed. A new prom completed last week is now being tested. We are unsure whether the fix for this problem is included. We will test for it this week while testing for reliability.

ASSIGNED: WONG TAK LAM DATE: 03/11/91 TIME: 02:22
To H.O.: How is testing on the new PROMs ? any schedule for the release ?

ASSIGNED: BAHIA MICHAEL E DATE: 02/26/91 TIME: 17:48
Prom is currently being tested but fix for this problem is not implemented at this time. If prom tests out good, fix may be implemented in next few weeks . Will keep you posted.

ASSIGNED: WONG TAK LAM DATE: 02/26/91 TIME: 02:07
H.O.: Update ACK. Please inform us if there is any status change. Thanks!

ASSIGNED: BAHIA MICHAEL E DATE: 02/20/91 TIME: 12:52
This problem is being worked on right now. Once it is corrected it will need to be tested. As there are major changes in this prom including 3 byte addressing, it will need to be thoroughly tested. Because of these changes, there are software steps that coincide with its installation. It will not be a plug and play situation which also may affect how soon we can send it to you. If the fix is finished this week, it will take at least a week to test. We will then need to have additional software readied to allow you to install . The new prom will most likely require reformatting all surfaces in the unit it is used in. In addition there is a configuration utility that must be run. If all goes well without problem, we may have everything ready to send in the first 2 weeks of March.

ASSIGNED: WONG TAK LAM DATE: 02/20/91 TIME: 05:16
To H.O.: Michael, any schedule for the PROM release ?

ASSIGNED: WONG TAK LAM DATE: 01/23/91 TIME: 05:21
To H.O.: Update acknowledged.

ASSIGNED: BAHIA MICHAEL E DATE: 01/22/91 TIME: 16:16
R&D considers this problem a P2 or P3. It has not been fixed yet as the prom is still being worked on. Having trouble keeping resources on this problem. Will try to insure fix is in next release of prom. Looks like at minimum 2

ASSIGNED: BAHIA MICHAEL E DATE: 01/22/91 TIME: 16:16
weeks, could be more as there are some major enhancements being implemented in the prom.

ASSIGNED: BAHIA MICHAEL E DATE: 01/08/91 TIME: 16:01
Still waiting for prom. Not ready yet.

ASSIGNED: BAHIA MICHAEL E DATE: 01/02/91 TIME: 12:52
Update acknowledged. Will get prom to you or file to create prom as soon as available.

ASSIGNED: CHUI SIMON DATE: 12/31/90 TIME: 04:02
To H.O.: Michael, pls forward the proms(temp.fix) to Japan when it is available.Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 12/21/90 TIME: 18:18
R&D has seen problem but has not resolved yet. We are hoping to get the fix into the next release of the DS prom which probably will not be available til February but I am hoping to get you a temporary fix before that. We are now off until Jan 2nd. Have a Merry Chrismas & a happy New Year.

ASSIGNED: BAHIA MICHAEL E DATE: 12/05/90 TIME: 09:40
R&D still working on problem.

ASSIGNED: BAHIA MICHAEL E DATE: 11/27/90 TIME: 17:56
An R&D engineer is investigating this problem.

ASSIGNED: BAHIA MICHAEL E DATE: 11/21/90 TIME: 15:40
Update acknowledged.

ASSIGNED: FUKAMACHI MANABU DATE: 11/20/90 TIME: 04:42
Same problem happend by 360KB floppy drive.
No problem on 386 (Same configuration).

ASSIGNED: BAHIA MICHAEL E DATE: 11/13/90 TIME: 18:29
Product call P200016609 has been opened against this call. Calls are not linked currently because this one was opened as a S/W call & the Product call as H/W. Not sure at this time which is correct. Appears to be combination o f VLSI O/S & 1.2 Meg floppy. DS prom rev also seems to be a factor as I could not reproduce the problem with the R1 prom on a DS which would fail w/ a newer prom. Most likely DS prom needs to be corrected. Did any of the uni ts you found this problem with have 360K floppy drives?

ASSIGNED: BAHIA MICHAEL E DATE: 11/06/90 TIME: 18:23
Have duplicated your problem. Was testing on a 386 CPU but when went back to check O/S revision found otherwise. Will open a product call for this probl

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ASSIGNED: BAHIA MICHAEL E DATE: 11/06/90 TIME: 18:23
em.

ASSIGNED: FUKAMACHI MANABU DATE: 11/06/90 TIME: 02:55
There are three sites which have the system. One (Three CPU) at the customer sites and two at CTC.
The problem frequency:
One (Three CPU) system at the customer site = 100 %
One system at CTC = about 50 %
Another system at CTC = Intermmitent.
Cable and ROM are correct. Pls advice.

ASSIGNED: BAHIA MICHAEL E DATE: 11/05/90 TIME: 17:45
See previous comment. Both systems have R3 proms using O/S 1.17 & 1.18.

ASSIGNED: BAHIA MICHAEL E DATE: 11/05/90 TIME: 17:44
Unable to duplicate your problem with program from 11/5 update. Change line
60 to: 60 FOR X = 1 TO 824
& added line 100: 100 GOTO 20
and kept opening the floppy door over & over & sometimes removed the diskette & no failures. Something is not set up properly. Possibly the floppy jumpers e incorrect. There are 3 versions of 1.2 Meg Floppy Drives supported. All are from Panasonic Mitsubishi, model #'s JU475-1BBG, JU475-2BGM, & JU475-3. The switch settings for all 3 can be found in the VS5000 Product Maintenance Manual, part # 741-1840-A1, pages 2-5, 2-63, & 2-7. The jumpers are identical for the 2200.
Did test program as was before change. Tested on 2 completely different systems. CS-D/386 with internal 1.2 Meg & 140 Meg & MicroVP w/ 386 & a DS with a 1.2 Meg & A 64 Meg. No problem found.

ASSIGNED: BAHIA MICHAEL E DATE: 11/05/90 TIME: 12:03
Will try to reproduce with program given.

ASSIGNED: FUKAMACHI MANABU DATE: 11/05/90 TIME: 03:46
CTC's answer:
Cable is right. Noise is irrelevant. Because not happen over the 1024 secto rs.
DISK address = 310, FLOPPY DISK 1.2MB = T/D10, 64MG Winchester = T/D11.

```
10   DIM A$(256)1, B$(256)1
20   FOR I = 1 TO 200
30   PRINT "FLOPPY SECTOR =", I
40   DATALOAD BA T/D10, (I,J) A$()
50   NEXT I
60   FOR X = 1 TO 3000
70   PRINT "WINCHESTER SECTOR=, X
80   DATALOAD BA T/D11, (X,Y) B$()
```

ASSIGNED: FUKAMACHI MANABU DATE: 11/05/90 TIME: 03:46
90 NEXT X
Run this proglam. Open the floppy disk's door, when X count < 824(1024, 200)
(1024 = Sector, 200 = I)

ASSIGNED: BAHIA MICHAEL E DATE: 11/02/90 TIME: 09:45
Tried continuously LISTing my 64 Meg on 1 terminal while LISTing or VERIFYing my floppy, then opening the door. Could not get it to fail. Was VERIFYing less than 1024 sectors. This is not a FAD. You should not get an I90 on any drive by opening the floppy door as long as the floppy has completed it's last function. Sounds like a drive or DS brd problem. One of the drives, more likely the floppy is creating some noise interference. If you think you have found a design problem please provide info on how to duplicate. You might also want to place the floppy & 64 Meg on separate power feeds from the power supply. There are 3. Also be sure the 64 Meg B Cable is not plugged into J7 of the DS brd. J7 is exclusively for 10 Meg Removable drives. J@, J9, % J10 are all common B cable connectors & can be used with any Fixed Winc hester regardless of the A cable connector used.

ASSIGNED: WONG TAK LAM DATE: 10/31/90 TIME: 05:22
To H.O.: Please advice whether this is a function as designed or not.

ASSIGNED: YEUNG ADA DATE: 10/23/90 TIME: 03:05
To: CSO/Japan, PTR is accepted in ASC at Oct 23, 90.

W A N G L A B O R A T O R I E S I N C .

PROBLEM TRACKING AND REPORTING
CUSTOMER COMPLETE DETAIL REPORT
H E A D E R I N F O
CUSTOMER PROBLEM NUMBER C900005044

PROBLEM NUMBER:	C900005044	CUST NAME:	HUTCHISON PAGING LTD
PRIORITY	P1	CUST NUMBER:	HH 00000001370
PROBLEM TYPE:	ESC	CUST CONTACT:	VICTOR LAU
LINK TO PROB NO:	NOT LINKED	CUST CONT PHONE:	88-047-26 -
		CUST ADDRESS 1:	
		CUST ADDRESS 2:	
SYSTEM MODEL NO:	CS/386-10N	CUST ADDRESS 3:	
GEN SYST MODEL:	2200 CS 386 CPU	CUST CITY:	
O. S. VERSION:	01 1C	CUST ST/PROV:	
HW MODEL NUMBER:	DS	CUST ZIP:	- CUST RDB: H9906
SW MODEL NUMBER:	OS	CUST COUNTRY:	
SW VERSION:	01 1C		
		RDB ASSIGNED:	8760
		PERSON ASSIGNED:	BAHIA MICHAEL E
PART NUMBER:		ORIG NAME:	LAU VICTOR
PART NUM REV:		ORIG EMPL NO:	HH-99123
SERIAL NUMBER:		ORIG PHONE:	- - -
		ORIG RDB:	H9906
CALL TRKG DATE:	00/00/00 00:00	NETWORKED:	N
CALL TRKG NO:		RES DEPLOYED:	
ORG ACT/SYM/ACN:		DATE ENTER PTR:	04/25/91
STATUS DATE:	06/12/91	DATE TO R&D:	019910510
STATUS CODE:	S 0 750	WKDAYS IN R&D:	38.06
STATUS ABBREV:	TESTING	TOT WKDAYS OPEN:	49.29
STATUS DESC:	TESTING		

PROBLEM SUMMARY :LAU VICTOR DATE: 04/25/91 TIME: 02:28
PROB: Two 2200DS frequently experience I94 error. As the user use platter D61 & D71 very heavily, hence mostly the error happened on D61 & D71. Since the user will retry for 4 times in case of error before abort, so the user application can still continue after encounter error. Hardware DS DPU, 2275MUX & 22C80 replaced, still same problem.
H/W: CS/386-10N, DS (112M+112M+R3 PROM), 2275MUX, 22C80
S/W: CS386 OS 1.1C (Refer C900005029)

RESOLUTION	MODEL NUMBER	GENERIC MODEL	VERSION
SYSTEM :	CS/386-10N	2200 CS 386 CPU	O.S: 01 1C
HARDWARE:	DS	MEDIUM STORAGE	
SOFTWARE:	OS	WANG VS OS SYST	SWR: 01 1C

PART NO. PART NO. REVISION

RESOLUTION TEXT :BAHIA MICHAEL E DATE: 07/03/91 TIME: 13:43
SC595. I94 problem no longer occurs in multi-CPU environment with CS/386 Maintenance Rel 1.1Q & the R3E (R4) prom. No problems since reconfigured on 6/11 with new O/S & prom. Close call.

ASSIGNED: LAU VICTOR DATE: 07/02/91 TIME: 22:41
No problem since upgrade to 1.1q on 6/11, call can be closed

ASSIGNED: BAHIA MICHAEL E DATE: 07/02/91 TIME: 11:00
If this problem has not occurred since the system was reconfigured will send call back to field for closing. Please update.

ASSIGNED: BAHIA MICHAEL E DATE: 06/21/91 TIME: 10:14
Want to monitor until July 1. If at that time the I94 has not reoccurred the call will be sent back.

ASSIGNED: CHUI SIMON DATE: 06/20/91 TIME: 22:36
Michael, I94 problem doesn't occur so far after the updating of the R4 prom and OS 1.1q. Think this call can be de-escalate back and we will monitor in our level. Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 06/12/91 TIME: 15:54
Downgraded call to ESCalation as requested. Cust running in multi-CPU environment with maint rel 1.1Q since 6/11, 10 AM without fail. Monitoring.

ASSIGNED: CHUI SIMON DATE: 06/12/91 TIME: 04:36
To Michael: The system was back to the original configuration and is working fine since Jun/11 10 a.m. We would like to downgrade this call from P1 CRITICAL to P1 ESC. We will keep closely monitor the site status and update you periodically. Regards.

ASSIGNED: BAHIA MICHAEL E DATE: 05/30/91 TIME: 13:06
According to a Wang Office from Duncan Chou to Dick Wu on 5/21, an O/S was sent to Hong Kong to resolve this problem. Is this problem corrected on the latest O/S?

ASSIGNED: BAHIA MICHAEL E DATE: 05/17/91 TIME: 11:07
Update acknowledged.

ASSIGNED: LAU VICTOR DATE: 05/15/91 TIME: 03:57
The I94 error can be trap in the @PSTAT, it is also trap by the intensive disk R/W background job. It is supposed stop the program execution, but it is circumvented by retry on error. But as Simon Chui tested on site, found hang for DATALOAD, and I94 for DATASAVE for multiple CPUs access, the hang problem can't be circumvented.

ASSIGNED: BAHIA MICHAEL E DATE: 05/14/91 TIME: 17:55
When the I94 occurs, does the program halt with an error on the screen or is the I94 only seen on the @PSTAT screen? Want to know the CPU, disk address, & program running each time the I94 fails stopping program execution. If only seen on the @PSTAT screen, I'm not as concerned as this problem should

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ASSIGNED: BAHIA MICHAEL E DATE: 05/14/91 TIME: 17:55
be resolved by correcting the SELECT H problem.

ASSIGNED: BAHIA MICHAEL E DATE: 05/10/91 TIME: 18:56
This problem appears to be just another symptom related to the SELECT H problem. Can this problem be circumvented by shutting SELECT H OFF? Or this should also not occur in a single CPU environment. We need to know if this O/S you are using is from Duncan Chou & if it is the same release as we are currently testing?

ASSIGNED: LAU VICTOR DATE: 05/09/91 TIME: 23:40
Upgrade OS to pre-relesae 1.2 on 8/5, re-run the intense R/W test from CPU3 W/S, same symptom (ie. hang at DATALOAD command, I94 at DATASAVE command for both disk 320 & disk 330), but the frequency greatly reduced.
Because of the hang prob, call raise to CRITICAL requested by user on 10/5.

ASSIGNED: LAU VICTOR DATE: 05/01/91 TIME: 23:52
Simon Chui on site found that when intensive R/W disk 320 and 330 from one WS while there were operators in CPU1, and CPU3, intermittently at instant of DATALOAD, and I94 at instant of DATSAVE for both disk.
After connect all WS from CPU3 to CPU1 and the above test run on CPU1 WS, the I94 and hang problem disappear.
I94 or hang problem from 30/4 up to now (2/5 11:00)

ASSIGNED: CHUI SIMON DATE: 04/25/91 TIME: 20:16
Initial escalated to R&D for advice.

ASSIGNED: CHUI SIMON DATE: 04/25/91 TIME: 04:29
To HKCSO: Call ack'd, under investigate.

ASSIGNED: LAU VICTOR DATE: 04/25/91 TIME: 04:14
Refer (PTR C900005029) & pls notice previous 2 updated in this call

ASSIGNED: YEUNG ADA DATE: 04/25/91 TIME: 03:20
To: CSO/HK, PTR is accepted in ASC at Apr 25, 91.

ASSIGNED: LAU VICTOR DATE: 04/25/91 TIME: 02:27
Before online on 16/4, the system is on trial run for 4 months, no problem report. From 16/4, onwards, the problem occurred very frequently (above 15 times per day). The only difference may be loading of disk I/O.
(For the heavy disk IO background partition, sometimes there is X75 or X77 error from the @PSTAT program, but the partition program still can continue)

ASSIGNED: LAU VICTOR DATE: 04/25/91 TIME: 02:17
Address 320 DS DPU replaced on 19/4, same problem.
2275MUX and 22C80 replaced on 22/4, same prob.

ASSIGNED: LAU VICTOR DATE: 04/25/91 TIME: 02:17
Address 330 DS DPU replaced on 22/4, same prob.
User use a terminal to loop on LISTDT to monitor the disk IO status. The user will hog disk 320 and 330 together when update the disk. It is suppose the disk 320 & 330 appear together in the PHT line of the LISTDT screen. However sometimes two disk appear in pair, sometimes in single.
It may due to LISTDT timing can't catch up with the disK IO timing. Or it is suspected the hogging of one disk is missed or skipped, by the same reasoning it is suspected the dehog of one of the disk is missed or skipped, that cause the everyday frequent hanging problem.
It is suspected for the missed disk IO such as read or write other than hog platter will cause I94 error ??

ASSIGNED: LAU VICTOR DATE: 04/25/91 TIME: 01:20
Solid and very frequently

H E A D E R I N F O

CUSTOMER PROBLEM NUMBER C900005037

PROBLEM NUMBER:	C900005037	CUST NAME:	HUTCHISON PAGING LTD
PRIORITY	P2	CUST NUMBER:	HH 00000001370
PROBLEM TYPE:	INFW	CUST CONTACT:	VICTOR LAU
LINK TO PROB NO:	NOT LINKED	CUST CONT PHONE:	88-047-26 -
		CUST ADDRESS 1:	
		CUST ADDRESS 2:	
SYSTEM MODEL NO:	CS/386-10N	CUST ADDRESS 3:	
GEN SYST MODEL:	2200 CS 386 CPU	CUST CITY:	
O. S. VERSION:	01 1C	CUST ST/PROV:	
HW MODEL NUMBER:	DS-TS150	CUST ZIP:	- CUST RDB: H9906
SW MODEL NUMBER:	DS	CUST COUNTRY:	
SW VERSION:	02 00		
		RDB ASSIGNED:	8760
		PERSON ASSIGNED:	BAHIA MICHAEL E
PART NUMBER:		ORIG NAME:	LAU VICTOR
PART NUM REV:		ORIG EMPL NO:	HH-99123
SERIAL NUMBER:		ORIG PHONE:	- - -
		ORIG RDB:	H9906
CALL TRKG DATE:	00/00/00 00:00	NETWORKED:	N
CALL TRKG NO:		RES DEPLOYED:	
ORG ACT/SYM/ACN:		DATE ENTER PTR:	04/23/91
STATUS DATE:	07/05/91	DATE TO R&D:	019910510
STATUS CODE:	S 0 318	WKDAYS IN R&D:	38.78
STATUS ABBREV:	INFORMATON	TOT WKDAYS OPEN:	50.79
STATUS DESC:	INFORMATION PROVIDED		

PROBLEM SUMMARY :LAU VICTOR DATE: 04/23/91 TIME: 23:04

PROB: When backup data from hard disk to tape by DS Util, the disk is hogged

1) Is it possible to backup data to tape sector by sector and hog disk ON & OFF instead of in a whole batch and hog disk before complete. (Ignore the file integrity of data inside the tape)
2) If it is unavailable on the DS-Utiltiy, is it feasible to achieve by user programming?

H/W: DS (1.2M floppy + DS-TS150 tape, 112M x2, R3 PROM), CS/386-10N

S/W: CS/386 OS 1.1C, DS Utility 2.0

(User application is 24 hr non-stop, can't do the offline backup.)

RESOLUTION TEXT :BAHIA MICHAEL E DATE: 07/05/91 TIME: 09:57

SC318. The hogging of the entire DS cabinet and the number of sectors transferred are factors set by the DS Utility Program. The program can be changed by the customer or a programmer if wanted. Wang however will not customize the program for 1 user or support any changes. Those making the changes take full responsibility for those changes.

ASSIGNED: CHUI SIMON DATE: 07/04/91 TIME: 04:59
Michael, Pls de-escalate the call back to us and we will monitor in our level
Will keep in touch if there is any query after verification.
Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 07/01/91 TIME: 13:26
Do not understand update. Original questioned concerned unhogging the DS during DS Utility Backup. This can be changed by the customers programmer if wanted. Wang does not modify these utilities for customers. It supplies the DS Utilities as easy way to get backups done. If user wants to change Backup that is fine, but this is not a problem and we should not have to keep a call open.

ASSIGNED: LAU VICTOR DATE: 06/30/91 TIME: 21:54
No 150M tape drive in office, have to test on user' site. Will test later after user come back from trip.

ASSIGNED: BAHIA MICHAEL E DATE: 06/26/91 TIME: 11:24
Please update this call. Is there any reason this call cannot be closed?

ASSIGNED: BAHIA MICHAEL E DATE: 06/19/91 TIME: 09:45
Please respond. Can we close this call?

ASSIGNED: BAHIA MICHAEL E DATE: 06/12/91 TIME: 16:04
Can we close this call?

ASSIGNED: BAHIA MICHAEL E DATE: 05/30/91 TIME: 13:03
Do you have any other questions on this? Can we close this call?

ASSIGNED: BAHIA MICHAEL E DATE: 05/17/91 TIME: 13:13
The read disk & write tape is done with 1 command on line 1130 with a GIO for internal backup moving 256 sectors at a time. It is advised not to change this as we don't know what affect the change would have. External backup does 2 sectors at a time. When less than 256 sectors remain again the remain der is read 2 sectors at a time. This should answer your question.

ASSIGNED: BAHIA MICHAEL E DATE: 05/17/91 TIME: 11:04
When the Backup is done data is moved from the disk to the tape buffer. When the buffer is full, tape is written to. Believe the 45 Meg Tape Drive has a buffer that is 256 sectors long. Not sure on the buffer size on the 150 Meg. Would imagine a programmer could change the block transfer size to the buffer without much difficulty. It would not be easy to change when to write to ta pe or to write less than a full buffer. If that was done the read program ma y also need to be changed. Have you tested the backup program with the HOG off as I don't believe the 150 Meg has a buffer bigger than 500 sectors.

ASSIGNED: LAU VICTOR DATE: 05/15/91 TIME: 03:46

From CS-D user guide p 9-7, the DS utility 2.0 can backup disk data by r sector range, but it seemed that the sector range is supposed to be whole disk platter or at least a large portion of the disk platter. As to the user requirement, the user situation can't afford to backup data more than 500 sectors at one time, as this may cause the operators's screen appeared to freeze during normal operation. Is there any practical method to implement the user's intention as stated in 13/5 update and any recommendation about the enqueries in the update.

ASSIGNED: BAHIA MICHAEL E DATE: 05/14/91 TIME: 16:24

The DS Utility Disk, version 2.0, can be easily changed so that it will not hog the entire cabinet. Wang does not support any changes & the customer or software vendor must be responsible for these changes. The program "@DSTAPEB " is the Backup program. If this program is listed there are comments to explain how to make this change, unhog the cabinet, and others. To simply unhog the DS, the $OPEN command on line 800 should be removed. This would allow writing to all addresses in the DS including the surface being restored during backup. From the main menu however a surface can be write protected by using the 'Protest/Unprotect DS Surfaces' menu pick. A 'hard' or 'soft' protect can be done to any disk address within the DS Cabinet. A hard protec t will require the DS to be powered off to clear, while a soft protect can be cleared by rerunning the utility. Again any change made to the utility shoul d be made by the customer or the VAR. If the surface being backed up is soft protected you would obviously be unable to write to it. Does this answer your questions?

ASSIGNED: LAU VICTOR DATE: 05/13/91 TIME: 04:33

(contunue)

a) Will it be limited by the hardware limitation (eg tape buffer, streaming tape operation mechanism, tape retention for every write operation etc)
b) If it is possible, is every 100 sectors counted as a data block or every 100 sectors counted as a data set (ie file mark for every 100 sectors) & located by the directory entry? Should the user's application skip on file mark or skip on data block?
c) Any other information about the DS tape besides the CS-D User Guide Chapter 10?

ASSIGNED: LAU VICTOR DATE: 05/13/91 TIME: 04:14

Hogging platter only during backup is helpful.
The user intention is use the tape as the secondary backup besides the image disk. The user want to use the tape like a disk, ie.

1) Hog a particular platter
2) Backup say 100 consecutive sectors from disk to tape
3) Dehog the disk for a while for other partition disk access
4) Reprocess step 1 to 3 again for next 100 consecutive sectors until end of

ASSIGNED: LAU VICTOR DATE: 05/13/91 TIME: 04:14
platter.
In case of restore
5) Hog a particular platter
6) Skip number of block to search for a particular data file.
7) Restore say 100 consecutive sector from tape to disk
8) Dehog the disk for a while for other partition disk access
9) Reprocess step 5 to 8 again for next 100 consecutive sectors until end of file (not disk platter).
No machine for testing and not sure of the tape backup operation, (continue)

ASSIGNED: BAHIA MICHAEL E DATE: 05/10/91 TIME: 18:48
Yes the currently utility intentionally hogs the entire device. The DS utili ty I am sure can be modified to change that. I would assume you would want t o hog the disk surface being backed up. Is this correct? Assuming the surfa ce to be backed up will be hogged, do you want me to find out what changes wo uld need to be made to the backup utility to allow shared access to the DS during the backup procedure?

ASSIGNED: CHUI SIMON DATE: 04/25/91 TIME: 00:35
Initial escalate to R&D for advice.

ASSIGNED: CHUI SIMON DATE: 04/24/91 TIME: 20:42
To HKCSO:Call ack'd.

ASSIGNED: YEUNG ADA DATE: 04/24/91 TIME: 02:11
To: CSO/HK, PTR is accepted in ASC at Apr 24, 91.

ASSIGNED: LAU VICTOR DATE: 04/23/91 TIME: 23:04
Solid

W A N G L A B O R A T O R I E S I N C .

PROBLEM TRACKING AND REPORTING
CUSTOMER COMPLETE DETAIL REPORT
H E A D E R I N F O
CUSTOMER PROBLEM NUMBER C900005009

PROBLEM NUMBER:	C900005009	CUST NAME:	HUTCHISON PAGING LTD
PRIORITY	P1	CUST NUMBER:	HH 00000001370
PROBLEM TYPE:	ESC	CUST CONTACT:	VICTOR LAU
LINK TO PROB NO:	NOT LINKED	CUST CONT PHONE:	88-047-26 -
		CUST ADDRESS 1:	
		CUST ADDRESS 2:	
SYSTEM MODEL NO:	CS/386-10N	CUST ADDRESS 3:	
GEN SYST MODEL:	2200 CS 386 CPU	CUST CITY:	
O. S. VERSION:	01 1C	CUST ST/PROV:	
HW MODEL NUMBER:		CUST ZIP:	- CUST RDB: H9906
SW MODEL NUMBER:	OS	CUST COUNTRY:	
SW VERSION:	01 1C		
		RDB ASSIGNED:	8760
		PERSON ASSIGNED:	BAHIA MICHAEL E
PART NUMBER:		ORIG NAME:	LAU VICTOR
PART NUM REV:		ORIG EMPL NO:	HH-99123
SERIAL NUMBER:		ORIG PHONE:	- - -
		ORIG RDB:	H9906
CALL TRKG DATE:	00/00/00 00:00	NETWORKED:	N
CALL TRKG NO:		RES DEPLOYED:	
ORG ACT/SYM/ACN:		DATE ENTER PTR:	04/18/91
STATUS DATE:	06/12/91	DATE TO R&D:	019910422
STATUS CODE:	S 0 750	WKDAYS IN R&D:	51.10
STATUS ABBREV:	TESTING	TOT WKDAYS OPEN:	53.71
STATUS DESC:	TESTING		

PROBLEM SUMMARY :LAU VICTOR DATE: 04/18/91 TIME: 22:26

PROB: Data in the disk catalogue area are scratched in one platter for two disk running in disk mirroring mode, show INDEX=0000 when LISTDCT. After restore back one disk and then only copy the disk catalogue tothe mirror disk, non updated data file of mirror disk still not match the catalogue (This symptom reported twice by the user's subsidary in other country. The user's application open a few data files and then R/W the records of the data file by DA disk mode. The application has been used for many years before upgrade to CS386/2200DS from MVP/2280. In addition, before saving the data to disk, the program will check the sector address whether it fall inside the disk catalogue areas, if yes program end. Moreover, the erased platter is different from those reported by subsid) Is it a reported known bug or user application fault?

H/W: CS/386-10N x3, 2200DS x2 (112M+112M R3 PROM), 2275MUX x2, 22C80 x4
S/W: CS/386 OS 1.1C 2228C x2

W A N G L A B O R A T O R I E S I N C .
PROBLEM TRACKING AND REPORTING
CUSTOMER COMPLETE DETAIL REPORT
P R O B . R E S O L U T I O N
CUSTOMER PROBLEM NUMBER C900005009

PROBLEM NO: C900005009
STATUS CODE: S 0 750 STATUS ABBR: TESTING DATE ENTERED: 07/03/91

	ORIGINAL MODEL NUMBER	GENERIC MODEL		VERSION
SYSTEM :	CS/386-10N	2200 CS 386 CPU	O.S:	01 1C
HARDWARE:				
SOFTWARE:	OS	WANG VS OS SYST	SWR:	01 1C

	RESOLUTION MODEL NUMBER	GENERIC MODEL		VERSION
SYSTEM :	CS/386-10N	2200 CS 386 CPU	O.S:	01 1C
HARDWARE:				
SOFTWARE:	OS	WANG VS OS SYST	SWR:	01 1C

PART NO. PART NO. REVISION

RESOLUTION TEXT :BAHIA MICHAEL E DATE: 07/03/91 TIME: 13:36
SC595. The problem with the disk catalog being scratched has not reoccurred since installing the R3.E (R4) prom and upgrading to Maintenance Rel 1.1Q on 6/11 under original multi-CPU configuration. Resolved with O/S 1.1Q & DS R3.E (R4) prom.

ASSIGNED: LAU VICTOR DATE: 07/02/91 TIME: 22:27
No problem since upgrade to OS 1.1q and DS R3E PROM on 6/11 under multiple CPUs, call can be closed.

ASSIGNED: BAHIA MICHAEL E DATE: 07/02/91 TIME: 10:58
If this problem has not reoccurred since the system was reconfigured will send back to field for closing as requested. Please update.

ASSIGNED: BAHIA MICHAEL E DATE: 06/21/91 TIME: 10:03
Want to continue to monitor until July 1 as both prom & O/S are new. At that time will de-escalate if this problem has not re-occurred.

ASSIGNED: CHUI SIMON DATE: 06/20/91 TIME: 22:26
To Michael, The scratch catalogue problem dosen't happen after update the OS 1.1q and R4 prom so far. You may de-escalate this call back for our monitoring.

ASSIGNED: BAHIA MICHAEL E DATE: 06/12/91 TIME: 15:42
Downgraded to ESCalation from CRITical. Cust running with Maint rel 1.1Q in mult-CPU environment with no problems reported. Is this correct?

ASSIGNED: CHUI SIMON DATE: 06/12/91 TIME: 04:15
Michael: The system was back to the normal configuration (Forground jobs distributed to three CPUs) and it is working fine since Jun 11. 10 a.m. Therefore we would like to downgrade this call from P1 CRITICAL to P1 ESC. We will keep closely monitor the site status and update you periodically. Regards.

ASSIGNED: BAHIA MICHAEL E DATE: 05/30/91 TIME: 12:59
There is a possibility this problem may be resolved with the fix for SELECT H where it has not occurred in the single CPU environment. However, if not, Duncan has indicated in a Wang Office to Dick Wu dated 5/21 that he could build a special O/S to identify the problem and display a screen message to help isolate.

ASSIGNED: BAHIA MICHAEL E DATE: 05/17/91 TIME: 08:42
As this problem has not occurred yet in the single CPU set up, there is a good chance the problem is either related to hardware problems with CPU2 or 3 or to the SELECT H problem. As we move to CPU3 and then CPU2 we should be able to verify the hardware is working or see a problem and correct it.

ASSIGNED: LAU VICTOR DATE: 05/15/91 TIME: 04:09
Both disks are updated individually (ie not copy from one to another), which disk updated first depend on user's situation to select which disk to be primary. For instance, disk 320 was initially selected as primary and disk 330 selected as secondary, then disk 320 was updated first then followed the

ASSIGNED: LAU VICTOR DATE: 05/15/91 TIME: 04:09
disk 330. In case we have to repair disk 320 for any reason, the user has to software switch disk 330 as primary in the application program. After we had repairedt disk 320, the user's application had to attach disk 320 as secondary, that is update disk 330 first then followed update disk 320.

ASSIGNED: BAHIA MICHAEL E DATE: 05/14/91 TIME: 17:48
This problem is most disturbing as it has not been reported anywhere else & we don't know the reason. It was indicated that D61 is a backup of D71 or vi ce versa. Which surface is updated lst & is the backup individually updated or is it copied from the lst disk? Have a feeling there may be a hardware problem with CPU 2 or 3. As updated in C9/5029 would like CPU 2 & 3 tested to see if a hardware problem exists. Both CPU's should be capable of running error free in the same configuration as CPU 1 is now running. If not the pro blem must be corrected. There is a possibity that the latest O/S may possibl y help although it still has the SELECT H problem. There is also the possibi lity the problem may be related to the SELECT H problem. First though, using the ACTION PLAN in C9/5029, verify CPU 2 & 3 will work in the single CPU environment as CPU 1 does & if not isolate problem & correct. Please, if any errors occur provide the CPU involved, the address that failed, and the error .

ASSIGNED: LAU VICTOR DATE: 05/14/91 TIME: 05:02
The OS installed to user refer as < OS1.2 (4/May) >, no problem from 10/5 up to now under single CPU environment.

ASSIGNED: LAU VICTOR DATE: 05/11/91 TIME: 03:45
Ref to WANG OFFICE, I have to make clear that scratch disk prob happened for both disk 320 and disk 330. Disk platter D61 happened for 6 times, and platter disk D71 happened for 5 times (both platter are heavily acceess by background job). Up to now, changes to H/W are as followed.
Disk 320: DPU, DS power supply, 2275MUX, 22C80, slave disk (D61-D67) replaced
Disk 330: DPU replaced.

ASSIGNED: BAHIA MICHAEL E DATE: 05/10/91 TIME: 18:07
Because there have been no reports of this type problem anywhere else, I feel most likely there is a hardware problem with the DS board or a configuration problem with the DS330 cabinet. Best way to isolate this problem would be to make the DS330 unit DS320 & vice versa. Would suggest to backup data and make switch to see if problem stays with the DS. Right now there is nothing we are doing that would directly fix this problem. If the problem follows the cabinet then that unit needs to be fixed or replaced. If the problem does not follow the cabinet we can hope the O/S fixes or the R4 prom correct the problem. Otherwise we will need to find some way to reproduce & isolate the problem. The call has been upgraded to Critical.

P R O B L E M D E T A I L
CUSTOMER PROBLEM NUMBER C900005009

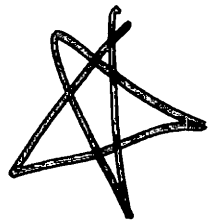
ASSIGNED: LAU VICTOR DATE: 05/10/91 TIME: 01:37
The scratch disk catalogue problem and hang CPU/DISK problem in PTR C90-5029
have very great impact to user. Thess problem also have very great impact
to th user's scheduled installation of similar config for the user's
subsidaries in other countries.
CRITICAL & URGENT !!

ASSIGNED: LAU VICTOR DATE: 05/09/91 TIME: 22:56
Disk D71 was scratched again on 10/5 , the symptom seemed to be similar
Sector 0-3xxxx filled with HEX(00)
Sector 3xxxx-(3xxxx+31) filled with HEX(6DB)
Switch all the 2 background jobs in CPU2 & CPU3 to CPU1 on 10/5.
Raise call to CRITICAL requested by user on 10/5.

ASSIGNED: LAU VICTOR DATE: 05/09/91 TIME: 22:43
Investigate the 2 copies of demaged disk D71 catalogue, found the following
1st copy:
Sector 0-1183 filled with HEX (00)
Sector 1184-1215 filled with HEX(DB6) ie. altogether 32 sectors
2nd copy:
Sector 0-2783 filled with HEX (00)
Sector 3784-2815 filled with HEX(6DB) ie. altogether 32 sectors
ie from the copy on 23/4
Sector 0-959 filled with HEX (00)
Sector 960-992 filled with HEX(6DB) ie. altogether 33 sectors
Replace the 2228C (210-7223 R5M7 Erev6, 210-7224A R6M8 Erev2 PROM 378-4001
R00) by 2228B (210-7223A R5M8 E4
210-7224A R6M8 E2
PROM 2060)
on 9/5 with all WS in CPU1, 2 background job each in CPU2, CPU3.

ASSIGNED: LAU VICTOR DATE: 05/09/91 TIME: 22:29
Had tried by reboot all CPUs, still couldn't get the maximum 900 sectors
DS ramdisk except after power OFF DS.
Install OS pre release 1.2 on 8/5, all 10 W/S attached to CPU1; CPU2 and
CPU3 each with 2 background jobs. Disk 330 was used as primary disk (ie.
first read primary disk 330 for read operation, in case of error, then read
secondary disk 320; for write operation, both disk 330 and 320 are written).
Half day after upgrade, the disk platter D71 (heavily access patter) was
scratched. Then copy the demaged disk for later investigation, and then
restore back data from the image platter D61. After normal operatio for
around 15 mins, platter D71 was scratched again for 2 mores times.
Later user run an application at CPU3 that will write data to disk at a
particular time. When that particular time approach, the platter D71 was
scratched again. After restore back data, tried the application again, the
problem couldn't be duplicated.

ASSIGNED: BAHIA MICHAEL E DATE: 05/07/91 TIME: 18:22
RAM Disk in the DS, addresses D60 and D70, is set with the DS Configuration Utility and should be set up prior to user access especially in a 2 CPU configuration. Looks like once the 2nd CPU accesses the DS, you loos part of the normally available memory. Make sure no one accesses the DS until after the RAM Disk is configured. You will probably need to RESET or re-boot to clear cache initially. If any indices are damaged please indicate the exact addressof the surface and any other information the customer can provide.



ASSIGNED: BAHIA MICHAEL E DATE: 05/06/91 TIME: 18:42
Sorry for delay. In training class last week & this week. Will look into your RAM Disk sector problem & get back to you.

ASSIGNED: LAU VICTOR DATE: 04/30/91 TIME: 04:54
(continue)
581 sectors (ie 1 more) can be allocated. Then power off for replacing slave disk. Retry again, 900 sectors can be allocated this time. Then attach back disk 320 to user application.
Any advice why the maximum ramdisk can't be allocated except power OFF the DPU? (Try to diable the DS cache at the next occurence of scratch disk catalogue. It is a disturbance to user to wait 4 mins for disk ready and pass self test after power OFF DS only for the sake of allocate ramdisk!)

ASSIGNED: LAU VICTOR DATE: 04/30/91 TIME: 04:46
320 Slave disk (ie D61-D67) replaced on 26/4 20:30
(From the the corrupted disk catalogue pattern in update 22/4, it is suspect ed the prob was caused by the DS cache. Hence tell the user to disable the DS cache by allocated the DS Ramdisk. However the maximum allocated ramdisk are 580 sectors for both disk 320 & 330 instead of the allowable 900 sectors. Reboot CPU with only one WS to allocate DS Ramdisk again, still same result. Retry with idle CPU2 (with internal DPU, 112M) with 1 WS, only 870 sectors can be allocated. Power OFF CPU2 (ie power off internal DPU), retry again, 900 sectors can be allocated this time. Detach disk 320 from user application for replacing slave disk. Before power OFF 320, allocated ramdisk again, only

ASSIGNED: LAU VICTOR DATE: 04/28/91 TIME: 22:27
320 slave disk (ie D61-D67) replaced on 26/4 20:00.
(Before replace the slave disk, from the corrupted pattern of the disk o catalogue in 224/4 update, suspect the scratch disk prob caused by the DS cache. Hence tried to disable the DS cache by allocate DS cache to DS Ramdisk However the maximum allocated ramdisk were 580 sector for both 320 & 330 disk instead of allowable 900 sectors. Reboot CPU with only one WS and one partition,same result.Try with the idle CPU2 (with internal DPU & 112M, boot with 1 WS). The maximum allocated ramdisk is 870 sectors. Then power OFF CPU2, allocate ramdisk again, can get 900 sectors this time. After detach disk 320 from the user application, reallocated the ramdisk again for disk

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ASSIGNED: LAU VICTOR DATE: 04/28/91 TIME: 22:27
320, this time get 581 sectors. Power OFF disk 320 for replacing the slave drive. Reallocate the ramdisk again for disk 320, this time can get the maximum of 900 sectors. Then attach back disk 320 to the user application.) Any advice why can't allocated maximum ramdisk from cache except -cont/ power OFF the DS? (Try to disable disk cache in case of next occurrance of scratching disk catalogue. It has to wait for 4 mins before the disk can be d ready & passed the self test. It is a disturbance to user to power OFF DS in order to allocate DS ramdisk.)

ASSIGNED: BAHIA MICHAEL E DATE: 04/26/91 TIME: 15:45
Update acknowledged.

ASSIGNED: WONG TAK LAM DATE: 04/26/91 TIME: 04:42
To H.O.: D61 catalogue area getting scratched 4 times today. After each of the occurrence, user just restored data back onto D61, but getting scratched again after around 10 minutes of usage. However, problem does not occur again (from 12:00 onwards) after user RE-IPL system. CSO will replace D61 to-night with a blank new spare disk. Regards.

ASSIGNED: LAU VICTOR DATE: 04/25/91 TIME: 04:50
For CPU config & DS config pls refer to PTR C900005029 24/4 12:09 & 12:20 late respectively. Scratch platter D61 (slave drive of 320) for 3 times & D71 for one time. These 2 platter are heavily R/W.

ASSIGNED: BAHIA MICHAEL E DATE: 04/24/91 TIME: 12:18
Update acknowledged. Please let me know as soon as drive is replaced. Which drive has been giving the problem and what is the drive configuration in each DS?

ASSIGNED: LAU VICTOR DATE: 04/23/91 TIME: 22:49
All checklists was checked and ok

ASSIGNED: BAHIA MICHAEL E DATE: 04/23/91 TIME: 11:36
First as stated in PTR C9/5029, insure each CPU has a different CPU number as defined in GENPART. This can be checked by keying in the following command, PRINT # CPU. Each CPU must return a different number. Also insure that the only disk address entries in GENPART are 310, 320, 330, & 340. If additional disk related addresses are present it could cause problems. If these things are correct or after they are corrected, the problem persists, replace the drive with the problem. There may be a problem related to alternate addressing. Hold onto the drive because if the problem is the drive I would like it sent to me for testing & possible duplication of the problem so that it can be corrected. Insure also that only the Drive Select 1 drive is terminated (there must be a drive select 1 drive if any winchester s are installed, that the sw settings accurately match the drives connected

ASSIGNED: BAHIA MICHAEL E DATE: 04/23/91 TIME: 11:36
(all 4 sw's off for no drive), & that the B cable connector for the 10 Meg Removable Winchester is not used with a fixed winchester. The diagram on the back cover will give the correct sw settings and identify the B cable connect ors.

ASSIGNED: CHUI SIMON DATE: 04/22/91 TIME: 04:42
After the third occurrence, field people using BA mode copy sectors 0 to 3000 for analysing. Found out that:
From sector 0 to 959, it contains HEX(00).
From sector 960 to 992, it contains HEX(6DB).
From 992 upto 3000, it contains original old data (as refer to D71).
The catalogue area of the drive is = 100 sectors.
End catalogue = 65000 sectors.
Current end = 14508 sectors.
It is a 112 meg drive. After the third problem occurrence, the chain of the controller used in address 320 had been replaced. It contains 2275mux *1, 22C80*1. The 320 DPU had also been replaced except for the two drives in the cabinet.

ASSIGNED: LAU VICTOR DATE: 04/21/91 TIME: 21:50
Prob happened again the third time on 22/4 11:00 on platter D61, no prob for D71. Any information?

ASSIGNED: LAU VICTOR DATE: 04/20/91 TIME: 01:57
Prob happened on twice in subsidary site on platter D22.
Prob happened 1st time in this user site on 16/4 on disk platter D61 & D71.
Prob happened again on 19/4 on platter D61. DS address 320 disk DPU was replaced.

ASSIGNED: CHUI SIMON DATE: 04/19/91 TIME: 05:15
Initial escalate for assistance. Pls advise ASAP since it is a 24 hr paging company and it can't afford any data lost or down time.

ASSIGNED: LAU VICTOR DATE: 04/18/91 TIME: 20:50
Freq: 3 times

W A N G L A B O R A T O R I E S I N C .
PROBLEM TRACKING AND REPORTING
CUSTOMER COMPLETE DETAIL REPORT
H E A D E R I N F O
CUSTOMER PROBLEM NUMBER C900004381

PROBLEM NUMBER:	C900004381	CUST NAME:	HUTCHISON PAGING LTD
PRIORITY	P1	CUST NUMBER:	HH 00000001370
PROBLEM TYPE:	ESC	CUST CONTACT:	VICTOR LAU
LINK TO PROB NO:	NOT LINKED	CUST CONT PHONE:	88-047-26 -
		CUST ADDRESS 1:	
		CUST ADDRESS 2:	
SYSTEM MODEL NO:	CS/386-10N	CUST ADDRESS 3:	
GEN SYST MODEL:	2200 CS 386 CPU	CUST CITY:	
O. S. VERSION:	01 10	CUST ST/PROV:	
HW MODEL NUMBER:	DS	CUST ZIP:	- CUST RDB: H9906
SW MODEL NUMBER:	OS	CUST COUNTRY:	
SW VERSION:	01 10		
		RDB ASSIGNED:	8760
		PERSON ASSIGNED:	BAHIA MICHAEL E
PART NUMBER:		ORIG NAME:	LAU VICTOR
PART NUM REV:		ORIG EMPL NO:	HH-99123
SERIAL NUMBER:		ORIG PHONE:	- - -
		ORIG RDB:	H9906
CALL TRKG DATE:	00/00/00 00:00	NETWORKED:	N
CALL TRKG NO:		RES DEPLOYED:	
ORG ACT/SYM/ACN:		DATE ENTER PTR:	12/05/90
STATUS DATE:	04/17/91	DATE TO R&D:	019901206
STATUS CODE:	S 0 212	WKDAYS IN R&D:	146.05
STATUS ABBREV:	FUTR FIX C	TOT WKDAYS OPEN:	146.55
STATUS DESC:	FUTURE FIX TESTED & TARGETED FOR RELEASE		

PROBLEM SUMMARY :LAU VICTOR DATE: 12/05/90 TIME: 21:38

PROB: When hogging disk platter with SELECT H ON / $OPEN commannd, the slave address of the daisy-chain drive in the 2200DS was also be hogged together

H/W: CS386-10N x3, 2200DS (112M+112M with R3 PROM on DPU), 2275MUX x2, 22C80 x4, 2236MXE x3 in each CPU

S/W: CS/386 OS 1.10

PROBLEM NO: C900004381
STATUS CODE: S O 212 STATUS ABBR: FUTR FIX C DATE ENTERED: 07/01/91

ORIGINAL	MODEL NUMBER	GENERIC MODEL		VERSION
SYSTEM :	CS/386-10N	2200 CS 386 CPU	O.S:	01 10
HARDWARE:	DS	MEDIUM STORAGE		
SOFTWARE:	OS	WANG VS OS SYST	SWR:	01 10

RESOLUTION	MODEL NUMBER	GENERIC MODEL		VERSION
SYSTEM :	CS/386-10N	2200 CS 386 CPU	O.S:	01 10
HARDWARE:	DS	MEDIUM STORAGE		
SOFTWARE:	OS	WANG VS OS SYST	SWR:	01 10

PART NO. PART NO. REVISION

RESOLUTION TEXT :BAHIA MICHAEL E DATE: 07/01/91 TIME: 16:24
SC595. This problem where with SELECT H ON if a Master address is hogged, the like slave address was also hogged from other CPUs, was resolved with the R3E prom. The prom was installed on 6/7 and there have been no problems.
Problem solved with R3E (R4) prom.

ASSIGNED: BAHIA MICHAEL E DATE: 07/01/91 TIME: 14:05
Unlinking call for purpose of transferring back to field for closing as requested by the field. No problems since installing R3E (R4) prom on 6/7.

ASSIGNED: LAU VICTOR DATE: 06/30/91 TIME: 21:42
No problem after install R 3-E PROM, call can be closed.

ASSIGNED: BAHIA MICHAEL E DATE: 06/21/91 TIME: 10:29
If no problems reported as of July 1st will de-escalate call back to field to be closed.

ASSIGNED: BAHIA MICHAEL E DATE: 06/14/91 TIME: 16:19
Hog of related slave address by 1st CPU from 2nd CPU when only a master address hogged corrected with R4 prom. Monitoring site at this time.

ASSIGNED: CHUI SIMON DATE: 06/13/91 TIME: 03:25
To Michael: The R4 prom had been tested in multi-DS environment. It won't hog the slave address. The DS310 is not yet installed of R4 prom, since it is a backup unit and will return to HKCSO after problem fix at site.

ASSIGNED: BAHIA MICHAEL E DATE: 06/12/91 TIME: 15:36
cording to Wang Offices received from Hong Kong, R4 prom has been installed in DS320 & DS330. Has system been set up in multi-CPU configuration to verify this specific problem has been resolved? Is DS310 to be upgraded to R4? If so, when?

ASSIGNED: BAHIA MICHAEL E DATE: 06/05/91 TIME: 15:31
Do not want to de-escalate this call because of the newness of the prom and the dramatic changes it effects. According to our Action Plan we should be testing this prom in-house in a multi-plexed environment but initially let's test with just a single CPU. When do you expect to have the hardware set-up in house to begin testing this prom?

ASSIGNED: CHUI SIMON DATE: 06/04/91 TIME: 21:56
Michael, Before the prom installation, we would like to have a stable OS installed at the site. This may help to avoid any unexpected result which mixed up the situation. By the way, pls de-escalate the call back as we can monitor the progress in our level. Thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 05/29/91 TIME: 17:13
Update acknowledged.

ASSIGNED: CHUI SIMON DATE: 05/29/91 TIME: 01:48
Michael, the proms and the fax have been rec'd. We will arrange to install

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ASSIGNED: CHUI SIMON DATE: 05/29/91 TIME: 01:48
at the idle CPUs to verify it. Will keep you informed of the test result.

ASSIGNED: CHUI SIMON DATE: 05/23/91 TIME: 23:22
To HKCSO: According to R&D info, the proms had been delivered via DHL on May 20. AWB # 609160285.

ASSIGNED: CHUI SIMON DATE: 05/22/91 TIME: 01:23
Michael, Ack'd your update, thanks.

ASSIGNED: BAHIA MICHAEL E DATE: 05/20/91 TIME: 14:02
Will be in Training tomorrow through the end of the week. Ray Turcotte from my group has 1 R4 prom & the DS Utility S/W. He will be mailing it to you. We are in the process of getting a 2nd prom. If there are any questions regarding the shipping and delivery of the prom & the Utility disk between now & Friday, May 24, please send Ray a Wang Office.

ASSIGNED: BAHIA MICHAEL E DATE: 05/17/91 TIME: 18:35
Talked with Stephen Chung yesterday. Would like to get an R4 prom to test in-house. Prom will not be installed on-site until Home Office ok. Have prom and Utility program ready but do not have details ready for installation procedure and configuration of drives. Giving training class next week so unsure when installation procedure will be available as I am now learning it myself. Will mail prom & Utility Disk Monday & FAX instructions when available.

ASSIGNED: BAHIA MICHAEL E DATE: 05/14/91 TIME: 15:38
In house testing looks good on the new prom. We are now in the process of sending proms to 2 beta sites which should happen this week. In a week or 2 we should have a good idea where we stand.

ASSIGNED: CHUI SIMON DATE: 05/13/91 TIME: 03:00
Michael, Any update status of the test result R4 prom and can you send one set of proms to us? We want to test it with OS 1.2.

ASSIGNED: BAHIA MICHAEL E DATE: 04/23/91 TIME: 12:13
The fix for this problem is the DS prom which we are currently testing. O/S 1.2 is being delayed by the SELECT H (platter hog) problem where in a multi-plexed environment (2 or more CPU's) an intermittent hang occurs. Once this problem is resolved 1.2 will be released. Taiwan is having trouble e getting this to work 100% but appears to be close to a final resolution.

ASSIGNED: CHUI SIMON DATE: 04/22/91 TIME: 20:59
Michael, as refer to resolution of PPTR, pls clarify what is the actual fix for this issue. By the way, do you have any idea about the release

ASSIGNED: BAHIA MICHAEL E DATE: 01/22/91 TIME: 16:33
able to include this fix. Hope to have a prom in a 2 to 4 week period. We are still waiting on a new maintenance rel we expect any day which we will te st against this problem but it looks like the problem is in the prom.

ASSIGNED: BAHIA MICHAEL E DATE: 01/18/91 TIME: 16:13
New maint rel with fix for platter hog not received yet. Taiwan R&D set back by h/w problem with equipment needed to make changes. Hoping to have something next week.

ASSIGNED: CHUI SIMON DATE: 01/15/91 TIME: 03:21
Michael, did you receive the latest release of s/w to verify the problem? Pls advise.

ASSIGNED: BAHIA MICHAEL E DATE: 01/10/91 TIME: 11:31
Update acknowledged.

ASSIGNED: CHUI SIMON DATE: 01/09/91 TIME: 23:11
Michael,Ack'd update,thanks.Pls keep me informed the test result of the s/w that you will receive this week.

ASSIGNED: BAHIA MICHAEL E DATE: 01/08/91 TIME: 18:46
Product call P2/16878 opened on this problem to increase visibility. Linking call to P2/16878. See previous comment.

ASSIGNED: BAHIA MICHAEL E DATE: 01/08/91 TIME: 15:32
Sorry have not got back to you earlier. Your problem is not fixed on latest maintenance release. We do however expect it will be fixed on the next relea se due here any day. Hopefully we will have it this week. Will open a Product PTR on this problem to increase visibility.

ASSIGNED: CHUI SIMON DATE: 01/08/91 TIME: 00:17
Miahael, any update status of the test result?

ASSIGNED: BAHIA MICHAEL E DATE: 01/02/91 TIME: 12:59
We have a new maitenance release but there is still a problem with SELECT H. However, your specific problem may be fixed. We are testing out the new rele ase today. Will test against your problem & update you on current status whe n testing is complete. Should know by Friday.

ASSIGNED: CHUI SIMON DATE: 12/27/90 TIME: 04:24
Michael, pls forward the s/w to us for testing when it is available.

ASSIGNED: BAHIA MICHAEL E DATE: 12/21/90 TIME: 17:43
Have not had opportunity to test this problem myself yet but have brought to the attention of R&D and a fix should be in the next release now expected to

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ASSIGNED: BAHIA MICHAEL E DATE: 12/21/90 TIME: 17:43
be ready the first week in January. No one will be available to monitor PTR next week. Next working day is 1/2/91. Merry Christmas & Happy New Year.

ASSIGNED: LAU VICTOR DATE: 12/19/90 TIME: 04:08
Getting trouble in retriving 1.1A from office, anyway the file @MVP is retreived. Testing in user site, found the following with $OPEN! command:
1) With OS 1.10, hogging Disk D21 will HOG daisy chain Disk platter D61 altogether from loacl CPU or multiplexed CPU.
2) But with OS 1.1A, hogging Disk D21 will not hog disk D61 if the issuing hog disk command workstation & the workstation reading disk platter D61 are reside on the same CPU. But the disk platter D61 is still be HOGGED for the WS in the multiplexed CPU. i.e the issuing hog disk WS & the read disk WS are from different CPU.

ASSIGNED: BAHIA MICHAEL E DATE: 12/11/90 TIME: 11:29
Update acknowledged.

ASSIGNED: CHUI SIMON DATE: 12/10/90 TIME: 21:36
To R&D:Will update you after verify at user site to-day.

ASSIGNED: BAHIA MICHAEL E DATE: 12/10/90 TIME: 18:53
In testing done Friday & today, this problem could not be duplicated on Maint Rel 1.1A. Initially had some difficulty as 1 of the DS's used for testing had a down rev prom. Please test as soon as possible as R&D is currently in Lowell & any O/S problem can now be fixed quicker. At the end of month R&D group going back to Taiwan & this will slow down the fix process.

ASSIGNED: BAHIA MICHAEL E DATE: 12/06/90 TIME: 17:04
Checked problem against 1.1 with other master addresses & no problem. Will go to lab to test against a unit with slave addresses. However, we have corrected some Hog problems previously reported. The fixes are in Maint Rel 1.1A which will be sent today via Wang Office for this problem & C900004379. Please let me know as soon as possible if this resolves your problems as Taiwan R&D is here now & fixing all open O/S bugs. If you can identify any bugs we can probably get them corrected fairly quickly.

ASSIGNED: CHUI SIMON DATE: 12/06/90 TIME: 05:25
Initial escalate for assistance.Pls advise.

ASSIGNED: LAU VICTOR DATE: 12/05/90 TIME: 21:38
i)
```
10 SELECT H ON: $OPEN T/D21
20 PRINT "Disk D21 is hogged"
30 KEYIN A$: $CLOSE T/D21
40 PRINT "Disk is released"
50 KEYIN A$: GOTO 10
```

RUN

LISTDCT/D61

W A N G L A B O R A T O R I E S I N C .
PROBLEM TRACKING AND REPORTING
CUSTOMER COMPLETE DETAIL REPORT
H E A D E R I N F O
CUSTOMER PROBLEM NUMBER C410005722

PROBLEM NUMBER:	C410005722	CUST NAME:	HENRY R KELLER ASSOCIATES INC
PRIORITY	P2	CUST NUMBER:	00 00000660670
PROBLEM TYPE:	ESC	CUST CONTACT:	ERIC KELLER
LINK TO PROB NO:	NOT LINKED	CUST CONT PHONE:	-716-874-1644
		CUST ADDRESS 1:	2005 SHERIDAN DR
		CUST ADDRESS 2:	
SYSTEM MODEL NO:	2200MVP-512	CUST ADDRESS 3:	
GEN SYST MODEL:	2200 MVP CPU	CUST CITY:	BUFFALO
O. S. VERSION:	03 00	CUST ST/PROV:	NY
HW MODEL NUMBER:	2200MVP-512	CUST ZIP:	14223-0000 CUST RDB: 3134
SW MODEL NUMBER:		CUST COUNTRY:	
SW VERSION:			
		RDB ASSIGNED:	3110
		PERSON ASSIGNED:	
PART NUMBER:		ORIG NAME:	KNORR II RICHARD K
PART NUM REV:		ORIG EMPL NO:	00-10892
SERIAL NUMBER:	OL2833	ORIG PHONE:	- - -
		ORIG RDB:	3110
CALL TRKG DATE:	00/00/00 00:00	NETWORKED:	N
CALL TRKG NO:		RES DEPLOYED:	
C... ACT/SYM/ACN:		DATE ENTER PTR:	02/27/91
STATUS DATE:	05/08/91	DATE TO R&D:	000000000
STATUS CODE:	H C 122	WKDAYS IN R&D:	0.00
STATUS ABBREV:	DEV REPLAC	TOT WKDAYS OPEN:	0.00
STATUS DESC:	DEVICE REPLACEMENT		

PROBLEM SUMMARY :KNORR II RICHARD DATE: 02/27/91 TIME: 10:32
The customer hardware consists of a 2200mvp chassis with an updated mother-board that allows the VLSI CPU board with 8meg of memory, DS cabinet containing one floppy, one tape drive and two 64 meg drives. The software package they run is T.O.M.. Intermittently the backup program will fail with an I93 when backing up one platter (D17) to the second disk. The failure is always within specific sector range around 57600. Rerunning of backup will go successfully, sometimes a third try is required. All other day to day operations have no problems. Tape backups are only done monthly and they too have no problems. This has been occurring since early Jan. with a frequency of once aweek to three nights in a row. We have used differant output platte replaced the input disk drive, moved other files to the suspect sectors, replaced DPU, disk drives cable harness, DS power supply, disk cable to the CPU,and CPU itself. The drive was formatted with the new DPU that contains an R3 prom.

R...OLUTION TEXT :BAHIA MICHAEL E DATE: 05/06/91 TIME: 18:30
HC122. Backup problem never totally resolved. Problem in DS related to Winc drives & 150 Meg Tape. Field has replaced CPU and DS circumventing the problem.

ASSIGNED: BAHIA MICHAEL E DATE: 05/06/91 TIME: 18:33
Sending call back to field to be closed as requested.

ASSIGNED: KNORR II RICHARD K DATE: 04/30/91 TIME: 08:57
(continuation of previous update) In our last phone call I committed to having the equipment sent to you, well I did not call in time. It has been sent to American Van Lines storage. the Serial No.s are DS 541552E CS OL2833 Mark Ota could assist you in locating the equipment. Again, I apoligize. We are now ready to close this call please return control and I will close this call.

ASSIGNED: KNORR II RICHARD K DATE: 04/30/91 TIME: 08:34
I am sorry Mike , I did not contact Buffalo office immediately after our

ASSIGNED: BAHIA MICHAEL E DATE: 04/26/91 TIME: 15:42
Still would not mind getting the DS sent here. Woulkd like to identify the problem for future reference. However, will be in Training next 2 weeks so co7uld not start to work on until then. Can we get the DS?

ASSIGNED: PATTERSON MARY SUE DATE: 04/25/91 TIME: 10:42
Mike, Keller is up and running on the exchange CS and DS, no problems have occurred. The "old" MVP and DS have been sent back to the Buffalo office and are going to be picked up this week and sent back to reman. There is nto a requirement to have field or R&D "fix" the DS problem. In fact, Eric placd an order early in the week for new equipment. Thanks for your help with this you can send the call back to 3110.

ASSIGNED: BAHIA MICHAEL E DATE: 04/23/91 TIME: 12:16
Status please. Any date set to ship back customers DS yet. Expected to be in Training next 2 weeks starting Monday, 4/29.

ASSIGNED: BAHIA MICHAEL E DATE: 04/15/91 TIME: 17:39
Talked with the DTS today. DS & CPU came in Friday & all went smoothly. DS did not have a tape drive which the BM will take care of. Cust wants to leave his original DS on site for a week or so as insurance. I will probably be go ing to Training on 4/29, so if DS is not received by early next week, there will probably be a 2 week delay to fixing the unit because of Training.

ASSIGNED: BAHIA MICHAEL E DATE: 04/15/91 TIME: 09:21
Update acknowledged.

ASSIGNED: PATTERSON MARY SUE DATE: 04/12/91 TIME: 11:33
MIKE, THE DS ARRIVED TODAY---ACTION PLAN AS STATED IN YOUR 4/11 UPDATE IS BEING CARRIED OUT.

ASSIGNED: BAHIA MICHAEL E DATE: 04/11/91 TIME: 14:47

ASSIGNED: BAHIA MICHAEL E DATE: 04/11/91 TIME: 14:47
2 64 Meg drives brought into lab Fri, 4/5. 1 Drive bad, hangs in access. 2nd drive ran fine all weekend. New drive arrived Monday and both drives ran error-free trough Wednesday when picked up by Paul Rousseau for shipment to Buffalo. Talked with customer several times this week. Problems continue du ring backup, tape connected. Formatting seems to temporarily resolve backup problems but keeps coming back. Formatting D12, D13, & D14 allowed backups o f those surfaces to run but as long as the problem is not corrected reliabili ty is in question & problems may occur at any time. DS expected to arrive in Buffalo Friday morning & brought directly to site. Customer today started ha ving problems formatting but it still working. 3rd drive needs to be install ed & formatted in DS. If all goes well DTS will be on site and will will test briefly with diags after format. Will then test with tape & disk backup s overnite & if successful should be operational on new DS Sat AM. Plans are now to send DS back to me to resolve problem. Once corrected & thoroughly tested, unit will be sent back to site giving cust 2 DS's for time being to get thru current crisis. Management has also decided to replace the cust's CPU with a CS/386 which initially will be used with a VLSI board for the customer's convenience. It is expected to arrive Tuesday, 4/16.

ASSIGNED: PETRIV YURI S DATE: 04/04/91 TIME: 16:53
drives on order we bring them by when i get them

ASSIGNED: BAHIA MICHAEL E DATE: 04/04/91 TIME: 14:57
last comment continued: insure the drive possibility is eliminated. There may possibly be a problem with 1 of the drives induced by use or connection of the tape drive. If all drives are affected the problem is more likely the DS board or 1 of the drives affecting the others. At any rate we need to clearly mark the drive so that they are easily identified & not re-installed at this site.
4. Two drives will be tested here, provided by the district, to insure reliability.
5. The tape drive will remain disconected until we have confidence the DS is running fine for at least 2 weeks unless otherwise requested by the cust.

ASSIGNED: BAHIA MICHAEL E DATE: 04/04/91 TIME: 14:49
Verify by customer came up clean. Ce on site yesterday & was able to duplica te backup problem. In doing a DATALOAD test to both D15 & D51 there was a slight hesitation at certain areas but nothing definite. In rerunning the backup, came up with a verify error around 9500 once, and hangs in different spots several other times. Arrangements are being made to go on site. Right now there looks to be a problem drive or some residual effect from the Tape problem encountered a week ago Saturday which seemed to disappear when the tape drive was disconnected. Action Plan:
1. D15 must be formatted because there is a marginal sector at 9500 approx.
2. After formatting, the backup procedure between D15 & D51 should be run to

ASSIGNED: BAHIA MICHAEL E DATE: 04/04/91 TIME: 14:49
see if the problem is resolved. If this backup runs clean on multiple tries, and there are no other problems running other backups, all 3 drives should be clearing marked to identify them & the D15 drive replaced.
3. If the backup does not run clean, D51 should be formatted and the backup run again to see if this resolves the problem. Backup should also be tested against other surfaces. If only these 2 surfaces have problems, both drives should probably still be replaced even if format corrects. If multiple surfaces have problems, but it is restricted to these drives replace both. If all 3 drives try the DS board. The problem may be induced by only 1 of the drives or possibly by the last tape problem but at this time we need to

ASSIGNED: BAHIA MICHAEL E DATE: 04/03/91 TIME: 14:28
CE called in. Cust getting hangs at different spots trying to restore D15 to D51. Took 6 tries to complete. Will have customer verify surfaces to see if any errors come up. If no errors CE will go on site to take closer look at disk surfaces. Tape Drive is still disconnected. Most likely have problem w/ disk surface or drive. Analyzer is still out there and should be checked against the occurrence of the problem. We also need to check for temperature related problems. If room where DS is located is hot we made need to address a possible temperature related problem. If data is written at a temperature greater than 20 degrees different from when it is read there could be read problems. Other than 11 days ago when the tape drive was used, there have be en no errors in the last 2 weeks. Though the problem may be related we need to look at it as new so that nothing is overlooked. We are still looking at a problem with the DS or something in the environment affecting it.

ASSIGNED: BAHIA MICHAEL E DATE: 03/26/91 TIME: 15:44
Mailed O/S 3.4 to CE today to possibly address performace issues brought up by customer on recent visit. Cust to talk with programmer at Northwest Sourc e Group as these performance issues began with latest upgrade of Speed S/W which included our 3.0 or 3.1 O/S.

ASSIGNED: BAHIA MICHAEL E DATE: 03/26/91 TIME: 14:28
CE called in yesterday. No problem running backups last week. But, on Saturday, customer did a tape backup & after doing so found they were unable to do their regular backups. Backups would hang at different places, but no error was given. CE was able to circumvent the problem by disconnecting the tape drive. Backup ran without a problem. Sys Admin is going on vacation starting today and will not be back until April 4th. Spoke with customer & he would prefer to wait until he returns to address problem. As agreed upon with the customer & CE, the CE will call the customer when he returns to make arrangements to go on site. CE will bring a 150 Meg Tape drive, the cable for the tape, a DS board, & a Power Supply. Most likely there is a problem with the DS board induced possibly by the problem tape drive we had to replac e. If the CE can duplicate the problem it should not be difficult to isolate

ASSIGNED: BAHIA MICHAEL E DATE: 03/26/91 TIME: 14:28
the cause. As before, surfaces may need to be reformatted to verify problem resolved. CE to call me when site visit arranged so that I can be available for phone support if needed. Left message at DTS's office to call.

ASSIGNED: BAHIA MICHAEL E DATE: 03/21/91 TIME: 16:34
On site Tuesday evening with DTS & CE. Following up on Action Plan, CE had disconnected Tape Drive after last customer failure. With Tape disconnected error still occurred so all surfaces were formatted as planned. After formatting & with drive disconnected problem could not be duplicated. Cust ran backup all nite, the nite before we came without failure. When we arrived we verified Backup worked. Connected Tape and Backup failed shortly thereafter. Disconnected drive & failure remained. As only had written to the backup surfaces, we reformatted the backup surfaces. This corrected the problem. The BACKUP program was misleading in that it indicated the Backup failed reading the source disk when in actuality it had failed writing to the destination disk. Replaced the Tape Drive & tested all night without fail.

ASSIGNED: PETRIV YURI S DATE: 03/21/91 TIME: 14:16
still working ok. will continue to monitor Thanks Yuri

ASSIGNED: BAHIA MICHAEL E DATE: 03/18/91 TIME: 13:46
DTS actively working call is now in training. New England District has reque sted Home Office on-site support. Arrangements have been made to go on-site Tuesday afternoon at 3PM.

ASSIGNED: BAHIA MICHAEL E DATE: 03/13/91 TIME: 15:32
DTS called in today. The 210-9746 Dual Controller has been installed & the voltages have been adjusted as discussed in the previous status comment. Error reoccurred during yesterdays backup w/ D17. D17 now should be reformat ted to insure the dataon D17 is 100% clean with the 9746. If the error occurs after formatting the agreed upon action plan would be:
Since on Saturday with a limited configuration the system ran flawlessly, to go back on site and work backwards.
That is to run backup with all components installed & start to remove or disconnect pieces to isolate. First we might try disconnecting the tape unit in the DS and the 3 workstations which were last to be connected on Sat befor e problems returned. DTS to make arrangements.

ASSIGNED: BAHIA MICHAEL E DATE: 03/11/91 TIME: 16:23
Talked w/ DTS Butch Knorr today. Last Thursday installed new 64 Meg in place of 2nd drive. Drive tested good but still had problem with Backup. On Sat DTS on site all day. Had previosly replaced all hardware in DS except 1st & 3rd 64 Meg drives so removed 1 at a time to isolate. When tested system with minimum configuration and after replacing 7342 Dual Controller w/ 6541-2 Single Controlller was able to backup successfully. When all hardware was

P R O B L E M D E T A I L
CUSTOMER PROBLEM NUMBER C410005722

ASSIGNED: BAHIA MICHAEL E DATE: 03/11/91 TIME: 16:23
reinstalled but still using 6541-2 Disk controller again had intermittent I93 during Backup usaually at about the same point. Action Plan:
1. Disk Controller to be replaced with lateszt Dual Controller, 210-9746, to be placed closest to the CPU board. (7342 Dual Controller likely suspect for at least some of the problems as there are known problems using with the DS.) 3/13
2. With CPU fully loaded voltages should be checked at the last I/O slot. This has already been checked but may want to double check. 3/13
3. DS is at maximum configuration. Adjust +12V to 12.5, range is 11.4 to 12.6V. This had helped before with backup problems to tape. 3/13
4. If an I93 occurs on a particular surface the customer should document the time & surface & reformat that surface in case data on that surface is margin al.
5. Should an error occur on a surface after being formatted the tape drive will be removed to reduce the load on the PS temporarily.

ASSIGNED: BAHIA MICHAEL E DATE: 03/05/91 TIME: 18:30
Drive ran Multi-Disk all weekend with only 1 soft error on 4th surface. By mistake 1st surface was not being tested. Yesterday restarted Multi-Disk against all 4 surfaces & no errors. Have copied Multi-Disk Diagnostics to 1st surface. Would suggest installing drive at end of day at open address & run Multi-Disk overnight. In morning can verify ran error-free & connect up as replacement drive. This will allow us to verify everything is working as it should be before customer use. Drive picked up this afternoon by Paul Rousseau for shipment to Buffalo. Spoke with Butch concerning testing of drive on-site before turning it over to customer. Please update when drive received.

ASSIGNED: BAHIA MICHAEL E DATE: 03/01/91 TIME: 11:15
Have talked with Yuri Petriv about this problem. The disk drive is still the most likely cause. Yuri is expected to bring a 64 Meg drive into my office today which we will test over the weekend & ship to you next week. Will update you Monday on our test results.

ASSIGNED: KNORR II RICHARD K DATE: 02/27/91 TIME: 11:40
My current plan is to obtain the chassis with mother board and power supply assembly any other thoughts or suggestions.

ASSIGNED: KNORR II RICHARD K DATE: 02/27/91 TIME: 10:32
I have no advice on how to duplicate.

SEND THURSDAY 09/17/87 08:20 AM

TO:
SUBJECT: DS MULTIPLEXING

TO: MIKE BAHIA FROM: KIRIT BAXI
SUBJECT: DS MULTIPLEXING DATE SENT: 09/04/87

MIKE
REF TAC CALL NO 87215001
THE SITUATION IS GETTING VERY CRITICAL SOFAR WE HAVE VIRTUALLY CHANGED EVERYTHING ON THE SITE I.E. MUX POWERSUPPLIES DRIVES CABLES ELIMINATED GROUND LOOPS ETC WE STILL GET INTERMITTANT I 92 FOLLOWED BY I90'S. THE 2275MUX WORKS OK WITH PHOENIX DRIVE. KERRIDGE ALSO HAVE THE SAME PROBLEM IN UK. BASICALLY NO DS IS WORKING IN MUX MODE IN EUROPE. IF R&D WANT TO LOOK AT THE PROBLEM KERRIDGE IS THE BEST SITE AS THE PROBLEM OCCURS IN LESS THEN A DAY. MY FEELING IS THAT THERE IS A TIMING ERROR ON DS POSSIBLY VENDOR CHIPS. WE NEED SOLUTION FAST. I HAVE STOPPED KERRIDGE SHIPPING ANY MULTIPLEXED DS SYSTEMS. IF THE FIX IS NOT FORTHCOMING SHORTLY I MAY HAVE TO STOP ANY DS MULTIPLEXED IN EUROPE.
REGARDS
JOHN BAXI

---------- REPLY ----------

JOHN, 9/16/87
HAVE FORWARDED YOUR WANG OFFICE MEMO TO R&D. HAD PREVICUSLY PHONED THEM ALSO ON THIS MATTER. MIKE RILEY TOLD ME YESTERDAY THAT AT THIS POINT IT LOOKS LIKE A FIX IS AT LEAST 2 WEEKS AWAY.

MIKE BAHIA

WANG OFFICE ELECTRONIC MAIL 10/16/87 15:20 PM PAGE: 1

TO: MIKE BAHIA MSC12E/LOWELL
FROM: GARY LOPER
SUBJECT: 2275 MLX BOARDS DATE: 10/14/87

MIKE, I HAVE HEARD THAT THERE ARE SOME PROBLEMS WITH THE CS/DS SYSTEMS HANGING WHEN USING THE 2275 MLX BOARD. AT ONE SITE WE HAD HERE IN CHICAGO, THE SYSTEM WOULD HANG MANY TIMES A DAY, UNTIL WE REPLACE THE 2275 MLX FOR THE THIRD TIME. THE TWO BOARDS THAT FAILED HAD 3 PINS ON THE DISK CONNECTOR, THAT ARE NOT USED TIED TO LOGIC GROUND, (33,34,35 I BELIEVE). THE BOARD THAT IS WORKING GOOD IN THE SYSTEM NOW DID NOT HAVE THESE PINS GROUNDED. ANY ECO'S OR TEMPORARY FIXES THAT YOU HAVE, WE WOULD BE WILLING TO TRY OUT HERE. KEEP US INFORMED. THANKS

GARY LOPER M/S 212-100
2122 YORK RD
OAKBROCK, IL. 60521

I96

37, 38, 39.

35, 34, 33 NAT'L CHIPS NEEDED TO BE GROUNDED.
SHOULD BE GROUND

TI CHIPS DO NOT REQUIRE THIS CHANGE

L19 PIN 1 TIED TO FEEDTHRU ABOVE

B7215001

EPLYING TUESDAY 01/26/88 02:29 PM

O:
UBJECT: DS 10 REM DRIVE

O: MIKE BAHIA FROM: MARTY NMN SCHARF
UBJECT: DS 10 REM DRIVE DATE SENT: 01/22/88

HAVE JUST RECEIVED SOME INFO ON THIS DRIVE FROM A CE.

A COUPLE OF HIS PROBLEMS WAS A CRASHED DRIVE AND A NOISEY DRIVE THAT WOULDN'T WORK UNLESS IT WAS LAID ON IT'S SIDE. HE LATER FOUND THAT THE DRIVE ON IT'S SIDE HAD TO BE BECAUSE THE MAGNET THAT IS GLUED TO THE SPINDLE, CAME OFF. THUS CAUSING THE REM PACK TO FLOAT. IN THE PROCESS OF FLOATING, IF HEADS ARE LOADED, THEY MAY CRASH OR BE DAMAGED. OTHERWISE THE PACK WILL PULL AWAY FROM THE SPEED SENSOR AND NOT BE DETECTED AS UP TO SPEED.

IT WOULD BE INTERESTING IF ALL OF THE REM 10 MEG DRIVES ARE HAVING SIMILAR PROBLEMS. MAYBE ALL IT WILL TAKE IS A BETTER GLUE JOB!

---------- REPLY ----------

MARTY,
ALSO WILL FORWARD THIS TO THE PRODUCT SUPPORT ENGINEER FOR HIS INFORMATION AS THIS WOULD BE IMPORTANT SHOULD OTHER DRIVES HAVE THE SAME PROBLEM.

THANKS,
MIKE B

WANG LABORATORIES, INC., SUITE 1800, 520 PIKE STREET, SEATTLE, WA 98101 • TEL: 206/340-6120

Mike,

These are the two 20-Meg drives that failed when using Redshaw install software on a 2200 DS. Failure that occurred was an I-92 and it appeared that it occurred at completion of the format of the first surface followed immediately by an execution of a scratch statement. Additionally, we found that if you keyed in the immediate mode statement:

SCRATCH DISK T/D10, LS=10 END = 38911

and repeatedly executed this statement, that the drives also also failed with either and I-92 error or a "hang".

Cal Blackburn, DTS
(206) 340-6653

DS CONFIG - 20 MEG & 1.2 MEG FLOPPY. (NO OTHER WANG'S)

DS1

ITEM SUBJECT: DAVE KREBILL

RE: 2200 DS CABINET--KEY ON THE B CABLE ON 32 MEG WINCHESTER WAS IN THE WRONG PLACE.

ITEM SUBJECT: 2200 DS PROBLEM

JOE,

WE HAD A PROBLEM WITH A 2200DS. WE WERE GETTING I93 ERRORS ON A 32MEG DRIVE. THE KEY ON THE B CABLE WAS BACKWARDS. I THOUGHT YOU MIGHT LIKE TO KNOW THIS.

MARK HARRIS DTS-NED

TAC

Problem Call

Control Number 08281011

Contact Name DAVE HERRING Position CE
Rdb # 3423 Tdx # Phone # 717 761 6134 Ext #

System Type 2200DS Device Type CPU
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 STRICKLER INS Phone # 717 263 4179
Address 3M15 City CHAMBERSBURG State PA
On Site Contact Name

Problem (*) Solution (+)

*EMP 28171
*DISPATCH 619931
*I92'S INSTALL NEED TO KNOW ABOUT JUMPER SETTINGS AND
*TERMINATIONS
10/7/88: GETS I92 ERROR ON SCRATCH AFTER FORMAT. APPEARS
TERMINATION INCORRECT FOR WINCS. ONLY THE WINC ON
DRIVE SELECT 1 IS TO BE TERMINATED. CE TO CORRECT
& TEST. IF STILL FAILING WILL TEST 1 DRIVE AT A
TIME. IF THIS IS CASE MOST LIKELY HAS BAD DRIVE OR
A CABLE AS DS BRD HAS BEEN CHANGED. (10MIN) MIKEB
>NO DRIVES DRIVES IN DS WORKING NOW. REMOVED ALL
WINC'S & CHANGED SW SETTINGS & GETTING I92 TO TO
FLOPPY. JUMPERS OK. MOST LIKELY DUAL CONTROLLER,
I/O CABLE OR CONNECTION, OR DS BRD. CE TO MOVE
DUAL CONTROLLER TO SLOT CLOSEST TO CPU BRD. IF
STILL NO GO WILL TRY STRAIGHT DISK CONTROLLER.
(15MIN) MIKEB
10/10 CALLED AND WILL C/B TOMORROW. CAREN 2:06
10/11/88: LEFT MESSAGE AT OFFICE TO CALL. (5MIN) MIKEB
>BROUGHT DS INTO SHOP & IS RUNNING FINE. WILL TEST
OVERNITE RUNNING MULTI-DISK DIAGS & BRING BACK TO
SITE. LOOKS LIKE DUAL CONTROLLER PROB & SINGLE
DISK CONTROLLER TRIED WAS BAD. (5MIN) MIKEB
+BY DISCONNECTING THE FAN WAS ABLE TO RUN ERROR FREE.
+REPLACED THE FAN & NOW WORKING FINE. ORIG FAN CAUSED I92
+ERRORS. CLOSE CALL /CE.
10/13/88 (10MIN) MIKEB

TAC

PROBLEM CALL

CONTROL NUMBER 07209097

CONTACT NAME MIKE SWARTZ POSITION CE
RDB # 3226 TDX # PHONE # 201 933 0330 EXT #

SYSTEM TYPE 2200CS 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 GREAT EASTERN COLOR PHONE # 201 487 3355
ADDRESS 3D01 CITY STATE
ON SITE CONTACT NAME

PROBLEM (*) SOLUTION (+)

*EMP 12165
*DISP 292341
*AT TIME I91 ERRORS WHEN CUST PROGRAMS
7/28/87: INTERMITTENT I91 TO BOTH SURFACES D21 & D22 OF THE ONLY WINC. CE UNABLE TO MAKE FAIL W/ RANDOM ACCESSES. CE IN PROCESS OF REPLACING WINC & REFORMATTING. IF STILL FAILING WILL REPLACE DS BRD. (10MIN) MIKEB
8/25/87: LEFT MESSAGE AT OFFICE TO CALL. (5MIN) MIKEB
+BAD 6541 DISK COTROLLER EVEN THOUGH WORKED FINE W/ FLOPPY.
+CLOSE CALL.
8/27/87 (5MIN) MIKEB

TAC

PROBLEM CALL

CONTROL NUMBER 07259107

CONTACT NAME DAVID HINKLE POSITION CE
RDB # 3424 TDX # PHONE # 215 433 7763 EXT #

SYSTEM TYPE 2200CS DEVICE TYPE 75 MUX
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 WILEY HOUSE PHONE # 215 867 5051
ADDRESS EXT.153 CITY STATE PA
ON SITE CONTACT NAME KATHY KORUTZ

PROBLEM (*) SOLUTION (+)

*EMPLOYEE# 28199
*DISPATCH# 330365
*GETTING I92'S AND T48'S WHEN TRYING TO ACCESS D11 AND
*D12 SURFACES.
9/16/87: CUST HAS AN MVPC AND A MVP MUXED TO A DS @ (310)
USING THE 75 MUX--75MUX IS IN THE MVPC. SEE (***)
ALSO ON THE SYSTEM IS A DPU W/2 PX S IN A D-CHAIN
CONFIG. THIS DPU IS MUXED TO BOTH CPU'S VIA THE
OLD MUX CONFIG FOR THE DPU SET UP. (320)
(20 MIN)
JOE
*** THE MVPC IS GETTING I92 P48 ON D11 & D12. ON THE
DS. THE MVP IS RUNNING ERROR FREE-NO PROB.