

Package Subject: 22C11-SCSI ANNOUNCEMENT

Mike Bahia  
2200 Product Support

----- Original Memo -----  
To: Mike Bahia From: I-She Chen  
Subject: 22C11-SCSI ANNOUNCEMENT Date Sent: 11/10/92

Mike ,

The 22C11-SCSI New SCSI Controller have been announcement but until now not formal release from H.O . We have been order this controller via Logistic channel but can't get this pcb . Our local customer's/ Sales very interest this new product . For your channel can we get this PCB , and how about the price if order some one's ,your reply will be appreciate .

Best Regards

CSO/TWN Support Enginner I-SHE CHEN 11/10 92

Package Subject: 22C11-SCSI ANNOUNCEMENT

Item Title: FYI

Attached is another memo on the 22C11-SCSI board. Just wanted to be sure you were abreast of the feedback on this board. This memo is very similar to ones received from Germany, Sweden, Canada, and many US VARS. Without the SCSI Controller which is running quite well at beta sites, we will have difficulty preventing or giving many customers any alternative but to migrate away from Wang. With this board we will be able to keep these customers happy and on Wang hardware for quite awhile. It will help sell CPU's and SCSI cabinets and drives. The SCSI provides 7-10 times the disk I/O of what is now available. We also have a very volatile situation concerning the Turbo O/S. No one is under contract to fix our bugs. This situation could blow up at any time. Duncan Chou, who was the lead engineer for 2200 R&D, is willing to come under contract to resolve the existing problems. This needs to happen as soon as possible.

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----- Next Memo -----

Item Title: 22C11-SCSI ANNOUNCEMENT

Mike ,

We have got two 22C11-SCSI controller boards from Taiwan R&D company before closed and doing beta site on Lai Lai Hotel ,the customers' response are positive . 2200 Users / Sales wish to get this new product ASAP , local 5 customers or more will upgrade to other vendor system if the product can't roll out on schedule, we will lose these customers . if this product is not formal release but can be ordered by PCB's may be can keep user continue to using 2200 system . If you know when will release or where can order this PCB's and how about the price , the information will be helpful for users and company future. Turbo 386 has not much meaning without 22C11-SCSI.

Best Regards

CSO/Taiwan I-She Chen Project Manager 11/23/92

----- Reply -----

To: I-She Chen From: Mike Bahia  
Subject: 22C11-SCSI ANNOUNCEMENT Date Sent: 11/10/92

I-She,  
The 22C11-SCSI was never formally announced or released although it is being used at several beta sites. A final decision has not been made on this board yet. Currently we are exploring several avenues including the possibility of an outside company building the board for us. Steve Bergmann is currently looking at the Marketing aspects of this board. I will copy him on this memo but you may want to send him a note yourself letting him know what kind of sales forecast you think you may have in your area as well as the affect if any of having or not having this board available. A final decision may be determined by the feedback provided by the field and our customers.

Best regards,

Package Subject: SCSI Controller 2200-CS

Item Title: SCSI Controller 2200-CS

Stephen,

Wang Germany is currently working together with a VAR ALEC GmbH, located in Dortmund.

This VAR was a Beta Site testing partner for the 2200 SCSI Controller. They have informed us that they require IMMEDIATELY 5-each of the SCSI Controllers.

They are well aware of the existing problems with this controller, however, are willing to purchase 5-each controllers immediately. Furthermore, they have approx. 80 customers who now have the CS installed, whereby they sell approx. 10-15 CS-Systems per year. Alec GmbH has informed us that, unless we can deliver the 5 controllers asap, they will no longer work with Wang within the 2200-CS arena.

**WHAT WE NEED:**

1. Is the product deliverable (the product is not in CPPF)???  
Wang Germany is willing to declare the 5-sites as Beta Sites.
2. Has, or will the SCSI-Controller be released within the very near future?
3. What will the controller cost (US List, Direct Cost and Sub Xfer Price)?
4. Even when the product is not yet released (and maybe will never be released) how can we obtain the required 5 ?

For Info: Alec GmbH is, as mentioned, aware of the bugs and is willing to work their application software AROUND the known problems.

Please send your response to Peter Szabo here at Wang Headquarters in Neu-Isenburg, Germany. He is the responsible ISO Marketing Manager. You can further reach him telephonically at the following telephone number:  
(0049) 6102-44-2337

Best regards,  
Dennis Ryckman      Peter Szabo

M E M O

To: Steve Bergmann  
From: Mike Bahia  
Subject: Concerns involving Release of the 22C11-SCSI  
Date: February 5, 1993

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This memo is to address the current status of the 22C11-SCSI and any issues with it at this time that need to be considered for release of the product. Those issues are in order of importance:

1. The latest general release of the Turbo O/S, 1.1, has major problems with tape backup. These problems are corrected in a maintenance release, 1.18. Release 1.18 needs to be sent out to each customer using the SCSI board. This can be handled by Sustaining Engineering under a controlled release.

Explanation: Due to several open issues that had still not been resolved with 1.18, we did not want to go through the release process with it. Also, see item 2.

2. Turbo O/S Release 1.18 requires new proms for all the Turbo boards, 2 each for the CPU board, MXF Controller, 22C11-HS, and 22C11-SCSI. Some of the boot diagnostic tests will not run properly without the correct proms. This can be handled by Sustaining Engineering under a controlled release.

Explanation: As there were still open issues with 1.18 we wanted resolved before going through the release cycle, and as the possibility of additional changes to the prom code existed, ECO's have not been written for these new proms in an effort to avoid repeating the process with the next release. However, all proms except for the SCSI Board proms seem to be downward compatible to 1.10.

3. Use of the SCSI hard disk requires special software to partition the disk and assign addresses. Early version software is packaged in with Turbo O/S 1.1. The latest software should be sent with the board. This software will be part of the O/S in the next general release. This software along with the completed documentation, the Basic-2 Utility Reference Manual (715-3949A) now going to publication, needs to be auto-enclosed with the controller. This can be handled by Sustaining Engineering for the short term under a controlled release. An auto-enclosure must be created for the 22C11-SCSI.

4. The SCSI Controller supports the following devices:

150MB HH Magnetic Peripherals Model 94221 Disk Drive	- 725-3822
326MB HH Micropolis Model 1684 Disk Drive	- 725-4895
326MB FH Micropolis Model 1578 Disk Drive	- 725-3814
647MB FH Hewlett Packard Model 97548S Disk Drive	- 725-4858
512MB 3 1/2" HH Seagate Model ST1581N Disk Drive	-
150MB HH Archive 2150S Tape Drive	- 725-4858
1.2GB HH Archive 4230NT Tape Drive	- 725-5981
1.2MB HH Teac Model FD-55GS Floppy Drive (not available from Wang	

These drives are the only drives supported. Customers using drives other than those listed above may or may not run into problems. This has been documented to the field via TSB and for customers via the Focus article written by Gene Schulz. This is not considered an issue but is important to know especially where 3rd party marketing may be involved. This is not

continued

to say a customer could not use a third party drive but if they do and a problem results due to the drive, the call will be billable and it will be up to the customer to get a proper replacement drive. The 512MB Seagate drive has not been documented as a tested drive but has been successfully running in the lab for several months.

The following is a list of existing Turbo problems which could also affect the SCSI Controller. On page 4 please find those bugs which are specific to the SCSI. Currently there are no open beta site calls with the SCSI controller involving the use of the SCSI hard drives or with SCSI tape with O/S release 1.18.

COMMON TURBO SYSTEM PROBLEMS ALSO AFFECTING THE SCSI:

High Speed Printer Port:

1. The High Speed printer buffer has a 1 character overflow. If the data string sent to the printer exceeds the remaining space in the buffer a hang occurs. This is an open issue with the 22C11-HS printer port which also occurs on the SCSI printer port.

Circumvention: The frequency of this problem can vary quite a bit depending on the size of the print job and the speed of the printer. Those customers experiencing the problem have gone to a standard printer controller which will slow down system performance a bit in comparison but otherwise works fine.

2. A GIO (general I/O) command that checks for printer Ready and works on the old bus does not work on the High Speed port as the system apparently in this case is monitoring the print buffer on the controller and not the printer. On either the 22C11-HS or -SCSI, READY is usually indicated even with no printer connected. If this program is allowed to run while the printer is deselected on either the -HS or -SCSI, within approximately 5-10 minutes the system is hung until the printer is selected.

Circumvention: Many customers would not be using this command. For those that have a problem, a standard printer controller can be used. Again though, use of the older controller will slow down system performance to some degree.

3. A second GIO (general I/O) sequence which works with the 386 CPU and on the old bus to determine if the printer is READY or NOT READY if used with the SCSI printer port always gives READY. With the 22C11-HS printer port the problem is much more severe with the same command. It can cause the disk port on that board to hang or severely slow down.

Circumvention: Use a standard printer controller at the expense of some system performance.

Three Byte Addressing (disk address greater the 16M in size, Turbo only):

4. For a 3 byte index type, sector 0 should only have header information in it. Index information (filenames) should start at sector 1. This is an O/S bug which also exist with the DS. Problem is not specific to the controller.

Circumvention: Do not use 3 byte addressing at this time.

5. The RENAME command may corrupt the disk index on a 3 byte surface. This is probably related to problem 4. Problem is not specific to the controller.

Circunvention: Do not use 3 byte addressing at this time.

6. The LOADDAT command does not work with an address beyond 16M. With the DS an error D89 (sector address beyond end of file), with SCSI P34 (illegal value). Problem is not specific to the controller.

Circunvention: Do not use 3 byte addressing at this time.

7. VERIFY of sector 65536 does not work properly with SELECT 3 ON. Problem is not specific to the controller. Problem is very minor.

Circunvention: Do not use 3 byte addressing at this time.

8. If booting from a 3 byte surface & O/S is beyond first 16 meg, cannot boot. Problem is not specific to the controller.

Circunvention: Do not use 3 byte addressing at this time.

Other:

9. If a SCSI address is scratched with END to 65535, the END CATALOG AREA shown with LIST is 94967295. Same prob with DS with R4 prom. Minor problem not critical to operation. Probable O/S bug.

10. If do a VERIFY/Dxx,(0,65023) to a SCSI address with the last sector equal to 65023, an error will be returned (Error in Sector 65024). Minor issue which also exists with the 2275. Probable O/S bug.

SCSI ISSUES:

1. Intermittently if booting with some MXE boards, the system may hang while loading @MVP. These boards work perfectly otherwise.  
Circumvention: No problem with the MXF board which I believe every Turbo order so far has included. Problem is also intermittent and will usually work on subsequent attempts.

2. Cannot boot from SCSI using an MXD board. Screen usually goes blank when key SF or will hang with message, 'Loading O/S'. RESET gets you back to Mount System Platter.  
Circumvention: Use MXF or MXE Controller instead. See #1 above.

SCSI Floppy:

3. SCSI floppy fails on verify with a 1.2M diskette starting at sector 2400. Sector 2398 appears to be the last usable sector. Any attempt to go beyond 2400 with any disk command will cause an error or hang.  
Circumvention: Use another floppy if available. Keep data within first 2400 sectors.

4. Turbo does not recognize SCSI floppy door open and does not clear cache. If LIST a floppy, remove diskette and LIST a 2nd floppy, system reads data from information still in CACHE.  
Circumvention: Reboot SCSI to clear cache.

5. Booting from SCSI floppy is extremely slow, 4 minutes compared with 52 seconds with DS floppy. Getting the SCSI config program loaded is also extremely slow if a SCSI floppy door is open. It took 5 seconds to pull up the inquiry screen with the door closed, 66 seconds with the door open.  
Circumvention: Use SCSI floppy only when absolutely needed.

Prom:

6. SCSI burn-in test (used in-house only) does not print out the same on printer port as 22C11-HS printer port if use printer that requires print driver. SCSI printer port is not issuing linefeed and lines overprint. Best answer would be to allow the option of selecting whether a linefeed is to be issued, otherwise both should be the same. Does not affect end user.  
Circumvention: Use 2245 Epson printer in stock which issues own linefeed.

Non-functional problems:

7. SCSI floppy returns same error if door open or disk not formatted. Door open should give I98. Disk not formatted, I93. Minor problem. No effect on operation.

8. SCSI Controller should return T errors using the Tape drive as the DS tape does. If rewind tape with no tape installed SCSI gives A04. Should give a T10. Other Tape problems should also give correct T error, not an Axx error. Minor problem. No effect on normal operation.

9. No way at present time to check SCSI tape, 150M, to see if write-protected. If tape is write-protected and try to write, system should return correct error, T12. Minor issue. May not be correctable.





Package Subject: SCSI Controller 2200-CS

Neu-Isenburg, Germany. He is the responsible ISO Marketing Manager. You can further reach him telephonically at the following telephone number:  
(0049) 6102-44-2337

Best regards,

Dennis Ryckman      Peter Szabo



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To: Mike Bahia

From: I-She Chen

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Date Sent: 11/10/92

Mike ,

The 22C11-SCSI New SCSI Controller have been announcement but until now not formal release from H.O . We have been order this controller via Logistic channel but can't get this pcb . Our local customer's/ Sales very interest this new product . For your channel can we get this PCB , and how about the price if order some one's ,your reply will be appreciate .

Best Regards

CSO/TWN Support Enginner I-SHE CHEN 11/10 92

Package Subject: 2200 Turbo/386 SCSI

Item Title: 2200 Turbo/386 SCSI

Stephen,

I don't really know. The market for TURBO has become very limited, it could be a good investment for some of our vendors/resellers to invest in a SCSI controller, because it then becomes more easy to convert from 2200 to UNIX or the LAN world (Niakwa or KCML).

We have now six Turbo CPU's installed at different customers and if we are lucky we will have six more in the end of FY93. The knowledge of these customers tells me that they are not so very cost sensitive, but to raise the price from \$1300 to \$5000 is a big step and I think it will definitely kill the 2200 SCSI market.

The forecast for 2200 SCSI in Sweden and I'm very optimistic is about six for FY93.

Best regards/ Torbjorn

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

Till Torbjorn Sagner

Fran: Stephen Bergmann

Ärende: 2200 Turbo/386 SCSI

Avsant: 92-12-03

Mike Bahia gave me your names as a knowledgeable 2200 person in your sales theater. For months, Wang field personnel have asked us to release the new 2200 Turbo/386 SCSI controller.

We are continuing to evaluate how this product could be brought to market. The major issue we see is low forecast (200 units) and low price (\$1,295). In order to generate a reasonable business case we, must either raise the price (to about \$5000 US) or find a third party to build it at the lower price. We are looking at both alternatives, but wonder how price sensitive the product is. How many units would your business unit COMMIT TO SELL at \$5,000 US versus \$1,295 U.S.?? Please respond via Wang Office ASAP.

Package Subject: Help !

Item Title: Help !

L S SUN

I regret to inform you that we have stopped the beta program and will not be bringing this product to market. This is a business decision that has been made. Even though the customer is aware of the situation, we cannot honor your request. Sorry.

Regards,  
Rick

----- Original Memo -----  
To: Rick Letourneau From: L.S. SUN(TAIPEI)  
Subject: Help ! Date Sent: 05/06/93

Rick, my name is L S Sun--acting GM for Wang Taiwan.  
I have a customer called Lai-Lai Sheraton who wants to test SCSI controller in their CS CPU's to solve outstanding disk hang problem.  
What I need is just to order four SCSI controllers for our testing. We do not need any support. Customer fully realize this situation.  
I would appreciate your kind approval to sell me 4 SCSI controllers.  
Best regards,  
L S Sun

JUL 6/1992

1. Hardware Switch Setting:

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

for examples:

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

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

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

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

SCSI I/O CABLES - 421-0066

2. Software for Controller:

.The MicroCode Name in OS Dekette is @22C11SS

.New Statement on OS for SCSI Control as Follows:

\$SCSI INQUERY T/Dxx,  
\$SCSI FORMAT T/Dxx,(ID)  
\$SCSI ID T/Dxx,A\$()  
\$SCSI READ T/Dxx,(ID)A\$()  
\$SCSI WRITE T/Dxx,(ID)A\$()  
\$SCSI CONFIG T/Dxx,A\$()

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

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

for master:

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

.  
 .  
 .

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

for slave:

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

.  
 .  
 .

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

Byte 300-511 is Reserved

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



### 3. SCSI Tape Command:

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

Where Dxx is Controller Select

A\$( ) is alpha string buffer

N is Number of Read Mark

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

S is start sector address of backup

E is end sector address of backup

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

### 4. System Table Build Sequence:

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

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

\$SCSI CONFIG T/Dxx,

Get System Config Table and format as follows:

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

The Definition of 48 bytes Drive Status is:

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

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

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

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

The definitions of the 10 Bytes Platter data is:

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

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



To: Bay City Metal  
"John"

w/ l.l (1.15)

From: Michael Riley

Date: 6/29/92

Subj: SCSI Tape problem

ON Line 240 & 250

add a % after the line number

240% PRINT AT(21,5,70);HEX(OE)...

250% PRINT AT(21,5,70);HEX(OE)...

This will cause the system not  
to execute that line...

Michael  
Riley

508 967 0524

LIST DET "ESCTAPEB"

1

06

D6F

2

E

D21

0, 10000

/

I91 ON

1/28/93

JOHN,

CHECK OUT THE SCSI RESTORE UTILITY. YOU HAVE AN EARLY VERSION OF THE SOFTWARE. HAVE MISPLACED YOUR PHONE # AS I WANTED TO CALL YOU. ~~GIVE~~ IF YOU CAN CALL ME AND GIVE ME YOUR MAIL ADDRESS, I WILL SEND YOU THE LATEST UTILITIES FOR THE SCSI. THE FN/TAB KEY IS USED TO EXIT AFTER COMPLETING THE RESTORE & IT WORKS.

BEST REGARDS,

*Mike*

508-656-0256

FAX 508-967-2125

MXE 7 BIT / 8 BIT

1:30 PM MTH

CQVL

500 RETENSION A08 STATEMENT ILLGAL

550 WRITE TAPE MARK A03 NOT ENOUGH MEMORY

A02 ON SCSI REWIND IF NO TAPE INSTALLED

A08 ON SCSTAPERREAD BAD TAPE OR DRIVE

TEAC <sup>6FR BACK</sup> FD-55GS 751-U 5105 5 1/4" FLOPPY  
PART # 19307351-51 <sup>BACK</sup> 5105

CONFIG SCREEN

TEAC FC-1  
.64 CAPACITY

MAGNETIC PERIPHERAL MN 94221-169 5 1/4" 150 MB HH DISK DRIVE  
PN 7748210

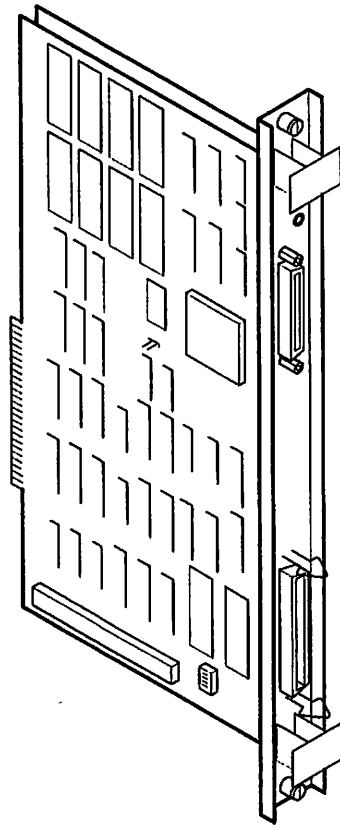
CDC 94221-5  
155.03 CAPACITY

ARCHIVE MODEL 4320NT PYTHON DAT 1.2 GIG<sup>HH</sup> TAPE DRIVE

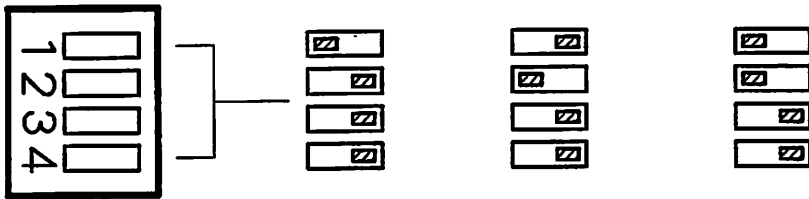


MODEL 97548S 450 MEG FH DRIVE  
OPTION STD

HP ~~97548S~~  
HP 97548SW  
647.80 CAPACITY



7411760-A1/D.2-1



BOOT FROM MIKE'S SCSI FLOPPY w/ 256 BYTES 1.18 O/S on 1.2M

		512 DS	
LOADING O/S ON SCREEN	2:45	:20	21
GOES BLANK			2:45
READY (PARTITION 1)	3:30	46	3:30
GENPART LOADED	4:05	52	3:45

### SCSI CONFIGURATION

BASE ADDRESS OF SCSI UNIT (D10, D20, D30:

### RECOVERY PROCEDURE

ONCE HAVE TAPE DIRECTORY SHOWN CANNOT EXIT CLEANLY.  
 MUST EITHER MOVE SPACE BAR OR  
 RETURN TO SELECT

MOVE PROB

D32

INDEX = 24

END CAT 2942

CURRENT 2937

SCRACH 340 TO 10000

INDEX 24

END CAT 2937

CURRENT 2937

MOVE T/D32, TO T/340,



VIPER 150

Messages I/O CABLE OFF - LED STAYS ON, DR SW INACTIVE  
CPU OFF

CPU ON - LED GOES OUT  
DR SW ACTIVATED AFTER CPU ACKNOWLEDGES DRIVES

NO TAPE A/DI ON REWIND/RETENSION

BAD INTERNAL CABLE 220-3691

1.18

NO TAPE

REWIND TAPE (BOTTOM IF SLABEN)

660 GOSUB '50 (HEX(0E 06), "REWIND TAPE"): #SCSITAPERREWINDT#2,

↑

I91 NOT READY

DOOR OPEN, TAPE IN

SAME AS ABOVE

TAPE IN, DOOR CLOSED

AT BOTTOM

REWIND

RETENSION

ERASE

BACKUP COMPLETE

NEW TAPE OUT OF WRAPPER w/ 1.18

CLOSE DR HEAR CLICKING NOISE IF TAPE PRESENT

HOLD DOWN 2<sup>ND</sup> SW (TAPE PRESENT SW)

WILL HEAR CLICKING SOUND WITHOUT SLIDING LATCH OVER

SCSI PROMS

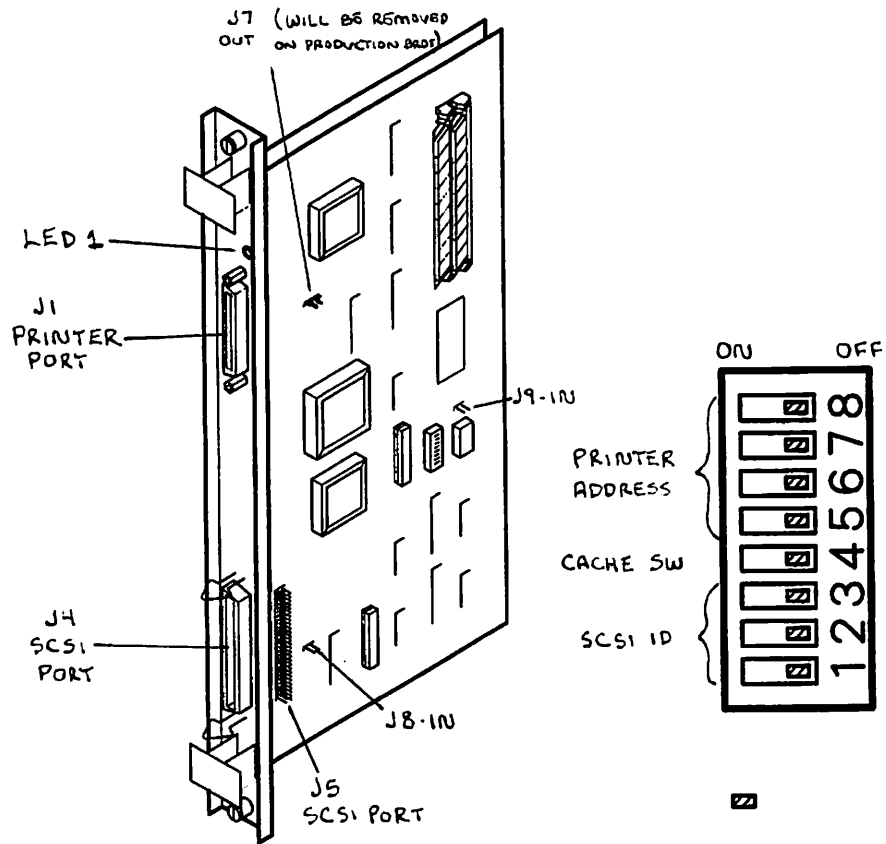
DATE CODE 7/7

IF KEY RETURN AFTER BACKUP TO RERUN THINKS LAST BACKUP IS STILL OUT THERE. IF D21 WAS DONE ON IT TAPE WILL THINK D21 IS THERE WHEN 2<sup>ND</sup> TAPE INSTALLED. MUST RETURN MUST RETURN

CLR VARIABLES

ORDR020A	P	00043888	00044048	00000158	00000003
FPY-14	D	00034998	00035002	00000001	00000004
@PM018V2	D	00035227	00035236	00000010	00000000
ELIGBE	P	00035541	00035549	00000004	00000005
VI13K100	SD	00005025	00007029	00001579	00000426
ERROR	P	00041803	00041824	00000017	00000005
CA030	P	00043016	00043084	00000064	00000005
FGH1	SP	00042488	00042556	00000068	00000001
ORD	SP	00004472	00004509	00000038	00000000
FGH10	SP	00043742	00043766	00000010	00000015
DFVC	SP	00034001	00034147	00000147	00000000
CADIM	P	00044049	00044052	00000004	00000000
PRNTAVAL	P	00044115	00044133	00000004	00000015
SCD	SP	00003946	00003986	00000041	00000000
OE080A	P	00000523	00000573	00000051	00000000
LABEL	D	00015715	00015718	00000004	00000000
PY190	P	00029159	00029206	00000048	00000000
TDSTAPER	P	00033084	00033141	00000058	00000000
qu050	P	00033343	00033416	00000074	00000000
PY080	P	00033417	00033438	00000022	00000000
QU050	P	00033439	00033534	00000096	00000000
PR012	P	00033535	00033580	00000046	00000000
DISKS	P	00033581	00033589	00000009	00000000
PY008	P	00033590	00033628	00000039	00000000
PY181	P	00033629	00033676	00000048	00000000
CHNGADDR	P	00033677	00033690	00000014	00000000
OE038	P	00033691	00033705	00000015	00000000
UT000	P	00033706	00033718	00000013	00000000
@TO.CRE0	P	00033719	00033724	00000006	00000000
PRINTER	P	00033725	00033727	00000003	00000000
DU	P	00033728	00033760	00000033	00000000
@@	D	00015719	00015774	00000056	00000000
/*0154*/	SP	00028393	00028458	00000066	00000000
ORDR070D	P	00031931	00031976	00000046	00000000
ORDR050F	P	00032795	00032841	00000047	00000000
ORDR060E	P	00032842	00032869	00000028	00000000
LADE020F	P	00032870	00032879	00000010	00000000
OE167B	P	00032880	00032926	00000047	00000000
PA010	P	00032927	00032987	00000061	00000000
@TO.CREF	P	00033028	00033083	00000056	00000000
@DOSCYCS	P	00033142	00033166	00000025	00000000
@DOSTYPE	P	00033167	00033180	00000014	00000000
TBO.DOSW	P	00033181	00033184	00000004	00000000
@MOVEFIL	P	00033204	00033234	00000031	00000000
TBO.CRT	P	00033310	00033317	00000008	00000000
ordr020A	P	00033761	00033874	00000114	00000000
AP010	P	00035305	00035370	00000064	00000002

22C11-SCSI CONTROLLER 212-9727  
 SCSI/PRINTER CONTROLLER 210-9582



SCSI ID				
	1	2	3	
ID 7	ON	ON	ON	7411700-A1/D.22 SUGGESTED ID
6	OFF	ON	ON	
5	ON	OFF	ON	

SCSI CFG

VPR IN

TYPE

VENDOR

CAP

SECTORS

DRIVE ID 6 | REMOVABLE DRIVE | TEAC FC-1 | 6 | 1.2 | 4800

6 HR AHEAD

WOLFGANG BORKE

ALEC

GERMANY 011-0049 231 923 700

(UP TO 4:45)  
10:45 EST

SCSI - SEAGATE ST4385N 330 MEG FORMATTED

1. USING DATALOAD BM 2 MEG 1024 DIMA#(1024,1024)2  
1 MIN 10 SEC

60K BLOCKS FOR 2 MEG 10-12 SEC

2. FLOPPY - CANNOT READ OR WRITE

A03 ERR NO LITE

RECOGNIZED IN SCSI CONFIG

DRIVE DRING ID IS 1

DD or HD COMMAND FOR SIZE OF DISKETTE

FLOPPY IS TERMINATED

TEAC FD556S750

SCSI FLOPPY

TEAC FD-556S 751-U

SQ BRD SAN-5294V0

DO IN HL IN

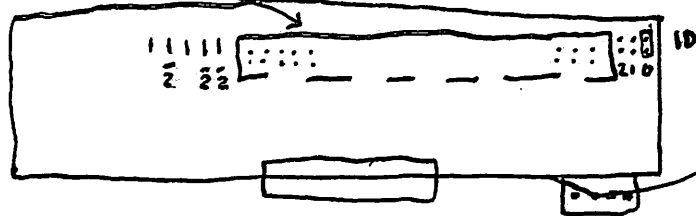
DC IN FG IN

(512) 32 MOST EFFICIENT  
BLOCK SIZE FOR R/W TO SCSI

3 TERM REMOVED

BEHIND COMM

SCSI INTERFACE BOARD



POWER CONN

KEY FULLY TO LEFT

WAIT TILL ALL DRIVE LED, GO OUT, ∴ POWER ON TURBO.

SCSI CONTROLLER 212-9127

9579 JPI IN SW 1

4 BK SW

34 ON ONLY DISK ADDR 1 off -310, 2 off -320, 1+2 off -330

IP CONT

9582 J8, J9 IN R6, R7, R8 IN SW 1, 2, 3, 4, 5

R6, R7, R8 IN

ON ONLY

CONTROLLER ID

PRINTER ADDRESS

215 - 57 OFF 215

6, 7 OFF 216

5, 6, 7 OFF 217

SCSI BRD

512 BYTE SECTOR FLOPPY

1, 2, 3 ON = 7

LOW DENSITY

FORMAT UTIL TYPE 2 DOS FORMAT

MUST TELL IF HD OR LOW DENSITY  
1.2 360K

DD  
SCSI FLOPPY T/D HD EXEC  
THEN RESET SCRATCH DISK

10 DIM A#(512)32

20 DATA LOAD BMT/D<sub>yy</sub>, AB()

35 FOR A = 1 TO 100

30 NEXT A

5 B# = TIME

40 C# = TIME

50 PRINT C# - B#

ALL DRIVES MUST BE NON-DIFFERENTIAL! (SCSI-1)

SWITCHES FOR THE CONTROLLER MUST BE SET AT 7 AT THE TIME. DUE TO CURRENT SOFTWARE LIMITATIONS

... TO BE SET AT 7 AT THE TIME. DUE TO CURRENT SOFTWARE LIMITATIONS ...

... TO BE SET AT 7 AT THE TIME. DUE TO CURRENT SOFTWARE LIMITATIONS ...

... TO BE SET AT 7 AT THE TIME. DUE TO CURRENT SOFTWARE LIMITATIONS ...

THUMB SEC = 6  
CAME UP AS DRIVE 1

2:35 \$SCSIFORMATT/D31,(1) OR RUN UTILITY LOW LEVEL FORMAT 150-5-6 min

# OF PLATTERS + SIZE OF EACH, MAX 15 ON MASTER, SLAVE 14

LN810. 012592

Do \$FORMAT

MICROPOLIS 1578 326 MBB FH 5/4 ROUND CABLE

### TOASTER

POWER ON - DRIVE DOES NOT SEEM TO COME UP, LED ON DRIVE <sup>ON IMMEDIATELY &</sup> STAYS ON  
WAITED 2 TO 3 MIN. DRIVE DID NOT ~~APPEAR TO~~ <sup>COME</sup> BE UP TO SPEED.

POWERED ON CPU - DRIVE LED WENT OUT, DRIVE ~~SEEMED TO~~ <sup>3 SHORT BLINKS WITHIN 5 SEC. CAN HEAR DRIVE SPINNING UP</sup> SPIN UP BUT HARD TO  
TELL. DRIVE LED NEVER WENT OUT. ALL DIAGS PASS. <sup>ONCE OR TWICE CAN HEAR</sup>  
SCSI LED NEVER WENT OUT. LED BLINKS ON & OFF BETWEEN 10 & 15 SEC & STAYS OUT.  
<sup>TWICE QUICKLY</sup>

I91 TO SCSI w/ SF

POWERED OFF CPU, SCSI DRIVE LED REMAINED OFF.

POWER ON CPU. BETWEEN 10-15 SEC AFTER POWER ON SCSI DRIVE ACCESSED & LED  
GOES ON ~~OFF A FEW TIMES~~. SCSI BLD LED REMAINS ON.  
<sup>ONCE LONG, ONCE SHORT</sup>

SCSI WORKS.

1. POWER ON TOASTER. DRIVE LED COMES ON & STAYS ON WITH POWER ON. DRIVE  
DOES NOT COME UP TO SPEED. TERM LED IS OUT.

2. POWER ON CPU. DRIVE LED <sup>CAN HEAR DRIVE SPINNING UP.</sup> GOES OUT IN 3 SEC, THEN 3 SHORT BLINKS, ALL WITHIN  
THE 1<sup>ST</sup> 5 SECONDS. BETWEEN 10 TO 15 SEC 2 SHORT BLINKS. SCSI LED NEVER  
WENT OUT. ALL OTHER TURBO LED'S OUT WITHIN 3 SEC, ALL SCREEN DIAGS PASS.  
TERM LED STILL OUT.

3. SF' ~~ON~~ TO SCSI RETURNS I91.

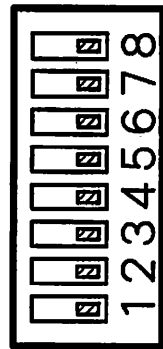
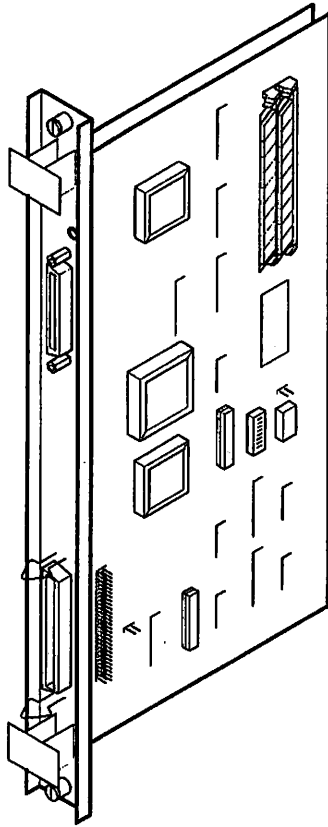
4. POWER CPU OFF & ON. SCSI LED REMAINED OFF. BETWEEN 10-15 SECONDS AFTER  
POWER ON SCSI DRIVE LED BLINKS ONCE LONG, ONCE SHORT. CONTROLLER LED ALWAYS ON.  
TERM LED STILL OUT.

5. SCSI NOW WORKING.

SCSI CONFIG	DRIVE ID	DEVICE TYPE	VENDOR	CAPACITY	SECTOR
	1	DIRECT ACCESS DEV	MICROP 1578-15	319.46	1277850







# POWER ON PROCEDURE WITH SCSI

WITH ARCHIVE VIPER 150, MICRO P 1684-07

POWER ON SCSI UNIT. (SPECIFIC TO DRIVES LISTED ↑)

TAPE LED STAYS ON.

DISK LED BLINKS 3 OR 4 TIMES IN 1<sup>ST</sup> 5 SECONDS & GOES OUT.

WITHIN 10-15 SECONDS A CLICK WILL BE HEARD FROM THE DRIVE.

TERMINATOR LED IS OUT.

## POWER ON CPU

TERMINATOR LED COMES ON IMMEDIATELY.

TAPE LED GOES OFF WITHIN 1 SECOND

AT 3 SECONDS LED'S ON NEW TURBO CONTROLLERS GO OUT. (MXE/22C11-HS)

SCSI LED AS IS NOW WILL STAY ON. (SCSI LED WILL BE CORRECTED TO GO OUT ON LATER VERSIONS)

AT 5 SECONDS MXE (IF PRESENT) LED GOES OUT.

AT 10-15 SECONDS, THE DISK LED WILL BLINK ONCE, PAUSE A SECOND & BLINK AGAIN. THIS INDICATES COMMUNICATION WITH CPU.

SYSTEM IS READY TO BOOT. KEY SHIFT/RESET OR ALLOW DIAGNOSTICS TO COMPLETE FOR: MOUNT SYSTEM PLATTER  
PRESS RESET

COMPLETE O/S WITH SYSTEM UTILITIES INCLUDING SCSI UTILITIES IS LOADED ON 1<sup>ST</sup> MASTER ADDRESS; D $\frac{1}{3}$  1.

SCSI UTILITIES - LOAD RUN FROM 1<sup>ST</sup> SCSI ADDRESS. SELECT DS UTILITIES.

TAPE DRIVE IS ID 1, DISK IDS.

DISK IS CONFIGURED FOR 15 SURFACES; D<sub>X1</sub> THRU D<sub>XE</sub> 0 TO 65024  
D<sub>XF</sub> 0 TO 416600

DS UTILITIES FOR SCSI ARE NOT FINAL CUSTOMER SHIP VERSION. NOT ALL KEYS ON ALL MENUS ARE FUNCTIONAL, ESPECIALLY KEYS TO RETURN TO PREVIOUS MENUS.

SCSI CONFIGURATION - USED FOR INITIAL FORMAT (LOW LEVEL) AND CONFIGURING SURFACES FOR INITIAL SETUP. USE THE 'CONFIGURATION SCREEN' TO DETERMINE IF SYSTEM IS RECOGNIZING SCSI DEVICES.

### SCSI CONFIGURATION

DRIVE ID	DRIVE TYPE	VENDOR	CAPACITY	SECTORS
1	SEQUENTIAL ACCESS DEVICE	ARCHIVE VIPER 150	0.00	0
5	DIRECT ACCESS DEVICE	MICROW 1684-07MB1	331.73	1326952

WITH ADDRESS D<sub>x</sub>F, 3 BYTE ADDRESSING MUST BE USED TO USE BEYOND SECTOR 65024 APPROXIMATELY. IF FILES ARE TO BE STORED BEYOND THE 1<sup>ST</sup> 16 MEG, THE SURFACE MUST BE SCRATCHED FOR 3 BYTE ADDRESSING.

LIST SELECT - WILL SHOW IF 3 BYTE ADDRESSING IS OFF OR ON.

SELECT 3 ON - TURNS ON 3 BYTE ADDRESSING FOR THAT PARTITION

SELECT 3 OFF - TURNS OFF 3 BYTE ADDRESSING

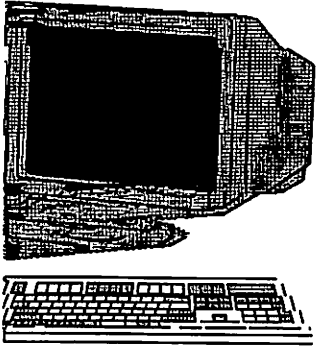
SCRATCH DISK 8 - SCRATCH COMMAND FOR 3 BYTE INDEX

SELECT 3 ONLY NEEDS TO BE ON WHEN ACCESSING BEYOND 16 MEG. IF JUST CALLING UP FILES FROM THE INDEX OR DOING DIRECT ACCESS WITH NUMERICAL SECTOR NUMBERING, NO PROBLEM. IF USING ALPHA VARIABLES PLEASE CONTACT MIKE RILEY TO INSURE FULL UNDERSTANDING OF WHAT NEEDS TO BE DONE.

# GAMENAME

## BLK JACK

## BOWLING



1080 ADD REM  
500

SELECT3 ON ONLY NEEDED WHEN ACCESSING DATAFILES IN  
DATA LOAD DA OR DC.

b1W8

\$SCSI INQUIRY T/Dxy TO CLEAR CONTROLLER

- .STARTD
- C-RAMDISK
- C-DSAPPLY
- C-DS
- C-DSCFIGP
- C-DSTAPBB
- C-DSTAPER
- C-MENU
- C-DSCFIG
- C-MITRATE

108-111  
110

280  
1015  
300 DS CONFIG  
300

65-28 650

LINE 30  
REM % REL 0.4 5/19/92

281

25-309

00 00 1F

1FF8 82EF

MEMORANDUM

TO: Worldwide Sales & Support

CC: Senior Management

FROM: Bob Trottier  
VS Program Manager

DATE: December 6, 1990

SUBJECT: VS SCSI & Related Mass Storage Product Announcements

In January, we will be making the public announcement of a number of significant VS Mass Storage Products, the most important of which is the availability of a new SCSI I/O subsystem for the high end of the VS product line.

The availability of SCSI on the high end VS marks the beginning of a new era for the VS. Although Wang will continue to offer traditional SMD/ESMD products for an indefinite period of time, we are focusing our mass storage development efforts on SCSI.

There are two reasons for this. First, the SCSI standard is far more flexible and easier to develop to than the older SMD standards. Second, SCSI moves us to a totally new price/performance curve. Because SCSI controllers can support more devices and a mix of disk and tape devices, and because the newer generation of SCSI devices are less expensive than the older technologies, SCSI will quickly become the technology of choice for new VS installations.

We will continue to offer SMD disk drives because it will generally be more economical for the customer to add a single drive to an existing controller, than to purchase an entire new I/O subsystem.

We have already begun limited First Customer Shipments to selected customers. You may approach your current high end VS customers and prospects with proposals for SCSI I/O subsystems. We will begin to ship all SCSI subsystem components in volume in the next quarter.

In addition to the new high end SCSI IOCs, we are announcing the first members of a new generation of SCSI disk drives. These drives are available on the VS 5000, VS 5/5E/6/6E and VS 75E, as well as on the high end. These drives provide more cost-effective, high performance mass storage than our previous offerings.

SCSI subsystems also support magnetic tape drives. In the attached package, you will find information about a new, lower cost 9-track reel to reel tape drive that is supported on the VS 5000 and VS 75E, as well as on the high end.

Perhaps the most widely awaited SCSI product is our new high performance tape drive based upon 3480 cartridge technology. Positioned primarily as a backup device, the 2249V-2 tape drive provides high speed backup and restore capability for high end VS systems.

I encourage you to carefully study the enclosed announcement material so that you will be fully prepared to assist your customers. Once you are familiar with the material, you have the following sales opportunities available to you:

**Selling Environment**

**Opportunities**

VS 5 / 5E / 6 / 6E

These customers are candidates for adding either of the new higher performance disk drives. Add two or three new drives and use them for most of your activity, including IPL volume, paging pools and work files. Keep the current internal drives only for occasional use. The benefit will be increased performance.

The selling advantage - migration to a VS 5000 or a new generation machine later - is going to be more economical as these drives can move to the new machine.

VS 75E

These customers are even more likely to be candidates for new disk drives to improve performance. You should also make VS 75E customers aware that there is now a 9-track 6250BPI tape drive that will work on their system.

VS 5000

Most VS 5000 installations will find performance benefits in the new SCSI drives because of their synchronous transfer capabilities and higher levels of drive performance. Call on your VS 5000 accounts and suggest upgrading the drive configuration, and adding the new 9 track tape drive.

VS 300/7K, 8K, 10K

Every high end installation is a candidate for the improved backup performance of the 3480 tape drive. Every one. In our test marketing we have found that customers see the need for improved backup, and tend to choose the full performance dual port IOC, so that they can add new disks as well.

Call on every high end account in your territory within the next 45 days to carry the news of SCSI to them.

For high end accounts, you should also recommend that they upgrade their installed SMD IOCs to caching IOCs in order to get the maximum value from their current investment.

Although SCSI generally improves I/O performance, it is not possible to make general statements about its impact upon system performance without a detailed knowledge of the current workload and performance situation. If you are in doubt, a SAM study should be conducted before assuming that SCSI will improve performance.

## NEW SCSI I/O SUB-SYSTEM FOR HIGH END VS

The new SCSI I/O subsystem is now available for the VS 7000/300, VS 8000, and VS 10000. This subsystem is comprised of two new IOC's, two new disk drives, and two new tape drives.

The SCSI IOCs are similar in design to the 70V98-4 ESMD caching disk controller. The 70V68-2, a two port version designed as a caching IOC, supports a wide range of high performance disk and tape options. The 70V68-1 is a single port controller optimized as a buffering IOC for tape operations and limited disk performance.

The 2269V-6F-SE 650MB SCSI 5-1/4" full height disk is the primary disk drive for the SCSI subsystem. This disk has been designed to provide up to 5MB/sec burst data transfer rates, and has been rigorously tested in Wang's Development and Integration laboratories.

The 2269V-5H-SE 320MB half height is new to high end VSs. Also offered as an improved disk drive for the VS 5000, this drive provides excellent performance, and low cost as well as a good upgrade path from the VS 5000 to high end VS installations.

Both of these drives share new and existing mounting options with the current family of 5-1/4" devices.

A rack mount component, the MDSC-R, is being offered to support the configuration of 5-1/4" devices in a rack mount environment such as the DSC-0 (commonly referred to as the 8-position data storage cabinet). A single MDSC-R can contain up to 2.6GB of storage (4-650MB disk drives) in a compact, convenient package, up to five MDSC-Rs can be installed in a single DSC-0. The MDSC-R supports up to four full height or seven half height disk and/or 2238V-3 tape drives or any combination not exceeding a total of seven devices all attached to a single SCSI chain.

Two new tape drives, while dramatically improve performance and value, are now available. The 2249V-2 18 track streaming cartridge tape drive, based on IBM 3480 technology, represents the fastest and most reliable VS backup solution to date. The 2248V-2-SE tri-density tape drive is a replacement product for the current 2248V-1 product, but requires no dedicated tape IOC. Also supported by the high end SCSI IOCs, the 2238V-3 150MB SCTD, is the same product currently shipping with every VS 5000 system, providing low cost media compatibility between the VS 5000 and high end VS installations. NOTE: It is not recommended that the 2238V-3 be used as a primary backup media for large installations due to IOC and CPU performance considerations.



Each 2249V-2 tape drive includes an autoloader as a standard feature, which is capable of holding ten tape cartridges. The autoloader can be operated in manual or automatic modes, allowing for minimal operator intervention. While handling tape positioning and loading functions, the autoloader is not directly supported by the VS utilities in automatic mode; however procedures can be written that respond to MOUNT and DISMOUNT screens through GETPARMS, thus minimizing the need for operator intervention during high speed backups. These procedures will be unique for every customer. Manual mode allows for normal operation of standard utilities while minimizing tape handling by the operator. The 2249V-2 will be supported by all the traditional Wang tape utilities including BACKUP, VOLCOPY, TAPEINIT, TAPECOPY, and TAPEDUMP. Several third party software houses are currently evaluating their solutions on the 2249V-2 to insure a wide selection of backup management solutions for the customer.

## ORDERING / AVAILABILITY / WARRANTY

Orders can be booked immediately. Support for the high end VS SCSI sub system in CONDUIT is planned for availability during the next quarter. Standard discounts apply. All products carry a one year warranty, with the exception of the 2249V-2, which carries a 90-day warranty.

## HARDWARE REQUIREMENTS

The high end SCSI I/O subsystem is supported by the following VS models:

VS 300  
All VS 7000 Models  
All VS 8000 Models  
All VS 10000 Models

## SOFTWARE REQUIREMENTS

The high end SCSI I/O sub system is supported in the following releases:

VS/OS 7.30.04      DSP 4.02.00  
VS/OS 7.21.06      DSP 3.61.00 (To be released mid-Dec)

## LIMITATIONS

- . The 70V68 is not yet recognized by VS/VM.
- . The 70V68 will be supported in the I/O expansion chassis once VS/VM support is available.

## SUPPLIES

### 2248V-2-SE

Use existing cleaning kits available through Wang Express

### 2249V-2

725-9029              2249V-2 Cartridge Magazine  
725-9030-20          2249V-2 Cleaning Cart. (Qty 20)  
725-7313-30          2249V-2 Tape Cartridges (Qty 30)

Contact Wang Express or your Country Supplies Manager for pricing and availability.

## NEW SCSI DEVICE SUPPORT FOR THE VS 5000

Several new high performance SCSI devices are now available for the VS 5000. The new 650MB full height disk drive, the 320MB half height disk drive, and the new tri-density 9-track tape drive each representing improved performance and configuration flexibility at a substantially reduced price per megabyte.

Since the introduction of the VS 5000, dramatic improvements in SCSI disk performance and density have occurred. These new SCSI disk drives incorporate the latest of these advancements. The SCSI devices originally introduced with the VS 5000 supported a SCSI bus protocol that was asynchronous and limited to burst data transfer rates to 1.5 MB/sec, which limited the effective throughput of the device regardless of the actual physical performance of the disk drive. New devices such as the 650MB FH or 320MB HH disk, support synchronous SCSI. These devices, combined with the new device package, allow the RCU and 50V68 to support synchronous protocols at 3.3MB/sec, thereby more than doubling SCSI bus bandwidth. This performance improvement can best be seen when multiple synchronous devices share the same SCSI bus, sometimes resulting in as much as a 25% increase in I/O throughput. Also, with the addition of the 2248V-2-SE, full industry standard tape exchange can be made using a common tape drive for all currently marketed VSs.

### MODELS

2248V-2-SE	SCSI 6250 BPI TD with SE Interface
2248V-2-ENCL	6250 GCR Desktop Enclosure
2248V-2-DSC	6250 GCR DSC-0 Installation Kit
2269V-5H-SE	SCSI 320MB HH Disk w/ SE interface
2269V-6F-SE	SCSI 650MB FH Disk w/ SE interface

### ORDERING INFORMATION

Specific model numbers, pricing, and maintenance information can be found in a separate document contained in this package. All model numbers are active and orders can be booked. 'C/' models are also available on some items to assist manufacturing in appropriately configuring the order to each customer's preference.

NOTE - To simplify the future introduction of new devices, enclosures and devices are not bundled: you must order them separately. Also, the SSM-C does not include any SCSI cables, so please make sure all appropriate interconnection cables are ordered. Note that the SSM-C is currently limited to a single disk drive, a single tape drive, or one disk and one tape drive. TWO HALF HEIGHT DISK DRIVES IN A SINGLE SSM-C IS NOT A SUPPORTED CONFIGURATION AT THIS TIME. With this change in ordering policy, please do not order either the '-INT' or '-EXT' SCSI models: these models will shortly be made unavailable.

Each XTEND comes with a 50 foot cable set and installation hardware, to allow placing the XTEND at its maximum distance from the CPU. You must order the SCSI interconnection cables to connect devices to the XTEND module. Remember, a differential SCSI bus is limited to 82 feet, and a single ended bus, 19.5 feet. Distances are measured from the XTEND module to termination including all internal and external cable lengths. All devices attached to the XTENDED port must be placed after the XTEND module. A maximum of one XTEND option is allowed per IOC port.

## 5 1/4" SCSI DISK AND TAPE DRIVES

The VS 5 1/4" disk drives carry new model numbers, which provide more information regarding the physical and electrical properties of the device. The 150MB streaming cartridge tape drive, a half height device, will retain its existing model number (2238V-3H). Each device now has a corresponding 'C/' version allowing for factory configuration of customer orders.

Model	Storage Capacity	Device Type	Interface / Form Factor	Supported System
2269V-5H-SE	320MB	- Fixed	- SE/Half	- VS w/SCSI
2269V-6F-SE	650MB	- Fixed	- SE/Full	- VS w/SCSI

5 1/4" SCSI disk and tape drives can be mounted in any of three housings, each with unique requirements: the SSM-C, the MDSC-D, and the MDSC-R. The SSM-C will support a single disk drive, a single 2238V-3H tape drive, or one half height disk and one 2238V-3 tape. THE SSM-C DOES NOT SUPPORT TWO HALF HEIGHT DISK DRIVES. Both the MDSC-D and the MDSC-R support up to four full height or seven half height disk and or 2238V-3 tape drives or any combination, not exceeding a total of seven devices all attached to a single SCSI chain. The MDSC-D is a freestanding unit with an attractive front bezel, allowing access to the top two full height positions. The MDSC-R is designed to mount in a DSC-0 (the 8-position Data Storage Cabinet), and allows access to all four full height positions. Both the MDSC-D and -R support a single MDSC-XTEND-SE for conversion of the SCSI bus from a differential to a single ended electrical interface.

You must order one XTEND-SE model per 70V68 port that will have attached SCSI single ended devices. The XTEND-SE model that you order depends on the mounting options your customer chooses. Generally, if an MDSC is included in the order, an MDSC-XTEND-SE is preferred. If all the devices are to be located in an SSM-C, order the SSM-XTEND-SE.

## OTHER TAPE DRIVES

2248V-2-SE: The 2248V-2-SE is a single ended device and can be mounted in a DSC-0 or placed on a table top. An XTEND module is required for connection to the IOC. Two unique options are available for this tape drive, depending on the mounting method chosen:

2248V-2-ENCL	Required if the customer wishes the drive to be freestanding. Country specific power cords must also be ordered.
2248V-2-DSC	This kit provides the required hardware to install the tape drive in a DSC-0.

2249V-2: The 2249V-2 can connect to the 70V68 as either a single ended or a differential device, thus making this the only device that does not require an XTEND module. This flexibility also adds complexity to the decision on how to attach the drive to the IOC. If the 2249V-2 is to be the only device on a specific port then you can cable directly from the IOC to the tape drive. If added distance is important, then the SSM-XTEND-D can be added allowing the 2249V-2 to be placed over 100 feet from the CPU. If the 2249V-2 is to share port with other devices, follow the requirements associated with single ended devices.

The 2249V-2 can be mounted in the DSC-0, but can be left on a table top or desk by ordering an enclosure kit:

2249V-2-ENCL      Required if the customer wishes the drive to be freestanding. Country specific power cords must also be ordered.

Two special package models are available for the 2248V-2 and 2249V-2:

2249V-2-10C      2249V-2 with a single port SCSI buffering IOC.

2248V-2-10C      2248V-2 with a single port SCSI buffering IOC.

You must still order all appropriate cables, installation kits, XTEND modules, and housings.

## SELLING FEATURES

### HIGH END SCSI IOC

- . Based on Industry Standards.
- . Supports a wide range of high performance devices
  - .. Disk drives
  - .. Tape drives
- . Minimizes the number of system IOCs required, thus freeing up IOC slots for user applications (such as LAN or '928' IOCs)
- . Lowers overall system and maintenance costs
- . All supported devices are rack-mountable, reducing floor space requirements

### SCSI Disk Drives

- . Next generation technology
- . Increased performance and reliability
- . Lower cost per megabyte
- . Greater configuration and installation flexibility
- . Fewer power and environmental considerations

### SCSI Tape Drives

- . 150MB 1/4" cartridge tape drive
  - .. Media compatibility with VS 5000
- . 9-track tri-density tape drive
  - .. Better performance at lower cost
  - .. Table top or rack-mountable
  - .. Available for VS 5000 and 75E
- . 18-track Streaming Cartridge Tape Drive
  - .. Based on IBM 3480 standard
  - .. 200MB+ per cartridge
  - .. The ultimate in VS tape performance
  - .. Highest level of data integrity
  - .. Standard 10 cartridge tape autoloader
  - .. Rack mountable
  - .. Up to 3 to 1 performance improvement over 9-track using standard utilities

**70V98-4E Caching Disk Controller Enhanced**  
**Now supports most VS drives**

Although SCSI is likely to be the disk technology of the future for the VS, the defacto technology today is SMD. Our VS customers have an investment that includes tens of thousands of installed controllers and well over a hundred thousand SMD drives.

In order to help them get the fullest possible advantage of this investment, Wang has made significant enhancements to the VS operating system and SMD I/O subsystems. The key points are:

- . The 70V98-4E Caching controller now supports almost all SMD drives. The price of this controller has been substantially reduced, and the cost of upgrading from the older 23V98 (non caching) IOC to the higher performing caching IOC has been reduced by over 50%.
- . The 50V98 IOC for the VS 5000 now supports dual ported drives, which enhances its ability to serve as an emergency backup to larger processors.
- . The 50V98 IOC now supports the 2265V-1 (75MB) and 2265V-2 (288MB) disk drives.

**70V98 ADDED DRIVE SUPPORT**

With Device Support package 3.6 (for the OS 7.20 series), and 4.02 for the OS 7.30 series, you can now support the following drives on the 70V98-4E caching ESMD IOC:

Model	Description
2265V-1	75MB Removable
2265V-2	288MB Removable
2267V-1	76MB Removable Cartridge Drive
2268V-1	76MB Fixed Winchester
2268V-2	147MB fixed Winchester
2268V-3	314MB fixed Winchester **
2268V-4	452MB Fixed Winchester **
2268V-6D	1GB Fixed Winchester ***

\*\* The 314MB & 452MB drives can be supported in either remap mode or non-remap mode. Remap mode allows the drive to appear error-free and provides a performance advantage. Non remap mode provides a slightly larger storage capacity.

\*\*\* The 1GB drive is supported only in remap mode.

Minimum support for this feature is VS/OS 7.20.00 and DSP 3.60.00. Support is also available in VS/OS 7.30.04 and DSP 4.02. These releases are currently available.

WSS subscribers can obtain these releases by making arrangements with their local support organization. Non-WSS subscribers can contact their sales representative to place an order for a billable per-incident update.

The price of the caching IOC was recently reduced to \$13,500 (from \$20,085).

The price of UJ-3545, which upgrades the non-caching 23V98 IOC to a 70V98 caching IOC, was reduced from \$14,700 to \$7,000 (U.S. list). Encourage your customers to migrate existing SMD drive bases to caching controllers to gain the performance advantage that caching offers.

## 50V98 VS 5000 SMD IOC NOW SUPPORTS DUAL PORTING/MORE DRIVES

The 50V98 Caching IOC is being enhanced in Device Support Package 3.61 to add support for two popular Wang removable drives: the 2265V-1 (75MB) and 2265V-2 (288MB), and to support the SW-04 dual porting option on other drives.

Adding 75MB and 288MB drives makes it easier and more economical for users of older VS systems to migrate to the VS 5000. This option is especially appealing to VS 100 installations, where there is frequently a significant investment in the older drive technology.

The addition of dual porting allows the use of the VS 5000 as an effective emergency backup for a larger machine such as a VS 8000. In this scenario, the key drives are normally attached to the VS 8000, but if the VS 8000 fails, these drives are switched over to the VS 5000 along with a subset of users, thereby keeping critical applications available.

Another potential use for dual porting is in a high volume WISS environment. A VS 5000 can be used for batch scanning and indexing. When the batch is processed, the drive can be switched over to the production VS, where the data is then copied to the optical drives and the production databases are updated.

Finally, dual porting allows the creation of highly available VS 5000 configurations for critical applications such as public safety dispatching. If a primary machine were to fail, the drives could be instantly and electronically switched to the backup machine.

In environments where rapid fallback dictates the need for dual porting, encourage the use of XDMS to minimize the time needed to recover files that may have been open at the time of failure.

For dual porting on OS 7.20 based systems the minimum OS level is 7.21. Device support package 3.5 is required. These releases are currently available.

Support for 75MB/288MB drives is part of field support release 7.20.06/Device package 3.61, which is in final QA and is expected to be released by mid-December.

WSS subscribers can obtain these releases by making arrangements with their local support organization. Non-WSS subscribers should contact their sales representative to order a billable per-incident update of this release.



## HIGH END SCSI I/O SUB SYSTEM CONFIGURATION GUIDELINES

To configure a SCSI I/O sub-system for any high end VS system, several components are required, depending on devices you intend to attach. However, the following considerations impact every installation:

- . The appropriate IOC and backpanels
- . XTEND Modules
- . 5-1/4" SCSI disk and tape drives
  - and mounting locations and cables
- . Other tape drives
  - and appropriate options

### IOCs AND BACKPANELS

There are two 70V68 models. The 70V68-1 includes a single port and 512K of device buffer memory. This IOC should be used only where the customer has a specific tape application, or when limited disk performance is acceptable. The 70V68-2 is fully loaded with 4MB of memory divided into 512K of tape buffers and 3.5MB of disk cache. Installation kits for the IOC are ordered separately and have to be ordered per port. These kits are specific to a VS chassis and include all required internal cables, backpanels, and SCSI bus termination for a single IOC port. Order one kit for a 70V68-1 and two kits for a 70V68-2.

70V68-KIT-L	For the 300, 7100, 7300, 8400, and 10000 chassis.
70V68-KIT-S	For the 7000 and 8200 chassis.

### XTEND MODULES

There are two types of electrical SCSI interfaces distinguished by total cable length, single ended, limited to 19.5 feet, and differential SCSI, allowing a total of 80 feet, terminator to terminator. The majority of SCSI devices are single ended, limiting real life configurations to less than 20 feet, which severely limits physical configuration possibilities for large VS installations.

The XTEND option physically moves the IOC SCSI bus connection 50 feet from the CPU. There are two types of XTEND models depending on the customers requirements and the configured devices: XTEND-D Extends the physical distance of the differential SCSI chain by 50 feet providing a maximum distance of 130' total cable length from terminator to terminator, and XTEND-SE extends by 50 feet and converts the differential electrical signals generated by the IOC to single ended allowing for the connection of single ended disk and tape drives. Three XTEND models are offered:

SSM-XTEND-D	A dedicated SSM-C with a differential extender installed.
SSM-XTEND-SE	A dedicated SSM-C with a single ended extender/converter installed.
MDSC-XTEND-SE	An installation kit designed to be mounted in either an MDSC-D or an MDSC-R.

SCSI I/O SUB SYSTEM

PRICING AND MAINTENANCE

HIGH END SCSI IOC LIST MAINT.

70V68-1	Single Port SCSI Buffering IOC	\$15,500	\$80
70V68-2	Dual Port SCSI Caching IOC	\$18,500	\$95
70V68-KIT-L	SCSI Single Port Rear Panel - Long	\$250	n/a
70V68-KIT-S	SCSI Single Port Rear Panel - Short	\$250	n/a

HIGH END SCSI OPTIONS

SSM-XTEND-D	Differential Extender in SSM-C	\$3,000	\$23
SSM-XTEND-SE	Single Ended Extender in SSM-C	\$3,000	\$23
MDSC-XTEND-SE	Single Ended Extend Kit for MDSC	\$2,500	\$17
C/MDSC-XTEND-SE	CONFIG-SE Extend Kit for MDSC	\$2,500	\$17

SCSI TAPE DRIVES

2248V-2-SE	SCSI 6250 BPI TD with SE Interface	\$19,000	\$143
2248V-2-IOC	SCSI 6250 BPI TD w/Buffering IOC	\$26,000	\$246
2248V-2-ENCL	6250 GCR Desktop Enclosure	\$750	n/a
2248V-2-DSC	6250 GCR DSC-0 Installation Kit	\$250	n/a
2249V-2	18-Track SCTD Diff & SE w/ Autoloader	\$34,000	\$226
2249V-2-IOC	18-Track SCTD w/ SCSI Buffering IOC	\$41,000	\$329
2249V-2-ENCL	18-Track Desktop Enclosure	\$750	n/a
2238V-3H	150MB Streaming Cartridge Tape Drive	\$1,995	\$10
C/2238V-3H-SE	CONFIG-150MB SCSI SCTD	\$1,995	\$10

SCSI DISK DRIVES

2269V-5H-SE	SCSI 320MB HH Disk w/ SE interface	\$4,495	\$29
2269V-6F-SE	SCSI 650MB FH Disk w/ SE interface	\$7,395	\$42
C/2269V-5H-SE	CONFIG-SCSI 320MB HH w/ SE interface	\$4,495	\$29
C/2269V-6F-SE	CONFIG-SCSI 650MB FH w/SE interface	\$7,395	\$42

SCSI CABINETS, CABLES, and MISC.

MDSC-D	Floor Standing MDSC	\$3,000	\$12
MDSC-R	Rack Mount MDSC	\$3,000	\$12
421-0090	50ft SCSI Cable	\$350	n/a
421-0089	25ft SCSI Cable	\$200	n/a
421-0066	8ft SCSI Cable	\$99	n/a
421-0059	3ft SCSI Cable	\$99	n/a
421-0084	2ft SCSI Cable	\$99	n/a
421-0110	1ft SCSI Cable	\$99	n/a

725-9029	2249V-2 Cartridge Tape Magazine	Wang Express
725-9030-20	2249V-2 Cleaning Cart. (Qty 20)	Wang Express
725-7313-30	2249V-2 Cartridge Tape (Qty 30)	Wang Express

## NEW SCSI DEVICE SUPPORT FOR THE VS5 / 5E / 6 / 6E / 75E

Several of the new high performance SCSI options are now available for 'E' series VSs. These are the same devices described as a part of the new SCSI support for the VS 5000. These solutions provide your customer with the ability to add low cost storage and tape backup to existing installations, while providing upward compatibility with currently marketed VS systems.

### MODELS

2248V-2-SE	SCSI 6250 BPI TD with SE Interface
2248V-2-ENCL	6250 GCR Desktop Enclosure
2248V-2-DSC	6250 GCR DSC-0 Installation Kit
2269V-5H-SE	SCSI 320MB HH Disk w/ SE interface
2269V-6F-SE	SCSI 650MB FH Disk w/ SE interface

### ORDERING INFORMATION

Specific model numbers, pricing, and maintenance information can be found in a separate document contained in this package. All model numbers are active and orders can be booked. Current manufacturing lead times are six weeks or greater. 'C/' models are also available on some items to assist manufacturing in appropriately configuring the order to each customer's preference.

### CONFIGURATION REQUIREMENTS

The new disk drives are supported by the 5E, 6E, and 75E. The 2248V-2-SE is supported only by the 75E due to limitations of the bus processor hardware.

### HARDWARE REQUIREMENTS

MODEL	Device Controllers	VS MODELS
2269V-5H-SE	Internal Bus Processor	VS 5, 5E, 6, 6E, 75E
2269V-6F-SE	Internal Bus Processor	VS 5, 5E, 6, 6E, 75E
2248V-2-SE	Internal Bus Processor	VS 75E

### SOFTWARE REQUIREMENTS

MODEL	DSP	VS/OS (min)	VS/OS (recommended)
2269V-5H-SE	3.60.00	7.20.00	7.21.05
2269V-6F-SE	3.60.00	7.21.05	7.21.05
2248V-2-SE	3.60.00	7.21.05	7.21.05

### MOUNTING REQUIREMENTS

MODEL	MOUNTING LOCATIONS
2269V-5H-SE	MDSC-D, MDSC-R, SSM-C (Cannot be internally mounted)
2269V-6F-SE	MDSC-D, MDSC-R, SSM-C (Cannot be internally mounted)
2248V-2-SE	DESKTOP (req. 2248V-2-ENCL & Country Kit) DSC-0 (req. 2248V-2-DSC for mounting hardware)

## CONFIGURATION REQUIREMENTS

The new disk drives are supported by all VS 5000 models and SCSI IOCs including the RCU and the 50V68 single port SCSI IOC. The 2248V-2-SE is supported only by the 50V68 IOC, and, thus, is not available for the VS 5000 Model 30. All the new SCSI devices require VS Device Support Package 3.60 or greater and VS/OS 7.20.00 or greater. 7.21.05 is recommended due to the extensive testing this VS/OS and DSP 3.60.00 have received. Other configuration restrictions, such as cable lengths, are consistent with existing VS 5000 SCSI configuration rules.

### HARDWARE REQUIREMENTS

MODEL	IOCs	VS 5000 MODELS
2269V-5H-SE	RCU, 50V68	5430, 5440, 5450, 5460
2269V-6F-SE	RCU, 50V68	5430, 5440, 5450, 5460
2248V-2-SE	50V68	5440, 5450, 5460

### SOFTWARE REQUIREMENTS

MODEL	DSP	VS/OS (min)	VS/OS (recommended)
2269V-5H-SE	3.60.00	7.20.00	7.21.05
2269V-6F-SE	3.60.00	7.21.05	7.21.05
2248V-2-SE	3.60.00	7.21.05	7.21.05

### MOUNTING REQUIREMENTS

MODEL	MOUNTING LOCATIONS
2269V-5H-SE	5600, MDSC-D, MDSC-R, SSM-C
2269V-6F-SE	5600, MDSC-D, MDSC-R, SSM-C
2248V-2-SE	DESKTOP (req. 2248V-2-ENCL & POWER CORD-xx) DSC-0 (req. 2248V-2-DSC for mounting hardware)

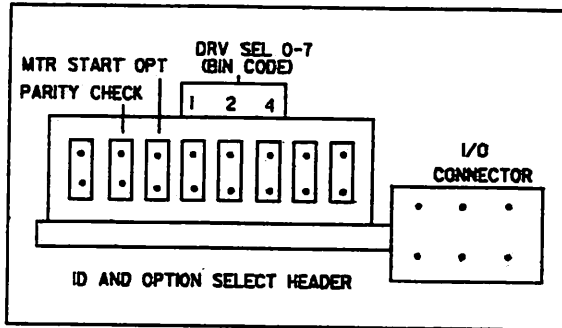


TECHNICAL SERVICE BULLETIN  
SECTION: HardWare General

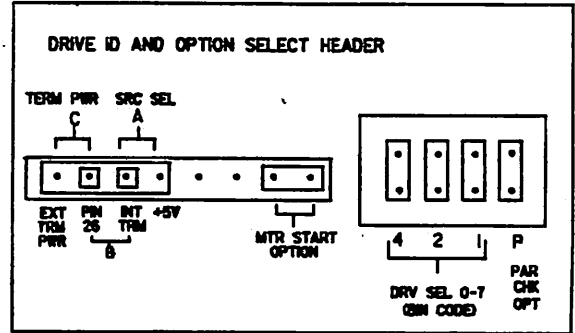
NUMBER: HWG 9055 REPLACES: \_\_\_\_\_ DATE: 04/23/91 PAGE 1 OF 7  
 MATRIX ID. 3110 PRODUCT/RELEASE# 5 1/4" and 3 1/2" disk drives  
 TITLE: Disk Drive Labels

PURPOSE:

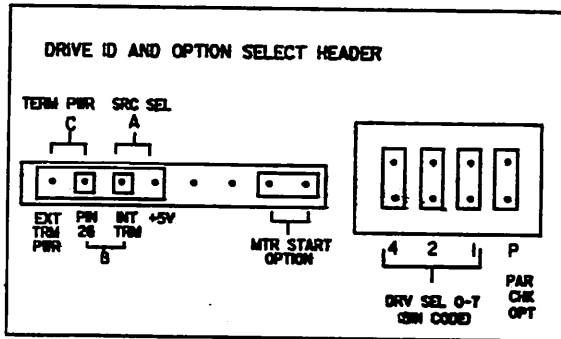
To provide a complete and coherent document containing all OEM vendor disk drive, labels and board layout changes, utilized at any previous time at Wang. Labels will be designated with Wang P/N, OEM vendor, and a brief drive description.



725-4895 Seagate 5 1/4" 326Mb HH SCSI



725-3823 Seagate 5 1/4" 85Mb UNFORMATTED SCSI



725-3822 Seagate 5 1/4" 180Mb HH

	SCSI ID	ID2	ID1	ID0
725-3814	0	OUT	OUT	OUT
	1	OUT	OUT	IN
	2	OUT	IN	OUT
	3	OUT	IN	IN
	4	IN	OUT	OUT
	5	IN	OUT	IN
	6	IN	IN	OUT
	7	IN	IN	IN

725-3814 Micropolis 5 1/4" FH 380Mb WIN

GROUP: Peripheral Support Engineering

MAIL STOP: 014-490

COMPANY CONFIDENTIAL  
WANG Laboratories, Inc.





# TECHNICAL SERVICE BULLETIN

## SECTION: HardWare General

NUMBER: HWG 9055      REPLACES: \_\_\_\_\_      DATE: 04/23/91      PAGE 3 OF 7  
 MATRIX ID. 3110      PRODUCT/RELEASE# 5 1/4" and 3 1/2" disk drives  
 TITLE: Disk Drive Labels

CONFIGURATION	JUMPER SETTING	Drive Type: 37			
Stand-alone (C <sub>1</sub> )		725-5070 			
Master (C <sub>2</sub> )					
Slave (D <sub>1</sub> )					
No defects exist on this drive.					
Cylinders	Heads	Write Precomp	Landing Zone	Sectors/Track	MB
1024	16	-1	1023	25	200

725-5070 Conner 3 1/2" HH 200Mb AT

JUMPER USE	DEVICE ID	OUT	OUT	OUT
1	OUT	OUT	IN	
2	OUT	IN	OUT	
3	OUT	IN	IN	
4	IN	OUT	OUT	
5	IN	OUT	IN	
6	IN	IN	OUT	
7	IN	IN	IN	
	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	

725-4895

DEFAULT SETTINGS

CABLE USE

725-4895 Micropolis 5 1/4" 326Mb HH SCSI

CONFIGURATION	JUMPER SETTING	DRIVE TYPE: 17			
Stand-alone (C <sub>1</sub> )	ACT	725-4860 			
Master (C <sub>2</sub> )	ACT				
Slave (D <sub>1</sub> )	ACT				
No defects exist on this drive.					
Cylinders	Heads	Write Precomp	Landing Zone	Sectors/Track	MB
977	5	300	977	17	40

725-4860 Conner 3 1/2" 40Mb AT

CONFIGURATION	JUMPER SETTING	DRIVE TYPE: 25			
Stand-alone (C <sub>1</sub> )	ACT	725-4859 			
Master (C <sub>2</sub> )	ACT				
Slave (D <sub>1</sub> )	ACT				
No defects exist on this drive.					
Cylinders	Heads	Write Precomp	Landing Zone	Sectors/Track	MB
615	4	0	615	17	20

725-4859 Conner 3 1/2" 20Mb AT

GROUP: Peripheral Support Engineering      MAIL STOP: 014-490

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TECHNICAL SERVICE BULLETIN  
SECTION: HardWare General

NUMBER: HWG 9055

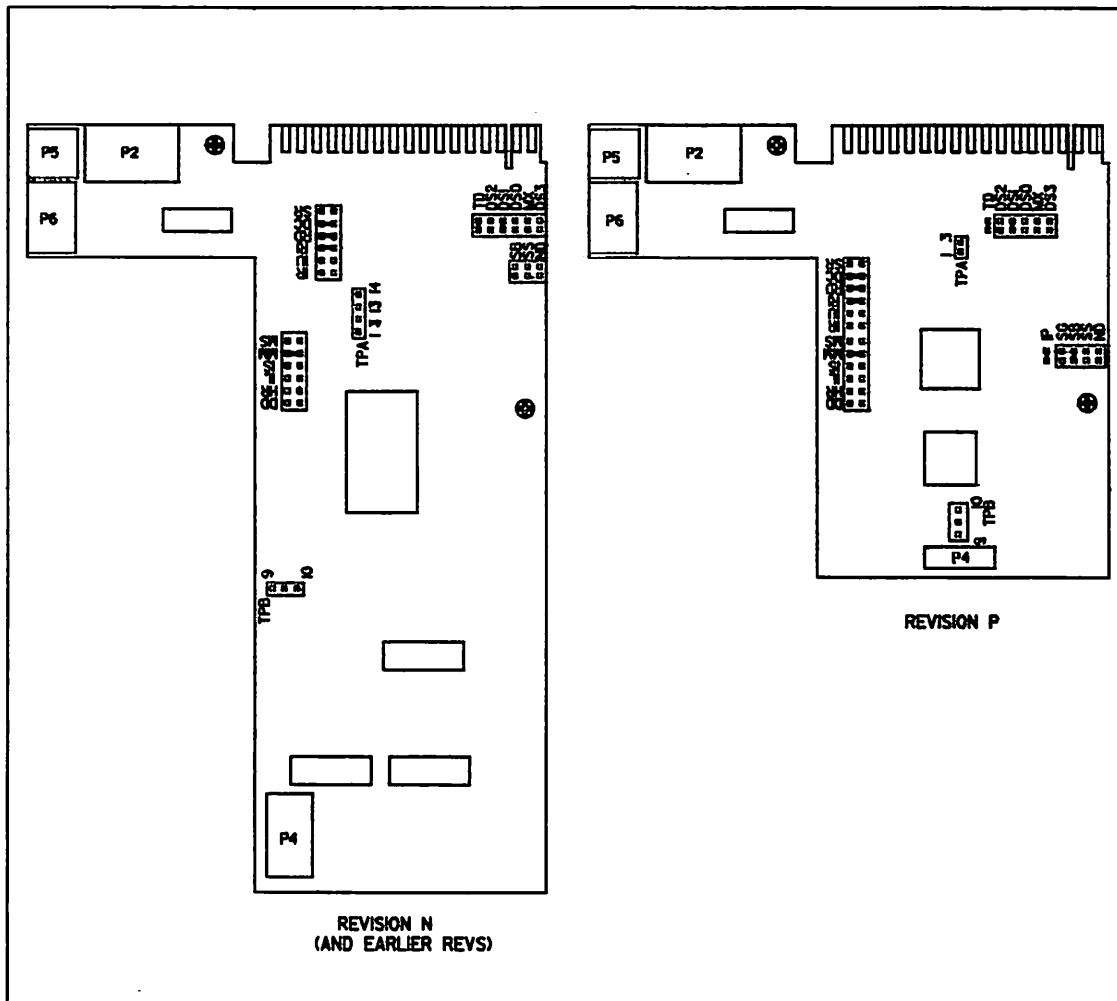
REPLACES: \_\_\_\_\_

DATE: 04/23/91 PAGE 4 OF 7

MATRIX ID. 3110

PRODUCT/RELEASE# 5 1/4" and 3 1/2" disk drives

TITLE: Disk Drive Labels



725-5083-VG Mitsubishi 5 1/4" 1.2Mb HH Floppy

GROUP: Peripheral Support Engineering

MAIL STOP: 014-490

COMPANY CONFIDENTIAL  
WANG Laboratories, Inc.





# TECHNICAL SERVICE BULLETIN

## SECTION: HardWare General

NUMBER: HWG 9055      REPLACES: \_\_\_\_\_      DATE: 04/23/91      PAGE 5 OF 7  
 MATRIX ID. 3110      PRODUCT/RELEASE# 5 1/4" and 3 1/2" disk drives  
 TITLE: Disk Drive Labels

Jumper Settings					
LT MASTER SLAVE EWS ACT	LT MASTER SLAVE EWS ACT	LT MASTER SLAVE EWS ACT	Drive Type: 45  725-5056		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Stand-alone (C <sub>1</sub> )	Master (C <sub>2</sub> )	Slave (D <sub>2</sub> )			
Configuration					
No defects exist on this drive.					
Cylinders	Heads	Write Precomp	Landing Zone	Sectors/Track	MB
1004	12	-1	1003	17	100

725-5056 Seagate 3 1/2" 104Mb AT

CONFIGURATION	JUMPER SETTING																								
C <sub>1</sub> or D <sub>1</sub>	<table border="1" style="font-size: small;"> <tr><td>16</td><td><input checked="" type="checkbox"/></td><td>5</td></tr> <tr><td>14</td><td><input checked="" type="checkbox"/></td><td>3</td></tr> <tr><td>12</td><td><input checked="" type="checkbox"/></td><td>1</td></tr> <tr><td>10</td><td><input checked="" type="checkbox"/></td><td>9</td></tr> <tr><td>8</td><td><input checked="" type="checkbox"/></td><td>7</td></tr> <tr><td>6</td><td><input checked="" type="checkbox"/></td><td>5</td></tr> <tr><td>4</td><td><input checked="" type="checkbox"/></td><td>3</td></tr> <tr><td>2</td><td><input checked="" type="checkbox"/></td><td>1</td></tr> </table>	16	<input checked="" type="checkbox"/>	5	14	<input checked="" type="checkbox"/>	3	12	<input checked="" type="checkbox"/>	1	10	<input checked="" type="checkbox"/>	9	8	<input checked="" type="checkbox"/>	7	6	<input checked="" type="checkbox"/>	5	4	<input checked="" type="checkbox"/>	3	2	<input checked="" type="checkbox"/>	1
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2	<input checked="" type="checkbox"/>	1																							
Drive Type: 35      725-4032																									
Cylinders	Heads	Write Precomp	Landing Zone	Sectors/Track	MB																				
976	5	-1	976	17	40																				

725-4032 Seagate 3 1/2" 40Mb WinI

CONFIGURATION	JUMPER SETTING	DRIVE TYPE: 17																								
Stand-alone (C <sub>1</sub> )	<table border="1" style="font-size: small;"> <tr><td>16</td><td><input type="checkbox"/></td><td>N</td></tr> <tr><td>14</td><td><input type="checkbox"/></td><td>N</td></tr> <tr><td>12</td><td><input type="checkbox"/></td><td>N</td></tr> <tr><td>10</td><td><input type="checkbox"/></td><td>N</td></tr> <tr><td>8</td><td><input type="checkbox"/></td><td>N</td></tr> <tr><td>6</td><td><input type="checkbox"/></td><td>N</td></tr> <tr><td>4</td><td><input type="checkbox"/></td><td>N</td></tr> <tr><td>2</td><td><input type="checkbox"/></td><td>N</td></tr> </table>	16	<input type="checkbox"/>	N	14	<input type="checkbox"/>	N	12	<input type="checkbox"/>	N	10	<input type="checkbox"/>	N	8	<input type="checkbox"/>	N	6	<input type="checkbox"/>	N	4	<input type="checkbox"/>	N	2	<input type="checkbox"/>	N	725-4860
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Cylinders	Heads	Write Precomp	Landing Zone	Sectors/Track	MB																					
977	5	300	977	17	40																					

725-4860 Seagate 3 1/2" 40Mb AT

CONFIGURATION	JUMPER SETTING																								
C <sub>1</sub> or D <sub>1</sub>	<table border="1" style="font-size: small;"> <tr><td>16</td><td><input checked="" type="checkbox"/></td><td>5</td></tr> <tr><td>14</td><td><input checked="" type="checkbox"/></td><td>3</td></tr> <tr><td>12</td><td><input checked="" type="checkbox"/></td><td>1</td></tr> <tr><td>10</td><td><input checked="" type="checkbox"/></td><td>9</td></tr> <tr><td>8</td><td><input checked="" type="checkbox"/></td><td>7</td></tr> <tr><td>6</td><td><input checked="" type="checkbox"/></td><td>5</td></tr> <tr><td>4</td><td><input checked="" type="checkbox"/></td><td>3</td></tr> <tr><td>2</td><td><input checked="" type="checkbox"/></td><td>1</td></tr> </table>	16	<input checked="" type="checkbox"/>	5	14	<input checked="" type="checkbox"/>	3	12	<input checked="" type="checkbox"/>	1	10	<input checked="" type="checkbox"/>	9	8	<input checked="" type="checkbox"/>	7	6	<input checked="" type="checkbox"/>	5	4	<input checked="" type="checkbox"/>	3	2	<input checked="" type="checkbox"/>	1
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10	<input checked="" type="checkbox"/>	9																							
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Drive Type: 31 725-4032																									
Cylinders	Heads	Write Precomp	Landing Zone	Sectors/Track	MB																				
732	7	300	732	17	42																				

725-4032 Panasonic 3 1/2" 40Mb WinI

GROUP: Peripheral Support Engineering      MAIL STOP: 014-490

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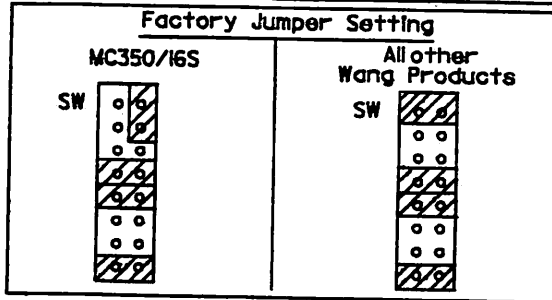
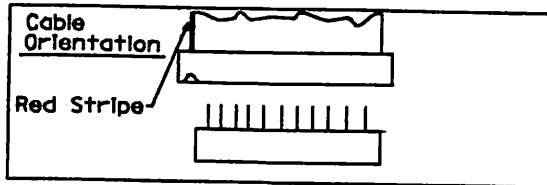


TECHNICAL SERVICE BULLETIN  
SECTION: Hardware General

NUMBER: HWG 9055 REPLACES: \_\_\_\_\_ DATE: 04/23/91 PAGE 6 OF 7  
MATRIX ID. 3110 PRODUCT/RELEASE# 5 1/4" and 3 1/2" disk drives  
TITLE: Disk Drive Labels

725-0269  
142 SCSI

725-0269 Micropolis 5 1/4" FH 170Mb Win1



725-4035 Mitsubishi 3 1/2" HH 1.44Mb

725-4033  
TYPE 33

725-4033 Micropolis 5 1/4" FH 145Mb ESDI

GROUP: Peripheral Support Engineering MAIL STOP: 014-490

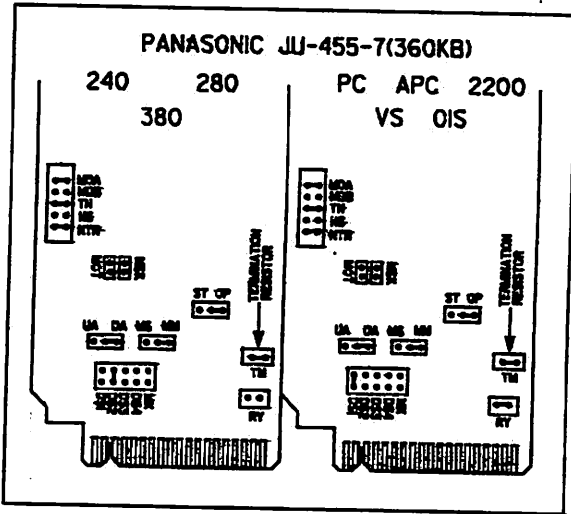
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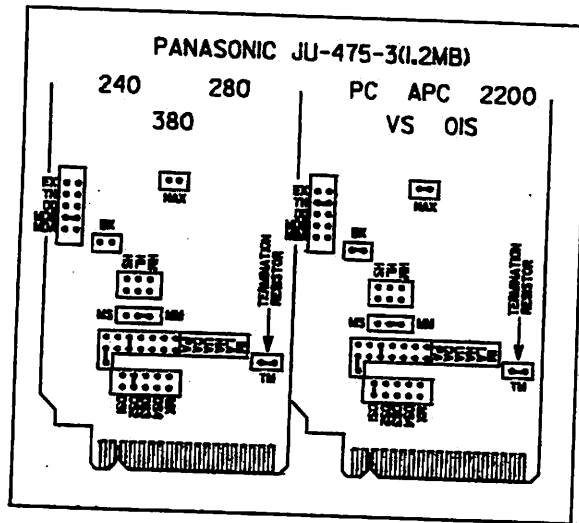
# TECHNICAL SERVICE BULLETIN

## SECTION: HardWare General

NUMBER: HWG 9055 REPLACES: \_\_\_\_\_ DATE: 04/23/91 PAGE 7 OF 7  
MATRIX ID. 3110 PRODUCT/RELEASE# 5 1/4" and 3 1/2" disk drives  
TITLE: Disk Drive Labels



725-0142 Panasonic 5 1/4" HH 360Kb AT  
725-0142-G Panasonic 5 1/4" HH 360Mb AT grey bezel



725-0258 Panasonic 5 1/4" HH 1.2Mb AT  
725-0258-G Panasonic 5 1/4" HH 1.2Mb AT grey bezel

GROUP: Peripheral Support Engineering MAIL STOP: 014-490

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**INTRODUCE**  
**to**  
**22C11-HS DISK CONTROLLER BIT**

**Milton Chen**

**03/28/91**

**WANG COMPUTER (TAIWAN) LTD.**

## **Contents**

- \* Configuration Requirement**
- \* User Interface**
- \* Operation Instruction**
- \* Test Item**
- \* Reference**
- \* Miscellaneous**

## **1.0 Configuration Requirement**

- 1.1 BIT ( Build In Test ) PROM reside at 22C11-HS mother board 210-9579-1A.
- 1.2 PROM located at L07: EVEN, L14: ODD.
- 1.3 Insert in the High Speed Channel board 210-7578.
- 1.4 Printer - If burn-in mode printer test is to be performed.

## **2.0 User Interface**

- 2.1 Using LED to indicate diagnostic test result.
- 2.2 LED turn ON after power-on.
- 2.3 Any diagnostics test error, LED is going to flash.
- 2.4 Diagnostic test pass, about ten seconds the LED will be turn OFF.

## **3.0 Operation Instruction**

- 3.1 There is two types of diagnostics employed by the PROM :  
Normal power-up mode and Burn-in mode.
- 3.2 Normal power-up mode :  
When power is applied to the unit, Normal power-up will be entered.

### 3.3 Burn-in mode :

22C11-HS daughter board.SW2, must set 'OFF'. The printer test will be performed in the burn-in mode only, if connect printer. The printer will print five lines of following message:

Copyright, Wang Laboratories, Inc. 1990 Rev.5070 → 5066

~~\*\*\*~~ 22C11-HS Run-in ~~and Print~~ Test \*\*\*

PASS

Upon completion of diagnostics Burn-in test, the LED will be turn off about one second and turn on as next time burn-in test begins.

## 4.0 Test Item

4.1 The hardware will be tested : 80286 CPU, 256K SRAM, 8255 PPI.

4.2 Test in the Program :

<u>Name of Test</u>	<u>Hardware Tested</u>
1. LED Test	LED ON/OFF test
—2. 80286 CPU Test	CPU register test
—3. SRAM Size Test	Detect SRAM Size
—4. 4K Bytes Semaphore Area Test	First 4K bytes test
—5. SRAM Data Bus Test	SRAM data bus test
—6. SRAM address line Test	Test SRAM address line
—7. SRAM Write/Read Test	SRAM W/R Test
8. Printer Test	8255 PPI port test

## 5.0 Reference

5.1 22C11-HS Disk Interface H/W Design Specification.

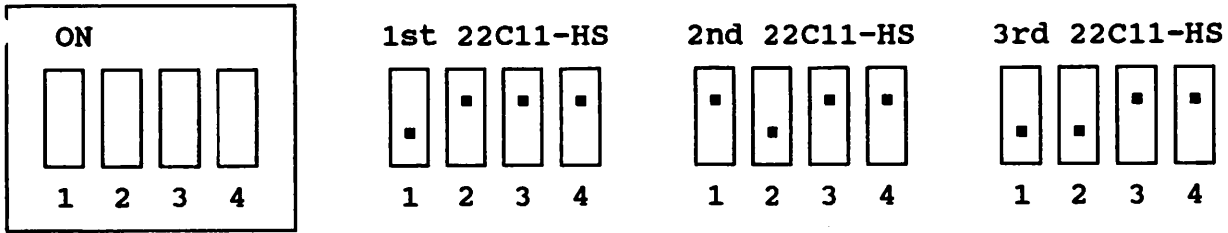
5.2 High Speed I/O Controller H/W Design Specification.

5.3 8255 Programmable Peripheral Interface Data Sheet.

5.4 22C11-HS Disk Interface BIT

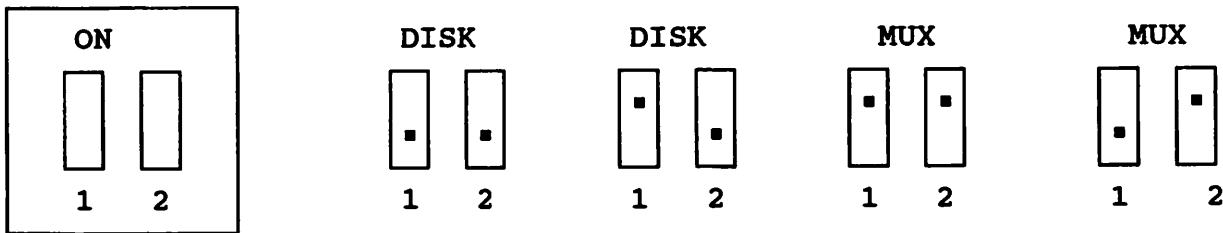
## 6.0 Miscellaneous

6.1 On 22C11-HS mother board (210-9579-1A) L:SW1 switch definition:

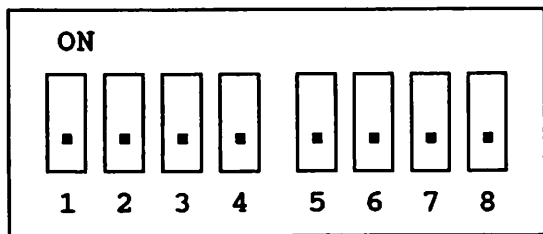


SW	4	3	2	1	Board Address
	0	0	0	1	No. 1 22C11-HS
	0	0	1	0	No. 2 22C11-HS
	0	0	1	1	No. 3 22C11-HS

6.2 Switch SW1 - MUX and Disk



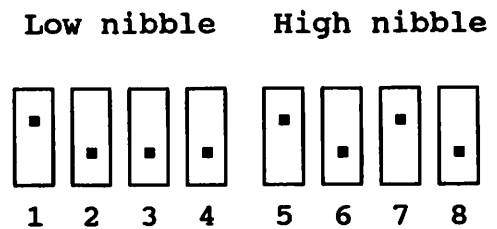
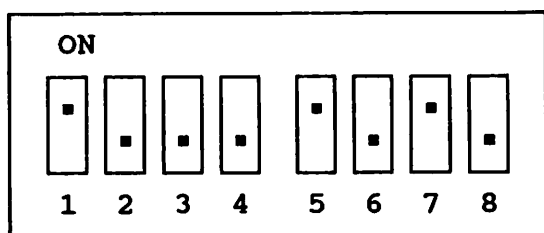
6.3 On 22C11 daughter board (210-9581) L:SW2 - PRINTER Address Port



Setting 'OFF' that is Diagnostics  
" RUN-IN " mode.

Printer Address Port Example:

If port address = 51H, the switch must setting as follows:



ON: 1  
OFF: 0

1 5  
5 12/5



CAN ONLY BOOT FROM HIGHEST ID # DRIVE |<sup>ST</sup> ADDRESS

**TECHNICAL SERVICE BULLETIN**  
**SECTION: HardWare Technical**

NUMBER: HWT 9728 REPLACES: \_\_\_\_\_ DATE: 06/25/92 PAGE 1 OF 6

MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO

TITLE: 22C11-SCSI Announcement: New SCSI Controller

**PURPOSE:**

To inform the field of the new SCSI Controller for the CS/386 TURBO and provide information on installing and testing.

**EXPLANATION:**

The 22C11-SCSI Controller (212-9727) is a new intelligent controller for use with the CS/386 Turbo CPU. It provides the Turbo with an industry standard SCSI interface capable of disk I/O performance beyond anything now available to the product line. With it, the faster and larger capacity disk and tape drives available to SCSI can now be used. Taking full advantage of the potential of this controller may require some programming changes. With this controller and the drives tested, multiple sectors can be read as quickly as 1 sector. If only reading 1 sector per access, throughput will be minimized. The number of sectors to read for optimum performance may vary from drive to drive. Changing programs on disk to '386' or 'NEW' format is recommended. A new command operational with the Turbo system is available to greatly simplify this process (\$MOVE!). The SCSI bus can support 8 SCSI devices of which the controller itself will be one. Multiplexing to multiple CPU's is not currently supported. The board also provides a standard 2200 Centronics printer interface, incorporating a 256K cache buffer.

Highlights and Advantages:

- ANSI X3.131-1986 compatible.
- 2 Meg of on-board cache dedicated to the SCSI bus.
- dramatic increase in disk and tape storage capabilities.
- supports up to a total of 7 SCSI devices /controller, 3 SCSI &/or disk controllers per CPU.
- supports up to 29 hard disk addresses, 2 floppy drives, and 1 tape /ctrl.
- any 1 hard disk can be configured for from 1 to 29 addresses.
- supports 3 byte addressing (allows use of a surface greater than 16 Meg).
- 100% compatible to existing BASIC-2 disk commands.
- uses SCSI drives and cabinets (SSM SCSI Storage Module & MDSC Mini Data Storage Cabinet) that are used with VS.
- choice of SCSI cable connection; J4, Amphenol type or J5, ribbon cable.
- standard 2200 Centronics printer port, J1, with 256K cache buffer.

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 019-690

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**TECHNICAL SERVICE BULLETIN**  
**SECTION: HardWare Technical**

NUMBER: HWT 9728 REPLACES: \_\_\_\_\_ DATE: 06/25/92 PAGE 2 OF 6

MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO

TITLE: 22C11-SCSI Announcement: New SCSI Controller

**EXPLANATION (cont'd):**

Configuration Requirements:

1. Turbo CPU
2. Turbo General Release 1.10.00 (beta test) 291-1001A
3. New Disk/Tape Utilities for SCSI (included w/ future O/S's)
4. SSM-C SCSI Storage Module or a MDSC Mini Data Storage Cabinet
5. Max SCSI cable length from controller to last device: 18.75 feet
6. See parts list (pg 6) for currently supported SCSI devices.

Hardware:

The board consists of a 210-9579 High Speed I/O Processor and a 210-9582 SCSI/Printer Controller. The 9579 I/O Processor is the same board used with the Turbo MXF Controller and the 22C11-HS Printer/Disk Controller, but with it's own proms at location L7 and L14. The 9582 board is new. It handles all communication to any attached SCSI device or printer. It has 2 common SCSI connectors, J4 external on the bottom half of the outer rail, and J5 found on the board just behind J4. This provides connections for either a 50 pin shielded amphenol connector via J4, or a 50 pin ribbon cable (not available from Wang) via J5. The board gives compatibility to the same SCSI devices supported on VS systems which use the SSM-C SCSI Storage Module and the MDSC SCSI Mini Data Storage Cabinet. These 2 units will be the offered Wang devices for housing SCSI drives for the Turbo. As each SCSI device is handled by a transparent driver imbedded in microcode, some SCSI devices may not be compatible unless they comply with existing drivers for devices already tested. R&D will add drivers for those SCSI devices which become popular. For currently supported devices see the 'parts list' on page 6. The printer port, J1, supports all existing 2200 printers.

Switch Settings and Jumpers:

210-9582 SW1 1,2,3 - SCSI ID # | 4 - Cache Enable | 5,6,7,8 - Prtr Addr  
\*\*\* w/ early :SCSI ID 7 = 1,2,3 All ON | Cache On = 4 ON | 215 = 5,7 OFF 6,8 ON  
version proms : | 216 = 6,7 OFF 5,8 ON  
:Jumpers J8 IN J9 IN | 217 = 5,6,7 OFF 8 ON  
\*\*\* w/ R0 & same as above : Cache On = 4 OFF | 215 = same as above  
proms dated | 216 = 5,8 OFF 6,7 ON  
7/6 or higher | 217 = 5 OFF 6,7,8 ON

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 019-690

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**TECHNICAL SERVICE BULLETIN**  
**SECTION: HardWare Technical**

NUMBER: HWT 9728 REPLACES: \_\_\_\_\_ DATE: 06/25/92 PAGE 3 OF 6

MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO

TITLE: 22C11-SCSI Announcement: New SCSI Controller

EXPLANATION (cont'd):

210-9579 SW1 (Disk Addr)

310 = 1 OFF only

320 = 2 OFF only

330 = 1,2 OFF only

Jumpers

JP1 - IN (clock enable)

Powering the SCSI Unit ON and OFF:

Note: The following information on powering up the system is based on the current beta hardware. For first customer ship, other than powering the SCSI unit first, the boot procedure should be similar to existing systems.

The normal procedure for powering up disk units in the past has been to power the disk unit/s up last after the CPU. With the beta hardware, the SCSI unit must be powered on first and all SCSI devices allowed to complete any self-tests that may exist. This normally takes just a few seconds and with many drives completes with a clicking noise and the drive LED going out. Most of the tested devices so far complete within 15 seconds. Multiple drives in a single cabinet may need more time. Once all drives within a unit complete their self-tests, the CPU can be turned on. After powering on the CPU, between 10 and 15 sec with 1 drive, the CPU will go out and talk to the drive/s. Usually the drive LED will blink twice during this period. When booting the CPU, RESET should not be keyed until this communication takes place, otherwise the drive/s may not be properly recognized by the system. If using a SCSI floppy, additional tests are done in the boot process. Allow up to a minute for these tests to complete. With the proper floppy drive, you can boot before configuring the SCSI devices. At the time of this writing, the suggested floppy drive (see 'parts list') would only read a 1.2M 2200 diskette formatted in DOS format. All Turbo O/S disks from Software Distribution are in DOS format. With 2 floppy drives, the drive with the lowest ID # would be the bootable drive (D10, D20, or D30 dependent on controller address). See 'Software Setup' for more information. If the SCSI unit is to be powered off while the system is up and running, all accesses and all drive activity should be allowed to complete to prevent problems. After repowering, the system should recognize any SCSI device operational before the unit was powered down. Any physical changes such as adding a device or changing a device ID # will likely require the system to be rebooted.

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 019-690

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**TECHNICAL SERVICE BULLETIN**  
**SECTION: HardWare Technical**

NUMBER: HWT 9728 REPLACES: \_\_\_\_\_ DATE: 06/25/92 PAGE 4 OF 6

MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO

TITLE: 22C11-SCSI Announcement: New SCSI Controller

EXPLANATION (cont'd):

Software Setup:

Use of the 22C11-SCSI Controller requires at minimum Turbo General Release 1.10.00 or higher. Unlike current disk drives now used with the 2200 product line which are pre-configured through switches and prom based code, SCSI disk drives must be configured through software. This is done with a new utility program which will be included with the Turbo Operating System. From the main menu new picks will include 'SCSI Configuration' and updated versions of the 'Tape Backup and Restore' programs which will work with both the DS and SCSI. The 'SCSI Configuration' menu pick steps the user through the processes needed to initially setup the drive for use including a low level SCSI format and configuring the hard disk drive/s for various platter sizes. Some pre-release versions of this software allow either 1 to 15 master addresses (D11-D1F, D21-D2F, or D31-D3F) or 1 to 14 slave addresses (D51-D5E, D61-D6E, or D71-D7E) per disk drive, with a maximum of 29 hard disk addresses per controller. The first master and slave addresses (D10, D20, D30, D50, D60, & D70) are reserved for floppy drives and the last slave address for tape (D5F, D6F, or D7F). Final version software will allow from 1 to all 29 addresses to be assigned to 1 drive to take better advantage of systems with one large drive. After configuring the drive/s, all surfaces should be formatted via a normal 2200 format (\$FORMATDISKT/Dxx). A 16 Meg surface can be formatted in a matter of seconds dependent on drive speed. This overwrites any code written to disk with the SCSI format which may create confusion for the system. Anytime a drive is to be reconfigured, both a low level SCSI format and a 2200 format should be done to insure all new surfaces are 100% clean. The SCSI format can be done via the utility or with the following command; \$SCSI FORMAT T/Dxx, (ID#). All data is lost. The 'Backup' & 'Restore' to SCSI Tape procedures are quite similar to the DS tape procedures. The main difference is you cannot append to a tape on 'Backup'. This is because the tape drives currently available write in a serial format and do not have the separate directory track used with the DS version tape drives. If using O/S 1.1 (same as 1.15) with a 5 1/4" SCSI floppy, only 1.2M 2200 diskettes formatted in DOS format (512 byte sectors) are compatible. A DOS format can be done on a 1.2M DS floppy by

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**SECTION: HardWare Technical**

NUMBER: HWT 9728 REPLACES: \_\_\_\_\_ DATE: 06/25/92 PAGE 5 OF 6

MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO

TITLE: 22C11-SCSI Announcement: New SCSI Controller

**EXPLANATION (cont'd):**

using the 'Format Disk Platter' menu pick from the main menu or the DOS utilities. The SCSI floppy drive suggested by Wang normally writes in 1.2M format. These diskettes will be compatible with existing 2200 1.2M drives. Standard 2200 format diskettes (256 byte sectors), both 360K and 1.2M, can be read with the latest software and proms. All Turbo O/S disks are created in DOS format. Booting can be done from the SCSI floppy before configuring the drives (see 'Powering the SCSI Unit ON and OFF' for more info). All standard BASIC-2 disk commands compatible to the DS with the CS/386 or Turbo are 100% compatible.

**ADDITIONAL INFORMATION:**

Diagnostics: Built-in: The 22C11-SCSI has a LED which will light during power up self tests. If the LED stays on, replace the board. See note.

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

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

CE Level: Magnetic Media (for 5-1/4" DSDD) p/n 732-8520A

Included in the current 2200 Diagnostic Pkg Rev 2.00.00 p/n 195-2956-0

Note: These diagnostics were built for other drives and may not fully recognize the SCSI drives. Tests should work as long as the sector limits are correct.

Program "MULTIDSK" must be revised to run on the Turbo or the following message will occur, "CPU SOFTWARE MUST BE UPGRADED TO RUN THIS PROGRAM". On the latest version, 69C1, this message is on line 175. On the previous line, 170 in this case, which begins as follows:

170 P\$=\$PSTAT(1):...etc.

append to the end of the line: :IF STR(P\$,9,1)="T" THEN 180

Program FTU must also be revised. With the latest version of FTU, rev 8734, line 120 needs to be changed. Line 120 begins as follows:

120 B\$=\$PSTAT(1):...etc. Delete everything from the first colon to the end.

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**TECHNICAL SERVICE BULLETIN**  
**SECTION: HardWare Technical**

NUMBER: HWT 9728 REPLACES: \_\_\_\_\_ DATE: 06/25/92 PAGE 6 OF 6

MATRIX ID. 4103 PRODUCT/RELEASE# CS/386 TURBO

TITLE: 22C11-SCSI Announcement: New SCSI Controller

**ADDITIONAL INFORMATION (cont'd):**

Miscellaneous:

The following maintenance manuals will provide additional information on the Turbo and details on setting up the SCSI drives and cabinets:

- 741-1769-A CS, CS/386, Turbo Maintenance Manual
- 741-2009 5 1/4" SCSI Devices & Storage Cabinets Maint Mnl
- 741-1874-A SCSI SSM-C Maint Mnl (replaced by 741-2009)
- 741-1879 SCSI MDSC Maint Mnl (replaced by 741-2009)

Anomalies:

1. A bug exists with the pre-release software which causes an error if using a virgin tape. This can be circumvented by placing a REM command in front of the failing REWIND or RETENSIONING command.
2. The system may not recognize a change of floppies and may read cache.
3. With pre-release s/w, error codes for tape are misleading. Axx errors will display if a tape problem exists. If using tape, read the command line should a failure occur to determine if the error occurred on a Tape command. If so, a tape related problem exists. Axx errors normally indicate an operator error or a bad CPU board.

Note: These problems should be resolved by FCS (first customer ship).

Parts list:

:PART # : DESCRIPTION :FRU:  
:212-9727 : 22C11-SCSI Controller : X :

Related hardware:

:725-3822 : Mag Periph 94221 150M HH Dsk: X :

:725-4895 : Micropolis 1684 326M HH Disk: X :

:725-3814 : Micropolis 1578 326M FH Disk: X :

:725-4858 : HP Model 97548S 647M FH Disk: X :

:725-3820 : Archive 2150S 150M HH Tape : X :

:725-5981 : Archive 4320NT 1.2G HH Tape : not avail at this writing:

:421-0066 : 50 Pin I/O Cable-SSM & MDSC : X :

: : 50 Pin SCSI Ribbon Cable : not available from Wang :

:725-4910 : 50 Pin SCSI Terminator w/LED: X :

:725-7269 : Term (repl'd by 725-4910) : X :

:725-1294 : 600' Data Cart Tape/Arch 150: X :

:725-9119 : 4mm Data Cart Tape/Arch 1.2M: X :

: : TEAC FD-55GS 751-U 5 1/4" Dr: not available from Wang : <sup>SIDE #</sup> TEAC FC-1

220-3691 DASTER INTERNAL RIBBON CABLE

GROUP: 2200 Basic 2 Platform Group MAIL STOP: 019-690

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## I. PRODUCT DESCRIPTION

### A. OVERVIEW OF THE PRODUCT

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

### B. SIMILARITIES/DIFFERENCES (with other WANG products)

#### 1) Software:

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

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

2) Hardware:

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

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

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

3) Other:

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

C. ANNOUNCE/FIRST CUSTOMER SHIPMENT DATE

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

D. SERVICE OFFERINGS/WARRANTY

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

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

E. SPECIAL PROGRAM/PROCEDURES

N/A

F. MAJOR COMPONENTS

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

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

#### G. CONFIGURATION REQUIREMENTS

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

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

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

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

#### II. MAINTENANCE PHILOSOPHY

##### A. Maintenance Objectives

###### 1) C.E. Level:

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

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

###### 2) Maintenance Procedures:

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

##### B. Types of contract to be offered

On-Site Maintenance Contracts will be offered.

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C. P.M. requirements

1) Customer performed:

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

2) WANG C.E. performed:

This product will not require scheduled preventive maintenance.

D. Diagnostics required/available:

1) C.E. Level:

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

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

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

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

III. TRAINING

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

A. CUSTOMER ENGINEER COURSE:

N/A

B. SALES SUPPORT COURSE

1) TIMETABLE and FORMAT

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

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#### IV. SPECIAL TOOLS/TEST EQUIPMENT

No unique items required to service this product.

#### V. OPERATING ENVIRONMENT

##### A. TEMPERATURE RANGE

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

##### B. VOLTAGE RANGE

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

##### C. HUMIDITY RANGE

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

##### D. PHYSICAL SPECIFICATIONS

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

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

##### E. SERVICE SPACE REQUIREMENTS

Observe service space requirements for unit models involved.

##### F. INPUT CURRENT

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

##### G. INPUT POWER

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

##### H. POWER FACTOR

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

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**APPENDICES**

MARKETING FORECAST

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

PRODUCT MATURE PERFORMANCE PREDICTED

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

PRODUCT ANALYSIS WITH GROWTHProduct Field Failures/Year and Calls/Year  
by Month after Installation

Model Number: 22C11-SCSI

Product Description: Turbo SCSI/Printer Controller

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

**NOTE:**

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

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

PARTS LIST

FRUs, CRUs,

		: stocking :					
		: location :					
:PART #	: DESCRIPTION	:FRU:CRU:Unique:	B	A	H	:	
:212-9727	: 22C11-SCSI Controller	: X : :	:	:	:	:	
Related hardware:							
:725-3822	: Mag Periph 94221 150M HH Dsk:	X :	:	:	:	:	
:725-4895	: Micropolis 1684 326M HH Disk:	X :	:	:	:	:	
:725-3814	: Micropolis 1578 326M FH Disk:	X :	:	:	:	:	
:725-4858	: HP Model 97548S 647M FH Disk:	X :	:	:	:	:	
:725-3820	: Archive 2150S 150M HH Tape	: X :	:	:	:	:	
:725-5981	: Archive 4320NT 1.2G HH Tape	: not avail at this writing:					
:421-0066	: 50 Pin I/O Cable-SSM & MDSC	: X :	:	:	:	:	
:	: 50 Pin SCSI Ribbon Cable	: not avail from Wang	:				
:725-4910	: 50 Pin SCSI Terminator w/LED:	X :	:	:	:	:	
:725-7269	: Term (repl'd by 725-4910)	: X :	:	:	:	:	
:725-1294	: 600' Data Cart Tape/Arch 150:	X :	:	:	:	:	
:725-9119	: 4mm Data Cart Tape/Arch 1.2G:	X :	:	:	:	:	
:	: TEAC FD-55GS 751-U 5 1/4" Dr:	not avail from Wang	:				
220-3691	TOASTER INTERNAL RIBBON CABLE	X					

Diagnostic Part Number: 195-2956-0

Parts required for P.M.: N/A

1. WHEN RAN SCSI CONFIG 2<sup>ND</sup> TIME AFTER CREATING A NEW CONFIG & SELECTED NOT TO LOAD EXISTING CONFIGURATION, THE SYSTEM PUT THE PASSWORD USED ON THE 1<sup>ST</sup> CONFIGURATION ON THE DOTTED LINE WHERE THE NUMBER OF SECTORS FOR SURFACE 1 WOULD BE ENTERED.

PASSWORD WAS SYSTEM

SETUP SCSI CONFIGURATION

SECTOR REMAINING : 620718

AMOUNT FOR SURFACE 1 SYSTEM \_ \_

2. SYSTEM WILL NOT EXCEPT AN ODD #, JUST BEEPS.
3. IF LAST ENTRY EXCEEDS AVAILABLE ~~REMAIN~~ SECTORS SYSTEM ASKS IF MASTER OR SLAVE. SHOULD ALLOW YOU TO JUST RE-ENTER.
4. IF YOU ENTER NO WHEN ASKED IF ALL ENTRIES MADE ARE ACCEPTABLE, THE SYSTEM ASKS YOU THE # OF SURFACES AGAIN. AFTER ENTERING # OF SURFACE IT SHOWS SECTORS AVAILABLE AS 0. IF ENTER A # PROBLEM 3 SHOWS UP.

WILL CREATING A NEW CONFIGURATION SCREW UP AN EXISTING DRIVE IF ADDRESSES DO NOT CONFLICT.

MIKE R  
SCSI UTIL

ADDR	SIZE	CURRENT END	CATALOG MAX	
D70				
D71	255'	65023	65000	
D72			65000	
D73	90'	33569	65000	
D74			100000	
D75	308	12500	100000	TYPE 2 INDEX, GO FORWARD
D76			100000	
D77	32	85000	100000	
D78	77	20303	100000	
D79			100000	
D7A	90'	28544	500000	
D7B	70'	65023	500000	
D7C	186	17462	100000	
D7D	90	17462	100000	
D7E	219	56282	100000	TYPE 0 INDEX, GO BACKWARD IN INDEX SECTOR FULL
D75			TAPB	



To : Duncan Chou (Taiwan R&D)  
Bill Hsien (Taiwan R&D)  
Don Casey  
Mike Runge  
Eugene Roy

From: Gene Schulz

Subj: SCSI Disk Controller For The CS/386 TURBO Product Line

Date: March 5, 1992

In order to increase SCSI peripheral sales and reduce 2200 R&D costs, this document outlines the proposed business plan and FCS requirements for the SCSI disk controller for the CS/386 TURBO, designed by Taiwan 2200 R&D.

The objectives of the attached plan are:

- . For the 2200 product line to be able to use the same SCSI disk and tape drives (in the SCSI Storage Module or Mini Data Storage Cabinet) offered on other Wang Products, thereby reducing R&D development costs by eliminating the need for any additional 2200 disk drive development in the future.
- . To provide our 2200 TURBO users the ability to take advantage of the increased I/O speed of the TURBO via SCSI devices.
- . To provide our 2200 users and VARs an entree into the world of SCSI disk and tape technology from ST-506 and QIC-2, with all the associated benefits of SCSI, e.g., larger and lower-cost disk drives, faster disk drives, increased I/O speed, etc.
- . To provide compatible media between 2200 and Unix systems, in order to facilitate migration to Unix from the 2200.
- . To create new markets, e.g., we had great success in upgrading the 2200 user base from 2280 Phoenix drives to the DS. SCSI availability, will create the potential to sell CS/386 TURBOS, along with SSM-Cs and MDSC-Ds to the 2200 user base, even if they have updated to a DS.

cc : Burt Morse (VAR Group, Mgr. Of Installed Base Programs)  
John Anderson (Director Alternate Channels)



## INTRODUCTION

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

As a follow up to the development of the CS/386 TURBO, Taiwan R&D has been working on a SCSI disk controller for the CS/386 TURBO. The first prototypes have been delivered and we have commenced internal and external testing for both market acceptance, feasibility and product performance.

## Product Description

### Hardware

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

- . CS/386 TURBO compatibility only.
- . Will support up to 7 SCSI diskette, disk and tape cartridge devices, in the standard 2200 disk format. Tested devices include the Wang SSM-C and MDSC-D enclosures, with the Wang 145MB, 320MB, 650MB SCSI disk drives and the 150MB tape cartridge. It is our intention to be open architecture.
- . Up to 7 TURBOS can share one SCSI cabinet.
- . Unlimited disk addressing capability.
- . Wang disk cache (2MB) algorithms (the same as the DS).
- . External printer port with a 256KB buffer.
- . Talks directly to the high-speed I/O bus, not the 2200 bus.

### Software

All new tape utilities are needed.

### Environment:

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

- . Domestic
  1. UL Standards for safety 114 (Office Appliance and Business Machines) or 478 (Data Processing Equipment).
  2. FCC Class A requirements for interference from computing devices.
  3. Wang Standard for electrostatic discharge (SPI 10-623).
  4. Wang Standard for Mechanical and Environmental Testing - SP 10-708

. International

1. CSA Standard for Safety C22.2 No. 154 (Data Processing Equipment).
2. IEC 435 (Safety of Electrically Energized Office Machines).
3. VDE Standard Class A for Germany.

## Media

No change to standard Wang media is needed

## Performance

Initial testing has shown, depending on the brand of SCSI disk used, disk I/O transfer rates are 7-12 times faster than ST-506 devices on a TURBO.

## Application Requirements

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

## Support

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

## MARKET ANALYSIS

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

The maximum storage now available on a DS is 316MB. The present 2200 architecture can support 448MB (28 fixed platters of 16MB per platter) per data storage cabinet (up to 3 DSs) but we don't offer ST-506 disk drives beyond 140MB in 5 1/4" technology. We now have 3-bit addressing on the CS/386 TURBO that makes the 16MB platter restriction go away. Without SCSI drives, we will not be able to take full advantage of this technology due to the size of ST-506 disks available.

In addition, with caching, SCSI drives will increase I/O performance by at least 500%, an increase badly needed by current 2200 users.

## Benefits

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

1. Increased TURBO and disk sales to current 2200 users. As previously noted, there is increased demand for larger and faster disk drives. These drives would open new markets to the existing 2200 user based estimated to be 30,000 worldwide.
2. Compatibility with other Wang product lines. The 2200 product line would now be able to offer the same SCSI devices and cabinets, e.g., the SCSI Storage Module and Mini Data Storage Cabinet being offered on the VS and PC product lines. This means we receive the additional benefits of increased quantity buy discounts from our suppliers, common product line

spare parts, servicing, etc.

3. Unix Compatibility We currently do not have any media compatibility with our SCO Intel products, except a 1.2MB diskette. The 150MB SCSI tape cartridge would provide the media compatibility needed to support 2200 users and VARs moving to a NIAKWA/Unix platform. Compatible drives would also encourage users to migrate in the future to Wang Unix systems.

Risks

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

Market Requirements

Current 2200/CS controllers range in price from \$300 to \$1,500, with the TURBO ST-506 Printer/Disk controller costing \$700.

Based on PB build and Taiwan build, the following are our projected GPMs for the 22C11-SCSI Controller:

<u>BUILD SITE</u>	<u>TOTAL COST</u>	<u>SELLING PRICE</u>	<u>GPM</u>	<u>MAINT.</u>
PB	\$423.63	\$1,295	67.3%	\$10/mo.
TAIWAN	\$370.91	\$1,295	71.4%	\$10/mo.

The following are some of the model numbers of the present Wang enclosures and SCSI drives that the 22C11-SCSI controller will support:

<u>MODEL</u>	<u>DESCRIPTION</u>
SSM-C	Storage Module
MDSC-D	Mini Data Storage Cabinet
2238V-3H	150MB Tape Cartridge
2269V-4H	145MB Fixed Winchester
2269V-5H-SE	326MB Fixed Winchester
2269V-6H-SE	650MB Fixed Winchester
HDS-3371-PC2	337MB Fixed Winchester
HDS-6320-PC2	632MB Fixed Winchester

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

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

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

DESCRIPTIONSSM-CDS145MB140MB

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

Benefits To The End-User:

1. The availability of disks that will support the full storage capabilities of the current 2200 OS, e.g., 28 fixed device addresses times 16MB platters = 448MB X 3 devices or drives per CPU = 1.3GB versus the current 948MB, a 396MB increase. Add to that, 3-bit addressing for the CS/386-TURBO, storage will only be limited by the physical size of available drives.
2. Lower-cost, large disk drive configurations, in comparison to current DS/ST-506 offerings.
3. All the associated benefits of SCSI, e.g., larger disk drives, faster disk drives, increased I/O speed, etc.
4. Open-architecture and drives that can be used on a Intel boxes if the user decides to migrate to NIAKWA/Unix.
5. By using SCSI drives on a TURBO system, you have a much better balanced I/O system that matches the capabilities of the CPU.

Forecasts

U.S. Forecast

<u>MODEL</u>	<u>Q4 FY'92</u>	<u>Q1 FY'93</u>	<u>Q2 FY'93</u>	<u>Q3 FY'93</u>	<u>TOTAL</u>
22C11-SCSI	50	50	50	50	100

International Forecast

<u>MODEL</u>	<u>Q4 FY'92</u>	<u>Q1 FY'93</u>	<u>Q2 FY'93</u>	<u>Q3 FY'93</u>	<u>TOTAL</u>
22C11-SCSI	50	50	50	50	100

Worldwide

<u>MODEL</u>	<u>Q4 FY'92</u>	<u>Q1 FY'93</u>	<u>Q2 FY'93</u>	<u>Q3 FY'93</u>	<u>TOTAL</u>
22C11-SCSI	100	100	100	100	200

Potential 1st Year \$\$ Business Opportunity

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

Announcements

	<u>U.S.</u>	<u>INT.</u>
Announcement Date	06/01/92	06/01/92
FCS	06/31/92	06/31/92

To: Bob Trottier  
From: Mike Bahia  
Subject: Magna SCSI Test  
Date: December 9, 1992

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In a followup to our meeting last week, on Monday afternoon, December 7th, representatives from Magna came in to allow us to evaluate the performance of their SCSI disk unit on the Turbo. The test results in comparison to our most common current drive and the unreleased SCSI system are shown below:

Model number	Magna MF 9300	2200 CS-D	VS MDSC-D
Hard drive tested	150 Meg SCSI	64M Microp 1325W	150M CDC 94221-5
Controller	Magna Dual Disk/Ptr	CS-D DPU / 2275MUX	22C11-SCSI
*Disk cache test			
1000 Reads, 1K/ Throughput	17-18 seconds 56-60K char/sec	16-17 seconds 60-64K char/sec	2-3 seconds 341-512K char/sec
**Disk test			
1000 Reads, 1K/ Throughput	50 seconds 20K char/sec	68 seconds 15K char/sec	9-13 seconds 114-146K char/sec

\*The disk cache test generated a physical disk address from 1 to 10 loading 4 sectors or blocks at a time resulting in cache use only after the initial 10 addresses were loaded.

\*\*The disk test was the same as the cache test, but used a random address between 0 and 10000 forcing the system to go out to the disk to do the read at a fairly consistent rate depending on cache size. Again 4 sectors or blocks are read on each access.

As can be seen above, our SCSI Controller is on average 6 times faster than the Magna unit which is comparable to our current disk offerings. The unit we tested also had a 150 Meg Archive Tape Drive and a 1.2 Meg 5 1/4" HH floppy drive. The tape drive is the same unit we would offer with the SCSI and performs a disk backup at the same speed, approximately 3 minutes for 16 Meg.

The Magna unit is still in our lab. If you need further information or have any questions please call me at extension 60256 or 60105.

cc: Steve Bergmann  
Peter Crenier  
Rick Letourneau  
Gene Roy

0110D



SCSI CDC 94221-5 155 MEG  
D31 4 SECTOR 1-10 RND

341K - 512 2-3 SEC

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1-10000

32K-54K  
78K, 114K

32,19,13,9

146,114

114K

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DS 64 MEG

10

D11

60K, 64K

17

~~5K~~

1-10000

15K

68 SEC

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4 SECTOR

10

60K, 56

17-18 SEC

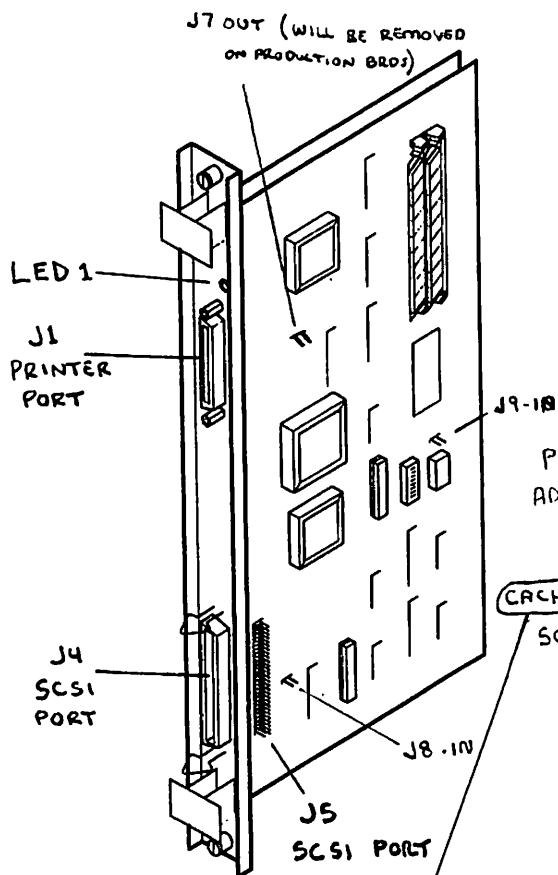
20K

50 SEC

2:07  
50 SEC RETENSION

# 22C11-SCSI CONTROLLER 212-9727

# SCSI/PRINTER CONTROLLER 210-9582

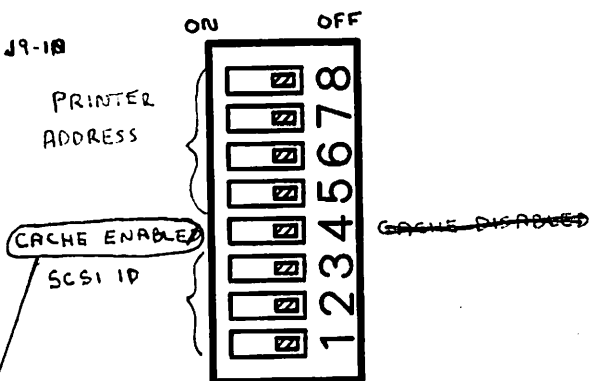


O/S 1.15  
EARLY  
VERSION PROMS  
PRINTER ADDRESS

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

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

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



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

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

O/S 1.15  
EARLY  
VERSION PROMS  
SCSI ID

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

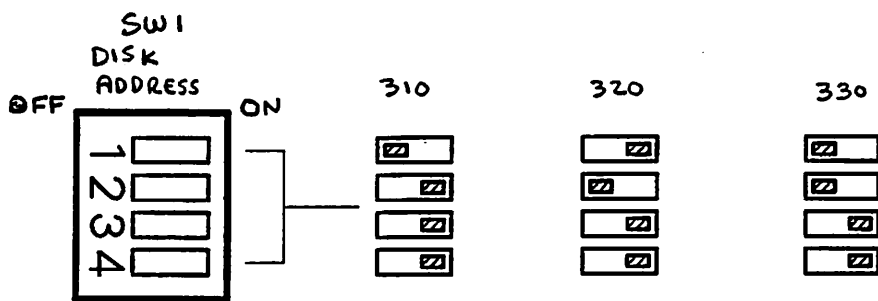
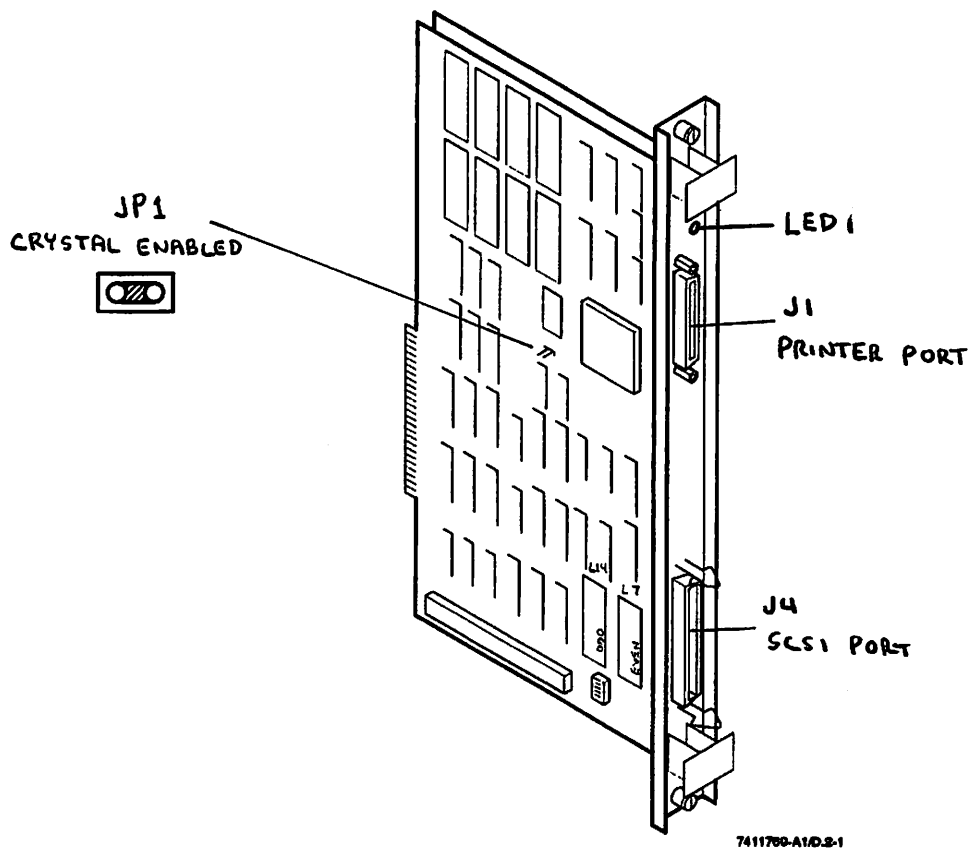
7411708-A10.D2

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

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

# 22C11-SCSI CONTROLLER 212-9727

HIGH SPEED I/O PROCESSOR 210-9579



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