EPSON

Product Support Bulletin

Subject: Proper Method for Running Benchmark and Diagnostics Programs

Date: 06/04/93
Page(s): 1 of 1

PSB No: S-0158
Originator: MWT

This bulletin describes the proper method for running any benchmark or diagnostics programs. This applies to any computer system.

In most cases, the computer should be started using an MS-DOS boot diskette that's 'clean' - in other words, one with no CONFIG.SYS or AUTOEXEC.BAT files. The appropriate executable can then be run, either from diskette or hard drive.

There will be some exceptions to the above rule. In attempting to benchmark or troubleshoot any add-on that requires a device driver (CD-ROM, local area network, etc.), obviously the necessary device driver(s) must be loaded. Also, some programs will require a minimum number of FILES or BUFFERS to be defined in the CONFIG.SYS file. Such programs will usually display this requirement if they are run without the necessary CONFIG.SYS file.

For the most consistent results, use the absolute minimal boot configuration that's allowed by the hardware being tested.

EPSON

Product Support Bulletin

Subject: Equity Series SIMM Compatibility

Date: 12/4/91
Page(s): 1 of 1

PSB No: S-0136
Originator: JAD

Due to the influx of third party SIMMs on the market, there are some that are not compatible with Epson products. This bulletin is intended to be an aid in ensuring that only compatible SIMMs are chosen for use in Epson's Equity Series of computers.

The SIMMs in question were SEIMENS, CUMULUS and KINGSTON. Installing these SIMMs in Epson products may cause the following errors:

Parity Check 1
18FFFE 0000 202 Memory Address Error
164 System Options Not Set
1500 E000 201" DOS RAM Address Error

It was thought that the chips used in these SIMMs were of poor quality.

Epson Portland evaluated the SIMMs in question and found that this was not true. The problem is caused by the SIMM circuit boards (ITE and TECAP circuit boards) used to manufacture the SIMM modules. The dimensions of these boards are not compatible with industry standard SIMM sockets. This may result in incomplete contact between the SIMM assembly and it's socket. This is caused by insufficient size of the contact surfaces in these products. Also enlarged holes in the TECAP product allow the component pin to pass entirely through the hole without making contact.

It is recommended that only SIMMS meeting industry standard contact surface specifications be used in Epson Equity computer products.

Some recommended SIMMs that were tested and found Compatible are:

Toshiba
Matsushita
CDC Enterprises
Samsung
Aculogic

For more information contact Technical Support.

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INFORMATION

Product Support Bulletin

Subject: Maximum Number of Printers Supported by Current Equity Computers

Date: 02/06/91
Page(s): 1 of 1

PSB No: S-0128
Originator: KAS

As computing environments increase in complexity, there has been an increasing number of instances that require the support of several printers by one computer. One common example is that of using Novell Netware's print server capabilities to provide printer access to a large group of users with differing printer requirements. Netware is capable of supporting three (3) parallel and two (2) serial printers on one server. Recent testing has shown that the Equity 386/25 Plus, Equity 386/25, Equity 386/20 and the Equity 386SX Plus will support three (3) parallel ports along with two (2) serial ports. The key factor in providing support for a third parallel port is the need for a parallel interface card that can be set to the IBM Monochrome Graphics/Parallel printer I/O address at 3BCh. The computer looks for this address first and, if present, will assign the parallel port on that card as LPT1. The built-in parallel port (I/O address 378h) will then be addressed as LPT2. We also had an AST I/O Mini serial/parallel card addressed at I/O address 278h, which was then reassigned to LPT3. Each of the three parallel ports was attached to a printer. There was also a printer attached to each of the two serial ports. All five printers were then set to print simultaneously under Netware Version 2.15 Rev. C using PCONSOLE. All five printers were able to print the documents assigned to them, simultaneously. The units were then tested using WordPerfect 5.1 on the network and again were successful in printing to the five (5) printers at the same time. The last tests were run with the units booting under DOS 4.01 and screen prints being directed to each of the printers. WordPerfect 5.1 was also used to direct documents to each of the printers. Again all five (5) printers were able to print the files that were sent to them.

Although not all Equity computer models were tested in this situation, the Equity models 386SX, IIe, III+ and II+ should work in a similar manner if the instructions above are used as a guide. There is one item of which to be aware when using the this setup and that is the system will complete the RAM count and lock up if using a monochrome monitor. If you need to use three parallel ports, USE A COLOR MONITOR.

Product Support Bulletin

Subject: Equity 386/20 Using Memory Above 2MB

Date: 10/09/92
Page(s): 1 of 1

PSB No: S-0123A
Originator: JDB/KAS

The purpose of this bulletin is to provide information on a problem which may occur when using more than 2MB of memory in the Equity 386/20 computer.

When expanding memory above 2MB for memory intensive applications (Networking software, AUTOCAD, LOTUS 1-2-3), insure that ROM BIOS version 1.11 or higher and the corresponding CHIPS set are being used, and a Revision 02 CHET-RM board is installed.

If the Equity 386/20 is to be used in the applications mentioned above and it does not have the component versions described above, they can be ordered with the following part numbers:

ROM BIOS	(current)	Y184802004 (CHE-B5) Lot. 9B
	(Rel. 2.16)	Y184801004 (CHE-A5) Lot. 9C
CHIPs Set		X403823021 (7L) Memory Controller
		X403822061 (9F) Int. Peripheral Controller
CHET-RM Board		Y184202100 (02 rev #)
Reference Disk		Required for User-Defined drive types and types 59-63 and the use of 1.44MB FDD as drive A:. (When using BIOS rel 2.10 or higher). Available on the Epson RBBS.

The problem does not occur in units that have this configuration.

NOTE
The chips in location 7L and 9F can be identified by the numbers printed on the top of the chips, these are the old and new numbers:

LOCATION	TYPE	CHIP NUMBER	PART NUMBER
7L	OLD	P82C302-20	X403823020
7L	NEW	P82C302C	X403823021
9F	OLD	P82C206F-1	X403822060
9F	NEW	P82C206H	X403822061

REFERENCE:
Engineering Change Notice EQ386/20-001A

Product Support Bulletin

Subject: Novell Advanced NetWare 286 ND on an 80386 - based Server

Date: 4/11/90
Page: 1 of 1

PSB No: S – 0116
Originator: MWT

This bulletin is to inform you of a potential problem that can occur when running Novell Advanced NetWare 286 in non- dedicated (ND) mode on an 80386 - based file server. This includes the Equity 386/20 and the 386SX.

When a DOS command is executed on the ND server and there is moderate network activity, the system may halt with the following error message:

Abend: INVALID TASK STATE INTERRUPT

This is apparently due to some 80286 - specific protected mode operations that' do not function quite the same way when executed on an 80386. This has been observed in the following NetWare versions:

Advanced NetWare 286 2.0a
Advanced NetWare 286 2.11
Advanced NetWare 286 2.12
Advanced NetWare 286 2.15a
Advanced NetWare 286 2.15b
ELS Level I
ELS Level II

Note that the problem does not occur with the latest version, Advanced NetWare 286 2.15c. Unless this version of NetWare 286 is being used, we cannot recommend non - dedicated file server operation with any Epson 80386 - based computer.

Product Support Bulletin

Subject: Equity 386/20 Patch for Novell NetWare 386

Date: 4/11/90
Page: 1 of 1

PSB No: S-0115
Originator: MWT

This bulletin is to inform you of the solution to a problem that occurs when running Novell NetWare 386 on the Equity 386/20. Note that the problem only appears when booting the 386/20 from floppy diskette, which is common practice to allow **the** entire hard disk drive to be partitioned as a single NetWare 386 volume.

When the SERVER program enters 80386 protected mode, it shuts down the floppy disk motor(s). After shutting down the motor(s), SERVER does not update the BIOS motor status byte located at 0040:003F. In the motor status byte, bit 0 = 1 indicates drive 0 (A:) motor is currently on. Bit 1 = 1 indicates drive 1 (6:) motor is currently on.

When SERVER needs to load a file (.NLM, .LAN, or .DSK), it switches back to real mode to let DOS handle file manipulation. DOS then calls the BIOS to access the floppy. The BIOS checks the motor status flag, which is on. The BIOS then attempts to access the floppy while the motor is off. After about one second, **the** BIOS returns an error of 80h (timeout) or 40h (seek incomplete). Depending on the DOS function in process, DOS may not be able to recover and complete the function.

In particular, these DOS functions may not recover if they are initiated when the motor status flag is on, but the drive motor is actually off: Read From File (function 3Fh) and Find First (function 4Eh). Read From File will fail if the file is already open, the flag is on and the motor is off. Find First (search for matching file name) will fail if **the** search string contains a subdirectory name, the flag is on and the motor is off.

The solution for this is a small (301 bytes) patch program called N386FIX.COM. This patch, when executed prior to running the NetWare 386 SERVER program, will properly set the motor status flag.

The compressed file N386FIX.ZIP may be found on the Epson Product Support RBBS in the file library PATCH. It is also available from the Epson Forum on Compuserve. It contains the executable file as well as an explanatory ASCII text file, N386FIX.DOC. Download with protocol and decompress with any utility that handles the .ZIP file format.

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INFORMATION

Product Support Bulletin

Subject: Equity Series Computers and Lotus 1 - 2 - 3 Release 3.0

Date: 12/7/89
Page: 1 of 1

PSB No: S-0108
Originator: KAS KAS

The advent of Lotus 1 - **2** - 3 Release 3.0 has raised a number of questions regarding memory management for the Epson Equity computers, specifically the Equity 386/20, Equity 386SX and Equity IIe. The purpose of this document is to discuss the memory requirements for Lotus 1 - 2 - 3 Release 3.0 and recommendations for installation.

Because programs run significantly faster with extended memory, Lotus recommends that you configure as much memory as possible as extended memory.

When installing Lotus 1 - 2 - 3 Release 3.0 on the Equity 386/20 or the Equity 386SX, do not use the EMS managers supplied with the system software (EEMM386.EXE for the Equity 386/20 and EMM386.SYS for the Equity 386SX). Neither of these EMS managers support the Virtual Control Program Interface (VCPI) which is required for compatibility with Lotus 1 - 2- 3 Release 3.0.

NOTE: Should you require an EMS manager for your Equity 386/20 or Equity 386SX, there are third party software packages available that are compatible with Lotus 1 - 2 - 3 Release 3.0. Two such packages are 386MAX version 4.03 or later, and Quarterdeck Expanded Memory Manager **(QEMM)** version 4.2 or later.

Do not use VDISK with the /E switch when running Lotus on the Equity 386/20. Though Lotus Release 3.0 will load, it will overwrite any data in the RAMDISK. VDISK supplied for both the Equity IIe and Equity 386SX is compatible with Lotus 1 - 2 - 3 Release 3.0 and does not have a problem with ovewriting data in the RAMDISK.

When installing Lotus 1 - 2- 3 Release 3.0 in the Equity IIe, use the EEMM286 memory manager in the hardware - emulation EMS mode. To do this, set memory as expanded memory on the Equity IIe and do not specify the expanded memory size. When the Equity IIe has only 1Mb system memory, you must select on - board memory type 5 in SETUP. When the Equity IIe has more than 1Mb of system memory, you must select type 3, 4 or 5.

Avoid the use of HDCACHE when installing Lotus 1 - 2 - 3 Release 3.0 on any of the Equity computer systems discussed in this document.

Product Support Bulletin

Subject: Equity II+, Ill + and 386/20 Compatibility with New Western Digital Hard Disk Controllers

Date: 9/8/89
Page: 1 of 1

PSB No: S-0101
Originator: PNM PNM

Western Digital has introduced a new series of 16 - bit hard disk controllers that replaces the models previously certified for use in our Equity Series computers. This bulletin reports on the compatibility of the new model controllers in our 80286 - and 80386 - based computers.

Current Model	New Model
WD1003A- WAH	WD1003V- MM1

Used in the Equity II + and III +, and currently available from Epson America, the WD1003A - WAH has been replaced in Western Digital's product line by the WD1003V- MM1, The new controller is capable of providing a 2:1 interleave format. This controller card has been tested in the Equity II + and Ill+ with the Epson 20Mb and 40Mb hard drives as well as the Seagate ST - 251. Tests were performed using a 2:1 interleave factor and all tests were completed successfully.

Current Model	New Model
WD1006A - WAH	WD1006V- MM1

The WD1006A - WAH hard disk drive controller card, used in the Equity 386/20 and 'currently available from Epson America, has been replaced in Western Digital's product line by the WD1006V- MM1. The new controller is capable of providing a 1:1 interleave format. The controller card has been tested in the Equity II+, Ill+ and 386/20 with the Epson 20Mb and 40Mb hard drives as well as the Seagate ST-251. All tests were performed using a 1:1 interleave factor in the test units and were completed successfully.

Product Support Bulletin

Subject: 16MB of RAM and the Equity 386/20 Computer

Date: 8/17/89
Page: 1 of 1

PSB No: S-0095
Originator: GLW

Purpose:

The purpose of this bulletin is to explain a potential problem when installing 16MB of RAM using 16 1MB SIMM modules. The SETUP program versions 5.1 and 5.2 allow an expansion memory setting that causes the following error to be displayed:

FC0000 6DDB 201 - Memory error
- Parity check 1
164 - Memory size error
(Run SETUP in DIAGNOSTICS)

Setup Information:

When entering information into the SETUP program, use the following values:

640K Main
15104K Expansion

Memory Map:

Address	Range	Size	Use
000000 - 09FFFF	0 - 640K	640K	RAM - Main
0A0000 - 0FFFFF	640K - 1 M	384K	Reserved
100000- FBFFFF	1M - 15.75M	15104K	RAM - Expansion
FC0000 - FFFFFF	15.75M - 16M	256K	Reserved

Explanation:

The 384K of address space between 640K and 1M is reserved for system use (including the SHADOW RAM feature). The 256K address space between 15.75M and 16M is also reserved for system use. The 640K and 15104K are combined into 15744K of total accessible RAM.

Product Support Bulletin

Subject: Novell Netware Compatibility Test Results for the Equity 386/20

Date: 8/11/88
Page: 1 of 1

PSB No.: S-0094
Originator: GLW

This bulletin is intended to provide a summary of the results of compatibility testing of the Equity 386/20 with Novell local-area networking products. The Equity 386/20 was tested at 20MHz. This information was provided to Epson by Novell's Independent Manufacturing Support Program. For complete test result reports, contact Novell, Inc.

Terms:
NDFS - Non - Dedicated File Server
NDWS - Non - Dedicated Work Station

Netware Version	2.0a	2.1	2.15	2.15	
Netware Type	ELS I	SFT	ELS II	ADV 286	
Tested as	NDFS	NDFS	NDFS	NDFS	NDWS
Network Interface					
3Com 3C501				X	X
3Com 3C503				X	X
3Com 3C505/1194				X	X
3Com 3C505/2012				X	X
AT&T Starlan				X	X
Gateway G - Net				X	
IBM PCN II				X	X
IBM TRN				X	X
Micom NI5010					X
Micom NP600				X	
Novell Int NIC		X			
Novell NE1000				X	X
Novell NE2000			X	X	X
Novell NL1000				X	
Novell RX- NET				X	X
Proteon ProNet				X	X
SMC/PD ArcNet				X	X
Novell DCB/NE2000				X	

Legend:
X tested as compatible
F failed
< blank > not tested

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INFORMATION

Product Support Bulletin

Subject: Using High Capacity ESDI and SCSI Hard Disk Drives with the Current Equity Series Computers

Date: 10/10/90
Page(s): 1 of 2

PSB No: S-0091A
Originator: PNM

The purpose of this bulletin is to provide some specific examples of how to install high capacity ESDI and SCSI hard disk drives in the current Equity Series computers.

The largest drive directly supported by the ROM BIOS (ver 220) in the Equity II+ and Equity Ill+ has a capacity of 130Mb, while the largest supported directly by the ROM BIOS in the Equity lIe, 386SX, 386/20 and 386/25 is 153Mb. To allow our units to be used in stand alone and especially network environments that require higher drive capacities, the use of the Adaptec ACB 2320 controller (available with the Equity 386/20) with the optional ACB-BIOS (available from Adaptec) will provide support for a variety of ESDI drives up to 314Mb. The AC&BIOS also has the ability to read the ESDI drive parameters from the drive itself. This will allow it to configure virtually any ESDI drive.

NOTE: The Adaptec BIOS ROM should be installed in location U25. In order for it to work, the jumper J13 pin 1 must be installed. Caution should be used when ordering the BIOS ROM as problems have been experienced when using version B. Versions A and C perform normally.

The WD1007V-SE1 controller is another option that can be used with high capacity ESDI drives that are not supported by the ROM BIOS drive tables. When using this controller' make sure that all pins on jumper on W1 are open. You can run SETUP and use Type 1 for the drive type or let the controller automatically set it at the end of the low level format routine provided by the controller's BIOS. To start the WD-BIOS Format Utility, run DEBUG and enter G=CC00:5. This will bring up a menu listing the operations that are available. Run the low level format and either enter the defective blocks listed on the drive by hand or let the program enter them automatically. Continue with the "Verify" and "Surface Analysis" utilities and finally finish with the "Set Drive Type and Exit". At this point there are 5 options from which to choose using the "+" and 'I-" keys to toggle through the available choices. Select the 'Translation Option-63 SPT (Sectors Per Track)" if the hard drive has more than 1024 cylinders or "Non-Translation" for drives with less than 1024 cylinders.

The next step after completing the low level format is to run the Novell COMPSURF utility. When setting up the COMPSURF Parameters it will ask if you want to “Format the drive?” where you will choose the “NO” response and proceed to the next option. When asked if you want to “Retain the Bad Track Table” answer ‘YES” and continue on with the rest of the COMPSURF options. After completion of the COMPSURF utility, continue on with the rest of the NETGEN installation.

The use of high capacity SCSI drives is another area where we are able to provide a solution for those customers who require storage capacities greater than the Epson Supplied options. When using a SCSI type hard disk drive, the hard disk controller usually is a part of the hard drive unit. The connection between the SCSI bus and the Equity’s data bus is made by installing a host adaptor into the Equity computer and connecting the SCSI drive to the host adaptor. The Seagate ST-296N, 85Mb drive, used in a stand alone configuration in the current Equity Series computers has provided favorable results.

When using SCSI drives in a Novell network, the use of the Future Domain SCSI adaptor with high capacity SCSI drives such as CDC and Maxtor has also been very successful. Future Domain recommends using Version 1.4 of their device driver when installing Novell Netware Versions 2.1-2.15. When used with the TMC-830 (use ROM Vers. 4.0L) or the TMC-840 (use ROM Vers. 5.0C) host adapters, drive sizes of up to 800Mb (CDC 94181-702) can be accommodated.

Product Support Bulletin

Subject: Western Digital XT - GEN Hard Disk Controller Anomalies

Date: 8/10/89
Page: 1 of 1

PSB No: S-0089
Originator: MWT

Recent reports from the field have revealed certain anomalous behavior when the Western Digital XT- GEN hard disk controller is used in the Equity II +, III + or 386/20 computers.

The XT - GEN controller is an 8 - bit, XT- type “generic” controller. As such, there would be an immediate loss of performance if it were installed in a 16 - bit, AT- type ISA bus system. However, the poor performance is not the only issue. The XT- GEN can produce addressing conflicts that do not directly point to the controller as the cause. For example:

An Equity II + was equipped with a Seagate ST- 225 hard drive and the XT- GEN controller. It was also configured with the IBM 5250 terminal emulation card and software and was connected to an IBM System/36 host. Additionally, IBM’s PC Support/36 software was correctly installed on both the II+ and System/36. This utility enables file and folder sharing as well as up- and download capability. The 5250 terminal emulation works perfectly; the PC Support/36 utility does not. This pointed to an “obvious” incompatibility.

As part of the troubleshooting procedure, a Western Digital WD1003V- MM1 16 - bit controller was substituted for the XT- GEN. With this one change, the PC Support/36 functions started operating correctly. Other similar examples have been reported.

Our recommendation is that 8- bit controllers in general should not be used because of performance losses. The XT- GEN controller should not be used at all.

Product Support Bulletin

Subject: Equity and Apex Series Compatibility with the Sysgen OmniBridge Controller and BridgeFiler External Floppy Drives

Date: 04/11/90
Page: 1 of 3

PSB No: S-0088B
Originator: KAS Kas

The purpose of this bulletin is to provide the results of compatibility testing conducted by the Computer Product Support Center with the Sysgen OmniBridge controller and Bridge - Filer external floppy disk drives.

Model	Comments
Equity I	The Equity I was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.
Equity II	The Equity II was found to be totally incompatible with the OmniBridge controller.
Equity III	The Equity III was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.
Equity I +	The Equity I + was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.
Equity Ie	The Equity Ie was found compatible with the OmniBridge controller. It was able to support only one external floppy drive, unlike the other models tested. The drive could be used as a high density (1.2Mb and 1.44Mb) or normal (360K and 720K) disk drive.

Equity II +	The Equity II + was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.
Equity lle	The Equity lle was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.
Equity lll +	The Equity III + was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 144M) or normal (360K and 720K) disk drives.
Equity 386SX	The Equity 386SX was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 144M) or normal (360K and 720K) disk drives.
Equity 386/20	The Equity 386/20 was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.
APEX	The Epson APEX was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.
APEX +	The Epson APEX was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.

APEX 100 — The Epson APEX 100 was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.

APEX 200 — The Epson APEX 200 was found compatible with the OmniBridge controller. It was able to support one or two external disk drives (daisychained) together. The external drives could be used as high density (1.2M and 1.44M) or normal (360K and 720K) disk drives.

NOTE: The recommended switch settings for the OmniBridge controller are as follows:

1-1 DOWN	2-1 DOWN
1-2 DOWN	2-2 DOWN
1-3 DOWN	2-3 UP
1-4 DOWN	2-4 UP

These settings select NO ADDRESS for the OmniBridge BIOS and allow it to coexist with the internal FDC of the computer in which it is being installed. This way you do not need to disable the internal FDC or connect any cables from the OmniBridge to internal floppy drives. This was found to be a universal setting for all of the computers listed above as compatible with the OmniBridge controller.

Product Support Bulletin

Subject: Tape Backup System Test Results

Date: 6/13/89
Page: 1 of 2

PSB No: S-0087
Originator: MWT

The Epson America Product Support Center has recently tested four tape backup systems:

Archive VP - 150i	Internal, 150MB
Mountain Series 4000 FileSafe	External, 40MB
Tallgrass TG - 4060 +	External, 60MB
Tecmar QT - 60e	External, 60MB

The tape drives were tested on a variety of systems (please see the notes below). In all cases, the drive manufacturer's documentation was used as a guide to installation and operation. Note that for 8086/88 computers, the XT- type settings were used. For the 80286/386 computers, the AT- type settings were used. This is important for correctly configuring the host adapters or controller cards for IRQ, DMA and I/O port address.

Archive VP - 150i

The VP - 150i was tested on the Equity II +, Ill + and 386/20. Due to the capacity and nature of the drive, it is not particularly suited for use in any of the 8086/88 computers. This was the only drive supplied with Unix/Xenix device drivers. It was tested under MS - DOS 3.3 and SC0 Xenix 286 System V version 2.2.1 with no problems encountered. The VP - 150i is also Novell tested and certified under the NetWare operating system.

Mountain Series 4000 FileSafe

The Series 4000 FileSafe was tested on the Equity II+, III + and 386/20. Due to the use of a 16 - bit controller, it was not tested in any of the 8086/88 computers. It was tested under MS - DOS 3.3 with no problems encountered. A chapter is included in the tape software documentation on backup and restore operations on a local area network, including Novell.

Tallgrass TG - 4060 +

The TG- 4060+ was tested on the Apex, Apex +, Equity I +, II +, Ill + and 386/20. It was tested under MS- DOS 3.2 and 3.3 with no problems encountered. There is no documentation on LAN operations.

Tecmar QT - 60e

The QT- 60e was tested on the Equity I +, II +, III + and 386/20. Testing was conducted under MS - DOS 3.3 with no problems encountered. The Tecmar documentation includes extensive information on installation and operation in a LAN environment.

General Notes

Of the four units tested, the Archive and Tecmar drives offered the easiest installation. They also provided the best performance, with the Tallgrass drive giving the slowest disk-to-tape and tape - to- disk operations. All four drives were supplied with menu-driven tape utility software for the MS - DOS environment. Command-line and timed, scheduled operations are also available. As previously mentioned, the Archive drive also included device drivers for use in a Unix/Xenix environment, offering the greatest level of flexibility.

Please contact the manufacturers for additional information.

Archive Corporation
Data Storage Division
1650 Sunflower Ave.
Costa Mesa, Ca. 92626
(800) 237 - 4929

Mountain Computer, Inc.
360 El Pueblo Rd.
Scotts Valley, Ca. 95066
(408) 438 - 6650

Tallgrass Technologies Corp.
11100 West 82nd St.
Overland Park, Ks. 66214
(913) 492 - 6002

Tecmar, Inc.
6225 Cochran Rd.
Solon, Oh. 44139
(216) 349 - 1009

Product Support Bulletin

Subject: Equity 386/20 Questions and Answers

Date: 8/7/91
Page(s) : 1 of 8

PSB No: S-0086A
Originator: PNM/JAD

Q1. What microprocessor does the Equity 386/20 use?

A. The Equity 386/20 utilizes an Intel 80386 microprocessor running at 20 megahertz. Use of this chip allows for a high powered, high speed 32 bit machine.

Q2. What is “Shadow Ram”? What does it do and how does it work?

A. Shadow RAM, activated through the setup program, is used to copy information from the system ROM BIOS and the video ROM into RAM. This provides for faster access of BIOS information by the Equity 386/20 resulting in enhanced system performance.

Q3. What RAM chips should be used when upgrading the memory?

A. Use the Epson 80 nSec - 9 bit SIMM module kits to expand the system memory. Epson supplies two memory upgrade kits, a 1 megabyte kit (4-256K SIMM modules) and a 2 megabyte kit (2-1 MB SIMM modules). You can expand the memory up to 16 Megabytes directly on the 32-bit memory card. Should you need to use third party SIMM modules we recommend the following:

ACULOGIC	1 Mbit x 9 80 nsec
CDC Enterprises	1 Mbit x 9 80 nsec
MATSUSHITA	1 Mbit x 9 80 nsec
SAMSUNG	1 Mbit x 9 80 nsec
TOSHIBA	1 Mbit x 9 80 nsec

The following SIMM’s do not work in with the Equity 386/20:

COMPAQ	PANASONIC
CUMULUS	SIEMENS
IBM	

Q4. What is page interleave memory architecture?

A. Page/interleave memory architecture is a method for increasing memory access time. Memory that is interleaved provides faster retrieval during sequential memory access. Interleaved architecture requires at least two banks of memory. Even memory addresses are in the first bank, odd memory in the second. While the processor is accessing memory in the first bank, memory in the second bank is being prepared for immediate access. In order to utilize the interleaving capabilities of the Equity 386/20, at least 2MB of memory are required when using 256K SIMMs, and 8MB when using 1 MB SIMMs.

Page mode divides the memory into blocks called pages. When working within any page, memory access is fast. Access speed is slightly diminished when pages are switched, after which memory is again accessed at maximum speed.

Combining these two methods provides a greater “hit ratio”, that is, a greater percentage of memory that is accessed at 0 wait states. Not accessing within a page or not sequentially results in 2-3 wait states. however, since this does not happen very often, overall performance of the system memory is generally less than 1 wait state.

Q5. How many wait states does the Equity 386/20 have?

A. The wait states on the Equity 386/20 depend on the hit ratio: 0 wait states on a hit and 2-3 wait states on a miss. With its page/interleave memory architecture, the Equity 386/20 provides fast memory access at a lower cost than other memory architectures.

Q6. What are the EMS software capabilities of the Equity **386/20?**

A. The Epson EMS software supports LIM 4.0 standards. It provides expanded memory capability for such applications as Lotus 123, Reflex, Autocad and Framework II. EMS allows an application to have more memory available for data storage. The application itself must reside in the 640k RAM accessible by MS-DOS, but it can use expanded memory capabilities to build larger spreadsheets, databases, etc.

Before the 80386 microprocessor existed, computer systems required special hardware to support expanded memory. With EMS software, 80386 machines can emulate expanded memory through the addition of memory chips; extra hardware or a special board are not required.

Q7. What is the Auto Speed function?

A. The Equity 386/20 is capable of operating at 20 MHZ or 8 MHZ. Some copy-protected applications require the computer to run at 8 MHZ while accessing the program diskette. By enabling the Auto speed function the computer automatically switches to 8 MHZ when accessing the diskette drive. it then switches back to 20 MHZ for optimal performance. Auto speed is accessed through the setup program under the Auto speed option.

Q8. What types of floppy disk drives will work on the Equity 386/20?

A. The Equity 386/20 will support a 5.25" 1.2 Mb half height drive (standard) as well as the 360 Kb floppy disk drive. To provide industry wide compatibility, the support of both 1.44 Mb and 720 Kb 3.5" floppy disks drives is also incorporated into the new ROM BIOS.

Q9. What size hard disk drives will be available for the Equity 386/20?

A. Two Hard disk drives will be available. The first is a 90 Mb ESDI drive with a 1:1 interleave and an average access time of 18 mSec. The second is a 40 Mb. 1:1 interleave ST-506 MFM drive that has an average access time of 28 mSec.

Q10. What are the drive types of the Epson Hard Drive options?

A. The Epson 90 Mb ESDI drive is a type 42 and the Epson 40 Mb drive is a type 17.

Q11. What is hard disk cache?

A. The Epson disk cache program improves the access time for program operation on the fixed disk by copying the most recently accessed data as well as data anticipated to be accessed next, into RAM.

Epson's hard disk cache program allows the user to define the amount of RAM reserved for cache data. If no size is specified, the system automatically allocates 64K of memory. The larger the disk cache, the better the system performance.

Epson utilizes a full track disk cache, which can further reduce the data access time of programs that read information one sector at a time, by retrieving the entire track of data when a single sector is requested. When the application then requests the next sector, it is retrieved from RAM, thus saving disk access time. This application is particularly useful with database programs.

Q12. What extended hard drive support is available in the new ROM BIOS drive tables that come in the Equity 386/20?

A. The Seiko-Epson BIOS will directly support hard drives that range in size from 10 Mb up to 153 Mb. Larger size drives can be used by using a supplementary BIOS for the hard disk controller that is installed in the machine. There is direct support for the Seagate ST-251 and the ST-4096 hard disks as well as several ESDI drives. SCSI drives have their own controllers attached to the drive and should work correctly when attached to the bus with a host adaptor.

Q13. The service manual has a listing of the ROM BIOS drive support table that is different than the drive table listed in the Product Support Guide. Which of the tables is correct?

A. The ROM BIOS table in the Epson Product Support Guide is correct. The ROM BIOS supports disk drives up to type 58. The correct data for types 56-58 are listed below:

TYPE	TYPE	CYL	HDS	Sectors	Landing Zone	MB
56	ESDI	967	5	34	967	80.3
57	ESDI	967	7	34	967	112.4
58	ESDI	967	9	34	967	144.5

Q14. What hard drive controllers can be used in the Equity 386/20?

A. Tested hard drive controllers for the Equity 386/20 include:

Western Digital	ESDI
Western Digital	WD-1007
Western Digital	WD-1006S-WAH
Western Digital	WD-1006V-MM1
Adaptec	ACB2320

Q15. Does the Equity 386/20 have cache memory?

A. No. The Equity 386/20 provides high speed (80ns) memory in a page interleave architecture operating at up to 0 wait states. This type of architecture allows a more affordable machine than one that uses cache memory.

Q16. What math co-processor should be used? Is the Weitek 3167 math co-processor supported?

A. You should use the Intel 80387-20 MHZ numeric co-processor for best results. The Weitek 3167 math co-processor is not supported.

Q17. Can 3 floppy drives be installed to support the different media types available?

A. No. The BIOS only supports 2 floppy disk drives.

Q18. Can the floppy drive controller be disabled in the Equity 386/20?

A. Yes. It can be disabled on the SPFG board by switching jumpers J1 and J2 to position BC. The jumpers come set from the factory in position AC, indicating the FDD controller is enabled.

Q19. Can the parallel port be disabled on the Equity 386/20?

A. Yes. To disable the parallel port on the SPFG board, jumpers J3 and J4 should be set to position BC. From the factory jumpers J3 and J4 are set to position AC, enabling the parallel port.

Q20. How many expansion slots are available?

A. There are a total of 9 expansion slots available, 6-16 bit slots, 2-8 bit slots and 1 reserved 8 bit slot for the SPFG board.

Q21. Can the Equity + keyboards be used on this machine?

A. The Equity + keyboards are the same as the keyboard used on the Equity 386/20 and are thus interchangeable.

Q22. What type of video cards can be used in the Equity 386/20?

A. The following cards have been tested:

MRS- Mono Board	Epson
IBM Display Adaptor	IBM
IBM Mono/Printer card	IBM
Hercules Graphics + Adaptor	Hercules Computer Tech
MRS - Color Board	Epson
Multi-Mode Graphics Adaptor	Epson
IBM Color Graphics Adaptor	IBM
Modular Graphic Card	Western Digital Paradise
Enhanced Graphics Adaptor	IBM
Autoswitch EGA	Western Digital Paradise
Vega EGA Board	Video 7
VGA Plus Adaptor	Western Digital Paradise
VGA Plus 16 Adaptor	Western Digital Paradise
ATI VGA Wonder 16	ATI Corp.
Sota VGA 16	Sota Technology
Fastwrite VGA	Video 7

Q23. What display option in the setup program should be used if a VGA or a EGA card is installed in the system?

A. Use the ‘Special Options choice to avoid seeing a “162 OPTIONS NOT SET” error message.

Q24. What mouse products are recommended for use on the Equity 386/20?

A. Both the serial mouse and the bus mouse by Microsoft have been approved for use on the new computer.

Q25. Are there any tested internal modems?

A. So far only the Hayes 2400 baud internal modem has been approved.

Q26. Is the Equity 386/20 a desktop or a floor standing machine?

A. The Equity 386/20 is a high powered desktop computer. Epson has taken into account that some users may not have adequate desk space for a machine the size of the Equity 386/20. therefore, a floor stand is available for the Equity 386/20 which allows the unit to be mounted on its side or on the floor.

Q27. Does Epson provide a version of DOS 4.01 for use with the Equity **386/20?**

A. No. The current version of DOS that is supported on the Equity 386/20 is Epson DOS 3.30.

Q28. What terminal emulation boards are compatible **w/ the Equity 386/20?**

A. The following items have been tested an approved.

3278/79 Emulation Adaptor	IBM
IBM 5250 Board	IBM
IRMA/2	DCA Inc.

Q29. I want to back up my hard disk. What tape backup system can I use?

A. The following units have been tested for use on the Equity 386/20:

Archive VP150i (Novell Certified)
Mountain Series 4000 Filesafe
Tecmar QT-60e
Tallgrass TG-4060+

Q30. Will it support Unix and/or Xenix? Which versions?

A. The Equity 386/20 has been tested w/ Santa Cruz Operations Xenix Rel. 2.1 and IBM PC Xenix Vers. 1.

Q31. What Local Area Networks have been tested on the Equity 386/20?

A. The following networking software and environments have been tested:

Software	Card	Mfg.
3COM 3Plus, 3COM	Etherlink II	3COM
	Etherlink Plus	3COM
PC Network Program, Ver. 1.0	Token-Ring Adaptor	IBM
	PC Network Adaptor	IBM
Token-Ring Network PC Adap., Ver 1.0	Token-Ring Adaptor	IBM
Token-Ring Starter Kit, Ver.1.1,IBM	Token-Ring Adaptor II	IBM
PC LAN Program, Ver. 1.2, IBM	Token-Ring Adaptor	IBM
	PC Network Adaptor II	IBM
PC Network Protocol Driver, Ver. 1.0, IBM	PC Network Adaptor	IBM
SFT Netware Level II, Ver 2.1, Novell	Token-Ring Adaptor	IBM
	PC Broadband Adaptor	IBM
	Broadband Adaptor II	IBM
	Ethernet Card, NE 1000	Novell

Product Support Bulletin

Subject: Using the EEMM386.EXE Device Driver

Date: 6/12/89
Page: 1 of 1

PSB No: S - 0085
Originator: MWT

The purpose of this bulletin is to explain the installation and usage of the EEMM386.EXE device driver on the Equity 386/20.

The Equity 386/20 can be configured with up to 16MB (155MB user accessible) of 32 - bit RAM. This is normally treated by the system as extended or linear memory. This can be used by a specific device driver (such as VDISK.SYS) or by an appropriate operating system - MS OS/2 or Xenix, for example. MS - DOS and MS - DOS applications cannot make direct use of this type of memory.

Some MS- DOS applications can take advantage of expanded memory specification (EMS) RAM. This is a memory paging specification developed jointly by Lotus, Intel and Microsoft and is commonly referred to as LIM spec memory. The current specification is 4.0.

Epson provides the device driver EEMM386.EXE with the Equity 386/20 that takes extended memory and emulates LIM EMS memory. It is installed at boot- up via a line in the CONFIG.SYS file. The proper syntax is:

```
DEVICE = C:\EEMM386.EXE nnnn
```

where nnnn is the amount of memory in kilobytes to be reserved for EMS emulation. As the system boots and installs the device driver, a message is displayed on the screen while each page (16KB) of memory is tested. Once installed, virtually any MS - DOS application that utilizes EMS memory can be loaded and will access the additional RAM.

Only one application tested to date has shown anomalous behavior - Microsoft Windows 286. When loaded, it does not recognize the existence of EMS memory. This is due to its extremely strict compliance with the LIM 4.0 specification. However, when an application such as Lotus 1 - 2 - 3 or Excel is loaded from Windows 286, these applications do detect and use the EMS memory. Note that windows/386 does not experience this behavior as it uses extended memory and performs its own EMS memory mapping.

Product Support Bulletin

Subject: Equity 386/20 Math Coprocessor (80387) Installation

Date: 01/04/90
Page: 1 of 2

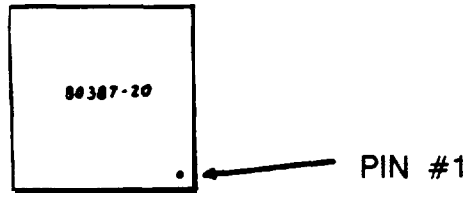
PSB No: S-0032A
Originator: JDB

The purpose of this bulletin is to provide information on installing the 80387 Coprocessor into an Equity 386/20.

Installation is as follows:

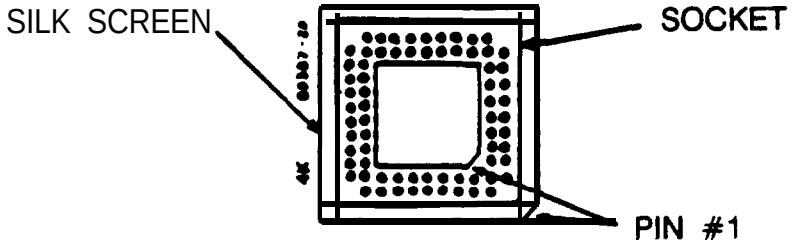
1. Locate coprocessor socket (location 4K) on CHET board.

2. Locate pin #1 on coprocessor chip (a dot on the upper side of the chip indicates pin #1.



3. Locate pin #1 on the coprocessor socket.

   a. The silk screen on the board shows a diagonal cut on one corner of the outline of the socket.
   b. The center of the socket also has a corner diagonally cut.



   This diagonally marked corner is pin #1.

4. Insert the coprocessor by matching pin #1 of the chip to pin #1 of the socket.

5. Change J3 (located between the CPU chip 5L and the CHET-RM board connector CN1) from “OFF” to “ON”.
The J2 jumper must also be installed in the “ON” position for the Equity 386/20 to use the full potential of the coprocessor.

6. Install the 80387 coprocessor in the EQ 386/20 “SETUP” utility.

Product Support Bulletin

Subject: Apex / Apex Plus / Equity Series Keyboards

Date: 4/19/89
Page: 1 of 1

PSB No: S-0080
Originator: REM

The purpose of this bulletin is to provide information on the various keyboards used with the Apex, Apex Plus and Equity series computers and the part numbers of the keyboard subassemblies used with these keyboards.

The Apex and Apex Plus computer keyboards are to be replaced as whole units.

The Equity series keyboards are repaired to the subassembly level. The Equity III keyboard PCB assembly is the only one that comes with the key top set attached.

Since some of the keyboards have the same model numbers, the difference can be determined by the FCC ID number in those cases.

The chart below provides a quick reference to determine the part number of the main keyboard PCB assembly, key top set, control logic subassembly, and keyboard cable.

Apex / Apex Plus

Model	Keyboard Unit
Apex	A265091A
Apex Plus	93553905410

Equity I, II, III

Model	Keyboard PCB Assy	Key Top set	Keyboard Cable
Equity I/II	Y145501001	Y145501021	Y144305000
Equity III	KAFLZ3AEPS1	attached	KACCL060UCA

Equity I +, II +, III+, 386/20

Model	Code	FCC ID	Keyboard PCB Assy	Control Board	Key Top set	Keyboard Cable
Q203A	AA	BKM9A8Q203A	Y127501001	attached	Y127501022	Y127501031
Q303A	AA	BMK9A8Q303A	Y127501001	attached	Y127501022	Y127501031
Q203A	A103A – AA	C9S4D7Q203A	Y163502001	none	Y127501022	Y163502020
Q203A	A103A – AA	C9S4D84701	Y163504007	Y171501017	Y127501022	Y163504006

Equity Ie

Model	Code	FCC ID	Keyboard PCB Assy	Control Board	Key Top set	Keyboard Cable
E1160A	-	C9S4D84701-201	Y163504007	Y171501017	Y171501007	Y171501006

Product Support Bulletin

Subject: Equity Series HDD Controllers Jumper Settings

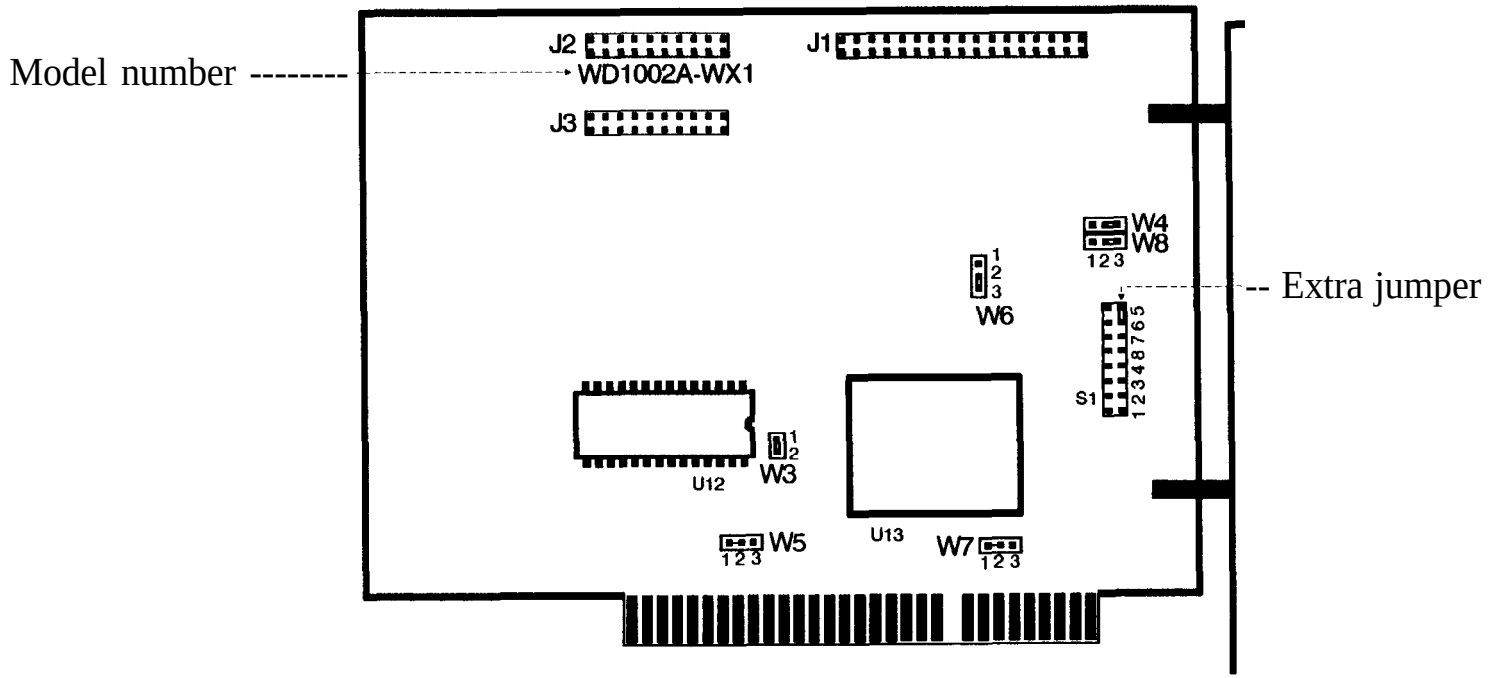
Date: 6/12/89
Page: 1 of 8

PSB NO.: S-0070A
Originator: APA APA

This bulletin provides information on the jumper settings for the hard disk controllers used in Epson Equity computers.

Please refer to the following pages for information regarding specific hard disk controllers:

HDD Controller WD1002A-WX1 (8-bit)

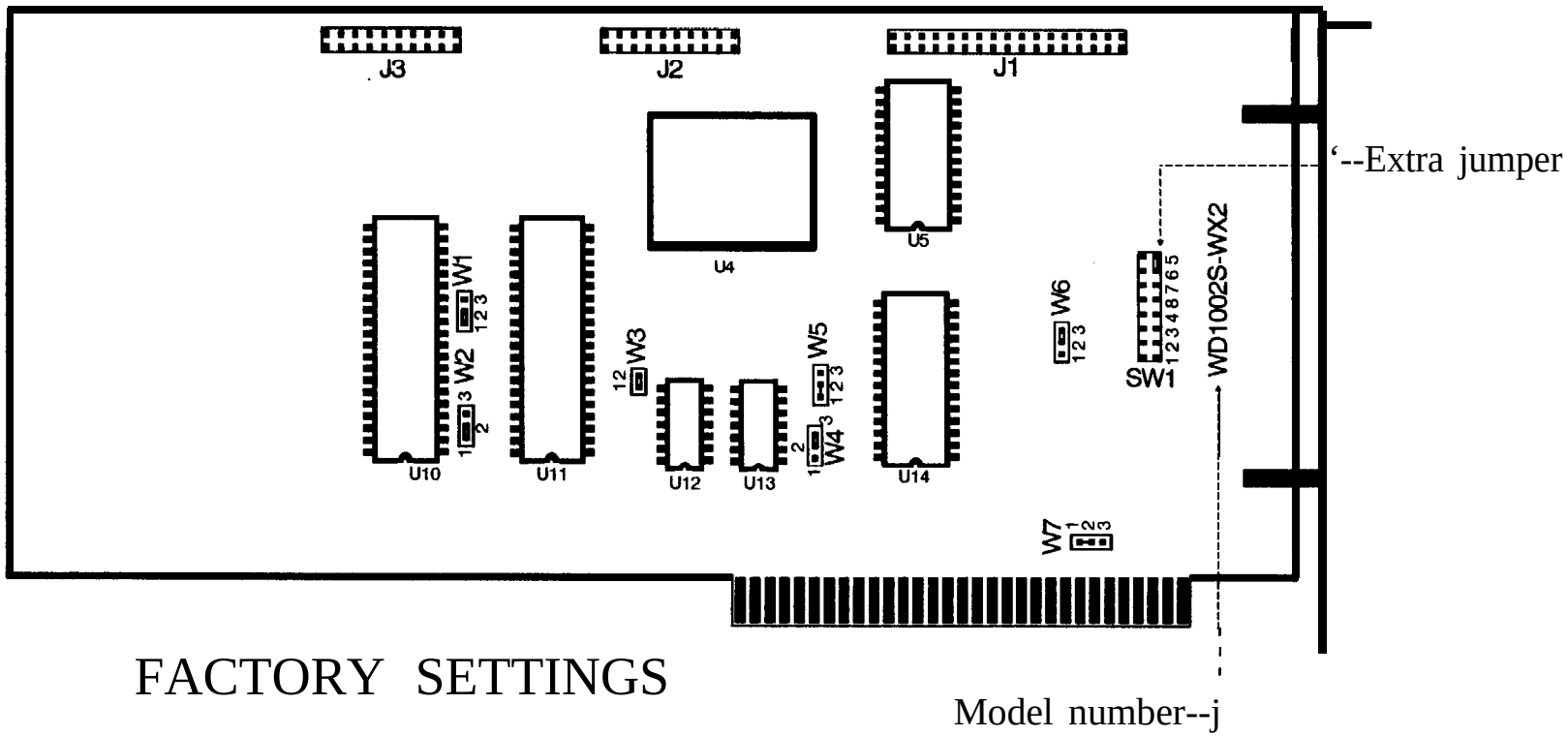


FACTORY SETTINGS

Jumper	Position	Description
W1	N / A	Not used.
W2	N / A	Not used.
W3	1 to 2	BIOS ROM is enabled (on controller).
W4	2 to 3	Device address 320H.
W5	* hard-wired 1 to 2	BIOS ROM size (32K or 64K).
W6	2 to 3	Reduced write current (< = 8 heads).
W7	* hard-wired 1 to 2	IRQ 5.
W8	2 to 3	Disk controller I. D. (set to be the first).

*** No jumper pins - 1 and 2 are connected by a PCB board etch.**

HDD Controller WD1002S-WX2 (8-bit)



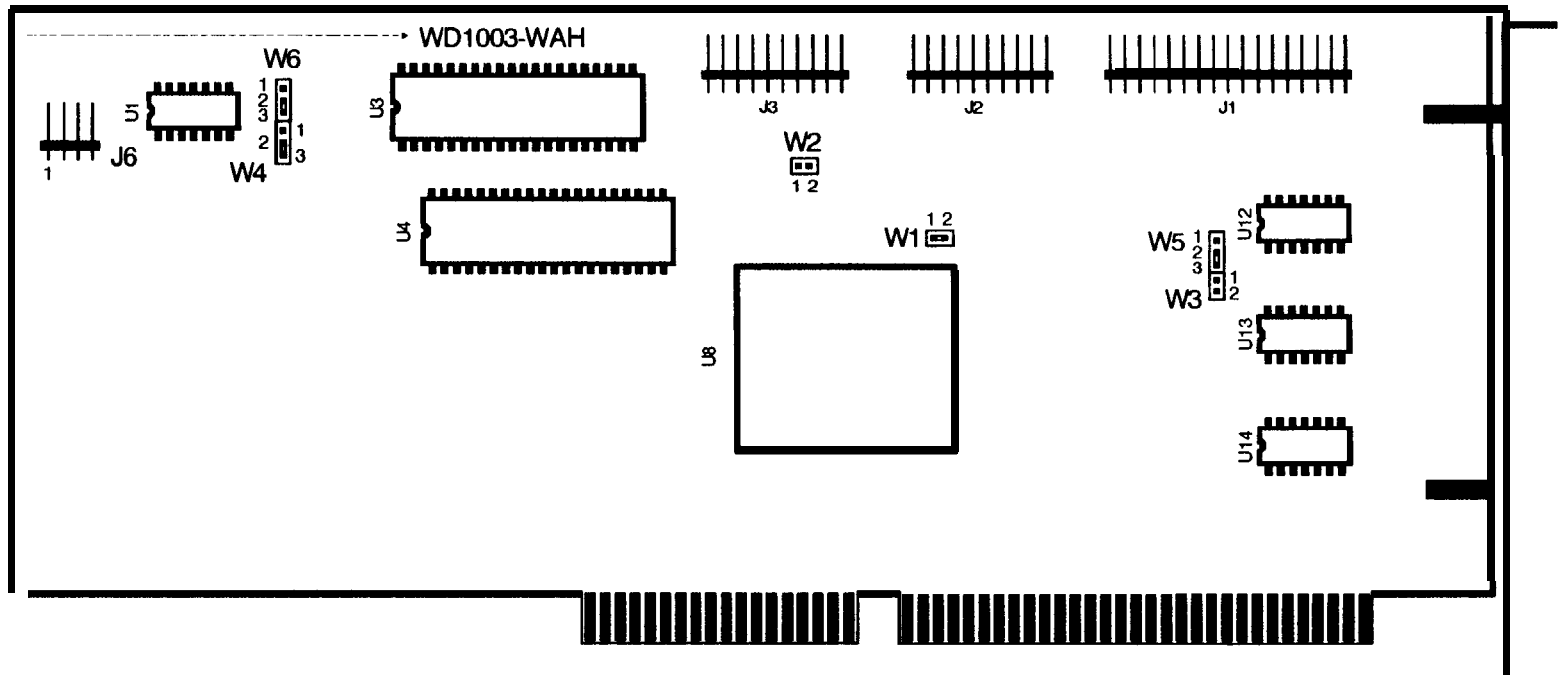
FACTORY SETTINGS

Jumper	Position	Description
W1	1 to 2	Required for this configuration.
W-2	1 to 2	Required for this configuration.
W3	1 to 2	BIOS ROM is enabled (on controller).
W4	2 to 3	Device address 320H.
W5	* hard-wired 1 to 2	BIOS ROM size (32K or 64K).
W6	2 to 3	Reduced write current (< = 8 heads).
W7	* hard-wired 1 to 2	IRQ 5.

*** No jumper pins - 1 and 2 are connected by a PCB board etch.**

HDD Controller WD1003-WAH (16-bit)

Model number



FACTORY SETTINGS

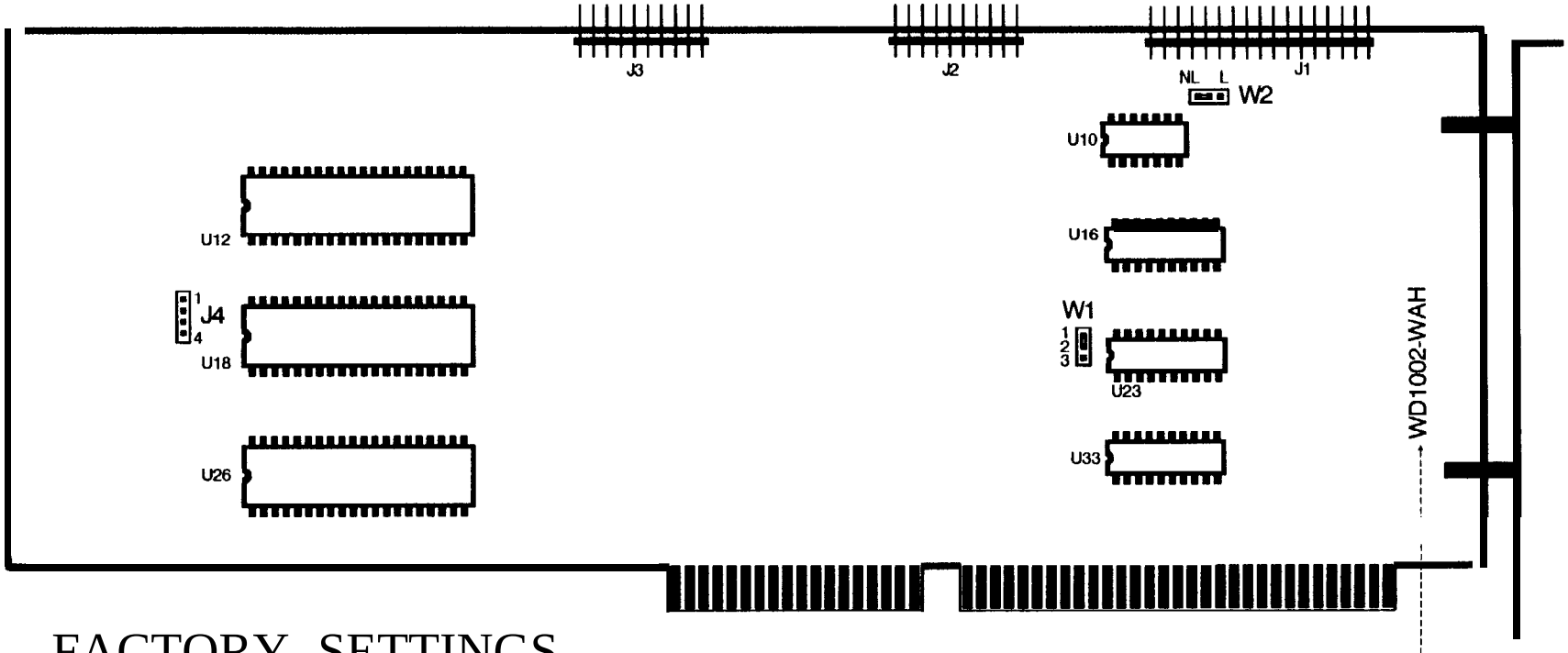
Jumper	Position	Description
W1	1 to 2	Status read is latched.
W2	No jumper	Primary address selected.
W3	* No jumper	Required for this configuration.
W4	2 to 3	Required for this configuration.
W5	2 to 3	Standard configuration.
W6	2 to 3	Standard configuration.

*** No jumper pins.**

Connection of LED indicator cable :

Model	Pin 1 of J6
Equity III	Orange wire
Equity II +	Blue wire
Equity III +	Red wire

HDD Controller WD1002-WAH (16-bit)



FACTORY SETTINGS

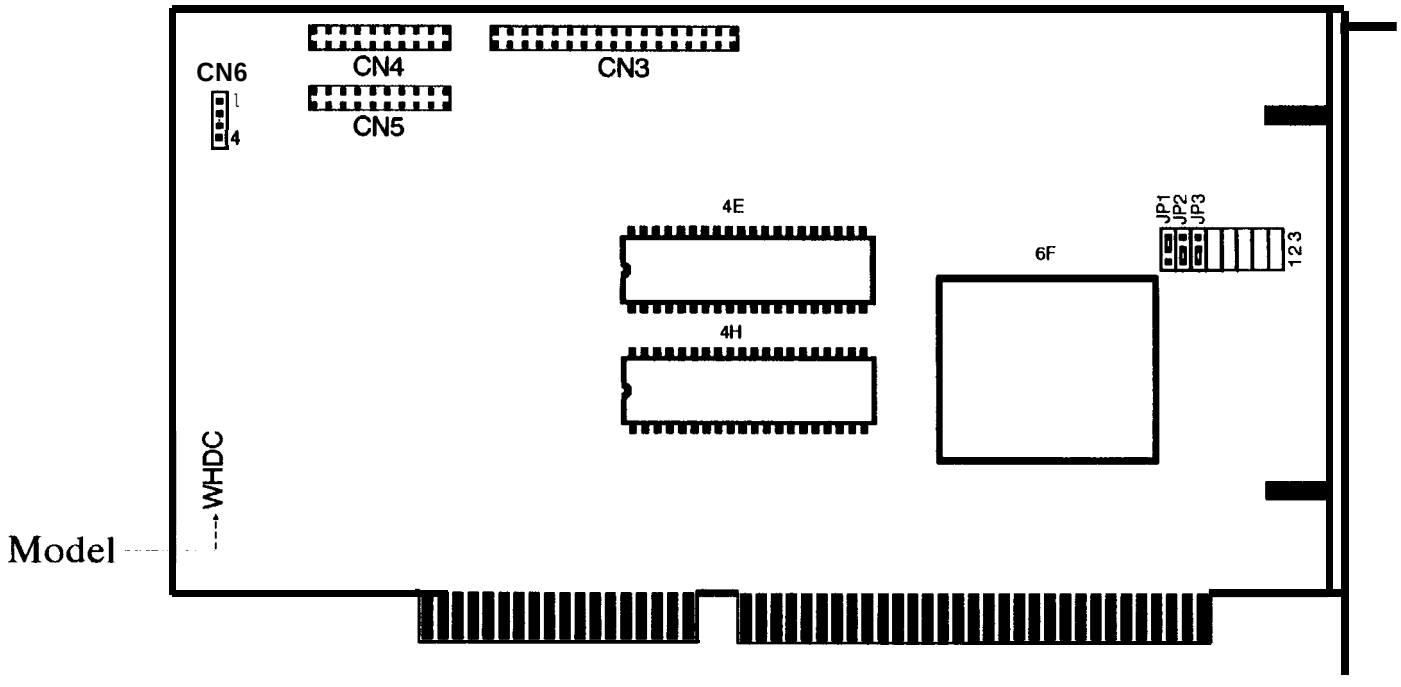
Model number

Jumper	Position	Description
W1	1 to 2	Primary base address.
W2	Center to NL	HDD activity LED only lights when the controller accesses the drive.

Connection of LED indicator cable :

Model	Pin 1 of J4
Equity III	Orange wire
Equity II +	Blue wire
Equity III +	Red wire

HDD Controller WHDC (16-bit)



FACTORY SETTINGS

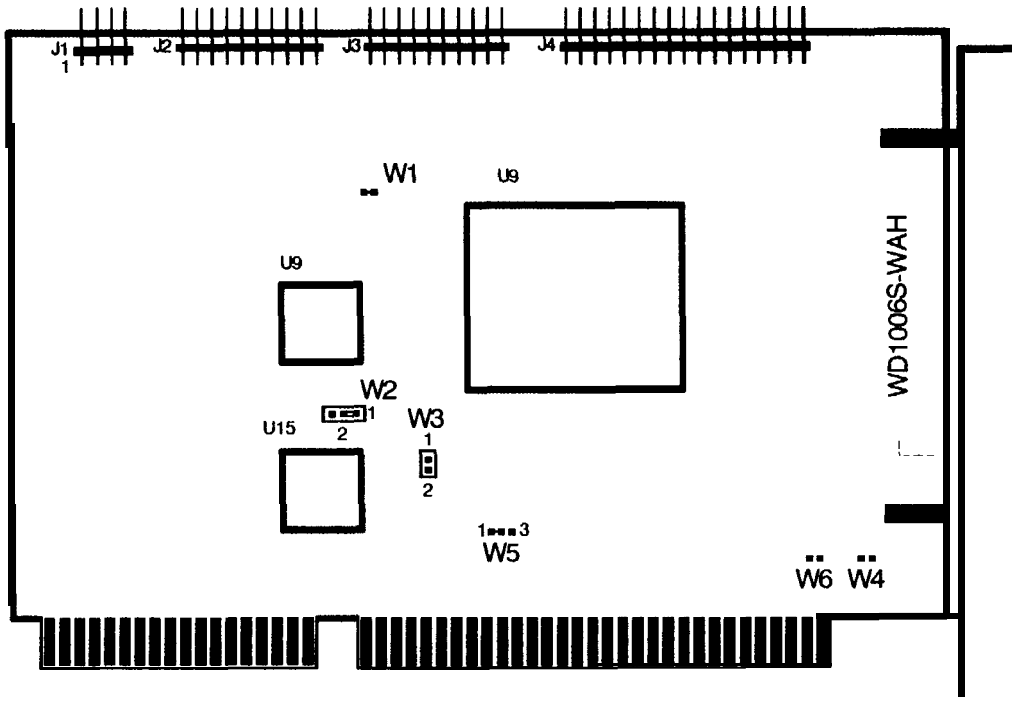
Jumper	Position	Description
* JP1 (J1)	*2 to 3 (B to C)	Primary address selected.
* JP2 (J2)	* 1 to 2 (A to B)	Status read is non-latched (select = drive busy).
* JP3 (J3)	* 1 to 2 (A to B)	WAH mode (dual HDD controller).
JP4 to JP8	No jumper pins.	Hardwired to factory settings.

* "JP" may labeled as "J", "1" as "A", "2" as "B" and "3" as "C".

Connection of LED indicator cable :

Model	Pin 1 of CN6
Equity III	Orange wire
Equity I I +	Blue wire
Equity I I I +	Red wire

HDD Controller WD1006S-WAH (16-bit)



Model number

FACTORY SETTINGS

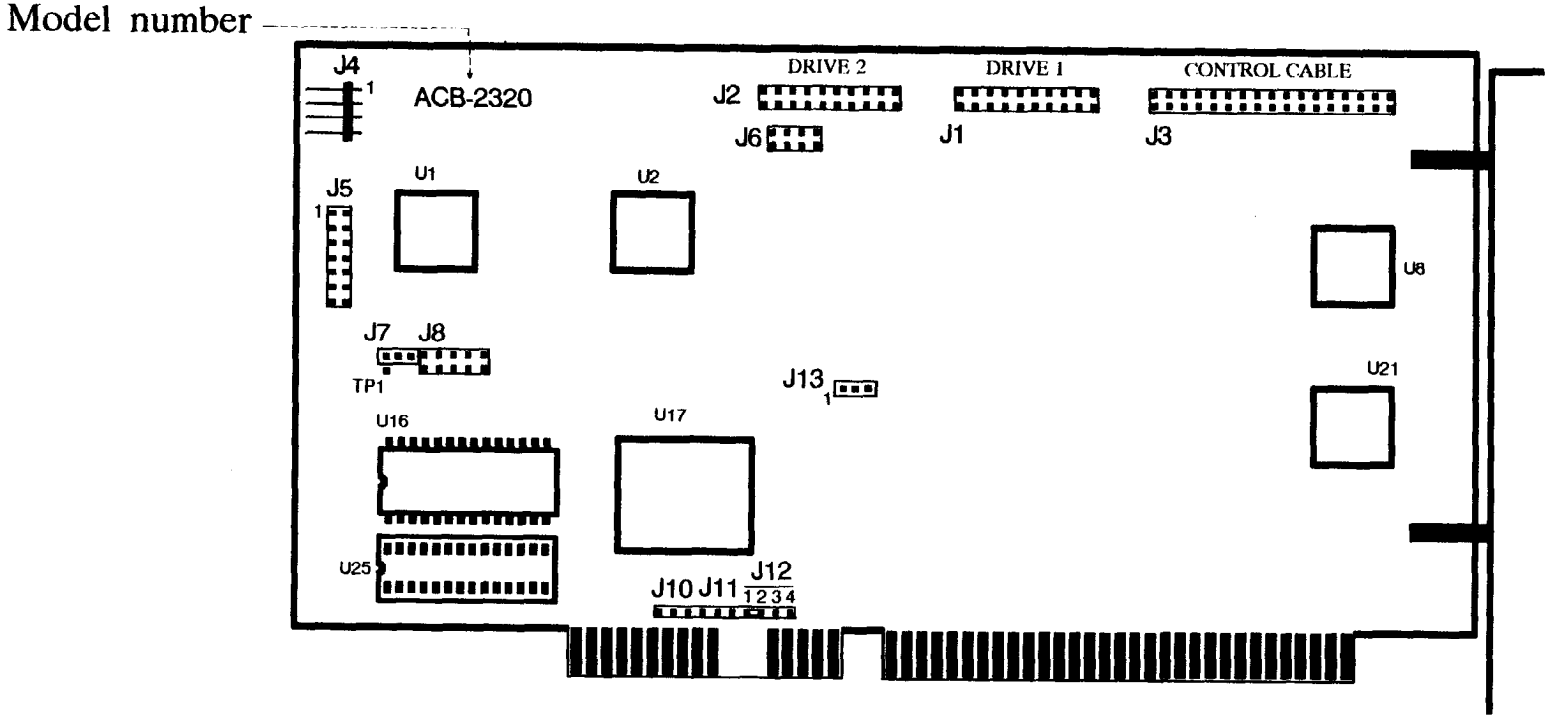
Jumper	Position	Description
W1	* 1 to 2	LED lights for drive selection (non- latched).
W2	1 to 2	No reduced write current,
W3	No jumper	Enables cacheing.
W4	* No jumper	Isolates mounting bracket from logic ground.
W5	* 1 to 2	Primary controller port.
W6	* No jumper	Non-latched mode.

*** No jumper pins.**

Connection of LED indicator cable :

Model	Pin 1 of J1
Equity 386/20	Red wire

HDD Controller ACB-2320 (16-bit)



FACTORY SETTINGS

Jumper	Position	Description
J5	No jumpers	Used for hardware port addressing.
J6	No jumpers	Manufacturing test points (DO NOT JUMPER).
J7	No jumper	Serial monitor output (DO NOT JUMPER).
J8	No jumpers	Manufacturing test points (DO NOT JUMPER).
J9, J10, J11	No jumpers	Not used.
J12	1 to 2	Selects IRQ 14.
J13	No jumper	ACB-BIOS disabled (no ROM present in location U25).

Connection of LED indicator cable :

Model	Pin 1 of J4
Equity 386/20	Red wire

EQUITY 386/20					
VER	PART #	DESC	TYPE	LOC	REASON
1.02 1.02	Y184801001 Y184802001	CHE-A2 CHE-B2	27256-10 27256-10	9C 9B	INITIAL RELEASE
1.11 1.11	Y184801002 Y184802002	CHE-A3 CHE-B3	27256-10 27256-10	9C 9B	Needed for compatibility with new CHIPs & Technology Mem. Controller and Integrated Periph. controller.
2.10 2.10	Y184801003 Y184802003	CCHE-A04 CCHE-B04	27256-10 27256-10	9C 9B	To allow user defined hard drive types. Expanded drive type table to include types 59-63. To allow use of 1.44MB 3.5" floppy drive as A: drive. Requires CHET MAIN board revision Y184201200 or above. See ECN EQ386/20-002 (10/10/90).
2.16 2.16	Y184801004 Y184802004	CCHE-A05 CCHE-B05	27256-10 27256-10	9C 9B	Fixes problem with EMM386.SYS and KEYB.COM. If 16MB of memory is installed, and EMM386.SYS and KEYB.COM are installed, CTRL-ALT-DEL will hang the system. Fixes problem with Imprimis 94244-383,Conner CP344, CP3104 and CP3204F. If two of these drives are installed, and both are set to User Defined Parameters, "1782- Disk Controller Failure" is displayed often during POD. The frequency of the message depends on which two drives are installed. Fixes problem with Seagate ST-157A , when attached to the IDE HDD controller, the system cannot properly recognize the HDD. Fixes "Shift Lock" problem on keyboard. Intermittently, the keyboard will go into a shift lock mode. Fixes DECnet Scheduler problem. After DECnet PCSA v3.0 or 3.1 is installed, various problem occur when attached to DECnet. SEE ECN No: EQ386/20-003 (10/9/92).

Product Support Bulletin

Subject: Using Expanded Memory with Equity and Apex Computers

Date: 3/2/90
Page: 1 of 6

PSB No: S-0047C
Originator: KAS

Q1. What is Expanded Memory?

A. Conventional memory, managed by MS - DOS, is limited to 640K. In response to the need for greater amounts of accessible memory, the LIM EMS (Lotus/Intel/Microsoft Expanded Memory Specification) was introduced in 1984. EMS, version 3.2, provides usable memory beyond the 640K limit through "bank switching". The expanded memory is divided into 16K portions called "pages". The computer accesses these pages through a "page frame" or "window" which is 64K of memory located between 768K and 896K in 80286 - based systems and between 800K and 960K in 8086 - or 8088 - based systems. 16K pages of memory are allocated for an application's use and the EMM (Expanded Memory Manager) handles the job of mapping the pages in and out of the page frame as they are needed. However, in order to make use of expanded memory, the software must be written to take advantage of the EMS. Software such as Lotus 1 - 2 - 3, Microsoft Windows and Borland's SideKick Plus make use of expanded memory. EMS is limited to 8Mb of expanded memory.

Q2. What is EEMS?

A. A superset of EMS, AQA EEMS (AST/Quadram/Ashton - Tate Enhanced Expanded Memory Specification) provides greater flexibility in the mapping of expanded memory. However, it also uses the technique of "bank switching" and has its own memory manager which accommodates such specially written software as Quarterdeck's DESQview. EEMS is also limited to 8Mb of expanded memory.

Q3. What about the 155Mb RAM listed as the maximum for the Equity lll +?

A. This larger amount of RAM is the maximum usable memory range for an 80286 microprocessor and generally refers to extended memory. Extended memory starts at the 1Mb boundary and extends out to 16Mb. As it requires a 24 - bit address to access memory in this range, extended memory is handled by the protected mode of the 80286. Examples of currently available software that can switch into protected mode to use extended memory are Framework II, AutoCAD, the VDisk RAM disk and Xenix OS.

Q4. How does LIM EMS 4.0, the latest version, differ from the earlier version, LIM EMS 3.2?

A. EMS 4.0 supports up to 32Mb of expanded memory where EMS 3.2 supported only 8Mb. EMS 4.0 has been changed to make it easier for applications to share expanded memory. In EMS 4.0, page mapping has been streamlined and new functions allow application programs to dynamically increase and decrease the amount of expanded memory allocated to them. In previous versions of EMS, the page frame was located in an unused 64K block of memory between 640K and 1Mb. EMS 4.0, subject to limitations in the system hardware, supports the page frame anywhere in the first 1Mb of memory. Before EMS 4.0, the page frame held four pages. Now you can define a page frame of up to eight pages in memory above 640K. The size of the page frame is limited only by the amount of available memory. There has also been a change to support the smaller than standard (16K) memory pages used by some expanded memory boards.

Q5. Is EMS 4.0 compatible with my old expanded memory board?

A. The EMM 4.0 driver works with existing hardware. You don’t need to buy a new expanded memory board. However, until you use applications that have been written to take advantage of EMS 4.0, you probably won’t notice much improvement in performance over your older version.

Q6. What memory expansion boards are compatible with the Equity I and Equity II?

A. The following boards have been tested by Epson in the Equity I and II:

All Card w/MMU Multifunction	All Computers, Inc.
Liberty PC	Quadram Corporation
Mini Magiccard (EV - 138)	Everex Systems, Inc.
AST SixPak Premium	AST Research
AST Rampage	AST Research

Q7. What memory expansion boards are compatible with the Equity III?

A. The following boards have been tested by Epson in the Equity III:

Grande Byte	STB Systems
Intel Above Board AT	Intel Corporation
Liberty AT	Quadram Corporation
AST Advantage	AST Research
AST Rampage AT	AST Research
AST Ramvantage	AST Research

Q8. What memory expansion boards are compatible with the Equity I +?

A. The following boards have been tested by Epson in the Equity I +:

64/256KB Expansion Option	IBM
Above Board PC (1985)	Intel Corporation
Fastcard IV (1.6)	Thesys

Q9. What memory expansion boards are compatible with the Equity Ie?

A. The following boards have been tested by Epson in the Equity Ie:

64/256KB Expansion Option	IBM
Quad Board II	Quadram
Fastcard IV	Thesys
RAMpage	AST Research

Note: The Intel Above Boards do not currently operate reliably with the Equity Ie.

Q10. What memory expansion boards are compatible with the Equity II + and Equity Ill + (10MHz models)?

A. The following boards have been tested by Epson in the Equity II + and Equity Ill + (10MHz models):

Advantage Premium	AST Research
Rampage 286 *	AST Research
Above Board 286	Intel Corporation
Above Board 286 p/s *	Intel Corporation
Grande Byte *	STB Systems
Rio Grande	STB Systems
Elite 16	Profit Systems

* Will run at 8MHz, not at 10MHt.

Q11. What memory expansion boards are compatible with the Equity II + and Equity Ill + (12MHz models)?

A. The following boards have been tested by Epson in the Equity II + and Equity III + (12MHz models):

Rampage 286 Plus	AST Research
Elite 16	Profit Systems
Above Board Plus	Intel Corporation

NOTE: Previously boards from Micron Technology were listed as compatible with the 12MHz models of the Equity II + and Equity Ill +. They have been removed from the list because Micron no longer produces ISA memory boards.

Q12. How do you expand the memory of the Equity 386/20?

A. Memory expansion in the Equity 386/20 can be accomplished by adding SlMMs (single in - line memory modules) to the CHET - RM board. Both 256K and 1Mb SlMMs are available from Epson America. The 256K SlMMs are sold in 1Mb kits and the 1Mb SlMMs are sold in 2Mb kits. Compatible third party 1Mb SlMMs are available from Matsushita, Toshiba and CDC Enterprises. You can also use third party memory expansion boards such as those listed above for the Equity II +/Ill +.

Q13. Are there any guidelines to installing the SIMMs in the Equity 386/20?

A. Yes, when SIMMs are installed to increase memory beyond 1Mb, they must be installed so that banks of SIMMs are installed as matched pairs. See the matrix below:

Memory	Bank 0	Bank 1	Bank 2	Bank 3
1MB	4X256KB			
2MB	4X256KB	4X256KB		
4MB	4X256KB	4X256KB	4X256KB	4X256KB
4MB	4X1MB			
8MB	4X1 MB	4X1 MB		
10MB	4X1 MB	4X1 MB	4X256KB	4X256KB
16MB	4X1 MB	4X1 MB	4X1 MB	4X1 MB

Note: Refer to PSB S - 0095 for 18MB RAM Setup information.

Q14. Is there a driver supplied with the Equity 386/20 to allow the use of the extended memory as expanded memory?

A. Yes, the Equity 386/20 system software includes the device driver EEMM386EXE. This driver emulates LIM EMS 4.0 memory using the extended memory supplied by the additional SIMMs. It will support only the onboard memory above 1 MB, up to 15MB. This is the maximum memory that can be installed on the CHET- RM board. It will not support memory installed on memory expansion boards.

Q15. Are there any expanded memory boards that are compatible with the Equity LT?

A. No, the option slots on the LT require a special connector. The hard drive controller and the LT cartridge modem are the only option cards currently available from Epson America.

Q16. What expanded memory boards are compatible with the Apex by Epson?

A. The Above Board PC from Intel Corporation has been tested by Epson in the Apex.

Q17. Are there any general guidelines for determining the chip speed to install on the memory expansion boards?

A. Yes, if the CPU speed is 8MHz or less, use 150ns RAM chips. If the CPU speed is 10/12MHz, use 120ns RAM chips.

Q18. Is there anything that should be kept in mind during the installation procedure for the memory expansion boards?

A. Yes, when installing the memory boards in the Equity II + and Equity Ill + (12MHz models), remember that the bus speed is 12MHz. For example, the Intel Above Board 288 and Above Board Plus allow you to set up the bus speed and chip speed in their installation programs.

Q19. What is meant by backfilling memory when using software such as DESQview?

A. Backfilling is a function of many expanded memory boards which allows a portion of the board's memory to be used as conventional memory. In this way, you could turn a 256K system into one with 840K memory or more. In certain situations, you may want to disable some of the computer's conventional memory and the use the memory on the expansion board (i.e. DESQview).

Q20. Which Epson computers have memory settings that allow backfilling memory?

A. The Equity I, Equity I +, Equity II + and Equity Ill + allow backfill. The Equity I comes with 256K standard and the Apex comes with 512K, thus allowing backfill. The Equity I + has DIP switch settings allowing system memory to be disabled to 256K or 512K. The Equity II+ and Equity Ill + have jumpers on the system memory boards to allow memory to be disabled to 256K and 512K.