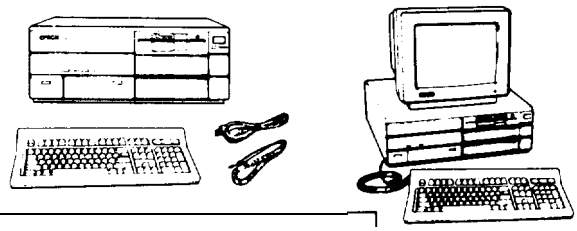
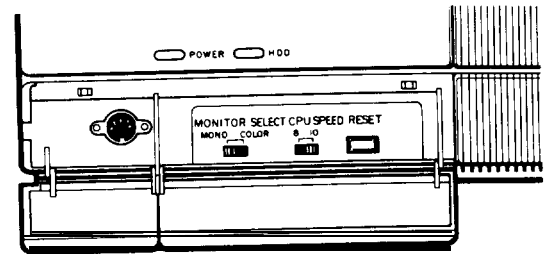


Computer Specifications

CPU:	80266 microprocessor, 8/12 MHz switch selectable clock speeds
Math Co-Processor:	80287 support (option), 8 MHz
RAM:	640KB on system board
ROM:	32KB EPROM pair, 32KB or 64KB selectable
Floppy Disk Controller:	Supports two drives with multiple formats: 5 25" double-density (360KB), 3.5" (720KB), 5 25" high-density (1 2MB) and 3.5" (1 44MB)
I/O Expansion Slots:	Six. full-length slots, three, 16-bit, three, 8-bit. Three, 16-bit and two 8-bit slots available in standard configuration
Speaker:	Internal. programmable
Clock/Calendar RAM:	64 bytes of CMOS RAM for real-time clock. calendar. and system configuration with battery backup
Keyboard:	Detachable, enhanced AT-style, 3-position, 101 sculpted keys, 58-key QWERTY configuration, 12 function keys
Power Supply:	Switching type, fan cooled, worldwide 1151230 V AC, 110 watts (140 watts peak). + 5V DC, + 12V DC, -5V DC, –12V DC
Mass Storage:	Three. Internal half-height devices maximum
Standard:	5 25 half-height floppy disk drive; 1 2MB storage capacity
Optional:	5 25' half-height floppy disk drive; 1 2MB storage capacity
Optional:	5 25 half-height floppy disk drive; 360KB storage capacity
Optional:	3 5 half-height floppy disk drive; 720KB storage capacity
Optional:	5 25' half-height hard disk drive; 40MB storage capacity
Interfaces:	
Standard:	Centronics®-compatible parallel port, DB25 female connector
Standard:	AS-232C compatible serial port, DB9 male connector
Environmental Conditions:	
Temperature:	Operating Range. 41 ° to 90 °F (5° to 35°C) Storage Range. -4" to 140°F I-20" to 60°C)
Humidity:	Operating Range 20% to 60% non-condensing Storage Range: 10% to 90% non- condensing
Physical Dimensions:	

	CPU	Keyboard
Width:	15 7 in	19 3 in
Depth	16.3 in	7.7 in.
Height:	6 1 in.	1 8 in
Weight:	19.8 lbs. (single floppy disk drive configuration)	4 3 lbs

Power Requirements:	115V AC, 60Hz, 4A (95V-137V, 47Hz-63Hz); 230V AC, 50Hz, 2.8A (195V-265V, 47Hz-63Hz)
Software:	MS-DOS 3.3. including XTREE™ and Epson Enhanced Utility Software. GW-BASIC; System Diagnostics
Options:	
Video Adaptors:	MGA (Multi-Mode Graphics Adaptor) EGA (Enhanced Graphics Adaptor)
Displays:	12" Monochrome Display (720 x 350 dots) 13" Color Display (640 x 200 dots) 13" Enhanced Color Display (640 x 200 or 640 x 350 dots, automatically selectable)



Switch Settings

There are no DIP switches on the Equity II+. However, there is a MONITOR SELECT switch and a CPU SPEED switch on the front of the unit in the lower left hand corner.

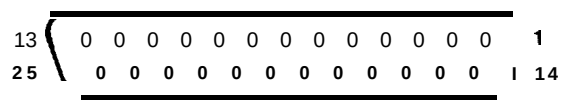
Monitor Select

Switch Setting	Monitor
MONO	Monochrome monitor
COLOR	Color, composite, EGA, and VGA monitors

The CPU SPEED switch selects between 8 MHz and 12 MHz. When the computer is running at 8 MHz, the power light is orange, and at 12 MHz, the light is green.

Connector Pin Assignments

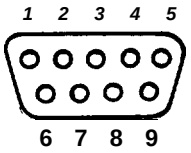
Parallel Port Connector



PIN NO.	*SIGNAL NAME*	*DIRECTION*	*DESCRIPTION*
1	– STROBE	O	
2	**DATA0**	O	**Printer Data Bit 0**
3	**DATA1**	O	**Printer Data Bit 1**
4	**DATA2**	O	**Printer Data Bit 2**
5	**DATA3**	O	**Printer Data Bit 3**
6	**DATA4**	O	**Printer Data Bit 4**
7	**DATA5**	O	**Printer Data Bit 5**
8	**DATA6**	O	**Printer Data Bit 6**
9	**DATA7**	O	**Printer Data Bit 7**
10	– ACK		**Acknowledge**
11	+ BUSY		Printer **Busy**
12	**+PE**		**End of Paper**
13	+ SLCT		Printer **Select**
14	– AUTOFT		**Auto Feed**
15	– ERROR		**Printer Error**
16	– INIT		Printer **Initialize**
17	– SLCTIN		**Printer Select in**
18	**GND**		**Ground**
19	**GND**		**Ground**
20	**GND**		Ground
21	**GND**		Ground
22	**GND**		**Ground**
23	**GND**		**Ground**
24	**GND**		**Ground**
25	**GND**		**Ground**

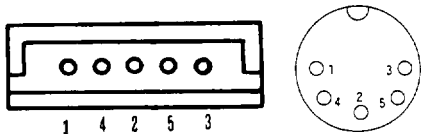
EQUITY II+ (12 MHz)

Serial Port Connector



PIN NO.	SIGNAL NAME	DIRECTION	DESCRIPTION
1	CRDET	I	Data Carrier Detect
2	RXDT	I	Receive Data
3	TXDT	O	Transmit Data
4	DTR	0	Data Terminal Ready
5	SG		Signal Ground
6	DSR	I	Data Set Ready
7	RTS	0	Request to Send
a	CTS	I	Clear to Send
9	RI	I	Ring Indicator

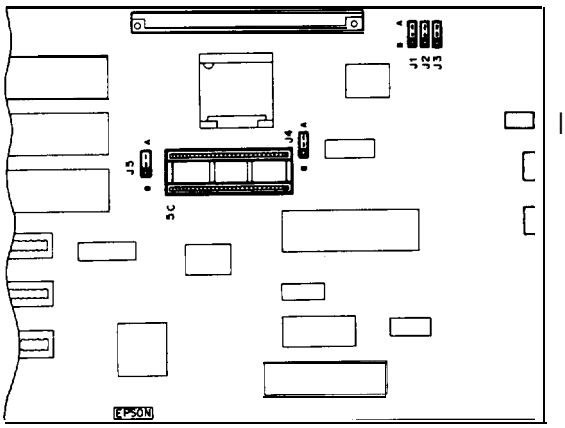
Keyboard Connector



PIN NO.	SIGNAL NAME	DIRECTION	DESCRIPTION
1	KBD CLK	I/O	Keyboard Clock
2	KBD DATA	I/O	Keyboard Data
3	KEY		No Connection
4	GND		Ground
5	vcc		Power

Jumper Settings

Main Circuit Board



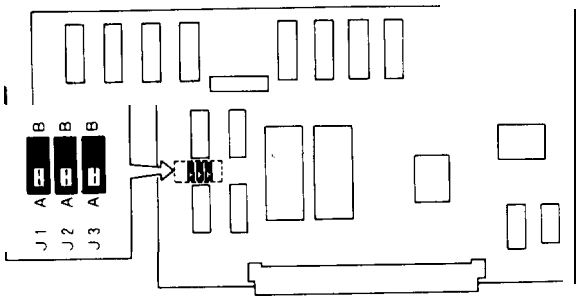
Main Circuit Board

Jumper					Function
1	2	3	4	5	
A					* EPROM 1 wait (note)
B					EPROM 2 wait (note)
	A	A			* 16-bit option card 1 wait (note)
	B	A			16-bit option card 2 wait (note)
	A	B			16-bit option card 3 wait (note)
	B	B			16 -bit option card 4 wait (note)
			A	A	* Coprocessor clock speed 8 MHz
			A	B	Prohibited
			B	A	Prohibited
			B	B	Coprocessor clock speed 2/3 CPU speed

* Factory Settings

Note: Selectable wait states only available at 12 MHz

Memory Board

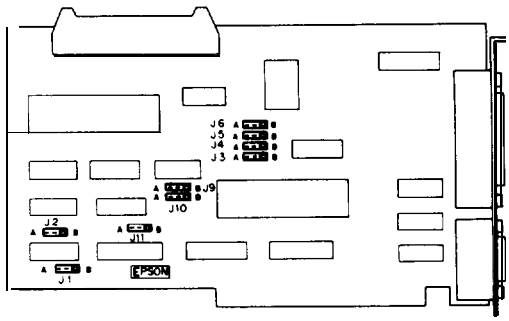


Memory Board

Jumper			Function
1	2	3	
A	A		* PAM 640 KB
B	A		PAM 512 KB
A	B		Prohibited
B	B		PAM 256 KB
		A	* EPROM 21728 type
		B	EPROM 27256 type

* Factory Settings

Multifunction Board



DMA Channels

Channel	Function
0	**Spare**
1	Spare
2	Floppy disk transfers
3	Spare (Hard disk drive)
4	Cascade of data from channel 0 -3
5	Spare
6	Spare
7	Spare

Multifunction Board

Jumper	Function
2 3 4 5 6 - 9 10	
1	* Primary register set of FDC
3	Secondary register set of FDC
A	* Enable FDC register set
B	Disable FDC register set
A A A	* Primary parallel I/F. IRQ7
A B B	Secondary parallel I/F, IRQ5
B A A	Video adapter parallel I/F. IRQ7
B B –	Disable parallel I/F
AA A	* Primary serial I/F. IRQ4
A B B	Secondary serial I/F, IRQ3
B- –	Disable serial I/F

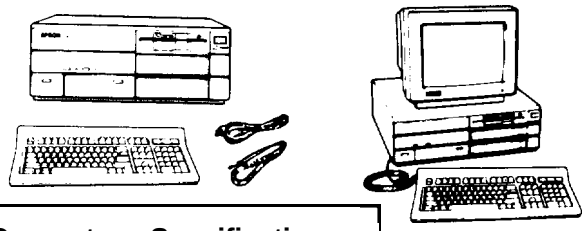
* Factory Settings

I/O Port Addresses

Address	Function
000 – 01F	DMA Controller 1
020 – 03F	Interrupt Controller 1
040 – 05F	Timer/Counter
060 – 06F	Keyboard controller and Port B
070 – 07F	CMOS RAM and Non – Maskable Interrupt Mask
080 – 09F	DMA Page Register
OAO – OBF	Interrupt Controller 2
OCO – 0DF	DMA Controller 2
0E0 -OFF	Numeric Coprocessor
1F0 – 1F8	Hard Disk Controller
278 – 27F	Parallel Port 1
2F8 -2FF	Serial Port 1
378 – 37F	Parallel Port 0
3B0 -3BF	Parallel Port 2 (on some video boards)
3F0 – 3F7	Floppy Disk Controller
3F8 – 3FF	Serial Port 0

Hardware Interrupts

CTLR1	CTLR2	FUNCTION
RQ0		Timer Output 0
RQ1		Keyboard
RQ2		Interrupt from CTLR2
RQ3		Serial port 2
RQ4		Serial port 1
RQ5		Parallel port 2
RQ6		Floppy disk interrupt
RQ7		Parallel port 1
	IRQ8	RTC interrupt
	IRQ9	Software redirected to IRQ2
	IRQ10	Reserved
	IRQ11	Reserved
	IRQ12	Reserved
	IRQ13	Coprocessor
	IRQ14	Hard disk controller
	IRQ15	Reserved



Computer Specifications

CPU	80286 microprocessor, 8110 MHz switch selectable clock speeds
Math Co-Processor	30287 support (option)
RAM	640KB on main system board
ROM	32KB **EPROM** pair, **32KB or 64KB** selectable
Floppy Disk Controller	Supports two drives with multiple formats, 5 25" double-density (360KB), 3 5" (720KB) and 5 25" high density (12MB)
I/O Expansion Slots	Six full-length slots; three. 16-bit, three. 8-bit Three. 16-bit and two, 8-bit slots available in standard configuration
Speaker	Internal. programmable
Clock/Calendar RAM	64 bytes of CMOS RAM for real-time clock. calendar and system configuration with battery backup
Keyboard	Detachable, enhanced IBM-AT style. 3 position, 101 sculpted keys, 58-key QWERTY configuration. 12 function keys
Power Supply	Switching type. fan cooled. worldwide 115/230V AC, 110 watts (140 watts peak) +5V DC +12V DC, −5V DC. -12V DC
Mass Storage	Three. internal half-height devices maximum
Standard	5 25" half-height floppy disk drive; 1 2MB storage capacity
Optional	5 25" half-height floppy disk drive 1 2MB storage capacity
Optional	5 25" half-height floppy disk drive; 360KB storage capacity
Optional	3 5" half-height floppy disk drive; 720KB storage capacity
Optional	3 5" half-height hard disk drive; 20MB storage capacity
Optional	5 25" half- or full-height hard disk drive; 40MB storage capacity
Interfaces	
Standard	Centronics*-compatible parallel port, DB25 female connector
Standard	RS-232C compatible serial port. DB9 male connector

Environmental Requirements

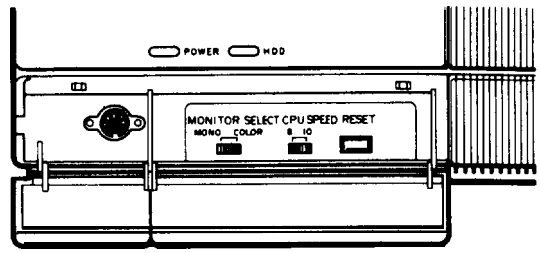
Temperature
Operating range 41' to 90°F (5" to 35°C)
Storage range −4° to 140°F (-20" to 60°C)

Humidity
Operating **range** 20% to 80% non-condensing
Storage range 10% to 90% non-condensing

Physical Characteristics	**CPU**	Keyboard
Width	15.7 in	19.3 in
Depth	16.3 in	7.7 in
Height	6 1 in.	1.8 in
Weight	19.8 lbs	39lbs

(Single floppy disk drive configuration)

Power Requirements	It5V AC, 60Hz, 1.9A (90V-137V, 47Hz-63Hz) 230VAC. 50Hz 1 OA (190V-265V, 47Hz-63Hz)
Video Options Adaptors	Monochrome Display Adaptor Color Graphics Adaptor MGA (Multi Mode Graphics Adaptor) EGA (Enhanced Graphics Adaptor)
Displays	12" Monochrome Display (720x350 dots) 13' Color Display (640x200 dots) 13' Enhanced Color Display (640x200 or 640x350 dots, automatically selectable)



Switch Settings

There are no DIP switches on the Equity II+. However, there is **a** MONITOR SELECT switch and a CPU SPEED switch on the front of the unit in the lower left hand corner.

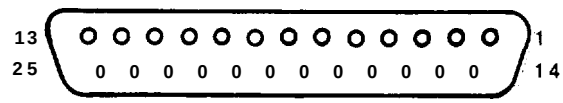
Monitor Select

Switch Setting	Monitor
MONO	Monochrome monitor
COLOR	Color, composite, EGA, and VGA monitors

The CPU SPEED switch selects between 8 MHz and 10 MHz. When the computer is running at 8 MHz, the power light is **orange, and at 10** MHz, the light is green.

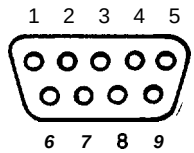
Connector Pin Assignments

Parallel Port Connector



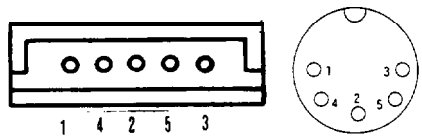
PIN ND.	*SIGNAL NAME*	*DIRECTION*	*DESCRIPTION*
1	− STROBE	0	
2	DATA0	0	Printer Data Bit 0
3	DATA1	0	Printer Date Bit 1
4	DATA2	0	Printer Date Bit 2
5	DATA3	O	Printer Data Bit 3
6	DATA4	O	Printer Data Bit 4
7	DATA5		Printer Data Bit 5
8	DATA6	0	Printer Data Bit 6
9	DATA7	0	Printer Date Bit 7
10	− ACK	I	Acknowledge
11	+ BUSY	I	Printer Busy
12	+PE	I	End of Paper
13	+ SLCT	I	Printer Select
14	− AUTOFT	I	Auto Feed
15	-ERROR	I	Printer Error
16	− INIT	I	Printer Initialize
17	− SLCTIN	I	Printer Select In
18	GND		Ground
19	GND		Ground
20	GND		Ground
21	GND		Ground
22	GND		Ground
23	GND		Ground
24	GND		Ground
25	GND		Ground

Serial Port Connector



PIN NO.	SIGNAL NAME	DIRECTION	DESCRIPTION
1	CRDET	I	Data Carrier Detect
2	RXDT	I	Receive Data
3	TXDT	0	Transmit Data
4	DTR	0	Data Terminal Ready
5	SG	–	Signal Ground
6	DSR	I	Data Set Ready
7	RTS	0	Request to Send
a	CTS	I	Clear to Send
9	RI	I	Ring indicator

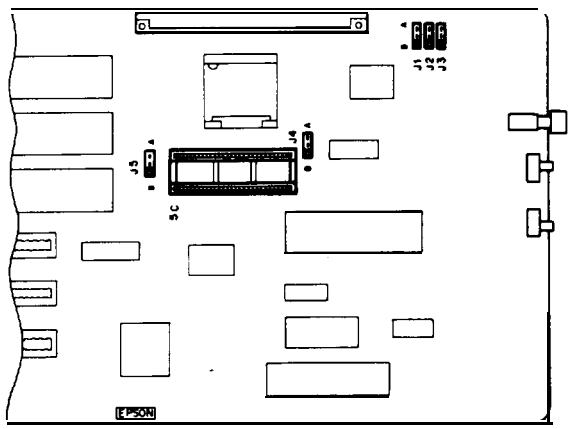
Keyboard Connector



PIN ND.	SIGNAL NAME	DIRECTION	DESCRIPTION
1	KBD CLK	I/O	Keyboard Clock
2	KBD DATA	I/O	Keyboard Date
3	KEY		No Connection
4	GND		Ground
5	vcc		Power

Jumper Settings

Main Circuit Board



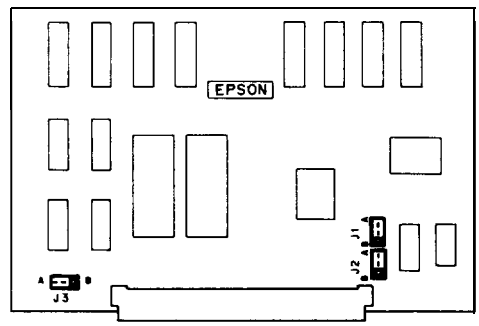
Main Circuit Board

Jumper 1	2	3	4	5	Function
A					* EPROM 1 wait (note)
B					EPROM 2 wait (note)
	A	A			* 16-bit option card 1 wait (note)
	B	A			16-bit option card 2 wait (note)
	A	B			16-bit option card 3 wait (note)
	B	B			16-bit option card 4 wait (note)
			A	A	* Coprocessor clock speed 8 MHz
			A	B	Prohibited
			B	A	Prohibited
			B	B	Coprocessor clock speed 2/3 CPU speed

* Factory Settings

Note: Selectable wait states only available at 10 MHz

Memory Board



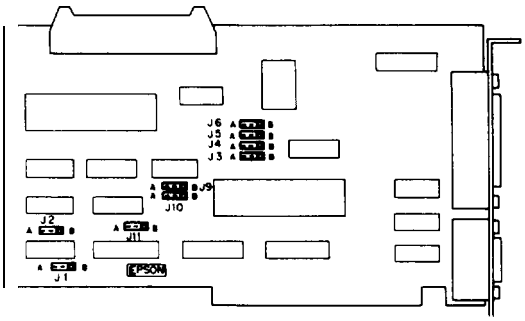
Memory Board

Function Jumper 3	
1	2
A	A * PAM 640 KB
B	A PAM 512 KB
A	B Prohibited
B	B PAM 256 KB
	A * EPROM 21728 type
	B EPROM 27256 type

* Factory Settings

EQUITY II+ (10 MHz)

Multifunction Board



DMA Channels

Channel	Function
0	Spare
1	Spare
2	Floppy disk transfers
3	Spare (Hard disk drive)
4	Cascade of data from channel 0 – 3
5	Spare
6	Spare
7	Spare

Multifunction Board

lumper	Function
2 3 4 5 6 9 1 0 1 1	
\	* Primary register set of AT FDC
3	N/A
A	* Enable FDC register set
B	N/A
A A A	* Primary parallel I/F, IRQ7
A B B	Secondary parallel I/F, IRQ5
B A A	Parallel I/F on video, IRQ7
B B	Disable parallel I/F
A A A	* Primary serial I/F, IRQ4
A B B	Secondary serial I/F, IRQ3
B	Disable serial I/F
A	* Enable register set of AT FDC
B	N/A

* Factory Settings

I/O Port Addresses

Address	Function
000 – 01F	DMA Controller 1
020 – 03F	Interrupt Controller 1
040 – 05F	Timer/Counter
060 – 06F	Keyboard controller and Port B
070 – 07F	CMOS RAM and Non – Maskable Interrupt Mask
080 – 09F	DMA Page Register
OAO-OBF	Interrupt Controller 2
OCO-ODF	DMA Controller 2
0E0 -OFF	Numeric Coprocessor
1F0 – 1F8	Hard Disk Controller
278 – 27F	Parallel Port 1
2F8 – 2FF	Serial Port 1
378 – 37F	Parallel Port 0
3B0 – 3BF	Parallel Port 2 (on some video boards)
3F0 – 3F7	Floppy Disk Controller
3F8 – 3FF	Serial Port 0

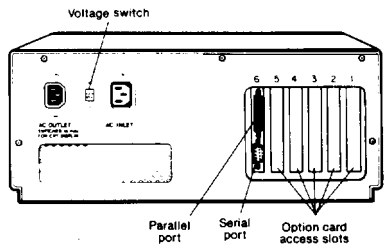
Hardware Interrupts

CTLR1	CTLR2	FUNCTION
IRQ0		Timer Output 0
IRQ1		Keyboard
IRQ2		Interrupt from CTLR2
IRQ3		Serial port 2
IRQ4		Serial port 1
IRQ5		Parallel port 2
IRQ6		Floppy disk interrupt
IRQ7		Parallel port 1
	IRQ8	RTC interrupt
	IRQ9	Software redirected to IRQ2
	IRQ10	Reserved
	IRQ11	Reserved
	IRQ12	Reserved
	IRQ13	Coprocessor
	IRQ14	Hard disk controller
	IRQ15	Reserved

Installation/Support Tips

Power

The Equity II+ has a power supply that is switchable between 115 V, for USA and Canadian use, and 230 V, for use in other countries. The voltage switch is located at the rear of the CPU between the AC inlet and the AC outlet (see figure below).



WARNING! The voltage is not changed between the AC inlet and the AC outlet. If the CPU is switched for 230 V in order to function in Europe, only peripherals certified for use at 230 V should be plugged into the outlet.

Installing Floppy Disk Drives

- When installing a floppy disk drive as drive B, remember to set the drive select jumper to the second position and attach the pass-through connector on the floppy drive controller cable to the drive, not the end connector.
- If the drive does not function normally, make sure that the drive type has been correctly selected in SETUP. Also check that any special drivers that may be necessary have been installed correctly.

Installing Hard Disk Drives

- It is recommended that a 16-bit AT- type hard disk controller be used in the Equity II+. If you must for some reason use an 8-bit XT- type controller, select drive type NONE in SETUP.
- If you are having difficulty in formatting the hard disk drive, try starting over with the Unconditional Format option in diagnostics.

Setup

- When installing an optional expanded memory board, do not list the memory under the memory expansion option in SETUP. That option is for EXTENDED memory ONLY.
- If you are installing an EGA or VGA card, select SPECIAL OPTIONS as display type in SETUP. This holds true even when you are using a color or monochrome monitor with these cards.
- When installing a hard disk drive, be sure to consult the drive type table (on page EQII + -7) for the drive type which fits the drive you are installing.

Third Party Option Boards

- If you find that some third party option boards do not function properly in the Equity II+ at the higher speed, try setting the CPU speed back to 8 MHz.
- If setting the CPU speed to 8MHz allows a 16-bit board to function, try increasing the wait states by changing jumper settings on the main system board. (See page EQII + -002 or EQII + -004 for 12MHz and 10MHz boards, respectively.) The default setting is one wait state and a larger number of wait states may enhance the board's performance at the higher speed.
- When installing an option board which has a selectable interrupt setting, avoid the use of IRQ2. For a table of hardware interrupt functions, see pages EQII + - 002 and EQII + -004 for 12 MHz and 10 MHz models, respectively.

Software Problems

- When installing a copy -protected software package on the Equity II+, set the the CPU speed to 8 MHz. This has been found to have fewer conflicts with copy-protection. After the installation, the CPU can be switched back to the higher speed.
- If a software package does not appear to be compatible with the Equity II+, try switching the CPU speed to 8 MHz before giving up. Some software packages (e.g., IBM Topview 1.0 and PFS:First Publisher 1.00) have been found to function only at 8 MHz.

Hard Disk Drive Types

Drive type	Cylinders	Heads	Write precompensation	Landing zone (cylinder)	Capacity (MB)
1	306	4	128	305	10
2	615	4	300	615	20
3	615	6	300	615	30
4	940	8	512	940	62
5	940	6	512	940	46
6	615	4	-1	615	20
7	462	8	256	511	30
8	733	5	-1	733	30
9	900	15	-1	901	112
10	820	3	-1	820	20
11	855	5	-1	855	35
12	855	7	-1	855	50
13	306	8	128	319	20
14	733	7	-1	733	42
15	0	0	0	0	0
16	612	4	0	663	20
17	977	5	300	977	40
18	977	7	-1	977	58
19	1024	7	512	1023	60
20	733	5	300	732	30
21	733	7	300	732	42
22	733	5	300	733	30
23	306	4	0	336	10
24	612	4	305	663	20
25	306	4	-1	340	10
26	612	4	-1	670	20
27	698	7	300	732	40
28	976	5	488	977	41
29	306	4	0	340	10
30	611	4	306	663	20
31	732	7	300	732	43
32	1023	5	-1	1023	43
33-42	0	0	0	0	0
43	1024	8	512	1023	69
44	830	10	512	829	141
45	1024	5	512	1023	43
46	615	8	128	618	40
47	0	0	0	0	0

Information Reference List

Engineering Change Notices

EQII+-001	4/15/88	Equity II+ (12 MHz) and Equity III+ (12 MHz) ROM BIOS Upgrade
EQII+-002		Alternate Power Supply for the Equity II+
EQII+-003	3/20/89	ANDRO Board / Hitachi RTC *Change*
EQII+-004	6/12/89	Equity II+ (12 MHz) ANDRO Board Revision *Change*

Technical Information Bulletins

EQII+-001	3/8/88	WHDC Hard Disk Controller Manufacturing Change
EQII+-002	5/16/88	Service Tools for the 1.2MB FDDs
EQII+-003	3/20/89	CDC (94205-51) 40MB CDC Hard Drive - Spindle Grounding Brush Removal
EQSER-002	3/15/89	Equity Series Enhanced Keyboard Part Number Information
EQSER-003	6/12/89	Replacement Power Supply Input Voltage Setting
EQSER-004	6/12/89	Keyboard Alignment

Product Support Bulletins

s-00196	12/2/87	Equity/Apex Coprocessor Selection Guide
S-0026	11/19/87	Equity + Series Compatibility Certification
S-0031	12/14/87	Equity Series with Word and Serial Printers
S-0033	1/12/88	Equity II + /III + 40MB CDC HDD Information
S-0039	3/3/88	Equity Series Power Available and Consumption
S-0047A	6/12/89	Using Expanded Memory with Equity and Apex
S-0048A	5/11/88	Equity II+ Users Manual Switch Settings
S-0049	5/12/88	Equity II+ 10 MHz and 12 MI-k Differences
S-0051	5/16/88	Equity II + - Common Questions and Answers
S-0054B	5/4/89	Using Math Coprocessors with Equity and Apex
s-0081	10/12/88	Equity + Series Novell Netware Certification
S-0062A	6/9/89	Equity Series Computers - ROM History
S-0972	3/16/89	Using ST251 and ST4096 HDDs in the Equity II + /III +
S-0073	3/17/89	Micron Technology Expanded/Extended RAM Boards
S-0076	4/13/89	Equity II+ (12 MHz) and Novell ELS 2.0A Level I
S-0080	4/19/89	Apex/Apex Plus/ Equity Series Keyboards
S-0087	6/13/89	Tape Backup Systems Test Results
S-0088	7/12/89	Equity/Apex with Sysgen OmniBridge and BridgeFiler Drives
S-0091	8/11/89	Using High Capacity ESDI and SCSI HDDs with the Equity Series

Related Documentation

A190A-AA		Equity II + Software Package. MS-DOS 3.2 and GW-Basic
A806011		Equity II+ Software Package. MS-DOS 3.3 Upgrade
M-TM-EQII+		Equity II + Technical Manual
M-PM-EQII+PR		Equity II + Programmer's Reference Manual
M-PL-EQ2P	4/29/88	Equity II+ (10 MM and 12 MHz) Parts List
Y16299100300		Equity II+ (10 MHz) User's Guide and Diagnostics
Y16299110300		Equity II t (12 MHz) User's Guide