

**TEK-AT1
80C286 AT SINGLE-BOARD COMPUTER
HARDWARE REFERENCE MANUAL
VERSION 3.1, JULY 1994**

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NOTE

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ref: M700_3-1

INTRODUCTION

SECTION 1

The TEK-AT1 is a high performance PC/AT type computer on a half-card format (7" x 4.7"). It integrates all the basic functions available on an IBM AT - like a hard disk interface and a floppy disk controller.

Best of all, the TEK-AT1 is designed to operate in environments where a sturdy and compact system is essential. So elements such as a watchdog timer, solid state disks, and a power failure detector were added to make the TEK-AT1 perform even in the most extreme industrial applications.

Built using CMOS technology, the TEK-AT1 consumes very little power. Typically, less than 4 watts. The TEK-AT1 is also a versatile board. It can be installed in a PC passive backplane or, because of its small size, it can be used as a stand-alone controller by utilizing the four standard mounting holes and separate power connector.

And to top it off, an XT expansion header accommodates TEKNOR's series of display controllers or other optional expansion cards.

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Here are more exciting features found on the TEK-AT1 single board computer:

- PC/AT bus or stand alone operation
- 80C286 @ 16Mhz
- 512K, 1, 2, or 4 Mbytes of system memory with mixed DRAM support
- Up to 1M of user EPROM/Flash EPROM
- Up to 1M user RAM with battery backup
- Supports Shadow RAM BIOS for fast execution
- Flash EPROM boot
- Real-time clock with battery backup
- Optional 80287 coprocessor support
- AT keyboard and speaker port
- One parallel printer port (LPT1)
- Two serial ports with COM2 as RS232 or RS485
- Watchdog Timer
- Power Fail Detector
- Onboard floppy controller: drives two floppies
- Onboard IDE hard disk interface
- CMOS technology for low power
- Two year warranty

CONFIGURATION

SECTION 2

JUMPERS

The TEK-AT1 was designed to allow for minimal hardware configuration.

The following Jumpers can be configured by using shorting jumpers.

JUMPER	STATE	FUNCTION <small>* as shipped</small>
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RAM Battery Back-up

1

W0	Open*	NC
W0	Closed	Vbatt

Watchdog Timer

W1	Open	Disable
W1	Closed*	Enable

Flash EPROM

W2	Open	No Flash
W2	Closed*	Flash Installed

RAM Disk Memory Type

W3(1-2)	32K x 8, 128K x 8 SRAM
W3(2-3)	256K x 8, 512K x 8 SRAM

1 Vbatt must be installed to save configuration information at power down.

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Power Monitoring

W4	Open*	Disable
W4	Closed	Enable

Hard Disk Interface

W5	Open*	IDE Enabled
W5	Closed	IDE Disabled

Boot From Flash EPROM

SW1(1-2)	Open*	Boot From Drives
SW1(1-2)	Closed	Boot From Flash

Color/Monochrome

SW1(3-4)	Open*	Mono, EGA, VGA
SW1(3-4)	Closed	Color CGA Only

Console Is VT100 Terminal

SW1(5-6)	Open*	Standard Display Mode
SW1(5-6)	Closed	VT100 Mode

Remote Download

SW1(7-8)	Open*	Normal
SW1(7-8)	Closed	Serial Download Mode

Refer to *Diagram 2-1* and *Table 2-1* for exact jumper locations.

BIOS SETUP

The TEK-AT1 is fully software configurable. The setup program allows for minimal hardware configuration.

SETUP UTILITY

The SETUP program is located within the BIOS and can be activated at boot time by pressing < CTRL-ALT-S > in *Standard Display Mode*, or < CTRL-R > in *VT100 Mode*, at the configuration prompt during the power up sequence. Once the SETUP screen is displayed you can modify the date, time, or other setup information contained in the clock CMOS RAM. The system will reboot on exit from SETUP. The SETUP program should only be activated when all information in the computer has been properly saved.

Use the arrow keys to select the item you want to change. When the item is selected, press < + > or < - > keys to change an entry.

Press < F10 > to save the current configuration (press "Q" in *VT100 Mode*) and to exit. The configuration, with the exception of the time and date, is not saved until < F10 > is pressed. Press < ESC > to exit without saving the setup.

USER'S SETUP CONFIGURATION INFORMATION

The SETUP program can set the following:

- Time of day and Date*
- Floppy disk configuration*
- Fixed disk configuration*
- System memory size*
- Extended memory size*
- EMS memory size*
- Video type*
- Execute BIOS from RAM or ROM Shadow*
- Wait state selection*
- Initial CPU speed*

TABLE 2-1 CONFIGURATION JUMPERS

Jumper	Function
W0	RAM Battery Backup
W1	Watchdog Timer
W2	Flash EPROM (VPP)
W3(1-2) W3(2-3)	SRAM Memory Type: 32kx8, 128kx8 SRAM Memory Type: 256kx8, 512kx8
W4	Power Monitoring
W5	Hard Disk Interface
SW1(1-2) SW1(3-4) SW1(5-6) SW1(7-8)	Boot From Flash EPROM CGA/MGA, EGA, VGA Boot From VT100 Remote Download

CONFIGURATION 11

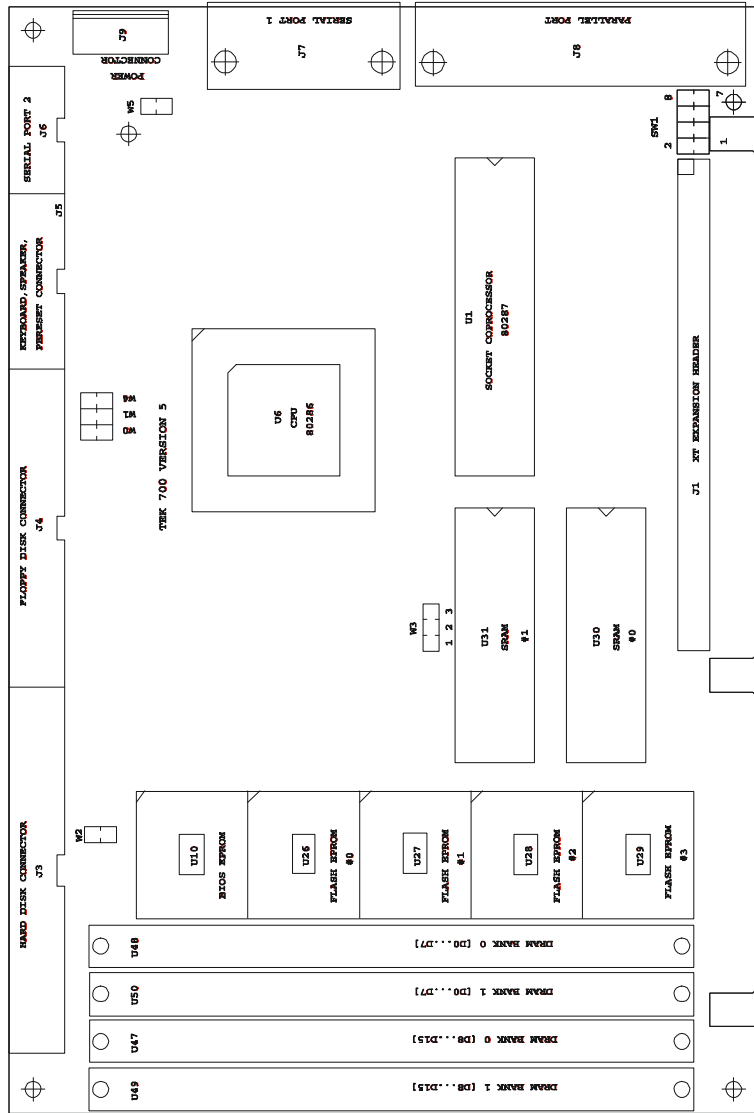


DIAGRAM 2-1 JUMPER LOCATIONS

SPECIFICATIONS

SECTION 7

DC CHARACTERISTICS

Supply Voltage Vcc min.: 4.75V
 Vcc max.: 5.25V
 + 12V: + /-5%
 -12V: + /-5%

Supply Current

	Std PC/AT Application ⁵	Embedded App. ⁶
I _{cc} typ.	980mA	850mA
I _{cc} stby.	300mA	300mA
I _{pp} + 12V	10mA	10mA
I _{pp} -12V	5mA	5mA

This current was measured with 4 Mbytes of DRAM 1 Mbyte of User Flash EPROM 256K SRAM along with hard disk, floppy disk, keyboard and monitor installed.

This current was measured with 4 Mbytes of DRAM 1 Mbyte of User Flash EPROM and 256K SRAM only.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature:

0^oC to 70^oC

-40^oC to + 85^oC Available

Non-Condensing relative humidity:

5% to 95%

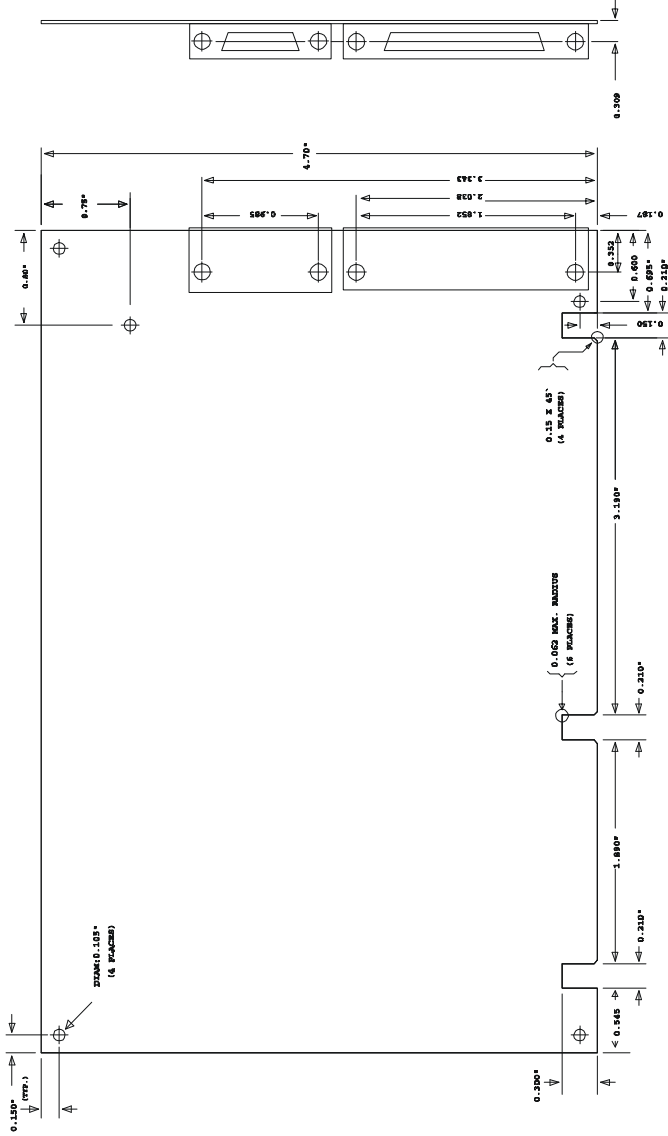


DIAGRAM 7-1 MECHANICAL SPECIFICATIONS

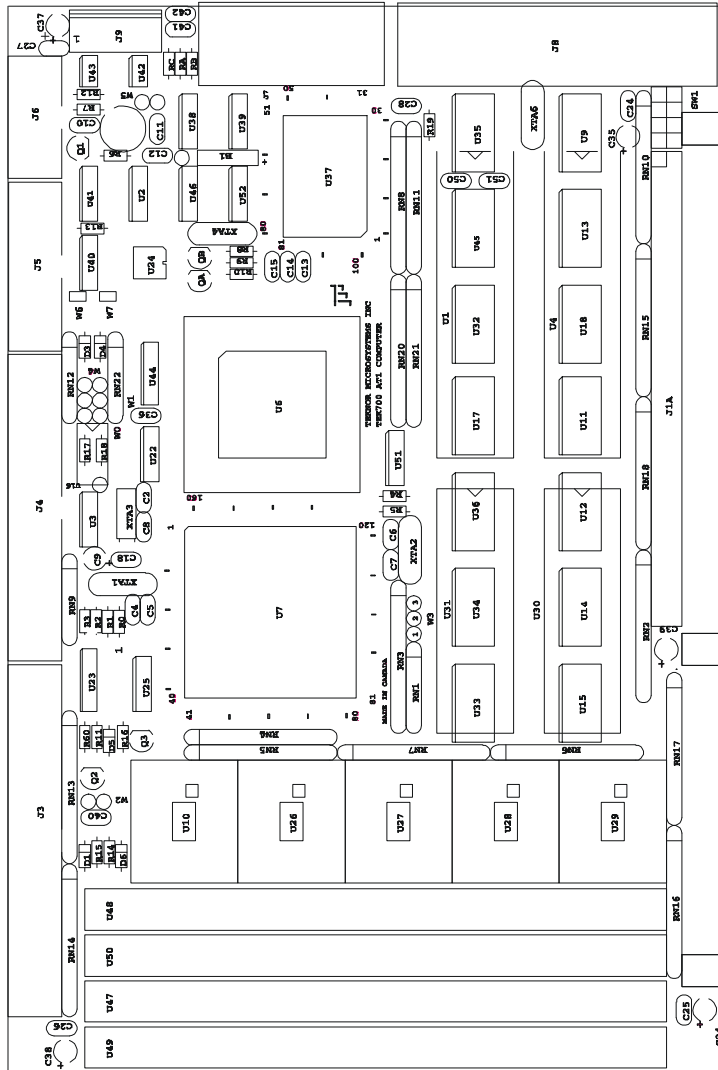


DIAGRAM 7-2 ASSEMBLY

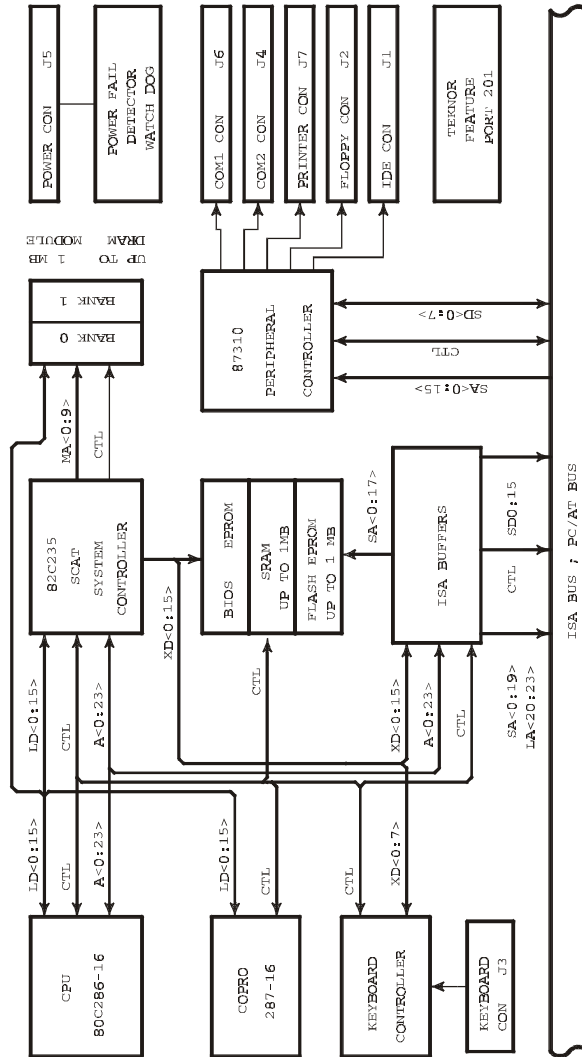


DIAGRAM 7-3 BLOCK DIAGRAM

CONNECTOR OVERVIEW

J9 POWER CONNECTOR

PIN NUMBER			PIN NUMBER		
SIGNAL FLOW			SIGNAL FLOW		
SIGNAL			SIGNAL		
VCC	-	1	2	-	GND
GND	-	3	4	-	+12V
-12V	-	5	6	-	PD

J5 KEYBOARD CONNECTOR

PIN NUMBER			PIN NUMBER		
SIGNAL FLOW			SIGNAL FLOW		
SIGNAL			SIGNAL		
KBDCLK	O	1	2	-	GND
KBDDATA	O	3	4	-	GND
VCC	-	5	6	-	VCC
SPKR	O	7	8	-	VCC
KBDINH	I	9	10	-	GND
AUTO*	I	11	12	-	GND
PBRES*	I	13	14	-	GND
ACT*	O	15	16	-	VCC

J8 LPT1 PRINTER CONNECTOR

PIN NUMBER			PIN NUMBER		
SIGNAL FLOW			SIGNAL FLOW		
SIGNAL			SIGNAL		
STB*	O	1	2	I/O	P0
P1	I/O	3	4	I/O	P2
P3	I/O	5	6	I/O	P4
P5	I/O	7	8	I/O	P6
P7	I/O	9	10	I	ACK*
BUSY	I	11	12	I	PE
SLCT	I	13	14	O	AFD*
ERR*	I	15	16	O	INIT*
SLIN*	O	17	18	-	GND
GND	-	19	20	-	GND
GND	-	21	22	-	GND
GND	-	23	24	-	GND
GND	-	25			

J7 COM1 CONNECTOR

PIN NUMBER				PIN NUMBER			
SIGNAL FLOW				SIGNAL FLOW			
SIGNAL				SIGNAL			
DCD	I	1		2	I	RX	
TX	O	3		4	O	DTR	
GND	O	5		6	I	DSR	
RTS	O	7		8	I	CTS	
RI	I	9					

J6 COM2 CONNECTOR/RS232

PIN NUMBER				PIN NUMBER			
SIGNAL FLOW				SIGNAL FLOW			
SIGNAL				SIGNAL			
DCD	I	1		2	I	DSR	
RX	I	3		4	O	RTS	
TX	O	5		6	I	CTS	
DTR	O	7		8	I	RI	
GND	-	9					

J6 COM2 CONNECTOR/RS485

PIN NUMBER			PIN NUMBER		
SIGNAL FLOW			SIGNAL FLOW		
SIGNAL			SIGNAL		
RESERVED	-	1	2	I	NC
RXD (-)	I/O	3	4	I/O	RXD (+)
TXD (-)	O	5	6	I	TXD (+)
NC	O	7	8	I	NC
GND	I	9			

J1-J2 PC BUS CONNECTOR**A Side**

I/O PIN	Signal Name	I/O
A1	I/O CH CK*	I
A2	SD7	I/O
A3	SD6	I/O
A4	SD5	I/O
A5	SD4	I/O
A6	SD3	I/O
A7	SD2	I/O
A8	SD1	I/O
A9	SD0	I/O
A10	I/O CH RDY*	I
A11	AEN	O
A12	SA19	I/O
A13	SA18	I/O
A14	SA17	I/O
A15	SA16	I/O
A16	SA15	I/O
A17	SA14	I/O
A18	SA13	I/O
A19	SA12	I/O
A20	SA11	I/O
A21	SA10	I/O
A22	SA9	I/O
A23	SA8	I/O
A24	SA7	I/O
A25	SA6	I/O
A26	SA5	I/O
A27	SA4	I/O
A28	SA3	I/O
A29	SA2	I/O
A30	SA1	I/O
A31	SA0	I/O

B Side

I/O PIN	Signal Name	I/O
B1	GND	Ground
B2	RESET DRV	O
B3	+5 Vdc	Power
B4	IRQ9	I
B5	-5 Vdc	Power
B6	DRQ2	I
B7	-12 Vdc	Power
B8	OWS	I
B9	+12 Vdc	Power
B10	GND	Ground
B11	SMESW*	O
B12	SMEMR*	O
B13	IOW*	I/O
B14	IOR*	I/O
B15	DACK3*	O
B16	DRQ3	I
B17	DACK1*	O
B18	DRQ1	I
B19	REFRESH*	I/O
B20	CLK	O
B21	IRQ7	I
B22	IRQ6	I
B23	IRQ5	I
B24	IRQ4	I
B25	IRQ3	I
B26	DACK2*	O
B27	T/C	O
B28	BALE	O
B29	+5 Vdc	Power
B30	OSC	O
B31	GND	Ground

C Side

I/O PIN	Signal Name	I/O
C1	SBHE	I/O
C2	LA23	I/O
C3	LA22	I/O
C4	LA21	I/O
C5	LA20	I/O
C6	LA19	I/O
C7	LA18	I/O
C8	LA17	I/O
C9	MEMR*	I/O
C10	MEMW*	I/O
C11	SD08	I/O
C12	SD09	I/O
C13	SD10	I/O
C14	SD11	I/O
C15	SD12	I/O
C16	SD13	I/O
C17	SD14	I/O
C18	SD15	I/O

D Side

I/O PIN	Signal Name	I/O
D1	MEM CS16*	I
D2	I/O CS16*	I
D3	IRQ10	I
D4	IRQ11	I
D5	IRQ12	I
D6	IRQ15	I
D7	IRQ14	I
D8	DACK0*	O
D9	DRQ0	I
D10	DACK5*	O
D11	DRQ5	I
D12	DACK6*	O
D13	DRQ6	I
D14	DACK7*	O
D15	DRQ7	I
D16	+5Vdc	POWER
D17	MASTER*	I
D18	GND	Ground

J1A MEZZANINE CARD CONNECTOR**A Side**

	I/O PIN	Signal Name	I/O
1	A1	I/O CH CK*	I
3	A2	SD7	I/O
5	A3	SD6	I/O
7	A4	SD5	I/O
9	A5	SD4	I/O
11	A6	SD3	I/O
13	A7	SD2	I/O
15	A8	SD1	I/O
17	A9	SD0	I/O
19	A10	I/O CH RDY*	I
21	A11	AEN	O
23	A12	SA19	I/O
25	A13	SA18	I/O
27	A14	SA17	I/O
29	A15	SA16	I/O
31	A16	SA15	I/O
33	A17	SA14	I/O
35	A18	SA13	I/O
37	A19	SA12	I/O
39	A20	SA11	I/O
41	A21	SA10	I/O
43	A22	SA9	I/O
45	A23	SA8	I/O
47	A24	SA7	I/O
49	A25	SA6	I/O
51	A26	SA5	I/O
53	A27	SA4	I/O
55	A28	SA3	I/O
57	A29	SA2	I/O
59	A30	SA1	I/O
61	A31	SA0	I/O

B Side

	I/O PIN	Signal Name	I/O
2	B1	GND	Ground
4	B2	RESET DRV	O
6	B3	+5 Vdc	Power
8	B4	IRQ9	I
10	B5	-5 Vdc	Power
12	B6	DRQ2	I
14	B7	-12 Vdc	Power
16	B8	OWS	I
18	B9	+12 Vdc	Power
20	B10	GND	Ground
22	B11	SMESW*	O
24	B12	SMEMR*	O
26	B13	IOW*	I/O
28	B14	IOR*	I/O
30	B15	DACK3*	O
32	B16	DRQ3	I
34	B17	DACK1*	O
36	B18	DRQ1	I
38	B19	REFRESH*	I/O
40	B20	CLK	O
42	B21	IRQ7	I
44	B22	IRQ6	I
46	B23	IRQ5	I
48	B24	IRQ4	I
50	B25	IRQ3	I
52	B26	DACK2*	O
54	B27	T/C	O
56	B28	BALE	O
58	B29	+5 Vdc	Power
60	B30	OSC	O
62	B31	GND	Ground

J4 FLOPPY DISK CONNECTOR PIN OUT

Pin Number	Signal Flow	Signal
2	<i>O</i>	<i>RPM/LC</i>
4	-	<i>N.C.</i>
6	-	<i>N.C.</i>
8	<i>I</i>	<i>INDEX*</i>
10	<i>O</i>	<i>MOTRENA*</i>
12	<i>O</i>	<i>DRIVESB*</i>
14	<i>O</i>	<i>DRIVESA*</i>
16	<i>O</i>	<i>MOTRENB*</i>
18	<i>O</i>	<i>DIRC*</i>
20	<i>O</i>	<i>STEP*</i>
22	<i>O</i>	<i>WRITE DATA*</i>
24	<i>O</i>	<i>WRITE ENABLE*</i>
26	<i>I</i>	<i>TRACK0*</i>
28	<i>I</i>	<i>WRITE PROTECT*</i>
30	<i>I</i>	<i>READ DATA*</i>
32	<i>O</i>	<i>HEAD SELECT*</i>
34	<i>I</i>	<i>DCHG</i>
1-33 (ODD)	-	<i>GND</i>

J3 HARD DISK CONNECTOR PIN OUT

Pin Number	Signal Flow	Signal
3	I/O	SD7
4	I/O	SD8
5	I/O	SD6
6	I/O	SD9
7	I/O	SD5
8	I/O	SD10
9	I/O	SD4
10	I/O	SD11
11	I/O	SD3
12	I/O	SD12
13	I/O	SD2
14	I/O	SD13
15	I/O	SD1
16	I/O	SD14
17	I/O	SD0
18	I/O	SD15
1	0	RST*
23	0	IOW*
25	0	IOR*
33	0	SA1
35	0	SA0
36	0	SA2
37	0	CS0*
38	0	CS1*
31	I	IRQ14
32	I	I/OCS16*
39	I	ACTIVE*
20	-	KEY (NOT CONNECTED)
21	-	RESERVED (NOT CONNECTED)
34	-	CONNECTION
2, 19, 22, 24	-	PDIAG
26, 30, 40	-	GND