IP100

5.25-inch form factor
ETX Base Board

USER'S MANUAL

Version 1.0

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Table of Contents

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Introduction

Product Description

The IP100 5.25-inch base board is designed for ETX CPU modules with dimensions of 100mm x 114mm. It packs all the PC connectors for the ETX CPU module to be a high-performance functional embedded board.

The IP100 includes the following features:

- Two Intel 82559 Ethernet controllers
- Pin header for four USB ports
- PS2 keyboard/mouse pin header
- Pin header for VGA CRT connector
- 18-bit LVDS connector (Hirose DF13)
- Pin header for COM 1 and COM2 ports
- Pin header for IDE and FDD connectors
- Pin header for parallel port connector
- DiskOnChip socket supports 2MB to 144MB flash disks
- One 32-bit PCI expansion slot
- One PC/104 expansion connector
- 4 PCB layers
- 203mm x 146mm

DiskOnChip flash disks are storage devices that has no moving parts and emulates FDD/HDD with Flash/RAM/ROM offering reliable data/program storage and long life span. They are reliable and suitable for industrial or other harsh environments characterized by motion, shock, vibration, adverse temperature, dust and humidity. Other features include faster data access, longer MTBF, lower power consumption, cost effective for small capacity and small form factor.

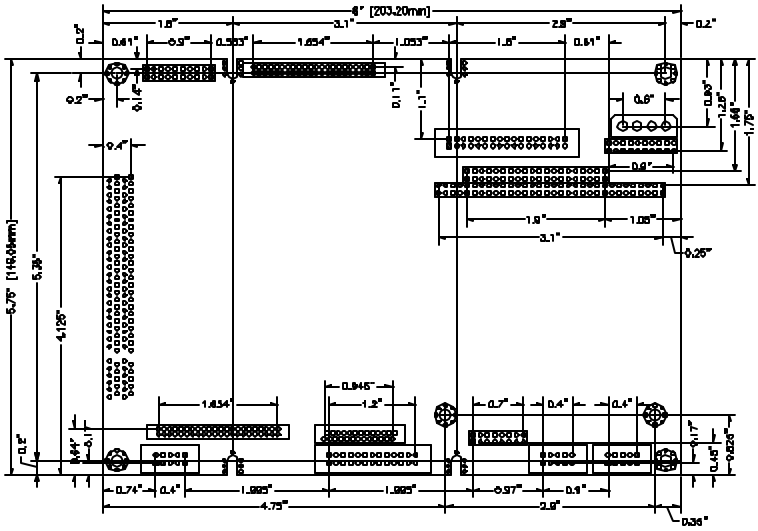
PC/104 is an ISA interface that supports compact-form-factor PC/104 modules (3.6" x 3.8"). It supports self-stacking and pin-and-socket connector. PC/104 features a standard form factor for Embedded applications. It is reliable, small in size and has low power consumption. Flexible mechanical configurations can be attained with PC/104. Modules support various functions such as display, audio, GPS, PCMCIA, fax/modem, Ethernet, SCSI, RS-232/422/485, digital I/O and SSD.

Checklist

Your IP100 package should include the items listed below. Damaged or missing items should be reported to your supplier.

- The IP100 Embedded Little Board
- This User's Manual
- One compact disc containing the following:
  - Intel 82559 Ethernet Drivers
- Optional cables such as:
  - 1 Audio Cable
  - 1 44-pin IDE Ribbon Cable
  - 1 44-pin to 40-pin IDE Ribbon Cable
  - 2 COM Port Cables
  - 1 Printer Port Cable
  - 1 PS/2 Keyboard/Mouse Cable
  - 1 VGA Cable
  - 1 RJ45 LAN Cable or IBLD dual RJ45 Cable

Board Dimensions



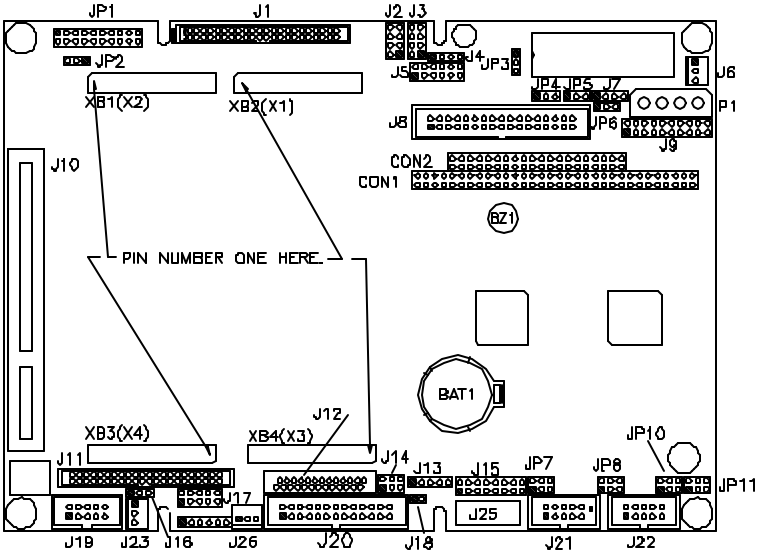
Installations

This section provides information on how to use the jumpers and connectors on the IP100 in order to set up a workable system. The topics covered are:

Setting the Jumpers

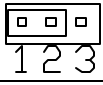
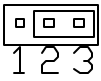
Jumpers are used on the IP100 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on IP100 and their respective functions.

Jumper Locations on IP100

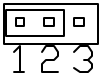
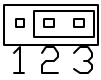


NOTE:
Before installing the ETX CPU module, make sure of the pin orientation of both the ETX interface connectors and the ETX module connector before plugging the module. Once the module is slightly plugged in, use an even force to fully plug in the module.

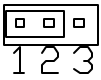
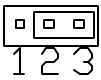
JP2: LCD Power Setting

JP2	Setting	Function
	Pin 1-2 Short/Closed	3.3V
	Pin 2-3 Short/Closed	5V

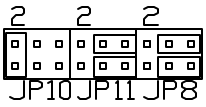
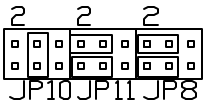
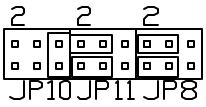
JP4: Onboard LAN2 Enable/Disable

JP4	Setting	LAN2 Function
	Pin 1-2 Short/Closed	Enabled
	Pin 2-3 Short/Closed	Disabled

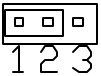
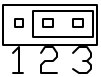
JP5: Onboard LAN1 Enable/Disable

JP5	Setting	LAN1 Function
	Pin 1-2 Short/Closed	Enabled
	Pin 2-3 Short/Closed	Disabled

JP10, JP11, JP8: RS232/RS422/RS485 (COM2) Selection

JP10, JP11, JP8	Pin Short	Function
	JP10: 1-2 JP11: 3-5, 4-6 JP8: 3-5, 4-6	RS232
	JP10: 3-4 JP11: 1-3, 2-4 JP8: 1-3, 2-4	RS422
	JP10: 5-6 JP11: 1-3, 2-4 JP8: 1-3, 2-4	RS485

JP6: DiskOnChip Address Select

JP6	Setting	Address
	Pin 1-2 Short/Closed	D0000-D7FF
	Pin 2-3 Short/Closed	D8000-DFFF

JP7: COM1/2 RS232 +5V / +12V Power Setting

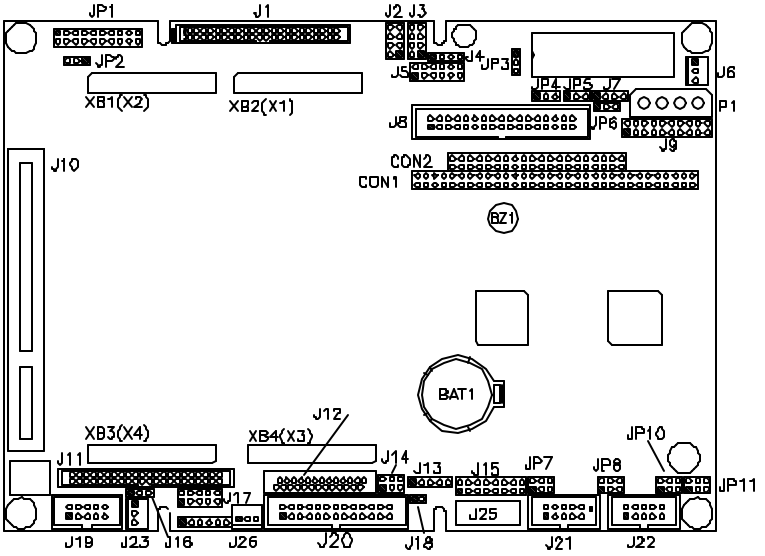
JP7 Pin #	Signal Name	JP7	Signal Name	JP7 Pin #
1	+5V		+5V	2
3	Pin 9 (COM1)		Pin 9 (COM2)	4
5	+12V		+12V	6

COM1 Settings: Pin 1-3 short = +5V, Pin 3-5 short = +12V
COM2 Settings: Pin 2-4 short = +5V, Pin 4-6 short = +12V

Connectors on IP100

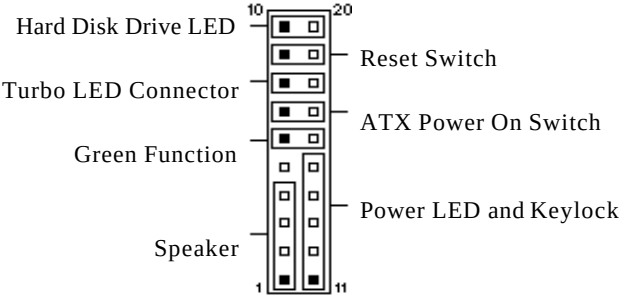
The connectors on IP100 allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on IP100 and their respective functions.

Connector Locations on IP100



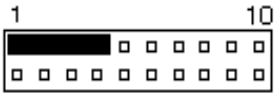
JP1: System Function Connector

The System Function Connector provides interfaces for light indicators of system activities (HDD/Power) and computer status switches.



Speaker: Pins 1 - 4

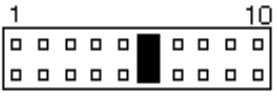
This connector provides an interface to a speaker for audio tone generation. An 8-ohm speaker is recommended.



Pin #	Signal Name
1	Speaker out
2	No connect
3	Ground
4	+5V

Green Function: Pins 6 and 16

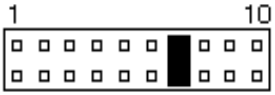
This connector is for the "Green Switch" on the control panel, which, when pressed, will force the system immediately into the power saving (sleep) mode.



Pin #	Signal Name
6	Sleep
16	Ground

ATX Power ON Switch: Pins 7 and 17

This 2-pin connector connects to the power switch. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.



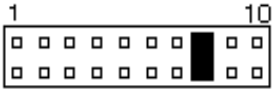
Power LED and Keylock: Pins 11 - 15

The power LED indicates the status of the main power switch. The keylock switch, when closed, will disable the keyboard function.

Pin #	Signal Name
11	Power LED
12	No connect
13	Ground
14	Keylock
15	Ground

Turbo LED Connector: Pins 8 and 18

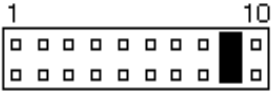
There is the no turbo/deturbo function on the embedded board. The Turbo LED on the control panel will always be on when attached to this connector.



Pin #	Signal Name
8	5V
18	Ground

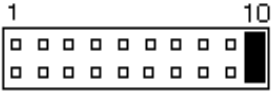
Reset Switch: Pins 9 and 19

The reset switch allows the user to reset the system without turning the main power switch off and then on. Orientation is not required when making a connection to this header.



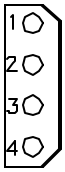
Hard Disk Drive LED Connector: Pins 10 and 20

This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.



P1: Main Power Connector

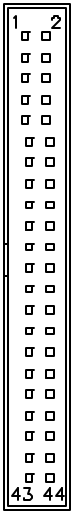
The P1 main power connector has the following pin assignments.



Pin #	Signal Name
1	+5V
2	Ground
3	Ground
4	+12V

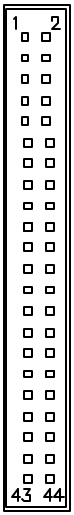
J1, J11: EIDE Connectors

J1 is the *primary* IDE connector. J11 is the *secondary* IDE connector.



J1: IDE1

Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	19	20	Key
DRQ0	21	22	Ground
Host IOW	23	24	Ground
Host IOR	25	26	Ground
IOCHRDY	27	28	Host ALE
DACK0	29	30	Ground
IRQ14	31	32	No connect
Address 1	33	34	No connect
Address 0	35	36	Address 2
Chip select 0	37	38	Chip select 1
Activity	39	40	Ground
Vcc	41	42	Vcc
Ground	43	44	N.C.



J11: IDE2

Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	19	20	Key
DRQ0	21	22	Ground
Host IOW	23	24	Ground
Host IOR	25	26	Ground
IOCHRDY	27	28	Host ALE
DACK1	29	30	Ground
MIRQ0	31	32	No connect
Address 1	33	34	No connect
Address 0	35	36	Address 2
Chip select 0	37	38	Chip select 1
Activity	39	40	Ground
Vcc	41	42	Vcc
Ground	43	44	N.C.

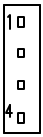
J2, J3: USB0/USB1 Connectors

The following table shows the pin outs of the USB pin headers connectors. Overall, the two pin headers support four USB ports.

Signal Name	Pin	Pin	Signal Name
Vcc	1	8	Vcc
USB0-	2	7	USB1-
USB0+	3	6	USB1+
Ground	4	5	Ground

Signal Name	Pin	Pin	Signal Name
Vcc	1	8	Vcc
USB2-	2	7	USB3-
USB2+	3	6	USB3+
Ground	4	5	Ground

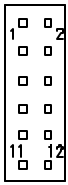
J4: CD-In Audio Connector



Pin #	Signal Name
1	CD Audio L
2	Ground
3	Ground
4	CD Audio R

J5: Audio Connector

J5, a 12-pin header connector, supports an optional external connector supporting 3 sockets for Line Out, Line In and Mic functions. The following table shows the pin assignments of this connector.



Signal Name	Pin #	Pin #	Signal Name
Line Out R	1	2	Line Out L
Ground	3	4	Ground
Line In R	5	6	Line In L
Ground	7	8	Ground
Mic	9	10	BIAS
Ground	11	12	NC

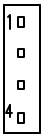
J6: System Fan Power Connector

J6 is a 3-pin header for a CPU fan. The fan must be a 12V fan.

Pin #	Signal Name
1	No connect
2	+12V
3	Ground

J7: Peripheral Power Connector

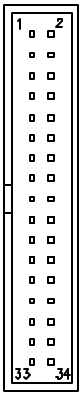
The J7 peripheral power connector has the following pin assignments.



Pin #	Signal Name
1	Ground
2	-5V
3	Ground
4	-12V

J8: External Floppy Drive Connector

J8 a 34-pin header for the external FDD connector.



Signal Name	Pin #	Pin #	Signal Name
Ground	1	2	RM/LC
Ground	3	4	No connect
Ground	5	6	No connect
Ground	7	8	Index
Ground	9	10	Motor enable 0
Ground	11	12	Drive select 1
Ground	13	14	Drive select 0
Ground	15	16	Motor enable 1
Ground	17	18	Direction
Ground	19	20	Step
Ground	21	22	Write data
Ground	23	24	Write gate
Ground	25	26	Track 00
Ground	27	28	Write protect
Ground	29	30	Read data
Ground	31	32	Side 1 select
Ground	33	34	Diskette change

J9: Primary and Secondary LAN Connector

Signal Name	Pin #	Pin #	Signal Name
LED1+	1	11	LED1-
RX+	2	12	RX-
LED2-	3	13	Ground
LED2+	4	14	Ground
TX+	5	15	TX+
LED3+	6	16	LED3-
RX+	7	17	RX-
LED4-	8	18	Ground
LED4+	9	19	Ground
TX+	10	20	TX-

Note: LED1 is Link ACT LED (LAN2)
LED2 is LAN2 speed LED (10M: no light, 100M: light)
LED3 is Link ACT LED (LAN1)
LED4 is LAN1 Speed LED (10M: no light, 100M: light)

J12: External Slim Type Floppy Drive Connector

J12 is a 26-pin connector for the slim type FDD connector.

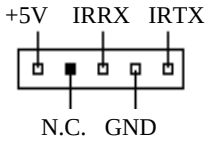
Pin	Signal	Pin	Signal
1	VCC	2	INDEX
3	VCC	4	DRV_SEL
5	VCC	6	DSK_CH
7	NC	8	NC
9	NC	10	MOTOR
1 I	DINST	12	DIR
13	NC	14	STEP
15	GND	16	WDATA
17	GND	18	EGATE
19	GND	20	TRACK
21	NC	22	WPROT
23	GND	24	RDATA
25	GND	26	SIDE

J10: PCI Slot

J10 of the IP100 is a 32-bit PCI slot supporting PCI cards for added functions.

J13: IrDA Connector

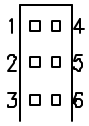
This connector is used to connector to infrared modules that supports wireless communication.



Pin #	Signal Name
1	+5V
2	No Connect
3	Ir RX
4	Ground
5	Ir TX

J14: TV-Out Connector (For SMI SM721 VGA)

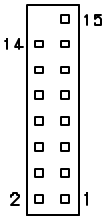
J14 is a 6-pin header that supports an S-video TV out cable.



Signal Name	Pin #	Pin #	Signal Name
Comp output	1	4	Ground
S-Y for S-video	2	5	Ground
S-C for S-video	3	6	Ground

J15: VGA CRT Connector

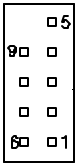
J15 is a 15-pin header for an external VGA CRT female connector.



Signal Name	Pin	Pin	Signal Name
Red	1	2	Vcc
Green	3	4	Ground
Blue	5	6	N.C.
N.C.	7	8	DDDA
Ground	9	10	H-Sync
Ground	11	12	V-Sync
Ground	13	14	DDCK
Ground	15	16	N.C.

J17: PS/2 Keyboard/Mouse Connector

J17, a 10-pin header connector, has functions for both keyboard and mouse. The following table shows the pin assignments of this connector.



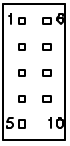
Signal Name	Pin #	Pin #	Signal Name
N.C.	10	5	N.C.
KB clock	9	4	Mouse clock
KB data	8	3	Mouse data
Vcc	7	2	Vcc
Ground	6	1	Ground

J18: LCD Inverter Backlight Control

J18, a 2-pin header is used for the LCD inverter backlight control.

J19: ETX LAN RJ45 Connector

J19 is the RJ45 connector headers for the integrated LAN of the ETX CPU module.

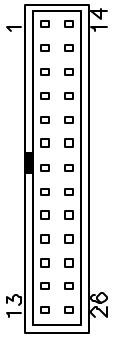


Signal Name	Pin #	Pin #	Signal Name
LED1+	1	6	LED1-
RX+	2	7	RX-
LED2-	3	8	Ground
LED2+	4	9	Ground
TX+	5	10	TX-

Note: LED1 is Link ACT LED
LED2 is LAN speed LED (10M: no light, 100M: light)

J20: Parallel Port Connector

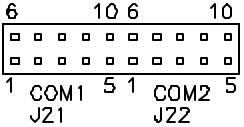
The following table describes the pin out assignments of this connector.



Signal Name	Pin #	Pin #	Signal Name
Line printer strobe	1	14	AutoFeed
PD0, parallel data 0	2	15	Error
PD1, parallel data 1	3	16	Initialize
PD2, parallel data 2	4	17	Select
PD3, parallel data 3	5	18	Ground
PD4, parallel data 4	6	19	Ground
PD5, parallel data 5	7	20	Ground
PD6, parallel data 6	8	21	Ground
PD7, parallel data 7	9	22	Ground
ACK, acknowledge	10	23	Ground
Busy	11	24	Ground
Paper empty	12	25	Ground
Select	13	N/A	N/A

J21, J22: COM1, COM2 Serial Ports

J21 (COM1) and J22 (COM2) are the onboard serial ports on the IP100.

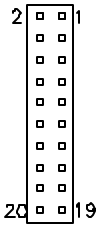


Pin #	Signal Name (RS-232)
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	Ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator
10	No Connect.

J22 (COM2) is jumper selectable for RS-232, RS-422 and RS-485.

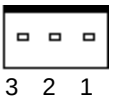
Pin #	Signal Name		
	RS-232	**R2-422**	**RS-485**
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	RTS-	NC
7	RTS	RTS+	NC
8	CTS	CTS+	NC
9	RI	CTS-	NC
10	NC	NC	NC

J25: 18-Bit LVDS Connector (DF13-20)



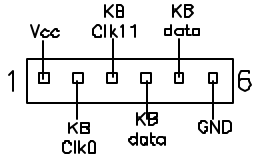
Signal Name	Pin #	Pin #	Signal Name
TX0-	2	1	TX0+
Ground	4	3	Ground
TX1-	6	5	TX1+
5V/3.3V	8	7	Ground
NC	10	9	NC
TX2-	12	11	TX2+
Ground	14	13	Ground
TXC-	16	15	TXC+
5V/3.3V	18	17	ENABKL
+12V	20	19	+12V

J26: ATX Power Control Connector



Pin #	Signal Name
1	Ground
2	PS-ON (soft on/of)
3	5VSB (Standby +5V)

J27: External Keyboard Connector

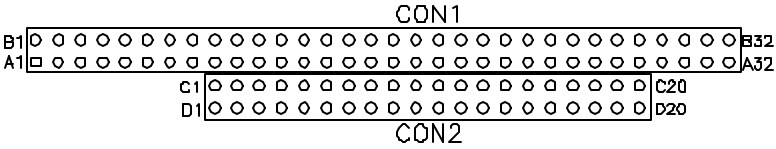


1	Vcc
2	KBClk (J17 pin4)
3	KBClk
4	KBDAT (J17 pin3)
5	KBDAT
6	Ground

CON1, CON2: PC-104 Connector

CON1 and CON2 are dual-in-line pin headers that support PC-104 modules. CON1 consists of 64 pins and CON2 has 40 pins. The following table shows the their pin assignments.

CON1				CON2			
Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	IOCHK	B1	GND	C1	GND	D1	GND
A2	D7	B2	REST	C2	SBHE	D2	MEMCS16
A3	D6	B3	VCC	C3	LA23	D3	IOCS16
A4	D5	B4	IRQ9	C4	LA22	D4	IRQ10
A5	D4	B5	-5V	C5	LA21	D5	IRQ11
A6	D3	B6	DRQ2	C6	LA20	D6	IRQ12
A7	D2	B7	-12V	C7	LA19	D7	IRQ15
A8	D1	B8	OWS	C8	LA18	D8	IRQ14
A9	D0	B9	+12V	C9	LA17	D9	DACK0
A10	IOCHRDY	B10	Key	C10	MEMR	D10	DRQ0
A11	AEN	B11	SMEMW	C11	MEMW	D11	DACK5
A12	A19	B12	SMEMR	C12	D8	D12	DRQ5
A13	A18	B13	IOW	C13	D9	D13	DACK6
A14	A17	B14	IOR	C14	D10	D14	DRQ6
ZA15	A16	B15	DACK3	C15	D11	D15	DACK7
A16	A15	B16	DRQ3	C16	D12	D16	DRQ7
A17	A14	B17	DACK1	C17	D13	D17	VCC
A18	A13	B18	DRQ1	C18	D14	D18	MASTER
A19	A12	B19	REFRESH	C19	D15	D19	GND
A20	A11	B20	CLK	C20	KEY PIN	D20	GND
A21	A10	B21	IRQ7				
A22	A9	B22	IRQ6				
A23	A8	B23	IRQ5				
A24	A7	B24	IRQ4				
A25	A6	B25	IRQ3				
A26	A5	B26	DACK2				
A27	A4	B27	TC				
A28	A3	B28	BALE				
A29	A2	B29	VCC				
A30	A1	B30	OSC				
A31	A0	B31	GND				
A32	GND	B32	GND				


CON1
B1
B32
A1
A32
C1
C20
D1
D20
CON2