ROBO-3600VLA

VIA Eden/C3 VIA Apollo
PN133T 5.25-inch SBC

USER'S MANUAL

Version 1.2P

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Introduction

Product Description

ROBO-3600VLA is a high-performance flexible embedded board based on the VIA ProSavage TwisterT (PN133T) chipset. The chipset is on an innovative and scaleable architecture with proven reliability. It is a two-chip set consisting of the VT8606 North Bridge Controller and VT82C686B South Bridge Controller.

ROBO-3600VLA supports the VIA Eden/C3 processors that features Native x86 execution, Integrated full-speed 192KB L1/L2 cache, 100/133MHz Front Side Bus, Advanced multimedia instruction set, and MMX ™ & 3DNow! ™

The VT8606 integrated graphics accelerator supports 8/16/32MB frame buffer using the system memory, integrated 2-channel 110MHz LVDS interface and digital port for NTSC/PAL TV encoder. One or two Ethernets can be supported by the Realtek 8139C single chip Ethernet controller. Additional key features include support for two USB ports, AC-97 link for audio, hardware monitoring, and power management.

The VT8606 integrated graphics accelerator supports 8/16/32MB frame buffer using the system memory, integrated 2-channel 110MHz LVDS interface and digital port for NTSC/PAL TV encoder. One or two Ethernets can be supported by the Realtek 8139C single chip Ethernet controller. Additional key features include support for two USB ports, AC-97 link for audio, hardware monitoring, and power management.

System memory is provided by one 168-pin DIMM socket that accommodates SDRAM with a maximum capacity of 512MB. The Award BIOS facilitates easy system configuration and peripheral setup.

Other advanced features include *DiskOnChip flash disk support*, 16-level watchdog timer, and IrDA interface.

DiskOnChip flash disks are storage devices that have no moving parts and emulate 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.

Checklist

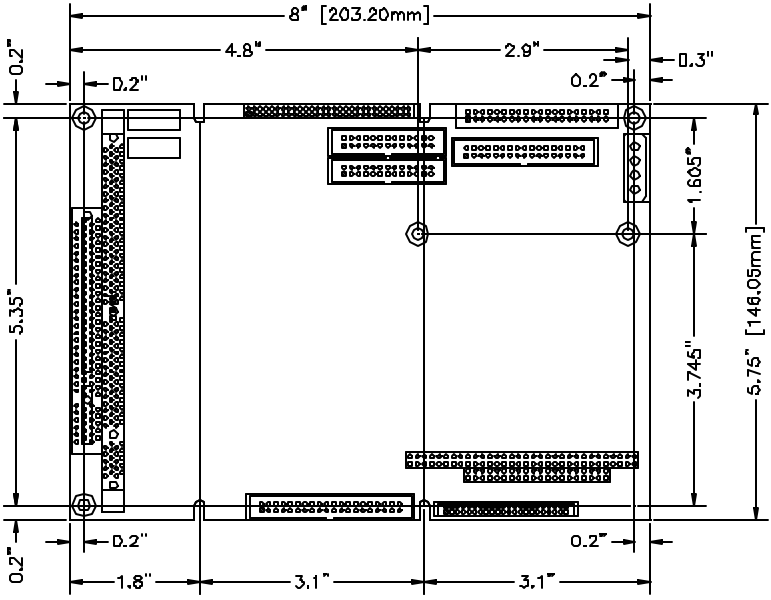
Your ROBO-3600VLA package should include the items listed below.

- The ROBO-3600VLA Embedded Board
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Optional cables such as:
  - 1 FDD Ribbon Cable
  - 1 Audio Cable
  - 2 IDE Ribbon Cables (40-pin & 44-pin)
  - 1 COM Port Cable
  - 1 Printer Port Cable
  - 1 PS/2 Keyboard/Mouse Cable
  - 1 VGA Cable
  - ROBO-3600VLA cable bracket for dual Ethernet

Specifications

Processor Supported	VIA Eden or C3 processors on board 100/133MHz Front Side Bus
Chipset	VIA Apollo PN133T Chipset North bridge: VT8606 (552-pin BGA package) South bridge: VT82C686B (352-pin BGA package)
BIOS	Award BIOS Supports ACPI, DMI, PnP
System Memory	1x DIMM socket supports up to 512MB capacity PC100/PC133 supported
I/O Chipset	VT82C686B chipset Keyboard controller built-in
I/O Features	1x FDD (up to 2.88MB, 3 Mode, LS120) 2x Parallel Port (EPP, ECP Port) 4x Serial Ports (3x RS232 and 1x RS232/422/485) 1x IrDA TX/RX Headers
Bus Master IDE	2x IDE interfaces for up to 4 devices; supports PIO Mode 3/4 or UDMA/33/66/100 HDD, and ATAPI CD-ROM
VGA	VT8606 integrated graphics controller 8/16/32MB frame buffer with system memory Integrated 2-channel 110MHz LVDS interface Digital port for TV encoder
LCD Interface	Supports 36 bit TTL LCD interface and 2 channel LVDS
TV Out (Optional)	VIA VT1621 TV Encoder Composite and S-Video output
Audio	VT82C686B chipset built-in sound controller With AC97 Codec
LAN	One or two Realtek RTL8139C Ethernet controllers 10Base-T / 100Base-TX protocol
USB	2 ports (pin header)
Watchdog Timer	16 levels (0, 2, 4, 6, …30 sec.)
Hardware Monitoring	Built-in VT82C686B chipset Monitors CPU/system temperature and voltages
DiskOnChip	Support M-Systems 2MB~288MB DiskOnChip flash disk
Digital I/O	4 in, 4 out
Expansion Slot	One 32-bit PCI slot One PC/104 expansion slot
Power Consumption	+5V: 8A max. +12V: 750mA max.
Form Factor	5.25-inch SBC
Dimensions	203mm x 146mm (7.99" x 5.75")

Board Dimensions



Installations

This section provides information on how to use the jumpers and connectors on the ROBO-3600VLA in order to set up a workable system. The topics covered are:

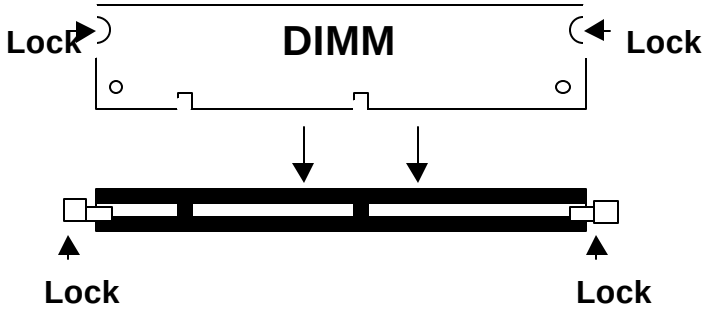
Installing the Memory (DIMM)

The ROBO-3600VLA Embedded Board supports one 168-pin DIMM socket for a maximum total memory of 512MB in SDRAM type. The memory module capacities supported are 64MB to 512MB.

Installing and Removing DIMMs

To install the DIMM, locate the memory slot on the Embedded Board and perform the following steps:

1. Hold the DIMM so that the two keys of the DIMM align with those on the memory slot.
2. Gently push the DIMM in an upright position until the clips of the slot close to hold the DIMM in place when the DIMM touches the bottom of the slot.
3. To remove the DIMM, press the clips with both hands.

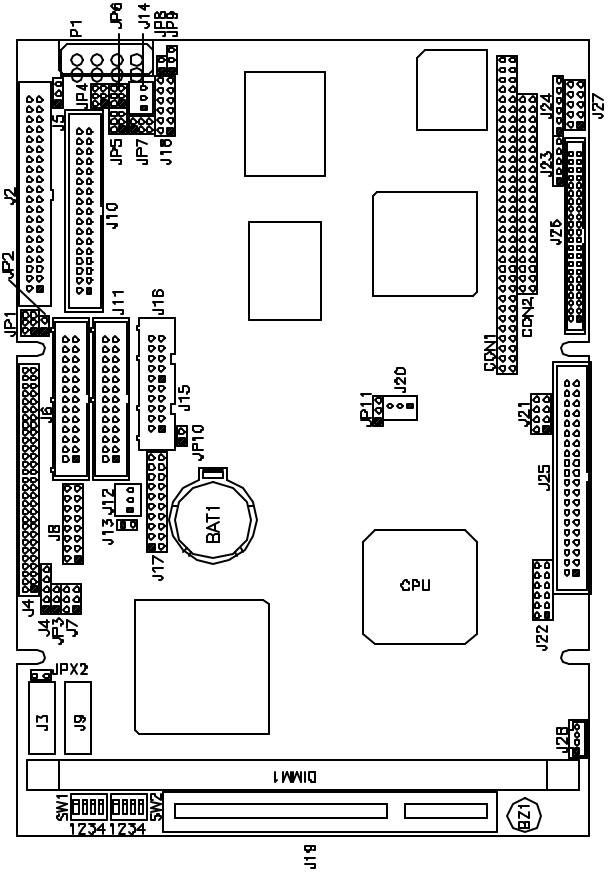


Top View of DIMM Socket

Setting the Jumpers

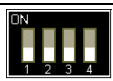
Jumpers are used on ROBO-3600VLA to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. Following lists the connectors on ROBO-3600VLA and their respective functions.

Jumper Locations on ROBO-3600VLA



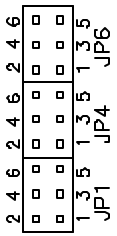
Jumpers on ROBO-3600VLA
SW1(3): CPU Bus Speed Selector
JP1, JP4, JP6: RS232/422/485 (COM2) Selection
JPX2: TV Output Selection
JP2: LAN1 Enable/Disable
JP3: LCD Power Setting
JP5: COM3/4 RS232 +5V / +12V Power Setting
JP7: COM1/2 RS232 +5V / +12V Power Setting
JP8: LAN2 Enable/Disable
JP9: DiskOnChip Address Select
JP10: AT/ATX Power Selection
JP11: Clear CMOS Content

SW1(3): CPU Bus Speed Selector

Bus Speed	SW1(3)	Switch Setting
66MHz		off off on on
100MHz		off off off on
133MHz		off off off off

JP1, JP4, JP6: RS232/422/485 (COM2) Selection

COM1 is fixed for RS-232 use only.
COM2 is selectable for RS232, RS-422 and RS-485.
The following table describes the jumper settings for COM2 selection.



COM2 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP1: 3-5 & 4-6 JP4: 3-5 & 4-6 JP6: 1-2	JP1: 1-3 & 2-4 JP4: 1-3 & 2-4 JP6: 3-4	JP1: 1-3 & 2-4 JP4: 1-3 & 2-4 JP6: 5-6

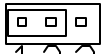
JPX2: TV Output Selection

JPX2	Setting	TV Output
	Short/Closed	TV Output
	Open	LCD Output

JP2: LAN1 Enable/Disable

JP2	Setting	LAN1
	Short/Closed	Enabled
	Open	Disabled

JP3: LCD Power Setting

JP3	Setting	Function
	Pin 1-2 Short/Closed	3.3V
	Pin 2-3 Short/Closed	5V

JP5: COM3/4 RS232 +5V / +12V Power Setting

JP5 Pin #	Signal Name	JP5	Signal Name	JP5 Pin #
1	+5V		+5V	2
3	Pin 9 (COM3)		Pin 9 (COM4)	4
5	+12V		+12V	6

COM3 Settings: Pin 1-3 short = +5V, Pin 3-5 short = +12V
COM4 Settings: Pin 2-4 short = +5V, Pin 4-6 short = +12V

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

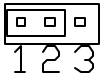
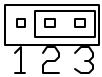
JP7 Pin #	Signal Name	JP7	Signal Name	JP7 Pin #
1	+5V		+5V	2
3	Pin 9 (COM1)		Pin 9 (COM2)	4
5	+12V		+12V	6

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

JP8: LAN2 Enable/Disable

JP8	Setting	LAN2
	Short/Closed	Enabled
	Open	Disabled

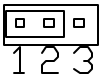
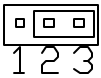
JP9: DiskOnChip Address Select

JP9	Setting	Address
	Pin 1-2 Short/Closed	D0000-D7FF
	Pin 2-3 Short/Closed	D8000-DFFF

JP10: AT/ATX Power Selection

JP10	Setting	AT / ATX Power
	Short/Closed	Select ATX Power
	Open	Select AT Power

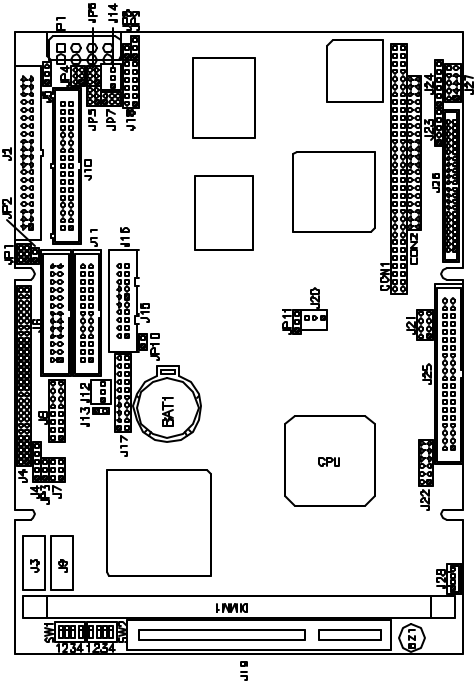
JP11: Clear CMOS Content

JP11	Setting	Function
	Pin 1-2 Short/Closed	Normal Operation
	Pin 2-3 Short/Closed	Clear CMOS Content

Connectors on ROBO-3600VLA

The connectors on ROBO-3600VLA allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on ROBO-3600VLA and their respective functions.

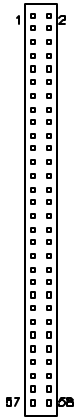
Connector Locations on ROBO-3600VLA



J1: LCD Panel Connector
J2, JB2, JC2, JD2: Serial Ports
J3: 1st Channel LVDS Connector
J4: LCD Inverter Output
J6: Secondary Parallel Port Connector
J7: TV-Out Connector
J8: VGA CRT Connector
J9: 2nd Channel LVDS Connector
J10: Floppy Drive Connector
J11: Primary Parallel Port Connector
J12: System Fan Power Connector
J14: External ATX Power Connector
J15, J16: LAN1, LAN2 Connector
J17: System Function Connector
J18: Digital I/O
J20: CPU Fan Power Connector
J21: USB Connector
J22: Audio Connector
J23: IrDA Connector
J24: External Keyboard Connector
J25, J26: Primary and Secondary IDE Connectors
J27: PS/2 Keyboard/Mouse Connector
J28: CD-in Connector

J1: LCD Panel Connector

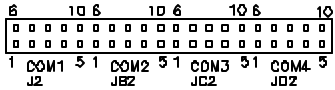
J1 is the TTL interface pin header for flat panel LCD displays. The following shows the pin assignments of this connector.



Signal Name	Pin #	Pin #	Signal Name
+12V	1	2	+12V
Ground	3	4	Ground
5V/3.3V	5	6	5V/3.3V
ENAVEE	7	8	Ground
P0	9	10	P1
B0	11	12	B1
B2	13	14	B3
B4	15	16	B5
P8	17	18	P9
G0	19	20	G1
G2	21	22	G3
G4	23	24	G5
P16	25	26	P17
R0	27	28	R1
R2	29	30	R3
R4	31	32	R5
Ground	33	34	Ground
ShfClk(DCLK)	35	36	V. Sync (FLM)
MDE(DE)	37	38	H. Sync (LP)
Ground	39	40	ENABKL
Ground	41	42	NC
DNAVDD	43	44	5V/3.3V
NC	45	46	NC
P24	47	48	P25
P26	49	50	P27
P28	51	52	P29
P30	53	54	P31
P32	55	56	P33
P34	57	58	P35

J2, JB2, JC2, JD2: Serial Ports

J2 (COM1), JB2 (COM2), JC2 (COM3) and JD2 (COM4) are the onboard serial ports on the IB795.

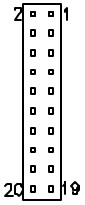


Pin #	Signal Name (RS-232)
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	Ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator
10	No Connect.

JB2 (COM2) is jumper selectable for RS-232, RS-422 and RS-485.

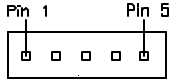
Pin #	Signal Name		
	RS-232	**R2-422**	**RS-485**
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	RTS-	NC
7	RTS	RTS+	NC
8	CTS	CTS+	NC
9	RI	CTS-	NC
10	NC	NC	NC

J3, J9: 1st and 2nd Channel 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
TX3-	10	9	TX3+
TX2-	12	11	TX2+
Ground	14	13	Ground
TXC-	16	15	TXC+
5V/3.3V	18	17	ENABKL
+12V	20	19	+12V

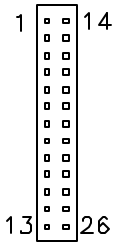
J4: LCD Inverter Output



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

J6: Secondary Parallel Port Connector

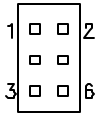
The following table describes the pin out assignments of this connector.



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

J7: TV-Out Connector

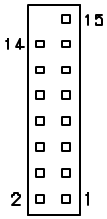
J7 is a 6-pin header for the optional TV-Out connector.



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

J8: VGA CRT Connector

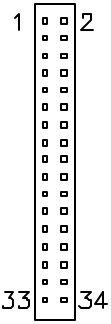
J8 is a 15-pin header for an external VGA CRT female connector.



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

J10: Floppy Drive Connector

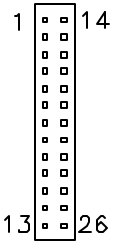
J10 is a 34-pin header and will support up to 2.88MB floppy drives.



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

J11: Primary Parallel Port Connector

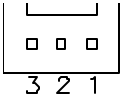
The following table describes the pin out assignments of this connector.



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

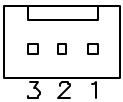
J12: System Fan Power Connector

J12 is a 3-pin header for the system fan. The fan must be a 12V fan.



Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection

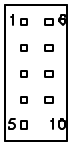
J14: External ATX Power Connector



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

J15, J16: LAN1, LAN2 Connector

J15 and J16 are the first and second LAN connectors for RJ45 cables.

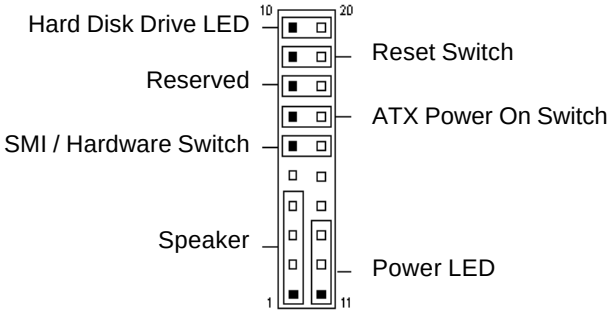


Signal Name	Pin #	Pin #	Signal Name
LED1+	1	6	LED1-
RX+	2	7	RX-
LED2-	3	8	Ground
LED2+	4	9	Ground
TX+	5	10	TX-

Note: LED 1: Active LED; LED2: Link LED

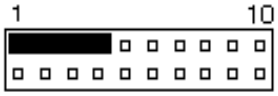
J17: System Function Connector

J17 provides connectors for system indicators that provide light indication of the computer activities and switches to change the computer status. J17 is a 20-pin header that provides interfaces for the following functions.



Speaker: Pins 1 - 4

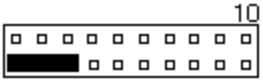
This connector provides an interface to a speaker for audio tone generation. An 8-ohm speaker is recommended.



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

Power LED: Pins 11 - 13

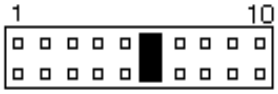
The power LED indicates the status of the main power switch.



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

SMI/Hardware Switch: Pins 6 and 16

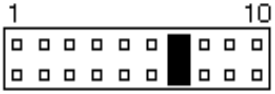
This connector supports the "Green Switch" on the control panel, which, when pressed, will force the system into the power-saving mode immediately.



Pin #	Signal Name
6	Sleep
16	Ground

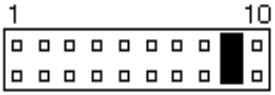
ATX Power ON Switch: Pins 7 and 17

This 2-pin connector is an "ATX Power Supply On/Off Switch" on the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.



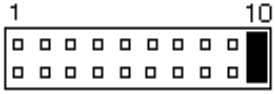
Reset Switch: Pins 9 and 19

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



Hard Disk Drive LED Connector: Pins 10 and 20

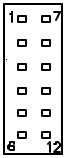
This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.



Pin #	Signal Name
10	Ground
20	5V

J18: Digital I/O Connector (4 in, 4 out)

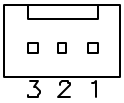
This 12-pin Digital I/O connector supports TTL levels and is used to control external devices requiring ON/OFF circuitry.



Signal Name	Pin #	Pin #	Signal Name
In0	1	7	+5V
In1	2	8	Out0
In2	3	9	Ground
In3	4	10	Out1
Ground	5	11	+12V
Out2	6	12	Out3

J20: CPU Fan Power Connector

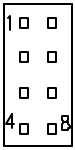
J20 is a 3-pin header for the CPU fan power.



Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection

J21: USB Connector

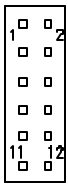
J21 supports an external USB connector with two ports.



Pin #		Signal Name
1	5	Vcc
2	6	USB-
3	7	USB+
4	8	Ground

J22: Audio Connector

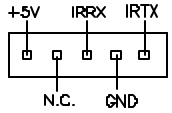
J22, a 12-pin header connector, supports an optional external connector supporting 3 sockets for Line Out, Line In and Mic functions. The following table shows the pin assignments of this connector.



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

J23: IrDA Connector

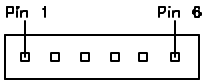
J23 is used for an optional IrDA connector for infrared wireless communication.



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

J24: External Keyboard Connector

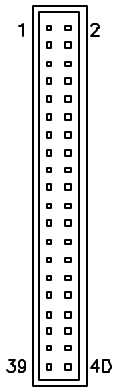
J24 is a a 5-pin header for the external keyboard connector.



Pin #	Signal Name
1	+5V
2	KBCLK-OUT
3	KBCLK-IN
4	KBDAT-OUT
5	KBDAT-IN
6	Ground

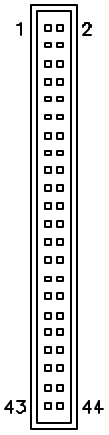
J25, J26: Primary and Secondary IDE Connectors

J25: Primary IDE Connector



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	Protect pin
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

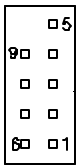
J26: Secondary IDE Connector



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.

J27: PS/2 Keyboard/Mouse Connector

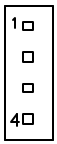
J27, a 10-pin header connector, has functions for keyboard and mouse.



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

J28: CD-in Connector

J28 is the 4-pin CD-in connector.



Pin #	Signal Name
1	Right
2	Ground
3	Ground
4	Left

Watchdog Timer Configuration

The function of the watchdog timer is to reset the system automatically and is defined at I/O port 0443H. To enable the watchdog timer and allow the system to reset, write I/O port 0443H. To disable the timer, write I/O port 0441H for the system to stop the watchdog function. The timer has a tolerance of 20% for its intervals.

The following describes how the timer should be programmed.

Enabling Watchdog:
MOVAX, 000FH (Choose the values from 0)
MOVDX, 0443H
OUT DX, AX

Disabling Watchdog
MOVAX, 00FH (Any value is fine.)
MOV DX, 0441H
OUT DX, AX

WATCHDOG TIMER CONTROL TABLE

Level	Value	Time/sec	Level	Value	Time/sec
1	F	0	9	7	16
2	E	2	10	6	18
3	D	4	11	5	20
4	C	6	12	4	22
5	B	8	13	3	24
6	A	10	14	2	26
7	9	12	15	1	28
8	8	14	16	0	30