

MAT-755

Transmeta TM5400/5600
5.25" SBC with Audio/LAN

USER'S MANUAL

Version 1.0

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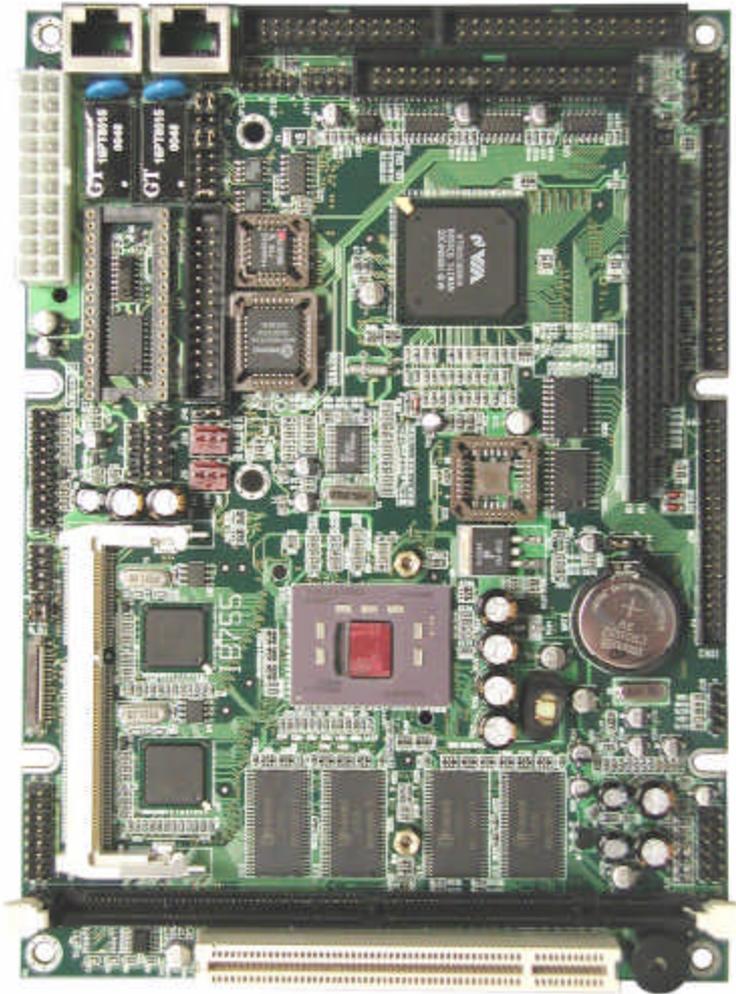
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A picture of the MAT-755 Transmeta Crusoe 5.25" SBC

Introduction

Product Description

MAT-755 little board is a high-performance multimedia Little Board based on the Transmeta Crusoe TM5400/5600 processor. The Crusoe processor a revolutionary x86-compatible solution that features:

- Remarkably low power consumption, allowing the processor to run cooler than conventional chips.
- High performance, optimized for real-life usage patterns. Crusoe delivers, whether you're browsing the web, watching a DVD, or recalculating your spreadsheet.
- Full x86 compatibility, so you are free to run the applications and Internet plugins of your choice.

MAT-755 packs all the functions of a versatile system, including audio, Ethernet, a MicroPCI socket and Hardware Monitoring into the 5.25-inch SBC form factor. System memory is provided by one DIMM socket that accommodates up to 128MB SDRAM.

The Award BIOS facilitates easy system configuration and peripheral setup. Other advanced features include *DiskOnChip flash disk* support, watchdog timer, *PC/104*, USB and IrDA interface.

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, digital I/O, GPS, PCMCIA, fax/modem, Ethernet, SCSI, RS-232/422/485 and SSD.

Checklist

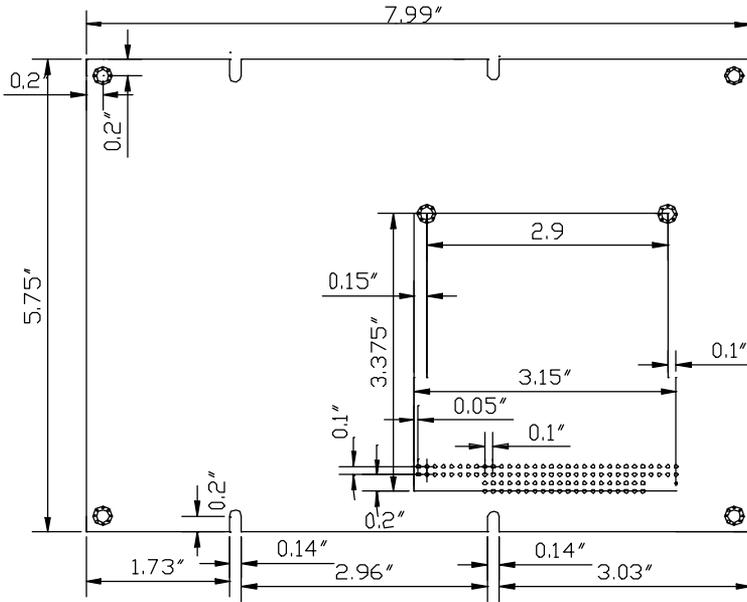
MAT-755 package should include the items listed below. Damaged or missing items should be reported to your supplier.

- MAT-755 Transmeta Crusoe 5.25-inch SBC
- This User' s Manual
- One compact disc containing the following:
 - Flash ROM Utility
 - Intel 82559 Ethernet Drivers
 - VIA 686A/B, AC97 Audio Drivers
- Optional cables such as:
 - 1 Floppy Ribbon Cable
 - 1 Audio Cable
 - 2 44-pin IDE Ribbon Cable
 - 1 COM Port Cable
 - 2 Printer Port Cable
 - 1 PS/2 Keyboard/Mouse Cable
 - 1 VGA Cable

Specifications

Processor Supported	Transmeta Crusoe Processor TM5400 / TM5600, 400MHz ~ 600MHz 66MHz Front Side Bus
Chipset	VIA VT82C686A/B chipset
BIOS	Award BIOS Supports ACPI, DMI, PnP
System Memory	1x DIMM socket support up to 128MB capacity, 3.3V
Multi I/O Chipset	VIA VT82C686A/B chipset
I/O Features	1x FDD (up to 2.88MB, 3 Mode) 2x Parallel Ports (EPP, ECP Port) 4x Serial Ports (3x RS232, 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 Ultra DMA/33 IDE HDD, and ATAPI CD-ROM
On-board Audio	VIA VT82C686A/B AC97 Digital Audio Controller
On-board Ethernet	Two Intel 82559 Ethernet controller 10/100Mbps data transfer speeds Two RJ-45 connector on board
Optional MicroPCI VGA cards	MicroPCI VGA cards <ul style="list-style-type: none"> • C&T 69000 (2MB embedded) • C&T 69030 (4MB embedded); with dual view • SMI 721 with 4MB/8MB embedded memory • Supports LCD/CRT display
Optional MicroPCI LAN	<ul style="list-style-type: none"> • With single Intel 82559 controller on board • With dual Intel 82559 controller on board
Hardware Monitoring	VIA VT82C686A/B Monitors CPU/system temperature and voltages
SSD Interface	Support M-Systems 2MB~144MB DiskOnChip
Watchdog Timer	16 levels
Other Features	One PCI slot PC/104 expansion connector USB headers for 2 ports IrDA headers for wireless communication
Power Requirement	+5V: 1A max, +12V: 900mA max. +3.3V: 1A max.
Form Factor	5.25-inch SBC (Little Board)
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 MAT-755 in order to set up a workable system. The topics covered are:

MicroPCI Daughter Card Installation	6
Installing the Memory (DIMM)	7
Setting the Jumpers.....	8
Connectors on MAT-755	13
Watchdog Timer Configuration.....	25

MicroPCI Daughter Card Installation

MAT-755 embedded board is integrated with a **MicroPCI socket** that uses SO-DIMM 144-pin connectors. These sockets can accommodate the optional MicroPCI daughter cards.

To insert the MicroPCI daughter cards, position it at 30° to the PCB and gently push it into the MicroPCI connector (See Figure 1 below). The card will not fit when inserted at an angle of 45° or 15°. Once inserted, slowly press the card towards the PCB until it locks on both sides to the clips of the connector. Screw the card to the PCB to secure the installation. To remove the MicroPCI card, pull the 'clips' sideways as shown in Figure 2 below.

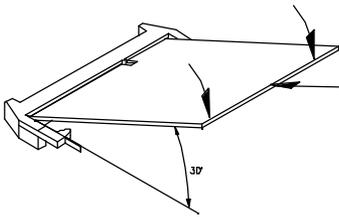


Figure 1.

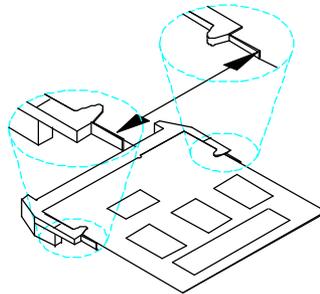


Figure 2.

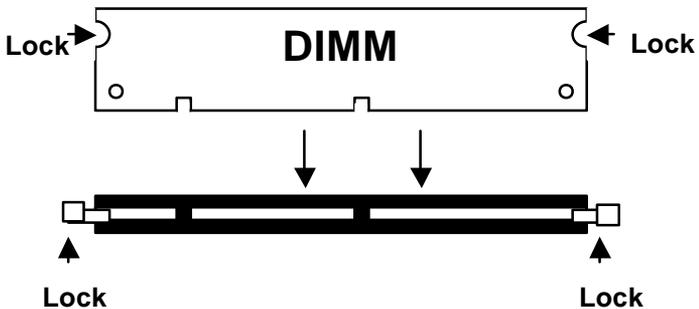
Installing the Memory (DIMM)

This section only applies if MAT-755 has a 168-pin DIMM socket. The DIMM socket supports a maximum total memory of 128MB in single side SDRAM type. The memory capacities supported are 32MB, 64MB, and 128MB .

Installing and Removing DIMMs

To install the DIMM, locate the memory slot on the little 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

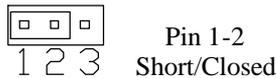
Note: For MAT-755 with on board SDRAM memory, do not replace the memory chips installed with other chips. A new BIOS will be required for the board to run properly.

Setting the Jumpers

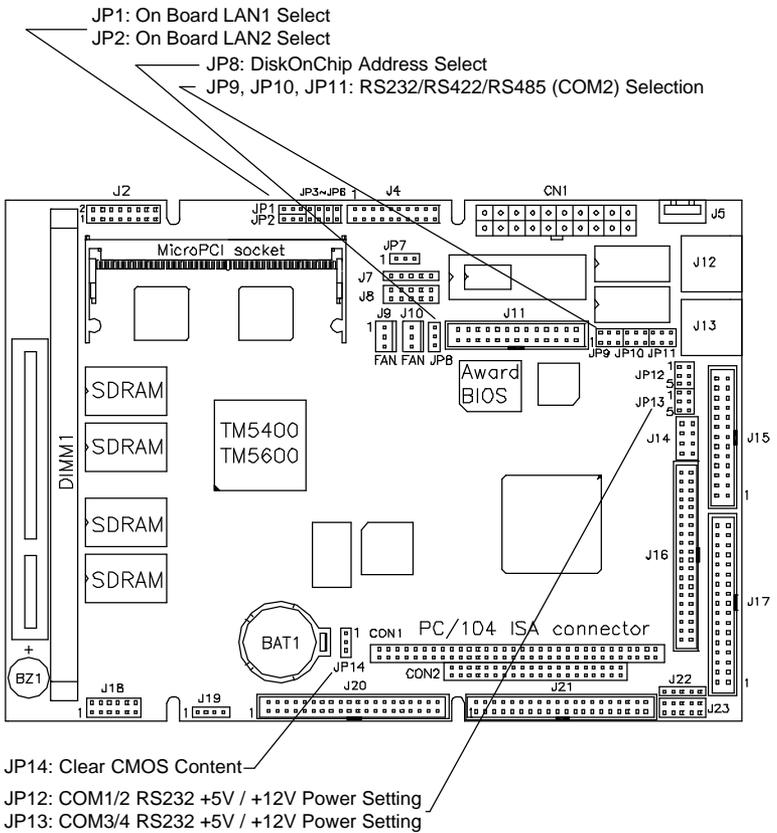
Jumpers are used on the MAT-755 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on MAT-755 and their respective functions.

Jumper Locations on MAT-755.....	9
JP1: On Board LAN1 Select	10
JP2: On Board LAN2 Select	10
JP8: DiskOnChip Address Select.....	10
JP9, JP10, JP11: RS232/RS422/RS485 (COM2) Selection.....	11
JP12: COM1/2 RS232 +5V / +12V Power Setting	11
JP13: COM3/4 RS232 +5V / +12V Power Setting	11
JP14: Clear CMOS Content.....	12

The following conventions are used in this section:



Jumper Locations on MAT-755



JP1: On Board LAN1 Select

JP1	Setting	Function
	Pin 1-2 Short/Closed	LAN 1 Enable
	Pin 2-3 Short/Closed	LAN 1 Disable

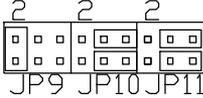
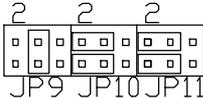
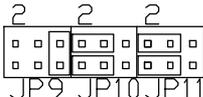
JP2: On Board LAN2 Select

JP2	Setting	Function
	Pin 1-2 Short/Closed	LAN 2 Enable
	Pin 2-3 Short/Closed	LAN 2 Disable

JP8: DiskOnChip Address Select

JP8	Setting	Address
	Pin 1-2 Short/Closed	DC000-DDFFF
	Pin 2-3 Short/Closed	DE000-DFFFF

JP9, JP10, JP11: RS232/RS422/RS485 (COM2) Selection

JP9, JP10, JP11	Pin Short	Function
 <p>JP9 JP10 JP11</p>	JP9: 1-2 JP10: 3-5, 4-6 JP11: 3-5, 4-6	RS232
 <p>JP9 JP10 JP11</p>	JP9: 3-4 JP10: 1-3, 2-4 JP11: 1-3, 2-4	RS422
 <p>JP9 JP10 JP11</p>	JP9: 5-6 JP10: 1-3, 2-4 JP11: 1-3, 2-4	RS485

JP12: COM1/2 RS232 +5V / +12V Power Setting

JP12	Signal Name	JP12	Signal Name	JP12
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

JP13: COM3/4 RS232 +5V / +12V Power Setting

JP13	Signal Name	JP13	Signal Name	JP13
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

JP14: Clear CMOS Content

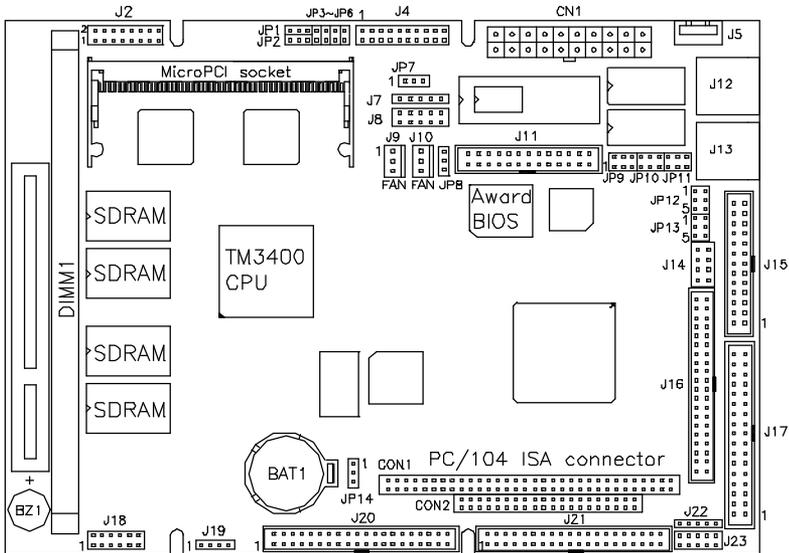
JP14	Setting	Function
 <p>A diagram of a three-pin header labeled 1, 2, and 3. A rectangular box is drawn around pins 1 and 2, indicating they are shorted.</p>	Pin 1-2 Short/Closed	Normal Operation
 <p>A diagram of a three-pin header labeled 1, 2, and 3. A rectangular box is drawn around pins 2 and 3, indicating they are shorted.</p>	Pin 2-3 Short/Closed	Clear CMOS Content

Connectors on MAT-755

Connectors on MAT-755 allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on MAT-755 and their respective functions.

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CN1: ATX Power Supply Connector	15
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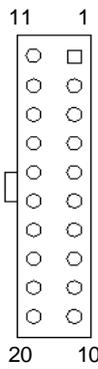
Connector Locations on MAT-755



- CN1: ATX Power Supply Connector
- J2: VGA CRT Connector
- JP3: LAN2 Speed LED
- JP4: LAN2 Activity LED
- JP5: LAN1 Speed LED
- JP6: LAN1 Activity LED
- J4: System Function Connector
- J7: IrDA Connector
- J8: Digital I/O Connector (4 in, 4 out)
- J9: CPU Fan Power Connector
- J10: System Fan Power Connector
- J15, J11: Parallel Port 1/2 Connectors
- J12, J13: Primary and Secondary RJ45 Connector
- J14: USB Connector
- J16: Serial Ports
- J17: Floppy Drive Connector
- J18: Audio Connector
- J19: CD-In Audio Connector
- J21, J20: EIDE Connectors
- J22: PS/2 Keyboard Selection
- J23: PS/2 Keyboard/Mouse Connector
- CON1, CON2: PC-104 Connector

CN1: ATX Power Supply Connector

CN1 is a 20-pin ATX power supply connector. Refer to the following table for the pin out assignments.



Signal Name	Pin #	Pin #	Signal Name
3.3V	11	1	3.3V
-12V	12	2	3.3V
Ground	13	3	Ground
PS-ON	14	4	+5V
Ground	15	5	Ground
Ground	16	6	+5V
Ground	17	7	Ground
-5V	18	8	Power good
+5V	19	9	5VSB
+5V	20	10	+12V

J2: VGA CRT Connector

J2 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.

JP3: LAN2 Speed LED

JP3 is the 2-pin Speed LED connector of the secondary LAN for an external LED indicator of network connection speed.

JP4: LAN2 Activity LED

JP4 is the 2-pin Activity LED connector of the primary LAN for the external LED indicator of the network activity status.

JP5: LAN1 Speed LED

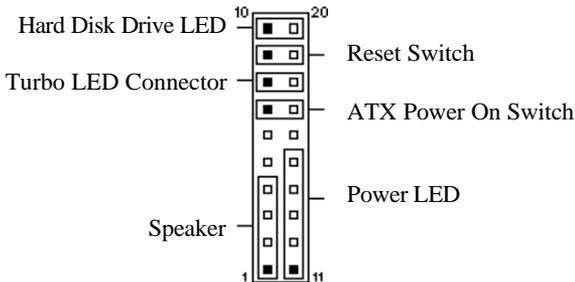
JP5 is the 2-pin Speed LED connector of the secondary LAN for the external LED indicator of the network connection speed.

JP6: LAN1 Activity LED

JP6 is the 2-pin Activity LED connector of the primary LAN for an external LED indicator of network activity status.

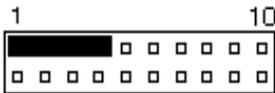
J4: System Function Connector

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

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: Pins 11 - 15

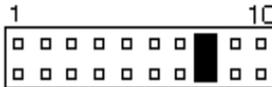
The power LED indicates the status of the main power switch.



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

Turbo LED Connector: Pins 8 and 18

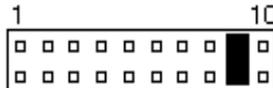
There is the no turbo/deturbo function on the embedded board. The Turbo LED on the control panel will always be on when attached to this connector.



Pin #	Signal Name
8	5V
18	Ground

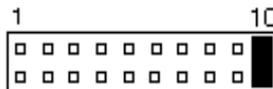
Reset Switch: Pins 9 and 19

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.



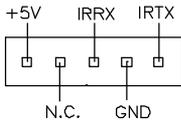
Hard Disk Drive LED Connector: Pins 10 and 20

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



J7: IrDA Connector

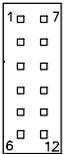
This connector is used for an IrDA connector for wireless communication.



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

J8: 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

J9: CPU Fan Power Connector

J9 is a 3-pin header for a CPU fan. The fan must be a 12V fan.



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

J10: System Fan Power Connector

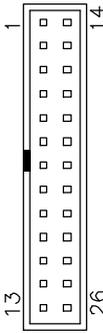
J10 is a 3-pin header for a system fan. The fan must be a 12V fan.



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

J15, J11: Parallel Port 1/2 Connectors

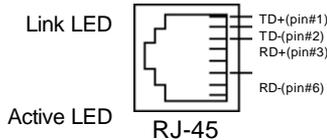
The following table describes the pin out assignments of this connector.



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, J13: Primary and Secondary RJ45 Connector

J12 and J13 are the primary RJ-45 and secondary RJ-45 connectors respectively. The figure below shows the pin out assignments of the connector and its corresponding input jack.



J14: USB Connector

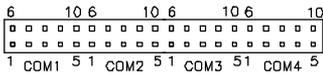
J14 is the onboard USB pin-header that supports an optional USB connector cable with two ports.



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

J16: Serial Ports

J16A (COM1), J16B (COM2), J16C (COM3) and J16D (COM4/TTL level) are the onboard serial ports on the MAT-755.



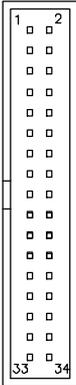
Pin #	Signal Name (RS-232)
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	Ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator
10	No Connect.

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

J17: Floppy Drive Connector

J17 of 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

J18: Audio Connector

J18, a 12-pin header connector, supports an optional external connector supporting 3 sockets for Line Out, Line In and Mic functions.



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 R
Ground	7	8	Ground
Mic	9	10	BIAS
Ground	11	12	NC

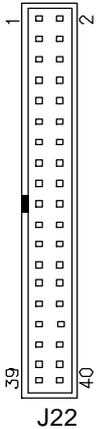
J19: CD-In Audio Connector



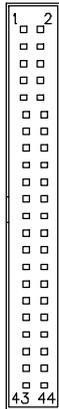
Pin #	Signal Name
1	CD Audio L
2	Ground
3	Ground
4	CD Audio R

J21, J20: EIDE Connectors

J21 is the *primary* IDE connector. J20 is the *secondary* IDE connector.



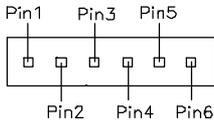
Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	19	20	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



J21: 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.

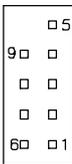
J22: PS/2 Keyboard Selection



Pin #	Signal Name
1	+5V
2	To Pin9 of J23
3	KB clock
4	To Pin8 of J23
5	KB data
6	Ground

J23: PS/2 Keyboard/Mouse Connector

J23, 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

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:

```
MOV  AX, 000FH (Choose the values from 0)
MOV  DX, 0443H
OUT  DX, AX
```

Disabling Watchdog

```
MOV  AX, 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

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BIOS Setup

This section describes the different settings available in the Award BIOS that comes with MAT-755 embedded board. The topics covered in this section are as follows:

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Load Optimized Defaults	43
Supervisor / User Password.....	43
Save & Exit Setup.....	43
Exit Without Saving	43

BIOS Introduction

The Award BIOS (Basic Input/Output System) installed in your system's ROM provides critical low-level support for standard devices such as disk drives, parallel port and serial ports. It also adds virus and password protection, as well as special support for detailed fine-tuning of the chipset controlling the entire system.

BIOS Setup

The Award BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the Award BIOS is immediately activated. Pressing the key immediately allows you to enter the Setup utility. If you are a little bit late pressing the key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

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Standard CMOS Features	Load Fail-Safe Defaults
Advanced BIOS Features	Load Optimized Defaults
Integrated Peripherals	Set Supervisor Password
Power Management Setup	Set User Password
PnP/PCI Configuration	Save & Exit Setup
PC Health Status	Exit Without Saving
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	
Time, Date, Hard Disk Type...	

The section below the setup items of the Main Menu displays the control keys for this menu. At the bottom of the Main Menu just below the control keys section, there is another section that displays information about the currently highlighted item in the list.

Note: *If your computer cannot boot after making and saving system changes with Setup, the Award BIOS supports an override to the CMOS settings that resets your system to its default.*

Warning: *It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

Standard CMOS Features

“Standard CMOS Features” allows you to record some basic hardware configurations in your computer system and set the system clock and error handling. If the Embedded Little Board is already installed in a working system, you will not need to select this option. You will need to run the Standard CMOS option, however, if you change your system hardware configurations, the onboard battery fails, or the configuration stored in the CMOS memory was lost or damaged.

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Standard CMOS Features

Date (mm:dd:yy)	: Thu, May 18 2001	Item Help
Time (hh:mm:ss)	: 00 : 00 : 00	Menu Level
IDE Primary Master	[None]	
IDE Primary Slave	[None]	Change the day, month,
IDE Secondary Master	[None]	Year and century
IDE Secondary Slave	[None]	
Drive A	[1.44M, 3.5 n.]	
Drive B	[None]	
Video	[EGA/VGA]	
Halt On	[All errors]	
Base Memory	640K	
Extended Memory	48128K	
Total Memory	49152K	

↑↓→Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General
Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

At the bottom of the menu are the control keys for use on this menu. If you need any help in each item field, you can press the <F1> key. It will display the relevant information to help you. The memory display at the lower right-hand side of the menu is read-only. It will adjust automatically according to the memory changed. The following describes each item of this menu.

Date

The date format is:

Day : Sun to Sat

Month : 1 to 12

Date : 1 to 31

Year : 1994 to 2079

To set the date, highlight the “Date” field and use the PageUp/ PageDown or +/- keys to set the current time.

Time

The time format is: **Hour : 00 to 23**

Minute : 00 to 59

Second : 00 to 59

To set the time, highlight the “Time” field and use the <PgUp>/<PgDn> or +/- keys to set the current time.

Primary HDDs / Secondary HDDs

The onboard PCI IDE connectors provide Primary and Secondary channels for connecting up to four IDE hard disks or other IDE devices. Each channel can support up to two hard disks; the first is the “Master” and the second is the “Slave”.

To enter the specifications for a hard disk drive, you must select first a “Type”. There are 45 predefined types and 4 user definable types are for Enhanced IDE BIOS. Type 1 to 45 are predefined. Type “User” is user-definable. For the Primary Master/Slave as well as Secondary Master/Slave, you can select “Auto” under the TYPE and MODE fields. This will enable auto detection of your IDE drives and CD-ROM drive during POST.

Press <PgUp>/<PgDn> to select a numbered hard disk type or type the number and press the <Enter> key. The hard disk will not work properly if you enter incorrect information for this field. If your hard disk drive type is not matched or listed, you can use Type User to define your own drive type manually. If you select Type User, related information is asked to be entered to the following items.

CYLS : Number of cylinders
HEAD : Number of read/write heads
PRECOMP : Write precompensation
LANDZ : Landing zone
SECTOR : Number of sectors
SIZE : Automatically adjust according to the configuration
MODE (for IDE HDD only) : Auto
 Normal (HD < 528MB)
 Large (for MS-DOS only)
 LBA (HD > 528MB and supports
 Logical Block Addressing)

NOTE: *The specifications of your drive must match with the drive table. If your hard disk drive type is not matched or listed, you can use Type User to define your own drive type manually.*

Drive A / Drive B

These fields identify the types of floppy disk drive A or drive B that has been installed in the computer. The available specifications are:

360KB 5.25 in.	1.2MB 5.25 in.	720KB 3.5 in.	1.44MB 3.5 in.	2.88MB 3.5 in.
-------------------	-------------------	------------------	-------------------	-------------------

Video

This field selects the type of video display card installed in your system. You can choose the following video display cards:

EGA/VGA	For EGA, VGA, SEGA, SVGA or PGA monitor adapters.(default)
CGA 40	Power up in 40 column mode.
CGA 80	Power up in 80 column mode.
MONO	For Hercules or MDA, includes high resolution monochrome adapters.

Halt On

This field determines whether or not the system will halt if an error is detected during power up.

No errors	The system boot will not be halted for any error that may be detected.
All errors	Whenever the BIOS detects a non-fatal error, the system will be halted and you will be prompted.
All, But Keyboard	The system boot will not be halted for a keyboard error; it will stop for all other errors.
All, But Diskette	The system boot will not be halted for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not be halted for a keyboard or disk error; it will stop for all other errors.

Advanced BIOS Features

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

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Advanced BIOS Features

		Item Help
Virus Warning	: Disabled	
CPU Internal Cache	: Enabled	
Quick Power On Self Test	: Enabled	Menu Level
First Boot Device	: Floppy	
Second Boot Device	: HDD-0	
Third Boot Device	: LS120	
Boot Other Device	: Enabled	
Swap Floppy Drive	: Enabled	
Boot Up Floppy Seek	: Disabled	
Boot Up Numlock Status	: On	
Typematic Rate Setting	: Disabled	Allows you to choose the VIRUS warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep.
Typematic Rate (chars/Sec)	: 6	
Typematic Delay (Msec)	: 250	
Security Option	: Setup	
OS Select For DRAM>64MB	: Non-OS2	
Report No FDD For WIN 95	: No	
Video BIOS Shadow	: Enabled	
C8000-CBFFF Shadow	: Disabled	
CC000-CFFFF Shadow	: Disabled	
D0000-D3FFF Shadow	: Disabled	
D4000-D7FFF Shadow	: Disabled	
D8000-DBFFF Shadow	: Disabled	
DC000-DFFF Shadow	: Disabled	
CPU Support CMPXCHG8B	: Disabled	

Virus Warning

This item protects the boot sector and partition table of your hard disk against accidental modifications. If an attempt is made, the BIOS will halt the system and display a warning message. If this occurs, you can either allow the operation to continue or run an anti-virus program to locate and remove the problem. Note that some diagnostic programs would attempt to access the boot sector table and can cause the virus warning. Disable the Virus Warning feature when this happens.

CPU Internal Cache

This item allows you to enable (speed up memory access) or disable the cache function. By default, these items are *Enabled*.

Quick Power On Self Test

This choice speeds up the Power On Self Test (POST) after you power up the system. If it is set to *Enabled*, BIOS will skip some items.

First/Second/Third Boot Device, Boot Other Device

These fields determine the drives that the system searches for an operating system. The defaults for the boot devices according to sequence are Floppy, HDD-0, LS120 and Enabled.

Swap Floppy Drive

This item allows you to determine whether or not to enable the swap Floppy Drive. When enabled, the BIOS swaps floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A. By default, this field is set to *Disabled*.

Boot Up Floppy Seek

When enabled, the BIOS will seek whether or not the floppy drive installed has 40 or 80 tracks. 360K type has 40 tracks while 760K, 1.2M and 1.44M all have 80 tracks.

Boot Up NumLock Status

This allows you to activate the NumLock function after you power up the system. By default, the system boots up with *NumLock On*.

Typematic Rate Setting

When disabled, continually holding down a key on your keyboard will generate only one instance. When enabled, you can set the two typematic controls listed next. By default, this field is set to *Disabled*.

Typematic Rate (Chars/Sec)

When the typematic rate is enabled, the system registers repeated keystrokes speeds. You can select speed range from 6 to 30 characters per second. By default, this item is set to *6*.

Typematic Delay (Msec)

When the typematic rate is enabled, this item allows you to set the time interval for displaying the first and second characters. By default, this item is set to *250msec*.

Security Option

This field allows you to limit access to the System and Setup. The default value is *Setup*. When you select *System*, the system prompts for the User Password every time you boot up. When you select *Setup*, the system always boots up and prompts for the Supervisor Password only when the Setup utility is called up.

OS Select for DRAM > 64MB

This option allows the system to access greater than 64MB of DRAM memory when used with OS/2 that depends on certain BIOS calls to access memory. The default setting is **NON-OS/2**.

Report No FDD for WIN 95

This option allows Windows 95 to share with other peripherals IRQ6 that is assigned to a floppy disk drive if the drive is not existing. The default setting is *No*.

Video BIOS Shadow

This item allows you to change the Video BIOS location from ROM to RAM. Video Shadow will increase the video speed.

C8000 - CBFFF Shadow/DC000 - DFFFF Shadow

Shadowing a ROM reduces the memory available between 640KB to 1024KB. These fields determine whether or not optional ROM will be copied to RAM.

CPU Support CMPXCHG8B

This field is related to Transmeta Crusoe's supporting Windows XP operating system. To support Windows XP, enable this field. For other operating systems, set this field as *Disabled*.

Integrated Peripherals

This option allows you to determine your hard disk configuration, mode and port.

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Integrated Peripherals

OnChip IDE Channel0	: Enabled	Item Help
OnChip IDE Channel1	: Enabled	Menu Level
IDE Prefetch Mode	: Disabled	
Primary Master PIO	: Auto	
Primary Slave PIO	: Auto	
Secondary Master PIO	: Auto	
Secondary Slave PIO	: Auto	
Primary Master UDMA	: Auto	
Primary Slave UDMA	: Auto	
Secondary Master UDMA	: Auto	
Secondary Slave UDMA	: Auto	
OnChip USB	: Enabled	
AC97 Audio	: Auto	
IDE HDD Block Mode	: Enabled	
Onboard FDD Controller	: Enabled	
Onboard Serial Port 1	: 3F8/IRQ4	
Onboard Serial Port 2	: 2F8/IRQ3	
UART 2 Mode	: Standard	
Onboard Parallel Port	: 378/IRQ7	
Onboard Parallel Mode	: Normal	
Onboard Serial Port 3	: 3E8H	
Serial Port 3 Use IRQ	: IRQ10	
Onboard Serial Port 4	: Disabled	
Serial Port 4 Use IRQ	: IRQ11	
Onboard Parallel Port 2	: Disabled	
Parallel Port 2 Use IRQ	: IRQ11	
Parallel Port 2 Mode	: ECP	
Chip Select Pin	: 240h	

OnChip IDE Channel0/1

These fields enable or disable the first and second IDE channels on board. Each channel supports two IDE devices.

IDE Prefetch Mode

These field enables/disables the prefetch buffers in the PCI IDE controller. The prefetch buffers are used as a temporary storage place as data is transferred from one location to another.

IDE Primary Master/Slave PIO, Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

IDE Primary Master/Slave UDMA, Secondary Master/Slave UDMA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, select Auto to enable BIOS support.

OnChip USB

This field enables/disables the USB function on board.

AC97 Audio

The default setting of *Auto* enables the AC97 audio if it is detected on board.

IDE HDD Block Mode

This option, if enabled, instruct the hard disk to read multiple blocks of data.

Onboard FDD Controller

This should be enabled if your system has a floppy disk drive (FDD) installed and you wish to use it.

Onboard Serial/Parallel Port

These fields allow you to select the onboard serial/parallel port and its address. The default values for these ports are:

Serial Port 1	3F8H/IRQ4
Serial Port 2	2F8H/IRQ3
Serial Port 3	3E8H/IRQ10
Serial Port 4	2E8H/IRQ11
Parallel Port 1	378H/IRQ7
Parallel Port 2	278H/IRQ11

UART 2 Mode Select

This item allows you to determine which Infra Red (IR) function of onboard I/O chip. The options are *Standard*, *IrDA*, and *ASKIR*.

Onboard Parallel Mode

This field allows you to determine parallel port mode function.

Normal	Standard Printer Port
EPP	Enhanced Parallel Port
ECP	Extended Capabilities Port
ECP+EPP	Extended Capabilities Port or Enhanced Parallel Port

Chip Select Pin

This item is used in conjunction with the digital I/O function. The address selectable are 240h, 260h, 280h, and 340h.

Power Management Setup

The Power Management Setup allows you to save energy of your system effectively. It will shut down the hard disk and turn off video display after a period of inactivity.

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Power Management Setup

ACPI Function	Enabled	Item Help
Power Management	User Define	
Video Off Method	Blank Screen	Menu Level
Standby Mode	Disabled	
HDD Power Down	Disabled	
Soft-Off by PBTN	Instant-Off	
Power-Supply Type	ATX	
P' WRON After PWR-Fail	Off	
RI Resume	Disabled	
MODEM Use IRQ	3	
RTC Resume	Disabled	
IRQ Wakeup Events	Press Enter	
VGA	OFF	
LPT & COM	LPT/COM	
HDD & FDD	ON	
PCI master	OFF	

ACPI Function

This field allows you to enable or disable the ACPI (Advanced Configuration Power Interface) function.

Power Management

This field allows you to select the type of power saving management modes. The options are as follows:

Min. Power Saving	Minimum power management
Max. Power Saving	Maximum power management.
User Define (default)	Each of the ranges is from 1 min. to 1hr. Except for HDD Power Down which ranges from 1 min. to 15 min.

Video Off Method

This field defines the Video Off features. There are three options.

V/H SYNC + Blank: blank the screen and turn off vertical and horizontal scanning.

DPMS: allows the BIOS to control the video display card if it supports the DPMS feature.

Blank Screen: This option only writes blanks to the video buffer.

Standby Mode

After the selected period of system inactivity, the fixed disk drive and the video shut off while all other devices still operate at full speed.

HDD Power Down

When enabled, and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

Soft-Off by PWR-BTTN

This field defines the power-off mode when using an ATX power supply. The Instant-Off mode (**default**) allows powering off immediately upon pressing the power button. In the Delay 4 Sec mode, the system powers off when the power button is pressed for more than four seconds or places the system in a very low-power-usage state, with only enough circuitry receiving power to detect power button activity or Resume by Ring activity when pressed for less than 4 seconds.

Power-Supply Type

This field selects the type of power supply used by the system.

PWRON After PWR-Fail

This item allows you to set the system to automatically power on after power returns after the system shut down due to power failure.

RI Resume

Use this field to allow the system to wake-up from standby mode when an incoming modem ring is detected.

Modem Use IRQ

The IRQ used by the modem can be set to *NA*, 3, 4, 5, 7, 9, 10 and 11.

RTC Resume

This disables/enables the wake function activated by a signal from the Real-Time Clock. When enabled, the user can manually input the time (hh:mm:ss) that the system should awaken from suspend mode.

IRQ Wakeup Events

The VGA, LPT & COM, HDD & FDD, and PCI master are I/O events which can prevent the system from entering a power saving mode or can awaken the system from such a mode. When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

PNP/PCI Configuration

This option configures the PCI bus system. All PCI bus systems on the system use INT#, thus all installed PCI cards must be set to this value.

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PnP/PCI Configurations

PNP OS Installed	No	Item Help Menu Level Select Yes if you are using a Plug and Play capable operating system. Select No if you need the BIOS to configure non-boot devices.
Reset Configuration Data	Disabled	
Resources Controlled By	Auto(ESCD)	
PCI/VGA Palette Snoop	Disabled	

PNP OS Installed

Select Yes if the system operating environment is Plug-and-Play aware (e.g., Windows 95). The options: Yes and No.

Reset Configuration Data

Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot. The options: Enabled and Disabled.

Resources Controlled by

The Award Plug and Play BIOS can automatically configure all the boot and Plug and Play-compatible devices. If you select Auto, all the interrupt request (IRQ) and DMA assignment fields disappear, as the BIOS automatically assign them. The options: Auto and Manual.

PCI/VGA Palette Snoop

Enabling this item informs the PCI VGA card to keep silent (and to prevent conflict) when palette register is updated (i.e., accepts data without responding any communication signals). This is useful only when two display cards use the same palette address and plugged in the PCI bus at the same time (such as MPEQ or Video capture). In such case, PCI VGA is silent while MPEQ/Video capture is set to function normally.

PC Health Status

This option configures the PCI bus system. All PCI bus systems on the system use INT#, thus all installed PCI cards must be set to this value.

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PC Health Status

Current CPU Temp.	48°C/118°F	Item Help
Current System Temp.	41°C/105°F	
Current CPU Fan Speed	0 RPM	Menu Level
Current Chassis Fan Speed	0 RPM	
Vcore	1.33V	
2.5V	2.53V	
3.3V	3.39V	
5V	5.10V	
12V	11.82V	

Current CPU/System Temp.

These read-only fields reflect the functions of the hardware thermal sensor that monitors the CPU/system temperatures.

Current CPU Fan / Chassis Fan Speed

These read-only fields show the current speeds in RPM for the CPU fan and chassis fan as monitored by the hardware monitoring function.

Vcore/2.5V/3.3V/5.V/12V

These read-only fields show the current voltages in the voltage regulators and power supply as monitored by the hardware monitoring function.

Load Fail-Safe Defaults

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high-performance features.

Load Optimized Defaults

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.

Supervisor / User Password

These two options set the system password. *Supervisor Password* sets a password that will be used to protect the system and Setup utility. *User Password* sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>. The **Enter Password:** message prompts on the screen. Type the password, up to eight characters in length, and press <Enter>. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

To disable a password, just press the <Enter> key when you are prompted to enter the password. A message will confirm the password to be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

Save & Exit Setup

This option allows you to determine whether or not to accept the modifications. If you type “Y”, you will quit the setup utility and save all changes into the CMOS memory. If you type “N”, you will return to Setup utility.

Exit Without Saving

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing “Y” will quit the Setup utility without saving the modifications. Typing “N” will return you to Setup utility.

LAN Drivers Installation

This section describes LAN features and driver installation of the Intel 82559 Ethernet function.

The following items are covered in this section:

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Introduction

Intel 82559 a 32-bit 10/100Mbps Ethernet controller for PCI local bus-compliant PCs. It supports bus mastering architecture, and auto-negotiation feature that can be used for both 10Mbps and 100Mbps connection.

Making Floppy Disks for NetWare and Windows Installation

You need to use a floppy disk to install the LAN drivers. Use the MAKEDISK.BAT utility located in the \LAN\Intel55X\MAKEDISK directory on the CD.

MAKEDISK [operating system] [destination]

where [operating system] is the OS for which you are creating the diskette, and [destination] is the drive letter and path (such as A:). If no destination is specified, the A: drive will be used.

The possible [operating system] options are:

NT = Microsoft Windows NT
W2K = Microsoft Windows* 2000
W9X = Microsoft Windows* 95 and Windows 98
NW = Novell NetWare servers and clients
DOS = Microsoft DOS and IBM OS2

Make sure you have a 1.44 MB formatted, non-bootable diskette in the floppy drive when using this utility.

NOTE: The utility MUST be run from the \LAN\Intel55X \MAKEDISK directory.

Alternately, you can use the following .BAT files (located in the root directory on this CD) to simplify this process:

MAKEW9X.BAT -- Creates a drivers disk for Windows 95 and Windows 98.

MAKENT.BAT -- Creates a drivers disk for Windows NT.

MAKEW2K.BAT -- Creates a drivers disk for Windows 2000.

MAKENW.BAT -- Creates a drivers disk for Novell NetWare servers and clients.

Installing LAN Drivers for Windows 95

Follow these steps to install the Intel 82559 LAN/Ethernet driver for Windows 95:

1. From the **Control Panel**, double-click the **System** icon.
2. Click the **Device Manager** tab.
3. Double-click **Other Devices** (question mark icon) in the list area.
4. Double-click a PCI Ethernet Controller.
5. Click the **Driver** tab, then click **Update Driver**.
6. Insert the Configuration and Drivers disk or CD in the appropriate drive, and at the Update Device Driver Wizard, select "**No**" and click **Next**.
7. Click **Have Disk**, insert the Configuration and Drivers disk in the appropriate drive, and click **OK**.
8. At the Select Device dialog box, click **OK** again.
9. Follow any prompts for Windows 95 installation disks and restart when prompted.

Note: The Windows 95 system files are typically available on the Windows 95 CD in the win95 directory (D:\win95).

Installing LAN Drivers for Windows 98

Follow these steps to install the Intel 82559 LAN/Ethernet driver for Windows 98:

1. From the **Control Panel**, double-click the **System** icon.
2. Click the **Device Manager** tab.
3. Double-click **Other Devices** or Network Adapters in the list area.
4. Double-click a PCI Ethernet Controller.
5. Click the **Driver** tab, then click **Update Driver**.
6. Click **Next** at the Update Device Driver Wizard.
7. Select "**Display a list of all the drivers...**" and click **Next**.
8. Insert the Intel adapter disk and click **Have Disk**.
9. Enter the appropriate drive for your disk media (A:) and click **OK**.
10. Click **OK** at the Select Device dialog box.
11. The Update Wizard displays the message that it has found the driver. Click **Next**.
12. Click **Finish**.
13. Restart your computer when prompted.

Installing LAN Drivers for Windows NT

Note: It is recommended that you install the latest Service Pack for Windows NT 4.0, available through Microsoft.

Follow the instructions below to configure the Ethernet hardware under Windows NT.

1. Double-click the **Network** icon in the **Control Panel**.
2. Select the **Adapter** tab.
3. Click **Add**. You'll see a list of adapters.
4. Don't select an adapter from this list. Instead, insert the Intel adapter disk or CD into the appropriate drive and click **Have Disk**.
5. Enter the appropriate drive for your disk media (A:) and click **OK**. Then follow the prompts to complete installation. When the adapter is added you'll see a new adapter listed in the Network adapters list.
6. Click **Close** to finish and configure any protocols as prompted.
7. Restart Windows NT when prompted.

Audio Drivers Installation

This chapter describes the VIA 686A audio driver installation process for Windows 98SE and Windows NT. Follow the installation steps below to finish the audio driver installation.

Windows 98SE Audio Driver Installation

1. Insert the driver CD disc to the CD-ROM drive. The CD-ROM autoruns and displays the selections available. Click on **VIA Chips Driver** and the following window appears. Click **VIA 686A PCI Multimedia Audio Driver**.



2. When the **Welcome** screen appears, click **Next** to proceed with the audio driver installation.



3. The **Select Components** window will appear. Click **Next** to install the audio driver.

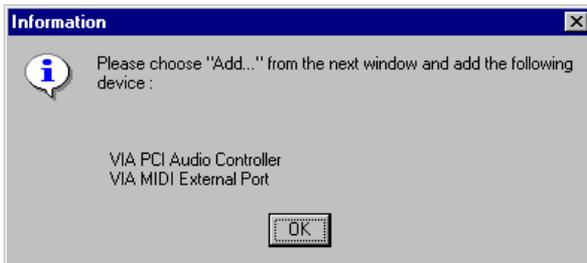


4. After the necessary files are copied, click **Finish** to restart the system.
5. When Windows restarts, the new hardware wizard window will appear. The wizard searches for the drivers for VIA PCI Audio Controller (WDM). Click **Next** to continue.
6. In the next window, select **Search for the best driver for your device (Recommended)**. Click **Next**.
7. Now, select **Specify a location**, then key in location path as **d:\via\via686A\win98\win98se**, assuming that D: is your CDROM drive and the driver CD is in the CDROM. Now, click **Next** → **Next**.
8. When prompted to insert the Windows 98SE CD, do so accordingly and click **OK**. When the screen appears with a message **can't find viaudio.dat**, insert the driver CD into the CDROM and key in the file path as **d:\via\via686a\win98\win98se** and click **Finish**.
9. Restart your computer when prompted for changes to take effect.

Windows NT 4.0 Audio Driver Installation

IMPORTANT: You should install the Windows NT 4.0 Service Pack 4 or higher first before installing the VIA 686A PCI multimedia audio device drivers. If you don't have Windows NT 4.0 Service Pack 4 or higher, please contact your software vendor or download it from Microsoft's web site.

1. Insert the driver CD disc to the CD-ROM drive. The CD-ROM autoruns and displays the selections available. Click on **VIA Chips Driver** and the following window appears. Click **VIA 686A PCI Multimedia Audio Driver**.
2. When the **Welcome** screen appears, click **Next** to proceed with the audio driver installation. The **Select Components** window will appear. Click **Next** to install the audio driver.
3. When the **Information** window appears, click **OK**. Please choose **"Add..."** from the next window and add the following device: VIA PCI Audio Controller and VIA MIDI External Port.



4. After the VIA PCI Audio Controller and VIA MIDI External Port devices are added, you will be asked whether to install the driver for the Microsoft Sidewinder 3D Pro Joystick. Click **No**. You will be prompted to press **"Add..."** from the next window and select **"Microsoft Side winder 3D Pro Joystick"** to install the joystick's driver.



Appendix

A. Post Codes

B. Interrupt Request Lines (IRQ)

A. POST Codes

POST (Power On Self Test) codes are to determine problems during boot up. Below are the codes for your reference.

POST (hex)	Description
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
01h	Expand the Xgroup codes locating in physical address 1000:0
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	1. Disable PS/2 mouse interface (optional). 2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Winbond 977 series Super I/O chips.
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.

POST (hex)	Description
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
16h	Initial Early_Init_Onboard_Generator switch.
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Dh	Initial EARLY_PM_INIT switch.
1Fh	Load keyboard matrix (notebook platform)
21h	HPM initialization (notebook platform)
23h	<ol style="list-style-type: none"> 1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. 3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information. 4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. 5. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
27h	Initialize INT 09 buffer
29h	<ol style="list-style-type: none"> 1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address. 2. Initialize the APIC for Pentium class CPU. 3. Program early chipset according to CMOS setup. Example: onboard IDE controller. 4. Measure CPU speed. 5. Invoke video BIOS.
2Dh	<ol style="list-style-type: none"> 1. Initialize multi-language 2. Put information on screen display, including Award title, CPU type, CPU speed
33h	Reset keyboard except Winbond 977 series Super I/O chips.
3Ch	Test 8254
3Eh	Test 8259 interrupt mask bits for channel 1.
40h	Test 8259 interrupt mask bits for channel 2.
43h	Test 8259 functionality.

APPENDIX

POST (hex)	Description
47h	Initialize EISA slot
49h	<ol style="list-style-type: none"> 1. Calculate total memory by testing the last double word of each 64K page. 2. Program writes allocation for AMD K5 CPU.
4Eh	<ol style="list-style-type: none"> 1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
50h	Initialize USB
52h	Test all memory (clear all extended memory to 0)
55h	Display number of processors (multi-processor platform)
57h	<ol style="list-style-type: none"> 1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.
59h	Initialize the combined Trend Anti-Virus code.
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Dh	<ol style="list-style-type: none"> 1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onboard_AUDIO switch.
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
65h	Initialize PS/2 Mouse
67h	Prepare memory size information for function call: INT 15h ax=E820h
69h	Turn on L2 cache
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Dh	<ol style="list-style-type: none"> 1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".
6Fh	<ol style="list-style-type: none"> 1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM.....
77h	Detect serial ports & parallel ports.
7Ah	Detect & install co-processor

POST (hex)	Description
7Fh	<ol style="list-style-type: none"> 1. Switch back to text mode if full screen logo is supported. <ul style="list-style-type: none"> -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: <ul style="list-style-type: none"> ◆Clear EPA or customization logo.
82h	<ol style="list-style-type: none"> 1. Call chipset power management hook. 2. Recover the text fond used by EPA logo (not for full screen logo) 3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	<ol style="list-style-type: none"> 1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs.
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	<ol style="list-style-type: none"> 1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining
95h	<ol style="list-style-type: none"> 1. Program daylight saving 2. Update keyboard LED & typematic rate
96h	<ol style="list-style-type: none"> 1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on the Embedded Little Board.

Level	Function
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt Cascade
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Parallel Port #2
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Serial Port #3
IRQ11	Serial Port #4
IRQ12	Reserved
IRQ13	80287
IRQ14	Primary IDE
IRQ15	Secondary IDE