IB104+

Transmeta Crusoe TM5400/5800
PC/104-Plus CPU Module

USER'S MANUAL

Version 1.0A

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Introduction

Product Description

The IB104+ is a high-performance PC/104 Plus CPU module that supports Transmeta Crusoe TM5400/5800 processor with CPU clock up to 800MHz. 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.

The IB104+ packs all the functions of a versatile system, including C&T 69000 VGA and Intel 82559 single chip Ethernet. System memory is provided by one SODIMM socket that accommodates up to 256MB SDRAM.

The Award BIOS facilitates easy system configuration and peripheral setup.

Remarks: In installing the PC/104 Plus CPU board into a chassis, it is recommended that the CPU board be placed on the topmost level of the PC/104 board layers. The chassis environment should be designed in such a way that there is good airflow to ventilate the system.

Checklist

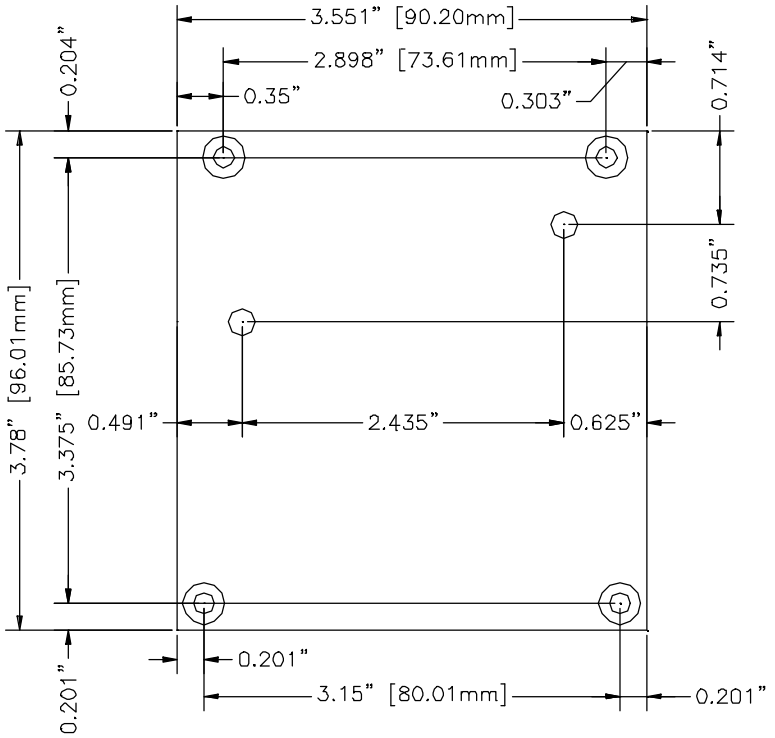
Your IB104+ package should include the items listed below. Damaged or missing items should be reported to your supplier.

- The IB104+ Transmeta Crusoe PC/104 Plus CPU Module
- This User's Manual
- One compact disc containing the following:
  - C&T 69000 VGA Drivers
  - Intel 82559 Ethernet Drivers
- Optional cable kit that contains:
  - 1 x USB cable
  - 1 x Keyboard/Mouse cable
  - 1 x LAN cable
  - 1 x parallel port cable
  - 2 x RS232 cable
  - 1 x IDE cable

Specifications

Product Name	IB104+
Form Factor	PC104 PLUS
CPU Type	TM5400/TM5800
CPU Voltage	0.9~1.6V
System Speed	800MHz/533MHz
Front Side Bus	66Mhz
Green /APM	APM1.2
Chipset	Transmeta Crusoe TM5800/5400 474 pin BGA VIA 686A/B South-bridge
BIOS	Award BIOS, 2Mbit support ACPI function
Cache	CPU integrated
Memory	SO-DIMM SDR 3.3V DIMM Socket x1
VGA	C&T69000 2MB embedded, for CRT and TTL LCD panel
LAN	Intel 82559 single chip Ethernet controller 10/100 BaseT support, full duplex, 2x4 2mmx2mm header pin-out connector spec to be provided by TMTA
Super I/O	VIA 686A/B integrated: COM1, COM2 (2.54mm 2x5 Rt. pin header)., FDC (ZIF Flex Slim type) 2.88MB (3 Mode Support), Parallel (2.54mm 2x13 Rt.angle pin header)
RTC/CMOS	VIA 686A/B integrated
Temperature Sensor	VIA 686A/B integrated
Keyboard Controller	VIA 686A/B integrated
IDE	VIA 686A/B integrated, IDE1 44-pin 2mm EIDE (Note: Match ref.PC104 vertical 2x22 pin 2mm header)
FDD	26-pin connector for slim type FDD connector
USB	Supports 1 USB port (1x4 pin header check reference PC104 for pitch)
Keyboard Connector	PS/2 (2.54mm pin header)
Power	5V only (Card operates at 5V only, but allows 12V to pass thru to other boards.
Watchdog Timer	32 levels
Dimensions	95x90mm (see PC104+ spec)
Power Supply Connector	5V, 12V, -5V, -12V, BAT,GND

Board Dimensions



Installations

This section provides information on how to use the jumpers and connectors on the IB104+ in order to set up a workable system. The topics covered are:

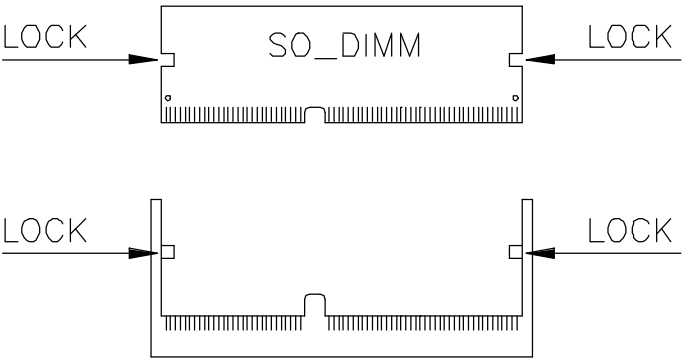
Installing the Memory (SODIMM)

The IB104+ has a 144-pin SODIMM socket. The SODIMM socket supports a maximum total memory of 256MB in SDRAM single side type. The memory capacities supported are 64MB, 128MB and 256MB.

Installing and Removing DIMMs

To install the SODIMM, locate the memory slot on the CPU module and perform the following steps:

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



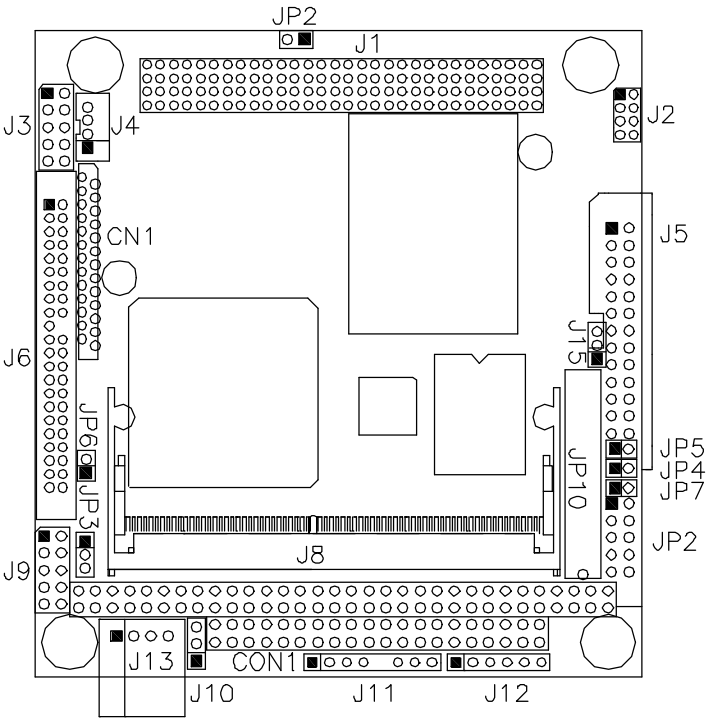
Top View of SODIMM Socket

Note: Please use 64MB and 128MB memory modules with 8M x 16 bit SDRAM. For 256MB memory support, please contact the manufacturer for more information.

Jumpers and Connector on IB104+

Jumpers are used on the IB104+ 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 IB104+ and their respective functions.

Jumper and Connector Locations on IB104+



CON1A & CON1B: PC/104 Connector
CN1: Floppy Drive Connector
JP2: VGA CRT Connector
J2: LAN Connector
JP3: Clear CMOS Content
J4: USB Connector
JP4: Speaker Connector
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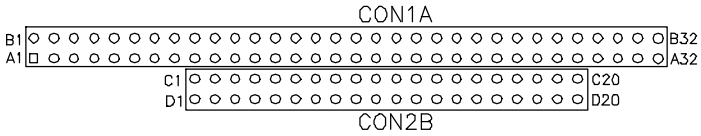
J13: Power Connector
J15: Panel Power Select

CON1A & CON1B: PC/104 Connector

CON1A and CON1B are dual-in-line pin headers that support PC-104 modules. CON1A consists of 64 pins and CON2B has 40 pins.

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	GND	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				

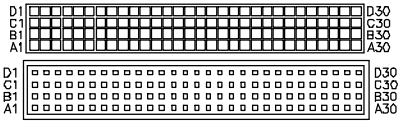


PC/104-Plus Bus Signal Assignments

J3/P3				
Pin	**A**	**B**	**C**	**D**
1	GND/5.0V KEY²	Reserved	+5	AD00
2	VI/O	AD02	AD01	+5V
3	AD05	GND	AD04	AD03
4	C/BE0*	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3V	C/BE1*	AD15	+3.3V
9	SERR*	GND	SB0*	PAR
10	GND	PERR*	+3.3V	SDONE
11	STOP*	+3.3V	LOCK*	GND
12	+3.3V	TRDY*	GND	DEVSEL*
13	FRAME*	GND	IRDY*	+3.3V
14	GND	AD16	+3.3V	C/BE2*
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3*	VI/O	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0*	GND	REQ1*	VI/O
24	GND	REQ2*	+5V	GNT0*
25	GNT1*	VI/O	GNT2*	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND
28	GND	INTD*	+5V	RST*
29	+12V	INTA*	INTB*	INTC*
30	-12V	Reserved	Reserved	GND/3.3V KEY²

* The shaded area denotes power or ground signals.

* The KEY pins are to guarantee proper module installation. Pin-A1 will be removed and the female side plugged for 5.0V I/O signals and Pin-D30 will be modified in the same manner for 3.3V I/O. It is recommended that both KEY pins (A1 and D30) be electrically connnected for GND for shielding.



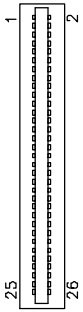
PC/104 Bus Signal (Reference Only)

J2/P2		
Pin	**Row D**	**Row C**
0	GND	GND
1	MEMCS16*	SBHE*
2	IOCS16*	LA23
3	IRQ10	LA22
4	IRQ11	LA21
5	IRQ12	LA20
6	IRQ15	LA19
7	IRQ14	LA18
8	DACK0*	LA17
9	DRQ0	MEMR*
10	DACK5*	MEMW*
11	DRQ5	SD8
12	DACK6*	SD9
13	DRQ5	SD10
14	DACK7*	SD11
15	DRQ7	SD12
16	+5V	SD13
17	MASTER*	SD14
18	GND	SD15
19	GND	KEY

J1/P1		
Pin	**Row A**	**Row B**
1	IOCHCHK*	GND
2	SD7	RESETDRV
3	SD6	+5V
4	SD5	IRQ9
5	SD4	-5V
6	SD3	DRQ2
7	SD2	-12V
8	SD1	ENDXFR*
9	SD0	+12V
10	IOCHRDY	KEY
11	AEN	SMEMW*
12	SA19	SMEMR*
13	SA18	IOW
14	SA17	IOR
15	SA16	DACK3*
16	SA15	DRQ3
17	SA14	DACK1*
18	SA13	DRQ1
19	SA12	REFRESH*
20	SA11	SYSCLK
21	SA10	IRQ7
22	SA9	IRQ6
23	SA8	IRQ5
24	SA7	IRQ4
25	SA6	IRQ3
26	SA5	DACK2*
27	SA4	TC
28	SA3	BALE
29	SA2	+5V
30	SA1	OSC
31	SA0	GND
32	GND	GND

CN1: Floppy Drive Connector

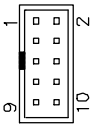
CN1 of the IB104+ is a slim 26-pin connector and will support up to 2.88MB FDD.



Signal Name	Pin #	Pin #	Signal Name
VCC	1	2	INDEX
VCC	3	4	DRV_SEL
VCC	5	6	DSK_CH
NC	7	8	NC
NC	9	10	MOTOR
DINST	11	12	DIR
NC	13	14	STEP
GND	15	16	WDATA
GND	17	18	EGATE
GND	19	20	TRACK
NC	21	22	WPROT
GND	23	24	RDATA
GND	25	26	SIDE

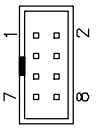
JP2: VGA CRT Connector

The pin assignments of the VGA CRT connector are as follows:



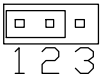
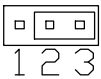
Signal Name	Pin	Pin	Signal Name
Red	1	2	Hsync
Green	3	4	Ground
Blue	5	6	Vsync
Ground	7	8	Ground
Ground	9	10	No connect

J2: LAN Connector



Signal Name	Pin	Pin	Signal Name
TX+	1	2	TX-
RX+	3	4	Ground
Ground	5	6	RX-
Ground	7	8	Ground

JP3: Clear CMOS Content

JP3	Setting	Function
	Pin 1-2 Short/Closed	Normal Operation
	Pin 2-3 Short/Closed	Clear CMOS Content

J4: USB Connector

Pin	Signal Name
1	Vcc
2	DT-
3	DT+
4	Ground

JP4: Speaker Connector

JP4 is the 2-pin connector for a 5V speaker.

Pin	Signal Name
1	Speaker
2	Vcc

JP5: Reset Connector

JP5 is the 2-pin connector for the reset button.

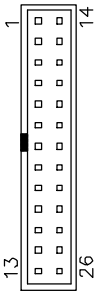
Pin	Signal Name
1	Reset
2	Ground

JP6: External Battery Connector

JP6 is the 2-pin connector for an external 3.3V battery.

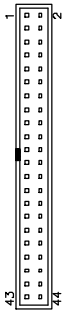
Pin	Signal Name
1	3.3V (VBAT)
2	Ground

J5: Parallel Port 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

J6: IDE Connector



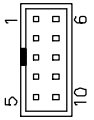
Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground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

JP7: Power LED Connector

JP7 is the 2-pin connector for the power LED.

Pin	Signal Name
1	Ground
2	Power LED

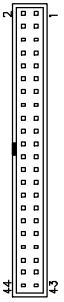
J9, J3: COM1 and COM2 Connectors



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.

JP10: LCD Panel Connector

IB104+ supports a C&T 69000 VGA controller and uses JP10 as the LCD panel interface. The 44-pin connector has 1.27 x 1.27mm pitch.



Signal Name	Pin #	Pin #	Signal Name
GND	1	2	GND
5V or 3.3V	3	4	FPVEE
5V or 3.3V	5	6	GND
5V or 3.3V	7	8	GND
FPVDD	9	10	GND
P0	11	12	P1
P2	13	14	P3
P4	15	16	P5
P6	17	18	P7
P8	19	20	P9
GND	21	22	P11
P10	23	24	GND
P12	25	26	P13
P14	27	28	P15
P16	29	30	P17
P18	31	32	P19
P20	33	34	P21
P22	35	36	P23
GND	37	38	GND
SHFCLK	39	40	FLM(V SYNC)
DE	41	42	LP(H SYNC)
GND	43	44	ENABKL

Flat Panel Display Interface Pin Descriptions

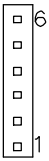
	Mono	Mono	Mono	Color	Color	Color	Color	Color	Color	Color	Color	Color
	SS	DD	DD	TFT	TFT	TFT	TFT	TFT+HR	STN-SS	STN-SS	STN-DD	STN-DD
Pin Name	8-bit	8-bit	16-bit	9/12/16 bit	18/24 bit	36-bit	18/24 bit	8-bit (4bP)	16-bit (4bP)	8-bit (4bP)	16-bit (4bP)	24-bit
P0	D0	UD3	UD7	B0	B0	FB0	FB0	R1	R1	UR1	UR0	UR0
P1	D1	UD2	UD6	B1	B1	FB1	FB1	B1	G1	UG1	UG0	UG0
P2	D2	UD1	UD5	B2	B2	FB2	FB2	G2	B1	UB1	UB0	UB0
P3	D3	UD0	UD4	B3	B3	FB3	FB3	B3	R2	UB2	UR1	LR0
P4	D4	LD3	UD3	B4	B4	FB4	SB0	G4	G3	LR1	LR0	LG0
P5	D5	LD2	UD2	G0	B5	FB5	SB1	R5	B2	LG1	LG0	LB0
P6	D6	LD1	UD1	G1	B6	SB0	SB2	B5	R3	LB1	LB0	UR1
P7	D7	LD0	UD0	G2	B7	SB1	B3		G3	LR2	LR1	UG1
P8			LD7	G3	G0	SB2	FG0		B3		UG1	UB1
P9			LD6	G4	G1	SB3	FG1		R4		UB1	LR1
P10			LD5	G5	G2	SB4	FG2		G4		UR2	LG1
P11			LD4	R0	G3	SB5	FG3		B4		UG2	LB1
P12			LD3	R1	G4	FG0	SG0		R5		LG1	UR2
P13			LD2	R2	G5	FG1	SG1		G5		LB1	UG2
P14			LD1	R3	G6	FG2	SG2		B5		LR2	UB2
P15			LD0	R4	G7	FG3	SG3		G6		LG2	LR2
P16					R0	FG4	FR0					LG2
P17					R1	FG5	FR1					LB2
P18					R2	SG0	FR2					UR3
P19					R3	SG1	FR3					UG3
P20					R4	SG2	SR0					LR3
P21					R5	SG3	SR1					LG3
P22					R6	SG4	SR2					LB3
P23					R7	SG5	SR3					
P24						FR0						
P25						FR1						
P26						FR2						
P27						FR3						
P28						FR4						
P29						FR5						
P30						SR0						
P31						SR1						
P32						SR2						
P33						SR3						
P34						SR4						
P35						SR5						
SHFCLK	SHFCLK	SHFCLK	SHFCLK	SHFCLK	SHFCLK	SHFCLK	SHFCLK	SHFCLK	SHFCLK	SHFCLK	SHFCLK	SHFCLK
Pixels/Clk:	8	8	16	1	1	2	2	2-2/3	5-1/3	2-2/3	5-1/3	8

J10: Power Connector

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

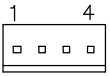
J11: For Testing Use Only

J12: Keyboard/Mouse Connector



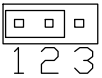
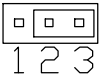
Pin #	Signal Name
1	Keyboard Data
2	Keyboard Clock
3	Mouse Data
4	Mouse Clock
5	Ground
6	Vcc

J13: Power Connector



Pin	Signal Name
1	+12V
2	Ground
3	Ground
4	Vcc

J15: Panel Power Select

J15	Setting	Power
	Pin 1-2 Short/Closed	3.3V (Default)
	Pin 2-3 Short/Closed	5V

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 watchdog timer has 32 levels. Therefore, the data bit starts from 0 to 4.
The following describes how the timer should be programmed.

Enabling Watchdog:
MOV AX, 001FH (Choose the values from 0)
MOV DX, 0443H
OUT DX, AX

Disabling Watchdog
MOV AX, 01FH (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 the IB104+ CPU module. The topics covered in this section are as follows:

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 <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> 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.

Phoenix - AwardBIOS CMOS Setup Utility

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

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features

Date (mm:dd:yy)	: Thu, May 18 2000	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 in.]	
Drive B	[None]	
Video	[EGA/VGA]	
Halt On	[All, but keyboard]	
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	1.2MB	720KB	1.44MB	2.88MB
5.25 in.	5.25 in.	3.5 in.	3.5 in.	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.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features

Virus Warning	**: Disabled**	Item Help
CPU Internal Cache	: Enabled	
Quick Power On Self Test	: Enabled	Menu Level
First Boot Device	: Floppy	
Second Boot Device	: HDD-0	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.
Third Boot Device	: CDROM	
Boot Other Device	: Enabled	
Swap Floppy Drive	: Disabled	
Boot Up Floppy Seek	: Disabled	
Boot Up Numlock Status	: On	
Typematic Rate Setting	: Disabled	
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	
Small Logo (EPA) Show	: Enabled	

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 default for the boot devices according to sequence are Floppy, HDD-0 and CDROM.

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

This controls whether or not the system will display an error message if no Floppy drive is detected.

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***.

Small Logo (EPA) Show

This field enables the showing of the EPA logo located at the upper right of the screen during boot up.

Integrated Peripherals

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

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals

OnChip IDE Channel0	: Enabled	Item Help
OnChip IDE Channel1	: Enabled	Menu Level
IDE Prefetch Mode	: Enabled	
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	
USB Keyboard Support	: Disabled	
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	

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 and 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 and 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.

On-Chip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately.

OnChip USB

This field enables/disables the USB function on board.

USB Keyboard Support

If you are using a USB keyboard, enable this field.

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;
Parallel Port - 378H/IRQ7

UART 2 Mode

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

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.

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup

Power Management	User Define	
Video Off Method	DPMS Supports	Menu Level
Standby Mode	Disabled	
HDD Power Down	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	

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.

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.

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

PNP OS Installed	No	Item Help
Reset Configuration Data	Disabled	
		Menu Level
Resources Controlled By	Manual	
IRQ Resources	Press Enter	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.
DMA Resources	Press Enter	
PCI/VGA Palette Snoop	Disabled	

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

IRQ-3 assigned to	Legacy ISA	Item Help
IRQ-4 assigned to	Legacy ISA	
IRQ-5 assigned to	PCI/ISA PnP	Menu Level
IRQ-7 assigned to	Legacy ISA	
IRQ-9 assigned to	PCI/ISA PnP	Legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PnP for devices compliant with the Plug and Play standard whether designed for architecture
IRQ-10 assigned to	PCI/ISA PnP	
IRQ-11 assigned to	PCI/ISA PnP	
IRQ-12 assigned to	PCI/ISA PnP	
IRQ-14 assigned to	PCI/ISA PnP	

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

DMA-0	PCI/ISA PnP	Item Help
DMA-1	PCI/ISA PnP	
DMA-3	PCI/ISA PnP	Menu Level
DMA-5	PCI/ISA PnP	
DMA-6	PCI/ISA PnP	Legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PnP for devices compliant with the Plug and Play standard whether designed for architecture
DMA-7	PCI/ISA PnP	

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.

Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status

CPU Warning Temperature	Disabled	Item Help
Current CPU Temp.	48°C/118°F	Menu Level
Current System Temp.	41°C/105°F	
Vcore	1.33V	
2.5V	2.53V	
3.3V	3.39V	
5V	5.10V	
12V	11.82V	

CPU Warning Temperature

This field sets the temperature threshold that when reached, the system would give an audible warning.

Current CPU / System Temperature

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

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.

Set Password

This option sets a password that will be used to protect the system and Setup utility. 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.

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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:

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 it 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.

VGA Drivers Installation

This section provides information on how to install the VGA drivers. Please follow the instructions set forth in this section carefully. Please note that there must be relevant software installed in your system before you could proceed to install the VGA drivers.

The following items are covered in this section:

Installing the Drivers for Windows 95/98

The following section describes the normal display driver installation procedures for Windows 95/98. Use the following procedures when installing the display drivers for Windows 95/98.

1. Click **Start**, then **Settings**, then **Control Panel**.
2. Double click **Display**.
3. Select the **Settings** tab, click the **Change Display Type** button.
4. Click the **Change** button under **Adapter Type**.
5. Click the **Have Disk** button and press **OK**.
6. Specify the path to the new driver and press **<ENTER>**:

Example 1: Insert the driver CD in the CD-ROM drive, and enter d:\vga\ct69000\win95 (assuming D: is the CD-ROM drive.)

Example 2: If you're not sure exactly where the drivers are, click the **Browse** button to find them.

7. The *Select Device* dialog box will appear. Select the hardware that corresponds to the one you installed in your machine and click **OK**.
8. Windows 95/98 will copy the display drivers to the proper directories on your system.
9. Continue by choosing **Close**. You will be asked to restart your machine. Do so accordingly.
10. After the system has restarted, you can go back into the **Display** applet and select alternate screen resolutions and color depths.

Installing the Drivers for Windows NT 4.0

Once you are in the Windows NT 4.0 environment, follow the procedures below to install the VGA drivers that come with the package.

1. Click the **Start** button, then go to **Settings** and click on **Control Panel**.
2. Click on the **Display** icon to start the *Display Properties* window.
3. Click on the **Settings** tab, and then click on **Display Type**.
4. In the *Change Display Type* window, click on **Change Adapter Type**. This will bring up the *Select Device* window.
5. In the *Change Display* window, click on **Have Disk**. Enter the directory where the Windows NT driver files are located as **d:\vga\ct69000\winnt40** (assuming D: is the CD-ROM drive.) Then select **OK**, or press **ENTER**.
6. Select **Chips Video Accelerator** from the display list provided, then click **OK** or press **ENTER**.
7. You will then see a warning panel about Third Party Drivers. Click on **Yes** to finish the installation.
8. Once the installation is complete, the system must be shut down and restarted for the new drivers to take effect.
9. When the system has restarted, the default graphics mode (usually 640x480x256color) has been automatically selected. Click the **Start** button, and then go to **Settings** and click on **Control Panel**. Click on the **Display** icon to start the *Display Properties* window. Click on the **Settings** tab. A new screen setting can be selected using either of the following methods:
    A. Use the slide-bar in the Desktop Area to select new setting.
    B. Click on **List All Modes**. From the list provided, select a new setting, then click **OK** or press **ENTER**.
    C. Click on **Test** to test the newly selected graphics mode. Follow the instructions given on screen. A test screen should appear, followed by the *Testing Mode* window. Click on **Yes** to continue. Click on **Apply** to switch to the new graphics mode. Graphics modes are changed dynamically on NT 4.0, so you do not need to shut down and restart for the new screen settings to work.

Appendix

A. 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 CPU module.

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