ROBO-678

Single Board Computer

User's Manual

P/N : 861106780029 Version 1.0

EC Declaration of Conformity

(To Be Added)

For the following equipment :

Product Name :

Model Name :

Trade Name :

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive (89/336/EEC). The equipment was evaluated and passed the test, the following standards were applied :

EMC :	EN 55022	(1994/A1:1995 Class A)
	EN 50082-2	(1995)
	EN 61000-4-2	(1995)
	EN 61000-4-3	(1996)
	EN 61000-4-4	(1995)

The following manufacturer is responsible for this declaration :

Portwell Inc.

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Taipei, R.O.C.	Oct. 29,1998	
Place	Date	Legal Signature of Authorized Person

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Chapter 5. Troubleshooting

How to Use This Manual

The manual describes how to configure your ROBO-678 system to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Board Computer.

Chapter 1 : Introduction. presents what you have in the inside of box and give you an overview of the product specifications and basic system architecture for this model of single board computer.

Chapter 2 : Hardware Configuration Setting. shows the definitions and locations of Jumpers and Connectors that you can easily configure your system.

Chapter 3 : System Installation. describes how to properly mount the CPU, main memory and M-systems flash disk to get a safe installation and give you a programming guide of Watch Dog Timer function.

Chapter 4 : BIOS Setup Information. specifies the meaning of each setup parameters and how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give you a guide of trouble-shooting.

Chapter 5 : Troubleshooting. gives you a few reminding hints in building up a valid and working system with ROBO-678, in terms of hardware and software perspective. Issues addressed are based on the customer application history collected throughout the years, and are presented as the most frequently encountered problems.

The content of this manual and EC declaration document is subject to change without prior notice. These changes will be incorporated in new editions of the document. **Portwell** may make supplement or change in the products described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site :

http://isc.portwell.com.tw

CHAPTER 1

Introduction

The ROBO-678 all-in-one single board computer is designed to fit a high performance Celeron/Pentium-III based CPU and compatible for high-end computer system with PCI Local Bus architecture. It is made to meet today's demanding pace, and keep complete compatibility with hardware and software designed for the IBM PC/AT. It's beneficial to build up a high performance system for VARs, or system integrators. The on-board 3D Graphics display, and fast Ethernet interface will bring full functionality and high performance to all segments of the PC market.

This single board computer runs with Intel Celeron/Pentium-III (PPGA370 or FC-PGA370) processor, and support DIMM up to 512 MB SDRAM. The enhanced on-board PCI IDE interface can support 4 drives up to PIO mode 4 timing and Ultra DMA/33/66/100 synchronous mode feature. The on-board Super I/O Chipset integrates one floppy controller, two serial ports, one keyboard controller, one hardware monitor, one IrDA port and one parallel port. Two high performance 16C550-compatible UARTs provide 16-byte transmit/receive FIFOs, and the multi-mode parallel port supports SPP/EPP/ECP function. Besides, two USB (Universal Serial Bus) ports provide high-speed data communication between peripherals and PC.

The PICMG standard makes the ROBO-678 work with the legacy ISA, ISA/PCI or multi-slots PCI-bus backplane. The on-board 32-pin DIP socket supports M-systems DiskOnChip 2000 product up to 288MB. The Watch-Dog Timer function can monitor your system status. One 6-pin Mini-DIN connector (with Y-Cable) is provided to connect PS/2 Mouse and Keyboard. The on-board Flash ROM is used to make the BIOS update easier. A standard 5-1/4" drive power connector is reserved to directly get more power energy for big power applications, and the additional 5-pin shrouded connector is reserved for connecting Keyboard interface on the backplane. The high precision Real Time Clock/calendar is built in to support Y2K for accurate scheduling and storing configuration information. One 4-pin header

is designed to support ATX power function. All of these features make ROBO-678 excellent in stand-alone applications.

1-1 Check List

The ROBO-678 package should cover the following basic items accompany with this manual.

- One ROBO-678 single board computer
- One Parallel port cable kit
- One serial port cable to support two interfaces
- One FDC cable
- One IDE cable
- One 10-pin cable kit for VGA port
- One Y-Cable cable for PS/2 Keyboard and Mouse
- One 5-pin to 5-pin keyboard cable for backplane connection
- One 4-pin ATX power control cable for backplane connection
- One CD-Title ROBO-678 to support Intel 82815 GMCH VGA display, Intel 82559 and 82801BA MAC 10/100Base-T fast Ethernet driver

If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

1-2 Product Specifications

- **Main processor**
  Intel Celeron and Pentium-III processors
  - ◆ CPU bus frequency : 66/100/133 MHz
  - ◆ CPU core/bus clock ratio : x2 to x8
  - ◆ Standard socket 370 for PPGA370 and FC-PGA370 CPU

- **BIOS**
  Award system BIOS with 4MB Firmware Hub to support DMI, PnP, APM , and ACPI

- **Main Memory**
  Two 168-pin DIMM sockets, supporting PC133/PC100 SDRAM up to 512MB (No ECC and Registered DIMM Support)

- **L2 Cache Memory**
  128KB L2 Cache built in Celeron and 256KB in Pentium-III processor

- **Chipset**
  Intel 815E Chipset

- **Bus Interface**
  Follow PICMG 2.0 standard (32-bit PCI and 16-bit ISA)
  Fully complies with PCI Local Bus specification V2.1 (support 4 master PCI slots)

- **PCI IDE Interface**
  Support two enhanced IDE ports up to four HDD devices with PIO mode 4 and Ultra DMA/33/66/100 mode transfer and Bus Master feature

- **Floppy Drive Interface**
  Support one FDD port up to two floppy drives and 5-1/4"(360K, 1.2MB), 3-1/2" (720K, 1.2MB, 1.44MB, 2.88MB) diskette format and 3-mode FDD

- **Serial Ports**
  Support two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs

- **IR Interface**
  Support one 6-pin header for serial Standard Infrared wireless communication

- **Parallel Port**
  Support one parallel port with SPP, EPP and ECP modes

- **USB Interface**
  Support two USB (Universal Serial Bus) ports for high speed I/O peripheral devices

- **PS/2 Mouse and Keyboard Interface**
  Support one 6-pin Mini-DIN connector and one 5-pin shrouded connector for PS/2 mouse/keyboard connection through Y-Cable and backplane connection

- **ATX Power Control Interface**
  One 4-pin header to support ATX power control with Modem Ring-On and Wake-On-LAN function

- **Auxiliary I/O Interfaces**
  System reset switch, external speaker, Keyboard lock and HDD active LED

- **Real Time Clock/Calendar (RTC)**
  Support Y2K Real Time Clock/calendar with battery backup for 7-year data retention

- **Watchdog Timer**
  Support 255 intervals from 0.5 sec./min. to 254.5 sec./min. by software programming

- **Disk-On-Chip (DOC) Feature**
  Reserved one 32-pin socket for M-systems Flash Disk up to 288MB
  DOS, Windows, Win95, NT(bootable) drivers and Utility supported

- **On-board VGA**
  Intel 82815 GMCH integrated graphics controller with 4MB memory

- **On-board Ethernet LAN**
  Support dual Ethernet utilizes Intel 82559 Fast Ethernet Controller and Intel 82801BA ICH2 integrated LAN controller to support RJ-45 interface at 10/100 Base-T speed

- **On-board 68-pin PCI device connector**
  Support one additional PCI device daughter board

- **High Driving Capability**
  Support 64mA high driving capability for multi-slots ISA-bus

- **External Power Connector**
  Support one standard 5-1/4" disk drive power connectors to enhance power driving

- **Power Good**
  On-board power good generator with reset time, 300ms ~ 500ms

- **CPU Cooling Fan**
  Support two 3-pin headers with wafer

- **System Monitoring Feature**
  Monitor CPU and system temperature, operating voltage, and fan status

- **Bracket**
  Support one Mini-DIN, two-port USB, dual Ethernet port

- **Physical and Environmental Requirements**
  - ◆ Outline Dimension (L X W) : 338.5mm (13.27") X 121.5mm (4.78")
  - ◆ PCB layout : 6 layer
  - ◆ Power Requirements : +5V @7A (typ.), +12V @200mA, -12V @30mA
  - ◆ Operating Temperature : 0°C ~ 60°C (32°F ~ 140°F)
  - ◆ Storage Temperature : -20°C ~ 80°C
  - ◆ Relative Humidity : 5% ～ 95%, non-condensing

1-3 System Architecture

The following illustration of block diagram will show you how ROBO-678 gives you a highly integrated system solution. The most up-to-date system architecture of ROBO-678 includes two main VLSI chips, 82815 GMCH (Graphics and Memory Controller Hub) and 82801BA ICH2 (I/O Controller Hub), to support Celeron/Pentium-III processor, SDRAM, 3D graphic display, PCI bus interface, APM, ACPI compliant power management, USB port, SMBus communication, and Ultra DMA/33/66/100 IDE Master. The on-board super I/O chip, W83627HF, will support PS/2 Keyboard/Mouse, two UARTs, FDC, Hardware Monitor, Parallel, Watch Dog Timer and Infrared interface. Besides, two on-board LAN devices will give user more flexibility and reliability of application in a highly-integrated environment.

The CPU socket adopts the Socket-370 type to support high availability and reliability, and easy operation in general industry application.

The 82815 Hub provides an integration of memory controller and graphics capability (AGP). This delivers AGP class graphics performance to PCs at reduced cost. It dynamically allocates and de-allocates system memory for complex 3D textures, preserving the benefits of standard AGP add-in solutions. Its 64-bit AGTL+ based host bus interface, optimized 64-bit DRAM interface supports two 3.3V DIMMs at the maximum bus frequency of 100/133 MHz. The 32-bit PCI bus interface supports 4 PCI masters for external backplane support.

The 82801BA Hub employs the Accelerated Controller Hub architecture which makes a direct connection from the graphics and memory to IDE controllers. It supports 2-channel dedicated Ultra DMA-33/66/100 IDE master interfaces, full Plug-and-Play compatibility, APIC (Advanced Programmable Interrupt Controller) interface, and internal real-time clock (RTC) to maintain time and date of a system. It also supports 2-port USB (Universal Serial Bus feature) and PCI 2.1 Compliance operation. It fully supports Operating System Directed Power Management via the Advanced Configuration and Power Interface (ACPI) specification. In addition, it is also linked via Firmware Hub Link bus to 82802AB Firmware Hub to support BIOS read/write access. Through the PCI bus, PC87200 PCI-to-ISA bridge is built in as a highly integrated PCI-to-ISA bridge solution for the best industry application.

The Super I/O chip W83627HF integrates two high-speed serial ports, one parallel port, SIR interface, Watch Dog Timer (WDT) which is enabled by jumper setting and triggered by software, H/W monitoring, FDD interface and 8042 keyboard controller with PS/2 mouse ports. This parallel port supports one PC-compatible printer port (SPP, bi-direction), Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP).

The PCI-to-ISA bridge supports a standard 16-bit ISA bus interface which is applied for all slower I/O operations. In ROBO-678, it supports DiskOnChip (DOC) for M-systems Flash disk, and ISA buffer driving for special I/O applications and multi-ISA slots.

Besides, an advanced feature is used on ROBO-678 to support detecting and monitoring of system temperature, operating voltage and fan status.

The 82802 Firmware Hub stores system BIOS and video BIOS, eliminating a redundant, nonvolatile memory component.

There are two on-board PCI Fast Ethernet via RJ-45 Ports to support full functionality of ROBO-678 AIO SBC (All-In-One Single Board Computer). The on-board 68-pin PCI connector supports additional daughter board for further support.

The graphic device is the 815E built-in Graphics Controller to support high end of graphics accelerator. It is implemented by high performance SDRAM 4MB to support color depths and high resolution up to 1600 x 1200 with 256 colors.

All of details of operating relations are shown in Figure 1-1 ROBO-678 System Block Diagram.

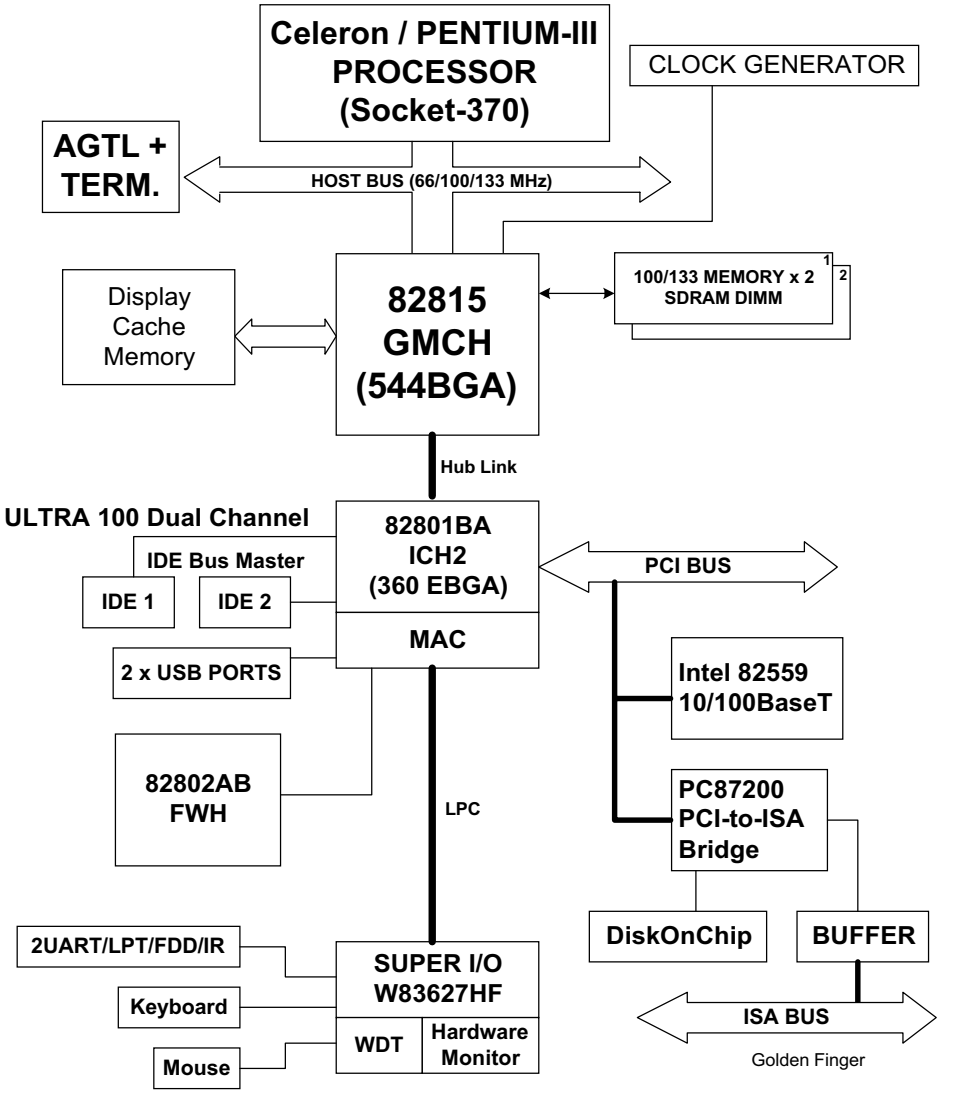


Figure 1-1 ROBO-678 System Block Diagram

CHAPTER 2

Hardware Configuration Setting

This chapter gives the definitions and shows the positions of jumpers, headers and connectors. All of the configuration jumpers on ROBO-678 are in the proper position. The default settings shipped from factory are marked with a star (★).

2-1 Jumpers

In general, jumpers on the single board computer are used to select options for certain features. Some of the jumpers are designed to be user-configurable, allowing for system enhancement. The others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (Short) or remove (NC) it from the jumper pins according to the following instructions. Here NC stands for "Not Connected". (**Figure 2-1**)

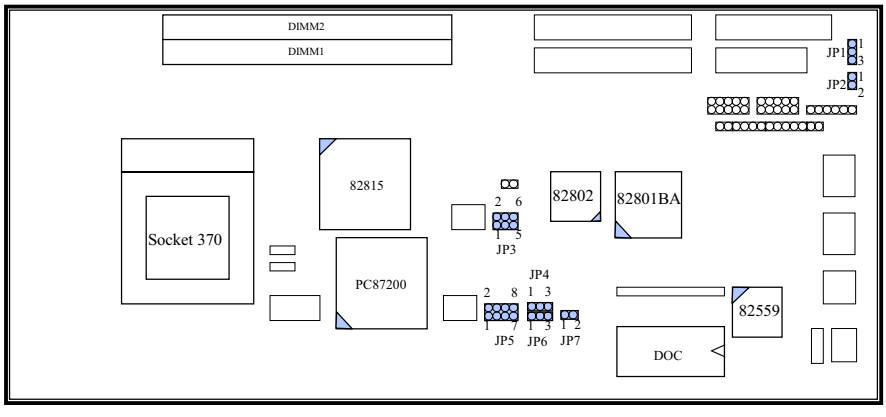


Figure 2-1 ROBO-678 Jumper Locations

Disk-On-Chip Jumper Setting (JP5)

Memory Address Space	JP5
D8000 – D9FFF	1-2 ★
DA000 - DBFFF	3-4
DC000 - DDFFF	5-6
DE000 - DFFFF	7-8

RTC CMOS Clear Jumper Setting (JP1)

JP1	Function
1-2	Normal Operation ★
2-3	Clear CMOS Contents

AT/ATX Power Selection (JP3)

JP3	Function
3-5, 4-6	Select ATX Power Supply ★
1-3, 2-4	Select AT Power Supply

On-board Ethernet1 (82559) enable/disable (JP6)

JP6	Function
1-2	On-board Ethernet1 Enabled ★
2-3	On-board Ethernet1 Disabled

On-board Ethernet2-PHY (82562ET) enable/disable (JP4)

JP4	Function
1-2	On-board Ethernet2-PHY Enabled ★
2-3	On-board Ethernet2-PHY Disabled

Safe Mode Jumper (JP2)

JP2	Function
Short	Enabled
NC	Disabled ★

Watch Dog Timer Setting Jumper (JP7)

JP7	Function
Short	Enabled
NC	Disabled ★

2-2 Connectors

I/O peripheral devices and Flash disk are connected to the interface connectors and DOC socket located on this single board computer (**Figure 2-2**).

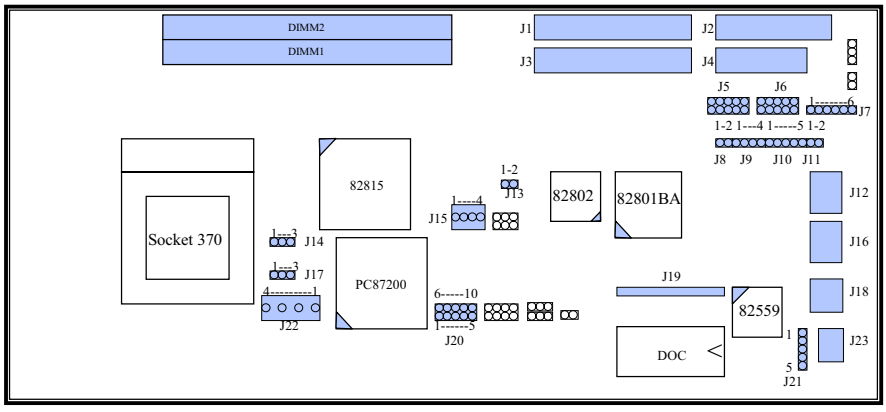


Figure 2-2 ROBO-678 Connector Locations

CONNECTOR	FUNCTION	REMARK
J1	IDE1 (Primary) interface	
J2	Floppy connector	
J3	IDE2 (Secondary) interface	
J4	Parallel port connector	
J5	COM1 serial port	2 x 5 shrouded header
J6	COM2 serial port	2 x 5 shrouded header
J7	IrDA (infrared) port	Reserve 6-pin for SIR
J8	System reset	
J9	External speaker interface	
J10	Keyboard lock and power indicator	
J11	IDE1/IDE2 active status report	LED indicator
J12	On-board Ethernet (Intel 82801BA) interface connector	RJ-45
J13	ATX power button interface	Connect to Chassis
J14	Chassis FAN power connector	Connect to Chassis

CONNECTOR	FUNCTION	REMARK
J15	ATX power control interface	Connect to Backplane
J16	On-board Ethernet (Intel 82559) interface connector	RJ-45
J17	CPU FAN power connector	
J18	Two-port USB interface	
J19	68 pin PCI Connector	
J20	On-board VGA connector	2 x 5 shrouded header
J21	External keyboard interface	Connect to backplane
J22	Standard 5-1/4" disk drive power connector	4-pin connector (pitch : 0.2 inch)
J23	PS/2 keyboard/mouse connector	6-pin Mini-DIN
U15	Socket 370	Celeron/PIII CPU
U25	M-systems Flash Disk	DIP 32-pin socket
DIMM1 – 2	DIMM socket	3.3V SDRAM

Pin Assignments of Connectors

J8: Reset Header

PIN No	Signal Description
1	Reset
2	Ground

J9 : External Speaker Header

PIN No.	Signal Description
1	Speaker signal
2	N/C
3	Ground
4	+5V

J10 : Keyboard Lock Header

PIN No.	Signal Description
1	+5V (220 ohm pull-up for power LED)
2	N/C
3	Ground
4	Keyboard inhibit
5	Ground

J11: IDE1/IDE2 Active LED Header

PIN No.	Signal Description
1	+5V (470 ohm pull-up for HDD LED)
2	HDD Active # (LED cathode terminal)

J5/J6 : Serial Port-1/Port-2 Connector (2 x 5 shrouded header)

PIN No.	Signal Description
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)
10	N/C

J22 : Standard 5-1/4" disk power connector

PIN No.	Signal Description
1	+12V
2	GND
3	GND
4	+5V

J13 : ATX Power Button Interface

PIN No.	Signal Description
1	Pull-high 100 ohm to +5V
2	Power Button Control Signal

J15 : ATX Power Control Connector

PIN No.	Signal Description
1	ATX Power Good Signal
2	ATX 5V Stand-by
3	ATX Power On Control
4	Ground

J23 : PS/2 Keyboard/Mouse Connector (6-pin Mini-DIN)

PIN No.	Signal Description
1	Mouse Data
2	Keyboard Data
3	GND
4	+5V
5	Mouse Clock
6	Keyboard Clock

J7 : Standard IrDA Header

PIN No.	Signal Description
1	VCC (+5V)
2	IOVSB
3	IRRX
4	Ground
5	IRTX
6	OVCROFF (Over Current Off)

J18 : Two-port USB Interface Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	+5V	2	USBD0-
3	USBD0+	4	USBGND0
5	+5V	6	USBD1-
7	USBD1+	8	USBGND1

J21 : External Keyboard Connector

PIN No.	Signal Description
1	Keyboard Clock
2	Keyboard Data
3	N/C
4	Ground
5	+5V

J14/J17 : Chassis/CPU Fan Power Connector

PIN No.	Signal Description
1	Ground
2	+12V
3	Pull-up 5V (Reserved for sense signal)

J12/J16 : Ethernet RJ-45 Interface Connector

PIN No.	Signal Description
1	TX+
2	TX-
3	RX+
4	Termination to Ground
5	Termination to Ground
6	RX-
7	Termination to Ground
8	Termination to Ground

J20 : On-board VGA Connector (2 x 5 Shrouded Header)

PIN No.	Signal Description
1	R
2	G
3	B
4	VSYNC
5	HSYNC
6	DDC_CLK
7	Ground
8	DDC_DATA
9	Ground
10	N/C

J1 /J3: IDE1/IDE2 Interface Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	RESET#	2	Ground
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15
19	Ground	20	N/C
21	DMA REQ	22	Ground
23	IOW#	24	Ground
25	IOR#	26	Ground
27	IOCHRDY	28	Pull-down
29	DMA ACK#	30	Ground
31	INT REQ	32	N/C
33	SA1	34	CBLID#
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD Active#	40	Ground

J4: Parallel Port Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Strobe#	14	Auto Form Feed#
2	Data 0	15	Error#
3	Data 1	16	Initialization#
4	Data 2	17	Printer Select IN#
5	Data 3	18	Ground
6	Data 4	19	Ground
7	Data 5	20	Ground
8	Data 6	21	Ground
9	Data 7	22	Ground
10	Acknowledge#	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	N/C

J2 : FDC Interface Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	Density Select 0
3	Ground	4	N/C
5	Ground	6	Density Select 1
7	Ground	8	Index#
9	Ground	10	Motor ENA#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor ENB#
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#
29	Ground	30	Read Data#
31	Ground	32	Head Select#
33	Ground	34	Disk Change#

J19 : 68 pin PCI Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	VCC	2	AD0
3	AD1	4	AD2
5	AD3	6	AD4
7	AD5	8	AD6
9	AD7	10	GND
11	VCC	12	AD8
13	AD9	14	AD10
15	AD11	16	AD12
17	AD13	18	AD14
19	AD15	20	GND
21	VCC	22	AD16
23	AD17	24	AD18
25	AD19	26	AD20
27	AD21	28	AD22
29	AD23	30	GND
31	VCC	32	AD24
33	AD25	34	AD26
35	AD27	36	AD28
37	AD29	38	AD30
39	AD31	40	GND
41	VCC	42	BE#0
43	BE#1	44	BE#2
45	BE#3	46	PAR
47	Frame#	48	TRDY#
49	IRDY#	50	GND
51	VCC	52	STOP#
53	Devsel#	54	Reserved for PERR#
55	SERR#	56	REQ#4
57	GNT#4	58	Reserved for REQ#3
59	Reserved for GNT#3	60	GND
61	PCI Clock1	62	PCI Clock2
63	PCIRST#	64	LOCK#
65	IRQ#A	66	IRQ#B
67	IRQ#C	68	IRQ#D

CHAPTER 3

System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you install M-systems Flash disk, set up onboard PCI device and handle WDT operation in software programming.

3-1 Socket 370 Celeron/Pentium-III Processor

Installing S370 CPU

1) Lift the handling lever of CPU socket outwards and upwards to the other end.
2) Align the processor pins with pin holes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into place. If this operation is not easy or smooth, don't do it forcibly. You need to check and rebuild the CPU pin uniformly.
3) Push down the lever to lock processor chip into the socket.
4) Follow the installation guide of cooling fan or heat sink to mount it on CPU surface and lock it on the socket 370.

Removing CPU

1) Unlock the cooling fan first.
2) Lift the lever of CPU socket outwards and upwards to the other end.
3) Carefully lift up the existing CPU to remove it from the socket.
4) Follow the steps of installing a CPU to change to another one or place handling bar to close the opened socket.

Configuring System Bus

ROBO-678 will automatically detect system bus based on the CPU used. However, users may configure CPU core/bus ratio in BIOS setup menu for engineering sample processor.

3-2 Main Memory

ROBO-678 provides two DIMMs (168-pin Dual In-line Memory Module) to support 3.3V SDRAM (Synchronized DRAM) as on-board main memory. The maximum memory size is 512MB. **ROBO-678 will automatically detect memory clock, based on the processor and SDRAM used. Please refer to the following table as your reference.**

ROBO-678 Memory Clock Reference Table

Processor FSB	PC-100SDRAM	PC-133SDRAM
133MHz	100MHz	133MHz
100MHz	100MHz	100MHz
66MHz	100MHz	100MHz

For system compatibility and stability, don't use memory module without brand. You can also use the single or double-side DIMM with ECC feature(2). Randomly installing DIMM in any DIMM socket is allowed. You can install different size of DRAM module on DIMM1, DIMM2 or all to boot up system.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedure to install your DRAM module into memory socket. Before locking, make sure that the module has been fully inserted into the card slot.

NOTE :

(1) To maintain system stability, don't change any of DRAM parameters in BIOS setup to upgrade your system performance without acquiring technical information.

(2) Due to Intel 82815 chipset limitation, SDRAM with ECC function is not supported. In the event of ECC SDRAM being adopted, ECC function is NOT supported while it is still OK to use this type of SDRAM.

(3) Due to Intel 82815 chipset limitation, Buffered (Registered) SDRAM is not supported. Buffered SDRAM will simply freeze up system.

3-3 M-systems Flash Disk

ROBO-678 reserves one 32-pin DIP sockets for installing M-systems Flash disk from 2MB to 288MB. This operation structure is running with pure ISA-bus without PnP (Plug and Play) function. Before installing, make sure that I/O address jumper setting is set on right position to prevent unworkable system due to I/O resource conflict. Do remember to follow DOC (DiskOnChip) installation procedure. Otherwise, it is possible to burn out the Flash chip due to incorrect installation.

Installing DOC

Align the DOC with pin holes on the socket. Make sure that the notched corner or dot mark (pin 1) of DOC corresponds to notched corner of the socket. Then press the DOC gently until it fits into place. If installation procedure is correct, the Flash disk can be viewed as a normal hard disk to access read/write data.

WARNING

Please ensure that your DOC is properly inserted. Placing the DOC in reverse will cause severe damage. Remember, a new DOC chip is always a formatted disk. You may simply plug the chip on the DOC socket and read/write through it. If you would like to boot from this Flash disk, it is necessary to refer to the application note from M-systems. You can easily get relative information from M-systems shipping package (such as product manual) or Web-site
http://www.m-sys.com.

3-4 Installing the Single Board Computer

To install your ROBO-678 into standard chassis or proprietary environment, you need to perform the following :

Step 1 : Check all jumpers setting on proper position
Step 2 : Install and configure CPU and memory module on right position
Step 3 : Place ROBO-678 into the dedicated position in your system
Step 4 : Attach cables to existing peripheral devices and secure it

WARNING

Please ensure that your SBC is properly inserted and fixed by mechanism. Otherwise, the system might be unstable or do not work due to bad contact of golden finger and ISA-bus slot. **It is recommended to apply 4-pin 5-1/4" IDE device power connectors from your power supply onto J22 to ensure a sufficient current supply.**

NOTE : Please refer to section 3-4-1 to 3-4-3 to install INF/VGA/LAN drivers.

3-4-1 INF Chipset Component Driver

Intel 82815 GMCH chipset is a new chipset that a few old operating systems might not be able to recognize. **To overcome this compatibility issue, for Windows Operating Systems such as Windows-95/98/98SE/2000, please install INF Chipset Component driver before any of other Drivers are installed**.

You can find very easily the INF chipset component driver in /INF directory of ROBO-678 CD-title. Please execute "Setup.exe" to start installation.

3-4-2 Intel 82815 GMCH Graphics Controller

Intel 82815 GMCH chipset is the result of new design approach to optimize the shared memory architecture while maintaining the cost benefits of integration through Direct AGP and Dynamic Video Memory Technology.

With no additional video adaptor, this onboard video will be the system display output. However, system will automatically switch to off-board video adaptor if there is any. In this case, onboard 82815 GMCH graphic feature will be disabled.

Drivers Support

Please find Intel 82815 GMCH driver in /Graphics directory of ROBO-678 CD-title. Drivers support Windows-3.1, Windows-95/98/98SE, Windows-NT 3.51/4.0, Windows-2000, OS2, and Linux.

(1) Windows-95: Please bring up the Display Control Panel and update graphics driver with /Graphics/win9x/Graphics/Win9x/I81xw9x.inf.

(2) Windows-98/98SE: Please execute /Graphics/win9x/Graphics/Setup.exe to start graphics drivers installation, or bring up the Display Control Panel and update graphics driver with /Graphics/win9x/Graphics/Win9x/I81xw9x.inf.

(3) Windows-NT 4.0: Please install Windows-NT 4.0 Service Pack 4 or above first, then execute /Graphics/Winnt4/Graphics/Setup.exe, or simply bring up the Display Control Panel and update graphics driver with /Graphics/winnt4/Graphics/WinNT4/I81xNT4.inf.

(4) Windows-2000: Please bring up the Device Manager and update graphics drivers with /Graphics/win2k/Graphics/Win2000/I81xNT5.inf.

(5) Redhat Linux V6.2: Please refer to the “release_linux.pdf” readme file in /Graphics/Linux directory for graphics drivers installation guide.

3-4-3 Intel 82559 / 82801BA MAC Fast Ethernet Controller

The following table indicates how to enable/disable on-board Intel 82559 / 82801BA MAC Fast Ethernet function by putting jumpers at proper position.

JP6	FUNCTION
1-2	Enable On-board Intel 82559 Ethernet
2-3	Disable On-board Intel 82559 Ethernet

JP4	FUNCTION
1-2	Enable On-board Intel 82562ET PHY
2-3	Disable On-board Intel 82562ET PHY

Drivers Support

Please find 82559 LAN driver in /Ethernet directory of ROBO-678 CD-title. The drivers support Windows-NT 3.51/4.0, Windows-95/98/98SE, Windows-2000, Windows-2000, SCO OpenServer 5.0.2, SCO Unixware 7.0, OS2 and Linux.

In Windows environment, Intel 82559 Fast Ethernet should appear as Intel (R) PRO/100+ Management Adaptor, and Intel 82801BA MAC Fast Ethernet should appear as Intel (R) PRO/100 VE Network Connection.

On-board LED Indicator (for LAN status)

ROBO-678 provides six LED indicators to report Intel 82559 / 82801BA MAC Fast Ethernet interfaces status. Please refer to the table below as a quick reference guide.

Intel 82801BA MAC	Intel 82559	Name of LED	Operation of Ethernet Port	
			ON	Off
D16	D20	LAN Link Integrity LED	Good link in 10 or 100 Mbps	Bad link
D17	D22	LAN active LED	Active	No active
D18	D23	LAN speed LED	100 Mbps	10 Mbps

3-4-4 On-board 68-pin PCI connector

ROBO-678 provides one on-board 68-pin PCI connector that allows you to apply additional PCI devices, such as SCSI or Ethernet. If you have a compatible PCI device, simply plug it onto the connector and secure it with two retention bars.

3-5 Clear CMOS Operation

The following table indicates how to enable/disable CMOS Clear Function hardware circuit by putting jumpers at proper position.

JP1	FUNCTION
1-2	Normal Operation
2-3	Clear CMOS Contents

To correct operate CMOS Clear function, users may turn off the system, move JP1 jumper to 2-3 position (this will not consume any power). To clear CMOS, please turn on the power and turn it off again for AT system, or press the toggle switch a few times for ATX system. Move the JP1 back to 1-2 position (Normal Operation) and start the system. System will then produce a “CMOS Check Sum Error” message and hold up. Users may then follow the displayed message to load in BIOS default setting.

3-6 Watch Dog Timer Programming

The following table will show you how to enable and disable Watch Dog Timer (WDT) circuit by putting jumpers at proper position.

JP7	FUNCTION
Short	Enabled
NC	Disabled

This will prepare WDT circuit ready for trigger. WDT is now in standby mode. Without adding this jumper, WDT circuit is always turned-off.

There is one programming guide (source code in Assembly language) and test program in ROBO-678 CD-title. Please refer to the programming guide to create your own Watch Dog Timer application, and feel the Timer by using the demo program.

CHAPTER 4

BIOS Setup Information

ROBO-678 is equipped with the AWARD BIOS stored in Flash ROM. This BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, ROBO-678 communicates with peripheral devices and check its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start-up.

4.1 Entering Setup

Turn on or reboot the computer. When the message “Hit <DEL> if you want to run SETUP” appears, press <Del> key immediately to enter BIOS setup program.

If the message disappears before you respond, but you still wish to enter Setup, please restart the system to try “COLD START” again by turning it OFF and then ON, or touch the "RESET" button. You may also restart from “WARM START” by pressing <Ctrl>, <Alt>, and <Delete> keys simultaneously. If you do not press the keys at the right time and the system will not boot, an error message will be displayed and you will again be asked to,

Press <F1> to Run SETUP or Resume

In HIFLEX BIOS setup, you can use the keyboard to choose among options or modify the system parameters to match the options with your system. The table below will show you all of keystroke functions in BIOS setup.

Keys to navigate within setup menu

Key	Functions
Up Arrow	Move to the previous item
Down Arrow	Move to the next item
Left Arrow	Move to the item on the left (menu bar)
Right Arrow	Move to the item on the right (menu bar)
Move Enter	Move to the item you desired
PgUp key	Increase the numeric value or make changes
PgDn key	Decrease the numeric value or make changes
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
Esc key	Main Menu -- Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1 key	General help on Setup navigation keys
F5 key	Load previous values from CMOS
F6 key	Load the fail-safe defaults from BIOS default table
F7 key	Load the optimized defaults
F10 key	Save all the CMOS changes and exit

4.2 Main Menu

Once you enter ROBO-678 AWARD BIOS CMOS Setup Utility, you should start with the Main Menu. The Main Menu allows you to select from eleven setup functions and two exit choices. Use arrow keys to switch among items and press <Enter> key to accept or bring up the sub-menu.

CMOS Setup Utility - Copyright (C) 1984-2000

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

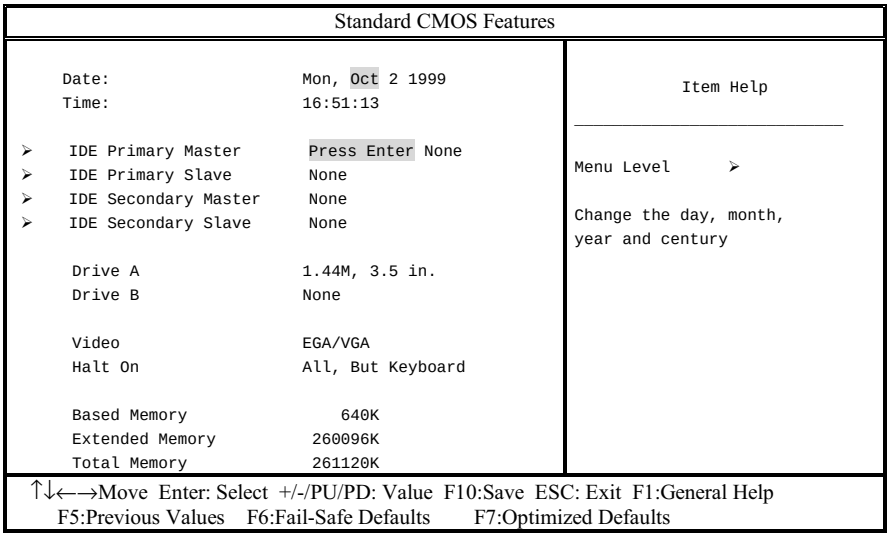
NOTE : It is strongly recommended to reload Optimal Setting if CMOS is lost or BIOS is updated.

4.3 Standard CMOS Setup Menu

This setup page includes all the items in a standard compatible BIOS. Use the arrow keys to highlight the item and then use the <PgUp>/<PgDn> or <+>/<-> keys to select the value or number you want in each item and press <Enter> key to certify it.

Follow command keys in CMOS Setup table to change **Date**, **Time**, **Drive type**, and **Boot Sector Virus Protection Status**.

■ **Screen shot**



■ **Menu seletions**

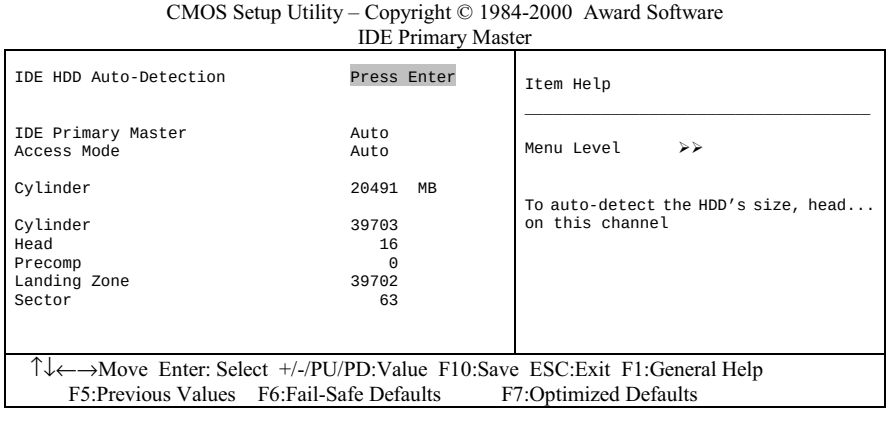
Item	Options	Description
Date	Mm:dd:yy	Set the system date. Note that the 'Day' automatically changes when you set the date
Time	Hh:mm:ss	Set the system time
IDE Primary Master	Options are in its sub menu (described in 4.4 Table)	Press <Enter> to enter the sub menu of detailed options
IDE Primary Slave	Options are in its sub menu (described in 4.4 Table)	Press <Enter> to enter the sub menu of detailed options
IDE Secondary Master	Options are in its sub menu (described in 4.4 Table)	Press <Enter> to enter the sub menu of detailed options
IDE Secondary Slave	Options are in its sub menu (described in 4.4 Table)	Press <Enter> to enter the sub menu of detailed options

Item	Options	Description
Drive A Drive B	None 360K, 5.25 in 1.2M, 5.25 in 720K, 3.5 in 1.44M, 3.5 in 2.88M, 3.5 in	Select the type of floppy disk drive installed in your system
Video	EGA/VGA CGA 40 CGA 80 MONO	Select the default video device
Halt On	All Errors No Errors All, but Keyboard All, but Diskette All, but Disk/Key	Select the situation in which you want the BIOS to stop the POST process and notify you
Base Memory	N/A	Displays the amount of conventional memory detected during boot up
Extended Memory	N/A	Displays the amount of extended memory detected during boot up
Total Memory	N/A	Displays the total memory available in the system

4.4 IDE Adaptors Setup Menu

The IDE adapters control the IDE devices, such as hard disk drive or cdrom drive. It uses a separate sub menu to configure each hard disk drive.

■ **Screen shot**



■ **Menu seletions**

Item	Options	Description
IDE HDD Auto-detection	Press Enter	Press Enter to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.
IDE Primary Master	None Auto Manual	Selecting 'manual' lets you set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=65535 means NONE !
Capacity	Auto Display your disk drive size	Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk checking program.
Access Mode	Normal LBA Large Auto	Choose the access mode for this hard disk
The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual'		
Cylinder	Min = 0 Max = 65535	Set the number of cylinders for this hard disk.
Head	Min = 0 Max = 255	Set the number of read/write heads
Precomp	Min = 0 Max = 65535	**** **Warning**: Setting a value of 65535 means no hard disk
Landing zone	Min = 0 Max = 65535	****
Sector	Min = 0 Max = 255	Number of sectors per track

4.5 Advanced BIOS Features

This section allows you to configure your system for basic operation. You have the opportunity to select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.

■ **Screen shot**

CMOS Setup Utility – Copyright © 1984 – 2000 Award Software
Advanced BIOS Features

Virus Warning	Disabled	Item Help
CPU Internal Cache	Enabled	
External Cache	Enabled	
CPU L2 Cache ECC Checking	Enabled	Menu Level ➢
Quick Power On Self Test	Enabled	
First Boot device	HDD-0	
Second Boot device	Floppy	
Third Boot device	CDROM	
Fourth Boot device	ZIP100	
Boot Up NumLock Status	On	
Typematic Rate Setting	Disabled	
X Typematic Rate (Chars/Sec)	6	
X Typematic Delay (Msec)	250	
Security Option	Setup	
OS Select For DRAM > 64MB	Non-OS2	
HDD S.M.A.R.T. Capability	Disabled	
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-DFFFF Shadow	Disabled	

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

Virus Warning

Enabled	Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
Disabled	No warning message will appear when anything attempts to access the boot sector or hard disk partition table.

CPU Interval Cache/External Cache

These two categories speed up memory access. However, it depends on CPU/chipset design.

Enabled	Enable cache
Disabled	Disable cache

CPU L2 Cache ECC Checking

This item allows you to enable/disable CPU L2 Cache ECC checking.

The choice: Enabled/Disabled.

Quick Power On Self Test

This category speeds up Power On Self Test (POST) after you power up the computer. If it is set to Enable, BIOS will shorten or skip some check items during POST.

Enabled	Enable quick POST
Disabled	Normal POST

First/Second/Third/Fourth Boot Device

The BIOS attempts to load the operating system from the devices in the sequence selected in these items.

The Choice: Floppy, LS120, ZIP100, HDD, SCSI, CDROM, LAN, and Disabled.

Boot Up NumLock Status

Select power on state for NumLock.

The choice: Enabled/Disabled.

Typematic Rate Setting

Key strokes repeat at a rate determined by the keyboard controller. When enabled, the typematic rate and typematic delay can be selected.

The choice: Enabled/Disabled.

Typematic Rate (Chars/Sec)

Sets the number of times a second to repeat a key stroke when you hold the key down.

The choice: 6, 8, 10, 12, 15, 20, 24, 30.

Typematic Delay (Msec)

Sets the delay time after the key is held down before it begins to repeat the keystroke.

The choice: 250, 500, 750, 1000.

Security Option

Select whether the password is required every time the system boots or only when you enter setup.

System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

Note : To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.

OS Select For DRAM > 64MB

Select the operating system that is running with greater than 64MB of RAM on the system.

The choice: Non-OS2, OS2.

HDD S.M.A.R.T. Capability

This option allows users to enable/disable the PC to predict the future failure of hard drive.

The choice: Enabled, Disabled.

Video BIOS Shadow

Select “Enabled” to enable shadowing VGA BIOS into the reserved 384K system memory so as to get higher display performance. “Disabled” will ignore this BIOS shadowing function.

The choice : Enabled/Disabled

Shadow Memory (from address C8000-DFFFF, 16K per segment)

Select “Enabled” to enable shadowing function for each memory segment. “Disabled” will ignore this BIOS shadowing function.

The choice : Enabled/Disabled

4.6 Advanced Chipset Features

This section allows you to configure the system based on the specific features of the Intel 82815 GMCH chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM (SDRAM) and the external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

■ **Screen shot**

CMOS Setup Utility – Copyright © 1984 – 2000 Award Software
Advanced Chipset Features

SDRAM CAS Latency Time	3	Item Help
SDRAM Cycle Time Tras/Trc	7/9	
SDRAM RAS-to-CAS Delay	3	Menu Level ➢
SDRAM RAS Precharge Time	3	
System BIOS Cacheable	Enabled	
Video BIOS Cacheable	Enabled	
Memory Hole AT 15-16M	Disabled	
Delayed Transaction	Enabled	
Display Cache Frequency	100 MHz	
System Memory Frequency	Auto	
On-Chip Video Window Size	64MB	
* Onboard Display Cache Setting *		
CAS# Latency	3	
Paging Mode Control	Open	
RAS-toCAS Override	by CAS# LT	
RAS# Timing	Fast	
RAS# Percentage Timing	Fast	

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

This chipset settings deal with CPU access to dynamic random access memory (DRAM). The default timings have been carefully chosen and should only be altered if data is being lost. Such a scenario might well occur if your system had mixed speed DRAM chips installed so that greater delays may be required to preserve the integrity of the data held in the slower memory chips.

SDRAM CAS Latency Time

This option controls the number of SCLKs between the time a read command is sampled by the SDRAMs and the time the GMCH samples correspondent data from the SDRAMs.

The Choice: 2, 3 SCLKs.

SDRAM Cycle Time Tras/Trc

This option controls the number of SDRAM clocks used per access cycle.

The Choice: 5/7, 7/9.

SDRAM RAS-to-CAS Delay

This option controls the number of SCLKs (SDRAM Clock) from a row activate command to a read or write command. If your system installs good quality of SDRAM, you can set this option to "3 SCLKs" to obtain better memory performance. Normally, the option will be set to 3 SCLKs.

The Choice: 2, 3 SCLKs.

SDRAM RAS Precharge Time

This option controls the number of SCLKs for RAS# precharge. If your system installs good quality of SDRAM, you can set this option to "3 SCLKs" to obtain better memory performance.

The Choice: 2, 3 SCLKs.

System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

The choice: Enabled/Disabled.

Video BIOS Cacheable

Select "Enabled" to enable caching VGA BIOS into L2 cache to get higher display performance. "Disabled" will ignore this BIOS caching function.

The choice : Enabled/Disabled

Memory Hole At 15-16M

In order to improve performance, certain space in memory is reserved for ISA cards. This memory must be mapped into the memory space below 16MB.

The Choice: Enabled/Disabled.

Delay Transaction

Select "Enabled" to enable delay transaction.This will enhance performance for data transmission between different PCI bus.

The Choice: Enabled/Disabled.

Display Cache Frequency

This option allows users to configure the display cache frequency. The default setting is 100MHz.

The Choice: 100MHz/133MHz.

System Memory Frequency

This option allows users to configure the system memory frequency. The default setting is Auto.

The Choice: 100MHz, 133MHz and Auto.

On-Chip Video Window Size

This option allows you to select the size of mapped memory for AGP graphic data.

The Choice: 64MB/Disabled.

CAS# Latency

This option selects in units of local memory clock periods.

The Choice: 2, 3 SCLKs.

Paging Mode Control

This option controls GMCH memory controller tends to leave pages open or pages close.

The Choice: Open / Close.

RAS-to-CAS Override

This option selects in units of display cache clock periods indicates the RAS#-to-CAS# delay.

The Choice: by CAS# LT / Override(2).

RAS# Timing

This option controls RAS# active to precharge, and refresh to RAS# active delay.

The Choice: Fast / Slow.

RAS# Precharge Timing

This option controls RAS# precharge in local memory clocks.

The Choice: Fast / Slow.

4.7 Integrated Peripherals

■ **Screen shot**

CMOS Setup Utility – Copyright © 1984 – 2000 Award Software
Integrated Peripherals

On-Chip Primary PCI IDE	Enabled	Item Help
On-Chip Secondary PCI IDE	Enabled	Menu Level ➢
IDE Primary Master PIO	Auto	
IDE Primary Salve PIO	Auto	
IDE Secondary Master PIO	Auto	
IDE Secondary Salve PIO	Auto	
IDE Primary Master UDMA	Auto	
IDE Primary Salve UDMA	Auto	
IDE Secondary Master UDMA	Auto	
IDE Secondary Salve UDMA	Auto	
USB Controller	Enabled	
USB Keyboard Support	Disabled	
Init Display First	PCI Slot	
IDE HDD Block Mode	Enabled	
POWER ON Function	BUTTON ONLY	
KB Power On Password	Enter	
Hot Key Power On	Ctrl-F1	
Onboard FDC Controller	Enabled	
Onboard Serial Port 1	3F8/IRQ4	
Onboard Serial Port 2	2F8/IRQ3	
UART Mode Select	Normal	
RxD , TxD Active	Hi,Lo	
IR Transmission Delay	Enabled	
UR2 Duplex Mode	Half	
Onboard Parallel Port	378/IRQ7	
Parallel Port Mode	SPP	
EPP Mode Select	EPP1.7	
ECP Mode Use DMA	3	
Restore After AC Power Loss	off	

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

OnChip Primary/Secondary PCI IDE

The chipset contains a PCI IDE interface with support for two IDE channels. Select Enabled to activate the primary IDE interface. Select Disabled to deactivate this interface

The choice: Enabled/Disabled.

IDE Primary/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.

The choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA/33/66/100 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/33/66/100, select Auto to enable BIOS support.

The Choice: Auto, Disabled.

USB Controller

This item allows you to enable/disable USB (Universal Serial Bus) function.

The choice: Enabled/Disabled

USB Keyboard Support

This item allows you to enable USB keyboard function under POST, BIOS setup menu, DOS, or Windows-NT with no USB driver loaded.

The choice: Enabled/Disabled

Init Display First

This item allows you to select the first display port to be initialized.

The choice: PCI Slot (off-board video adaptor), Onboard/AGP

IDE HDD Block Mode

This item allows you to enable/disable IDE HDD Block Mode. The function is to collect the data that is nearby the one being read and leave them in the system buffer. Buffered data can be used with faster transmission rate so as to enhance system performance.

The choice: Enabled/Disabled

Power On Function

This item allows you to select different power on scheme using ATX power supply.

Button Only	Power on by power Button
Keyboard 98	Power on by keyboard 98
Password	Power on using customized password string
Hot Key	Power on using special customized key
Mouse Left	Power on using mouse left click
Mouse Right	Power on using mouse right click
Any Key	Power on using any keyboard key

Keyboard Power On Password

In the event of "Power On Function" being configured as "Password", this item will be enabled for tuning. Press "Enter" key to enter a customized password, and confirm again when being asked. In the case that the confirmed password does not match the configured one, the message of "Password Disabled – Press any key to continue…" will be prompted.

Hot Key Power On

In the event of "Power On Function" being configured as "Hot Key", this item will be enabled for tuning.

The choice: Ctrl-F1 to Ctrl-F12.

Onboard FDC Controller

This item allows you to enable/disable onboard Floppy disk controller.

The choice: Enabled/Disabled

Onboard Serial Port 1/Port 2

Select an address and corresponding interrupt for the first and second serial ports.

The choice: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

UART Mode Select

This item allows users to select Infrared transmission mode.

Normal	Disable Infrared function
IrDA	Select IrDA mode transmission
ASKIR	Select ASKIR mode transmission

As Infrared transmission function shares onboard serial port 2, COM2 needs to be enabled.

RxD, TxD Active

This item is to configure Infrared transmission rate. Four options are available :

Hi, Hi	High rate for receiving / High rate for transmitting
Hi, Lo	High rate for receiving / Low rate for transmitting
Lo, Hi	Low rate for receiving / High rate for transmitting
Lo, Lo	Low rate for receiving / Low rate for transmitting

Onboard Parallel Port

This item allows you to configure I/O address of the onboard parallel port.

The Choices : Disabled, 378/IRQ7, 278/IRQ5, 3BC/IRQ7

Parallel Port Mode

There are four different modes for the onboard parallel port :

SPP	Switch to SPP mode
EPP	Switch to EPP mode
ECP	Switch to ECP mode
ECP + EPP	Switch to ECP + EPP mode

EPP Mode Select

Select different version of EPP mode.

The choices : EPP1.7/EPP1.9

ECP Mode Use DMA

Select a proper DMA channel for ECP mode.

The choices : 3/1

Restore After AC Power Loss

This item allows user to configure the power status of using ATX power supply after a serious power loss occurs.

On	System automatically restores power back
Off	System stays at power –off
Former-Sts	System restores back to previous status (On or Off)

4.8 Power Management Setup

The Power Management Setup allows you to configure you system to most effectively save energy while operating in a manner consistent with your own style of computer use.

■ **Screen shot**

CMOS Setup Utility – Copyright © 1984 –2000 Award Software
Power Management Setup

ACPI function	Enabled	Item Help
ACPI Suspend Type	S1(POS)	
Power Management	User Define	Menu Level ➢
Video Off Method	DPMS	
Video Off In Suspend	Yes	
Suspend Type	Stop Grant	
Suspend Mode	Disabled	
HDD Power Down	Disabled	
Soft-Off by PWR-BTTN	Instant-Off	
Resume On Ring	Enabled	
CPU THRM-Throttling	50.0%	
Resume by Alarm	Disabled	
Date(of Month) Alarm	0	
Time(hh:mm:ss) Alarm	0 0 0	
** Reload Global Timer Events **		
Primary IDE 0	Disabled	
Primary IDE 1	Disabled	
Secondary IDE 0	Disabled	
Secondary IDE 1	Disabled	
FDD,COM,LPT Port	Disabled	

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

ACPI Function

This item allows you to enable/disable the Advanced Configuration and Power Management (ACPI).

The choices : Enabled/Disabled.

Power Management

This category allows you to select the type (or degree) of power saving and is directly related to “HDD Power Down”, “Suspend Mode”.

There are three selections for Power Management, three of which have fixed mode settings.

Min. Power Saving	Minimum power management. Suspend Mode = 1 hr., and HDD Power Down = 15 min.
Max. Power Saving	Maximum power management. Suspend Mode = 1 min., and HDD Power Down = 1 min.
User Defined	Allows you to set each mode individually. When not disabled, Suspend Mode ranges from 1 min. to 1 hr. and HDD Power Down ranges from 1 min. to 15 min.

Video Off Method

This determines the manner in which the monitor is blanked.

V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS	Initial display power management signaling.

Video Off In Suspend

This allows user to enable/disable video off in Suspend Mode.

The choices : Yes/No

Suspend Type

Two options are available : Stop Grant and Power On Suspend.

Suspend Mode

When enabled and after the set time of system inactivity, all devices except the CPU will be shut off.

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 item allows users to set the time to remove the power after the power button is pressed.

The choices : Instant-Off/Delay 4 Sec.

Resume On Ring

When select "Enabled", a system that is at soft-off mode will be alert to Wake-On-Lan or Wake-On-Modem signal.

The choices : Enabled/Disabled

CPU Thermal-Throttling

This item allows you to configure the CPU working duty cycle during suspend mode.

The choices : 12.5%, 25.0%, 37.5%, 50.0%, 62.5%, 75.0%, 87.5%

Resume by Alarm

This item allows users to enable/disable the resume by alarm function. When "Enabled" is selected, system using ATX power supply could be powered on if a customized time and day is approached.

Date(of Month) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the date parameter of the timing dateline on which to power on the systm.

The choices : 0 ~ 31

Time(hh:mm:ss) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the time parameter of the timing dateline on which to power on the systm.

The choices : hh (0~23), mm (0~59), ss (0 ~59)

Primary/Secondary IDE 0/1

This item is to configure IDE devices being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choices : Enabled/Disabled

FDD, COM, LPT Port

This item is to configure floppy device, COM ports, and parallel port being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choices : Enabled/Disabled

4.9 PnP/PCI Configuration Setup

This section describes configuring the PCI bus system. PCI, or **P**ersonal **C**omputer **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components.

This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

■ **Screen shot**

CMOS Setup Utility – Copyright © 1984-2000 Award Software
PnP/PCI Configurations

	Reset Configuration Data	Disabled	Item Help

	Resources Controlled By	Auto(ESCD)	Menu Level ➢
➢	IRQ Resources	Press Enter	
➢	DMA Resources	Press Enter	BIOS can automatically configure all the boot and Plug and Play compatible devices. If you choose Auto, you cannot select IRQ DMA and memory base address fields, since BIOS automatically assigns them
	PCI/VGA Palette Snoop	Disabled	

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

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 card and the system reconfiguration has caused such a serious conflict that the operating system can not boot.

The choice: Enabled, Disabled .

Resource controlled by

The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows®95. If you set this field to "manual" choose specific resources by going into each of the sub menu that follows this field (a sub menu is preceded by a "➢").

The choice: Auto (ESCD), Manual.

IRQ Resources

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt. It allows you to determine the IRQ assigned to the ISA bus and is not available to any PCI slot. 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 PCI or ISA bus architecture.

The Choice: "Legacy ISA" and "PCI/ISA PnP"

DMA Resources

When resources are controlled manually, assign each system DMA channel a type, depending on the type of device using the DM channel. 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 PCI or ISA bus architecture.

The Choice: "Legacy ISA" and "PCI/ISA PnP"

PCI/VGA Palette Snoop

Leave this field at Disabled.

The choices : Enabled/Disabled.

4.10 PC Health Status

■ **Screen shot**

CMOS Setup Utility – Copyright © 1984-2000 Award Software
Frequency/Voltage Control

Current System Temperature	38℃/100℉	Item Help
Current CPU Temperature	43℃/109℉	----------
System Fan(J14)Speed	0 RPM	Menu Level ➢
CPU Fan(J17)Speed	5314 RPM	
Vcore	1.63 V	
Vcc1.8	1.85 V	
Vcc3.3	3.31 V	
+ 5 V	4.94 V	
+12 V	11.97 V	
-12 V	12.36 V	
- 5 V	5.04 V	
VBAT(V)	3.15 V	
5VSB(V)	4.87 V	

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

4.11 Frequency/Voltage Control

■ **Screen shot**

CMOS Setup Utility – Copyright © 1984-2000 Award Software
Frequency/Voltage Control

Auto Detect DIMM CLK	Enabled	Item Help
System Spectrum	Disabled	----------
CPU HOST/PCI Clock/PC133	Default	Menu Level ➢
CPU Clock Ratio	x 5	

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

Auto Detect DIMM CLK

This item allows you to enable/disable auto detect DIMM Clock

The choices : Enabled, Disabled

Spread Spectrum

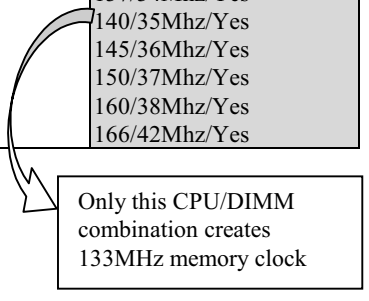
This item allows you to enable/disable the spread spectrum modulate

The choices : Enabled, Disabled

CPU HOST/PCI Clock/PC133

This item allows you to select CPU Host and the corresponding PCI Clock. Since CPU Host and PC133 will be automatically detected, different combinations of CPU and DIMM will produce different option table. Please refer to the following table as a quick reference guide. Based on the FSB of the processor used, default value of CPU Host will be automatically detected as 66MHz, 100MHz or 133MHz. PCI Clock default is always 33MHz. Users are allowed to tune the CPU Host and PCI Clock from the default 66/100MHz, 100/33MHz or 133/33MHz, up to 83/42MHz, 115/38MHz or 166/42MHz. Unless PC-133 DIMM and 133MHz FSB processor are used at the same time, PC133 will always be "No" since only PC-133 DIMM and 133MHz FSB processor is able to boost out a 133MHz memory clock. **Please refer to the following table as a quick reference table.**

CPU Host/PCI Clock/PC133	Non PC-133 DIMM	PC-133 DIMM
66MHz Processor PPGA Celeron FC-PGA Celeron	Default 67/33Mhz/No 68/34Mhz/No 70/35Mhz/No 75/38Mhz/No 80/40Mhz/No 83/42Mhz/No	Default 67/33Mhz/No 68/34Mhz/No 70/35Mhz/No 75/38Mhz/No 80/40Mhz/No 83/42Mhz/No
100MHz Processor PIII-550E~PIII-850E	Default 100/33Mhz/No 103/34Mhz/No 105/35Mhz/No 110/37Mhz/No 115/38Mhz/No	Default 100/33Mhz/No 103/34Mhz/No 105/35Mhz/No 110/37Mhz/No 115/38Mhz/No
133MHz Processor PIII-667EB~PIII-933EB	Default 133/33Mhz/No 137/34Mhz/No 140/35Mhz/No 145/36Mhz/No 150/37Mhz/No 160/38Mhz/No 166/42Mhz/No	Default 133/33Mhz/Yes 137/34Mhz/Yes 140/35Mhz/Yes 145/36Mhz/Yes 150/37Mhz/Yes 160/38Mhz/Yes 166/42Mhz/Yes



* Only Engineering Sample Processor is allowed to be configured with different system clock.

CPU Clock Ratio

This item allows you to select the CPU core/bus ratio

The choices : 3 ~ 8

4.12 Default Menu

Selecting "Defaults" from the main menu shows you two options which are described below

Load Fail-Safe Defaults
When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N) ? N

Pressing 'Y' loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults
When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N) ? N

Pressing 'Y' loads the default values that are factory settings for optimal performance system operations.

4.13 Supervisor/User Password Setting

You can set either supervisor or user password, or both of then. The differences between are:

supervisor password : can enter and change the options of the setup menus.

user password : just can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

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

PASSWORD DISABLED

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

4.14 Exiting Seleting

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit without saving (Y/N)? Y

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

4.15 POST Messages

During the Power On Self-Test (POST), if the BIOS detects an error requiring you to do something to fix, it will either sound a beep code or display a message. If a message is displayed, it will be accompanied by:

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

POST Beep

Currently there are two kinds of beep codes in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps. The other code indicates that your DRAM error has occurred. This beep code consists of a single long beep repeatedly.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes messages for both the ISA and the EISA BIOS.

CMOS BATTERY HAS FAILED

CMOS battery is no longer functional. It should be replaced.

CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain proper system boot files. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure the disk is formatted as a boot device. Then reboot the system.

DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

Type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.

DISPLAY SWITCH IS SET INCORRECTLY

Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter Setup and change the VIDEO selection.

DISPLAY TYPE HAS CHANGED SINCE LAST BOOT

Since last powering off the system, the display adapter has been changed. You must configure the system for the new display type.

EISA Configuration Checksum Error PLEASE RUN EISA CONFIGURATION UTILITY

The EISA non-volatile RAM checksum is incorrect or cannot correctly read the EISA slot. This can indicate either the EISA non-volatile memory has become corrupt or the slot has been configured incorrectly. Also be sure the card is installed firmly in the slot.

EISA Configuration Is Not Complete PLEASE RUN EISA CONFIGURATION UTILITY

The slot configuration information stored in the EISA non-volatile memory is incomplete.

Note: When either of these errors appear, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

ERROR ENCOUNTERED INITIALIZING HARD DRIVE

Hard drive cannot be initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

ERROR INITIALIZING HARD DISK CONTROLLER

Cannot initialize controller. Make sure the cord is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly on the hard drive.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

Cannot find or initialize the floppy drive controller. make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

Invalid EISA Configuration
PLEASE RUN EISA CONFIGURATION UTILITY

The non-volatile memory containing EISA configuration information was programmed incorrectly or has become corrupt. Re-run EISA configuration utility to correctly program the memory.

NOTE: When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

Memory Address Error at ...

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory parity Error at ...

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

MEMORY SIZE HAS CHANGED SINCE LAST BOOT

Memory has been added or removed since the last boot. In EISA mode use Configuration Utility to reconfigure the memory configuration. In ISA mode enter Setup and enter the new memory size in the memory fields.

Memory Verify Error at ...

Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.

OFFENDING ADDRESS NOT FOUND

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

OFFENDING SEGMENT:

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

PRESS A KEY TO REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

Should Be Empty But EISA Board Found
PLEASE RUN EISA CONFIGURATION UTILITY

A valid board ID was found in a slot that was configured as having no board ID.

NOTE; When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

Should Have EISA Board But Not Found
PLEASE RUN EISA CONFIGURATION UTILITY

The board installed is not responding to the ID request, or no board ID has been found in the indicated slot.

NOTE: When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

Slot Not Empty

Indicates that a slot designated as empty by the EISA Configuration Utility actually contains a board.

NOTE: When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

Wrong Board In Slot
PLEASE RUN EISA CONFIGURATION UTILITY

The board ID does not match the ID stored in the EISA non-volatile memory.

NOTE: When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

FLOPPY DISK(S) fail (80) → Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40) → Floppy Type dismatch.

Hard Disk(s) fail (80) → HDD reset failed

Hard Disk(s) fail (40) → HDD controller diagnostics failed.

Hard Disk(s) fail (20) → HDD initialization error.

Hard Disk(s) fail (10) → Unable to recalibrate fixed disk.

Hard Disk(s) fail (08) → Sector Verify failed.

Keyboard is locked out - Unlock the key.

Keyboard error or no keyboard present.

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

BIOS ROM checksum error - System halted.

The checksum of ROM address F0000H-FFFFFH is bad.

Memory test fail.

BIOS reports the memory test fail if the onboard memory is tested error.

4.16 BIOS POST Check Point List

AWARDBIOS provides all IBM standard Power On Self Test (POST) routines as well as enhanced AWARDBIOS POST routines. The POST routines support CPU internal diagnostics. The POST checkpoint codes are accessible via the Manufacturing Test Port (I/O port 80h).

Whenever a recoverable error occurs during the POST, the system BIOS will display an error message describing the message and explaining the problem in detail so that the problem can be corrected.

During the POST, the BIOS signals a checkpoint by issuing one code to I/O address 80H. This code can be used to establish how far the BIOS has executed through the power-on sequence and what test is currently being performed. This is done to help troubleshoot faulty system board.

If the BIOS detects a terminal error condition, it will halt the POST process and attempt to display the checkpoint code written to port 80H. If the system hangs before the BIOS detects the terminal error, the value at port 80H will be the last

test performed. In this case, the terminal error cannot be displayed on the screen. The following POST checkpoint codes are valid for all AWARDBIOS products with a core BIOS date of 07/15/95 version 6.27 (Enhanced).

Code	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.
0h1	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
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

Code	Description
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	Disable PS/2 mouse interface (optional). Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
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.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reeserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
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.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	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.

Code	Description
24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	Program CPU internal MTRR (P6 & PII) for 0-640K memory address. Initialize the APIC for Pentium class CPU. Program early chipset according to CMOS setup. Example: onboard IDE controller. Measure CPU speed. Invoke video BIOS.
2Ah	Reserved
2Bh	Reserved
2Ch	Reserved
2Dh	Initialize multi-language. Put information on screen display, including Award title, CPU type, CPU speed ….
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34h	Reserved
35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45h	Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page. 2. Program writes allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range.

Code	Description
	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.
4Fh	Reserved
50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onbaord_AUDIO switch.
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reserved
64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	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”.
6Eh	Reserved
6Fh	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
70h	Reserved
71h	Reserved
72h	Reserved

Code	Description
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..
76h	Reserved
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved
7Fh	1. Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: ◆Clear EPA or customization logo.
80h	Reserved
81h	Reserved
82h	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	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.
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	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

Code	Description
95h	1. Program daylight saving 2. Update keyboard LED & typematic rate
96h	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)

4.17 Flash BIOS Utility

Utilize AWARD Flash BIOS programming utility to update on-board BIOS for the future new BIOS version. Please contact your technical window to get this utility if necessary.

NOTE : Remark or delete any installed Memory Management Utility (such as HIMEM.SYS, EMM386.EXE, QEMM.EXE, …, etc.) in the CONFIG.SYS files before running Flash programming utility.

CHAPTER 5

Troubleshooting

This chapter provides you a few useful tips to quickly get your ROBO-678 running with no failure. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

5-1 Backplane Setup

Backplane

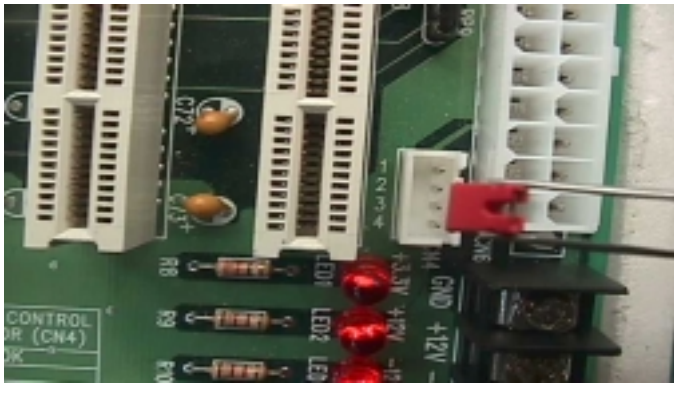
ROBO-678 is a full-sized SBC, and therefore is able to run on any PICMG backplane, active or passive.

ATX power

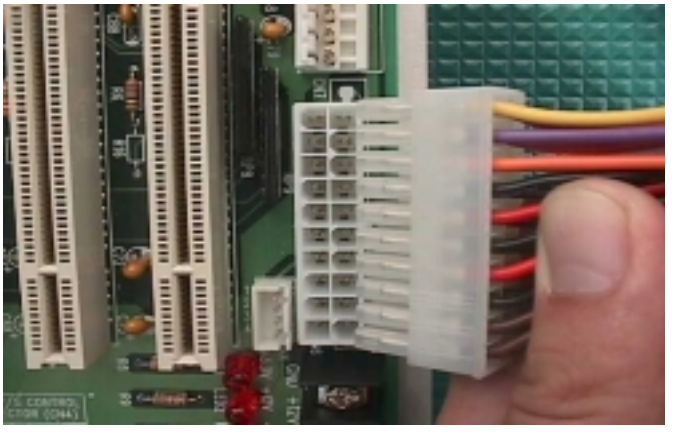
ROBO-678 is designed to support ATX powering. Please refer to the following instruction to apply ATX power on your ROBO-678 and backplane.

Demonstration model: Backplane - PBP-14P4 / ROBO-678

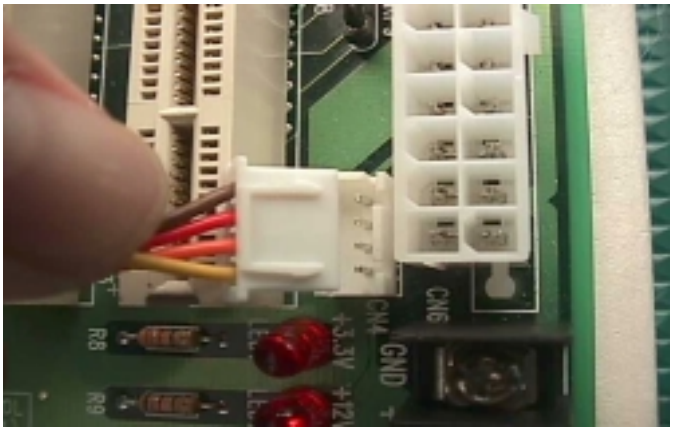
Step1: Remove the jumper on pin3 and pin4 of CN4 ATX P/S CONTROL CONNECTOR, 4-pin) connector (see the Figure below). CN4 connector is on the lower-left side of the CN7 (ATX POWER CONNECTOR) on the backplane.



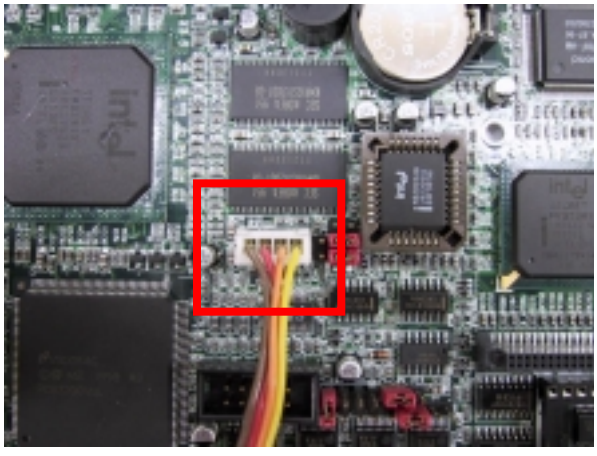
Step2: Connect 20-pin power cable of the ATX POWER with the CN7 (ATX POWER CONNECTOR,20-pin) connector on the backplane. The CN7 is located on the upper-right side of the backplane with white color.



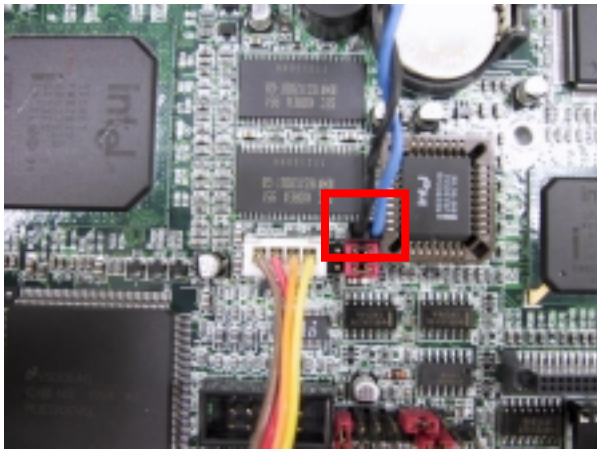
Step3: Use a 4-pin power cable to connect the CN4 (ATX P/S CONTROL CONNECTOR,4-pin) connector on the backplane.



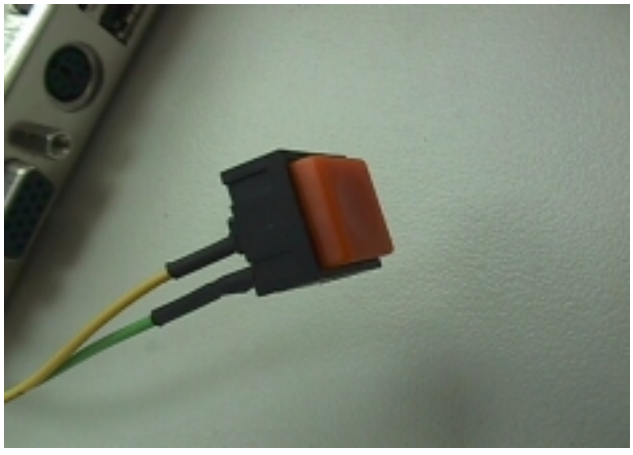
Step4: Please find the J15 4-pin header on the center part of ROBO-678 in white color. You will also see a mark with “J15” at the left bottom corner of J15 header. Connect the 4-pin power control cable with this J15 header.



Step5: Connect TOGGLE SWITCH with J13 connector on ROBO-678. J13 connector (2-pin) is located just on the upper side of JP3 jumper of ROBO-678.



Step6: The figure below is the TOGGLE SWITCH which is used to switch the ATX Power on/off for SBC. Usually the TOGGLE SWITCH is located on the chassis front panel. Press the switch button once will turn power on, and press again to turn it off.



Q : In addition to the above description, is there anything to do to finish up an ATX system ??
A : Yes. ROBO-678 needs to be configured to support ATX function for the above cabling. Please move jumper JP3 to 3-5 short and 4-6 short (support ATX function).

Q : How can I build up an AT system using ATX power supply
A : Do not forget to move JP3 of ROBO-678 back to 1-3 short and 2-4 short (support AT function).

If the ATX power supply has a switch, such as ORION-300ATX, leave the jumper of backplane connector (CN4) in step 1 and use the power supply switch as the system power on switch.

In all cases, users may apply a 2-pin AT (on/off) switch over pin-3 and pin-4 of the backplane connector (CN4) in step 1. However, power supply switch needs to be moved to “on”, if there is one.

5-2 Onboard hardware installation

Q: How do I connect my keyboard and mouse ??

A: Users may always adopt PS/2 keyboard and mouse over the PS/2 interface (through Y-cable), J23, on ROBO-678.

However, it is also fine to adopt a standard keyboard over the standard keyboard connector on backplane, if provided. In this way, users need to adopt a 5-pin keyboard connection cable to line-up, external keyboard interface, J21 on ROBO-678 with the 5-pin keyboard connector on backplane.

Q: OK. I have finished up hardware installation, but I got nothing when I power on the system. Why ??

A: There are thousands of different reasons to produce this power on failure.

1. Check ROBO-678 jumper JP3. For AT power supply or ATX power supply used for AT system, JP3 needs to be at 1-3 and 2-4. Otherwise, it needs to be at 3-5 and 4-6. Incorrect power setting will not allow you to power on the system.
2. Double check if every connector is attached with the correct cable.
3. If you have changed processor with different system clock, please move JP1 (CMOS clear Jumper) to 2-3, power on the system to clear CMOS, power off the system, move JP1 back to 1-2, and power on again.

Q: I power on the system, but the CPU speed is not correct. Why ??

A: This applies to Engineering Sample processor ONLY. If you have ever loaded the BIOS optimal default, thank you for doing so. However, this will force the BIOS to pick up the default CPU core/bus ratio as well. It needs to be emphasized again that ROBO-678 does not have switch or jumper to configure CPU core/bus ratio. This is done through BIOS setting. Please check in the "Frequency/Voltage Control" section of Chapter 4 (4-11) to adjust this core/bus ratio. System default setting is "x5", and hence you should always get a speed of 333 (66MHz FSB), 500 (100MHz FSB) or 667 (133MHz FSB) at boot up after load in the BIOS optimal default.

Q : I connect two IDE devices over one IDE flat cable, but the system either does not start or hangs from time to time. Why ??

A : Make sure that you have configured the two IDE devices as master and slave, respectively.

Q : I am using an ATA-66 hard drive, how can I know that ATA-66 function is started ??

A : You need to use the 80-pin ATA-66 IDE flat cable to have this function ready. During POST, you can see ATA-66 message while hard drive is being detected.

5-3 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the device cables required before turning on AT power. CPU, CPU fan, CPU fan power cable, 168-pin SDRAM, keyboard, mouse, floppy drive, IDE hard disk, printer, VGA connector, device power cables, ATX accessories or P8/P9 power cable are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with ROBO-678, it is recommended, when going with the boot-up sequence, to hit "DEL" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to "**Load Optimal Defaults**", press "Enter" and "Y" to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so that you can be sure that system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load in the default BIOS setting any time system appears to be unstable in boot up sequence.

Auto Detect Hard Disks

In the BIOS => Standard CMOS setup menu, pick up any one from Primary/Secondary Master/Slave IDE ports, and press "Enter". Setup the said IDE port and its access mode to "Auto". This will force system to automatically pick up the IDE devices that are being connected each time system is booted.

Improper disable operation

There are too many occasions where users disable, in BIOS setup, a certain device/feature in one application, but do not enable it before manipulating with another application where the disabled device is needed. Certainly, users fail to detect this device/feature and end up with system failure.

Please check in the BIOS setting that the devices or ports that you need are not disabled. These include the floppy drive, COM1/COM2 ports, parallel port, USB ports, external cache, on-board VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resource. A few good examples are

disable COM1 serial port to release IRQ #4
disable COM2 serial port to release IRQ #3
disable parallel port to release IRQ #7
disable PS/2 mouse to release IRQ #12,
…, etc.

A quick review of the basic IRQ mapping is given below for your reference.

IRQ#	Description
IRQ #0	System Counter
IRQ #1	Keyboard
IRQ #2	Programmed Controller
IRQ #3	COM2
IRQ #4	COM1
IRQ #5	Nothing
IRQ #6	Floppy Disk Controller
IRQ #7	Printer Port (Parallel Port)
IRQ #8	CMOS Clock
IRQ #9	Nothing
IRQ #10	USB interface
IRQ #11	Nothing
IRQ #12	PS/2 mouse
IRQ #13	Data Processor
IRQ #14	Primary IDE Controller
IRQ #15	Secondary IDE Controller

It is then very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resource is not enough, please disable some devices listed above to release more.

5-4 OS Diagnostics

What will be presented here is a brief guide to properly house-in the driver for any Microsoft Windows-95/98/NT device. For other operating systems, please refer to OS manual/guidebook.

Booting

Users may find quite a lot that Windows-95/98 hangs in loading sequence. Windows logo stays with no progress, or simply no display is given. Please restart your system and hit “F5” when loading the Windows system and enter “Safe mode”. Users will always be allowed to enter “Safe mode” with success to remove devices that are not properly running or installed. Please proceed to do so and restart your Windows. Removed devices will be automatically detected again and drivers will be loaded in if drivers have been copied in the system database, or you will be asked to provide driver source for installation.

For Windows-NT 4.0 users, it is always not recommended to change your hardware configuration after your first installation. However, if such a change is needed, please note that sometimes Windows-NT 4.0 will stop loading and prompt you with a whole page of error messages. Please note that reinstallation of this NT hard disk is inevitable. You have to backup your data stored in this hard disk because it is almost impossible to switch back this system unless booting up with another hard disk. If this NT hard disk is installed with FAT16 disk format, please boot up your system with any Windows OS. You will then be able to see this NT hard disk and retrieve any data you have interest in. However, if this NT hard disk is installed with NTFS disk format, there is only NTFS that allows you to retrieve this NT hard disk again.

Display setup

By default, any Windows OS starts with 640 x 480 by 16 colors display. Please load in the display driver provided in ROBO-678 product CDROM to maximize the VGA performance. If you are using a monitor that Windows cannot identify, you will also need to set, in the display setup menu, a system monitor to correctly retrieve display output. For Windows-NT 4.0 users, as ROBO-678 provides Direct AGP on-board display feature, Service Pack 3.0 or above is required to activate this display feature.

Network setup

Windows-95/98 users.

1. Please apply an ISA/PCI network card over ISA/PCI slot.
2. Start Windows-95/98 and let Window-95/98 automatically detect your network adapter.
3. Provide the driver and complete installation.
4. Restart your windows system is required.
5. After you come back to windows, please go to Control Panel -> System -> Device Manager and see if your network adapter has been installed properly. A warning sign will be prompted if the network adaptor is not properly installed.

6. Please remove this network device from system setup menu and restart windows to re-detect your network adapter again.
7. After you are sure that hardware installation is completed, please go to Control Panel -> Network to set up your networking configuration. This includes DNS, IP, Gateway. Appropriate protocols are required to carry your networking activities. Please refer to your system administrator for additional assistance.

Windows-NT 4.0 users.

1. Please install your network adapter manually in Control Panel -> Network -> Adapter. Drivers are required at this stage.
2. Proceed "Binding" after you load in the driver.
3. Change to Protocol label and load in the protocols that you have interest (generally, TCP/IP). Configuring IP, gateway and DNS is required for TCP/IP protocol.
4. Proceed again "Binding" after you complete the protocol loading.
5. Restart your system.
6. There is also situation that your installed network adapter is not working anymore for you, or old network driver stays in the system after you change your network card. Please remove then all the network adapters and protocols from network setup menu and redo the loading of driver and protocols again.
7. Network setup within Windows-NT 4.0 is not as easy as within Windows-95/98. Special familiarity and care are required to come out with a successful installation.

Note

Please visit our technical web-site at

http://www.portwell.com.tw

for additional technical information that is not covered in this manual.