OPERATIONS MANUAL
EBC-855

NOTE: *This manual has been designed and created for use as part of WinSystems Technical Manuals CD and/or the WinSystems website. If this manual or any portion of the manual is downloaded, copied or emailed, the links to additional information (i.e. software, cable drawings) may be inoperable.*

REVISION HISTORY

P/N 400-0327-000

ECO Number	Date Code	Rev Level
ORIGINATED	062606	Preliminary
	070219	A
	070424	B
07-81	070710	C
07-143	070828	D
07-173	071219	D.1
08-33, 08-43, 08-44	080313	D.2
08-52	080424	D.3
08-86	080617	D.4
08-150, 08-166, 09-01	090107	D.5

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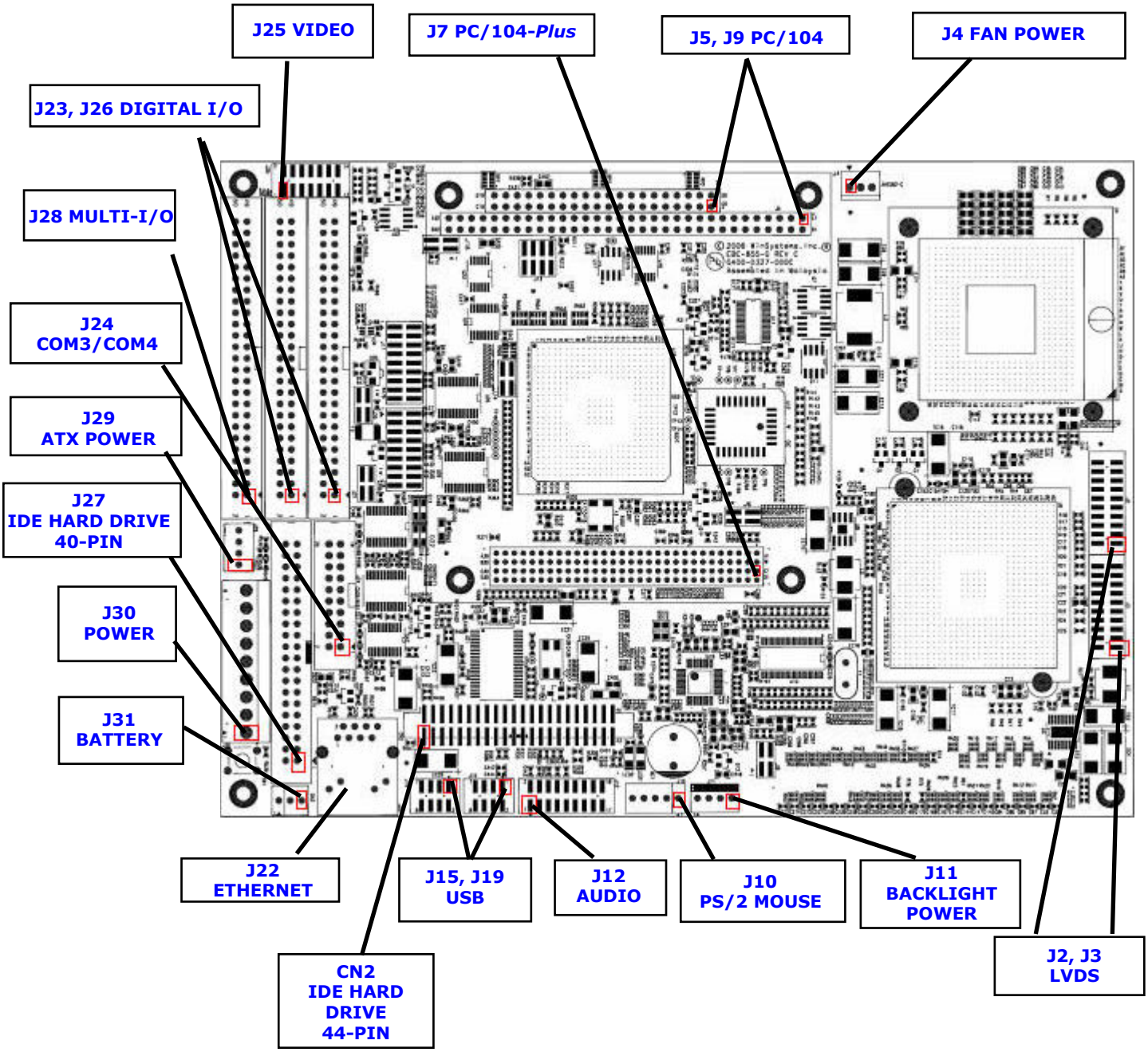
Top View - Connectors

For the convenience of the user, a Visual Index has been provided with direct links to connector and jumper configuration data.

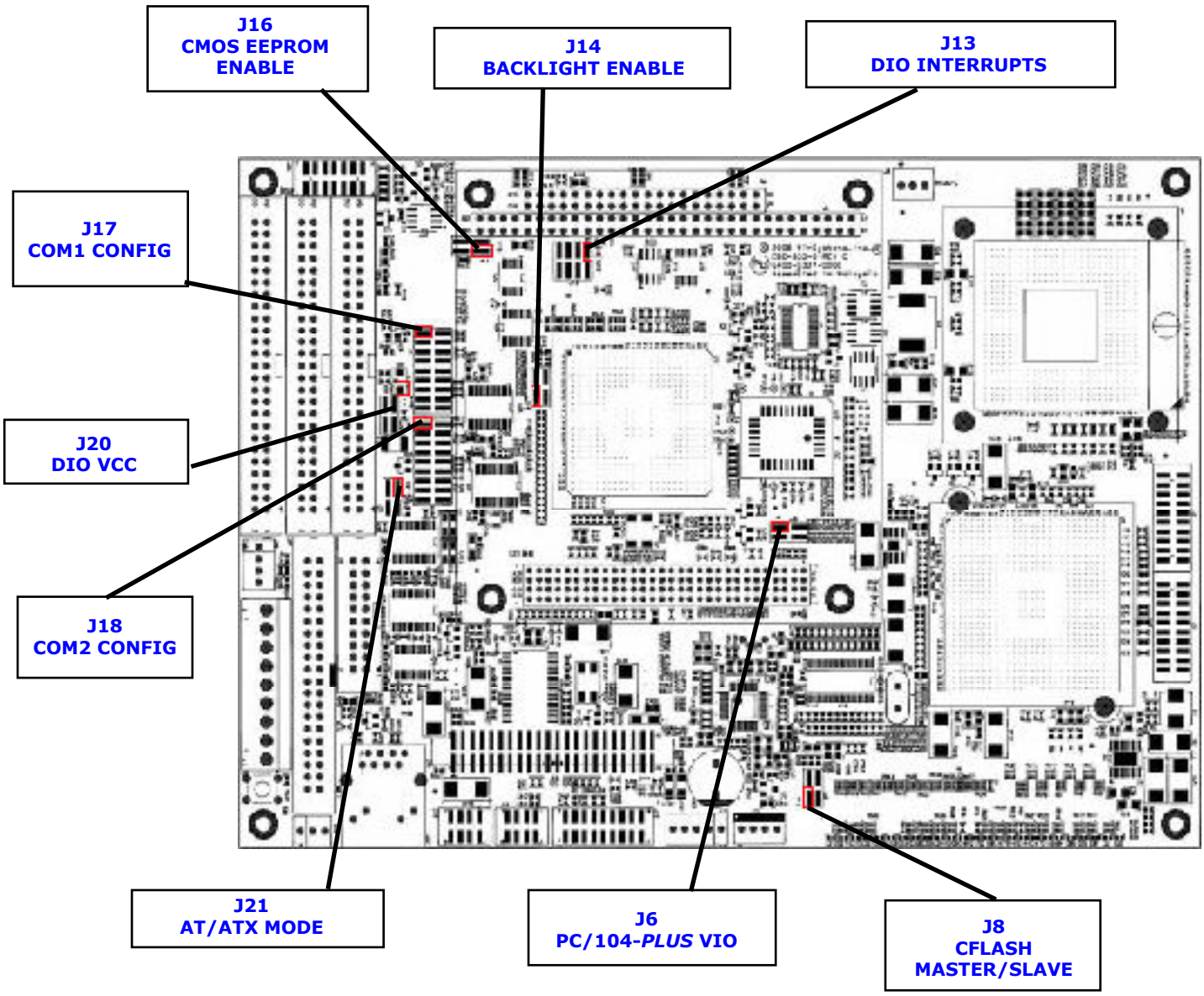


NOTE: The reference line to each component part has been drawn to Pin 1, where applicable. Pin 1 is also highlighted with a red square, where applicable.

Visual Index – Quick Reference

Top View - Jumpers

For the convenience of the user, a Visual Index has been provided with direct links to connector and jumper configuration data.

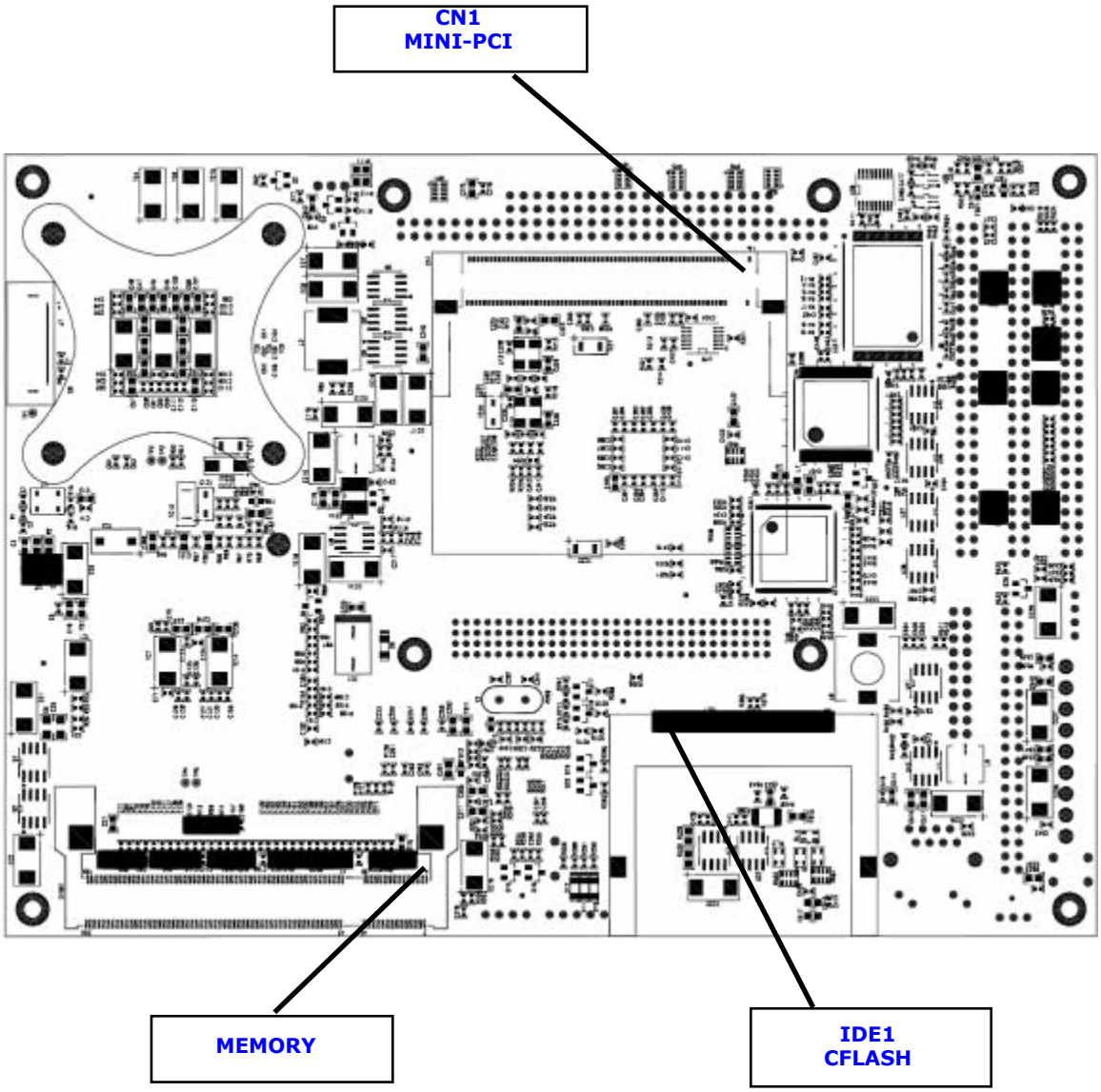


NOTE: The reference line to each component part has been drawn to Pin 1, where applicable. Pin 1 is also highlighted with a red square, where applicable.

Visual Index – Quick Reference

Bottom View

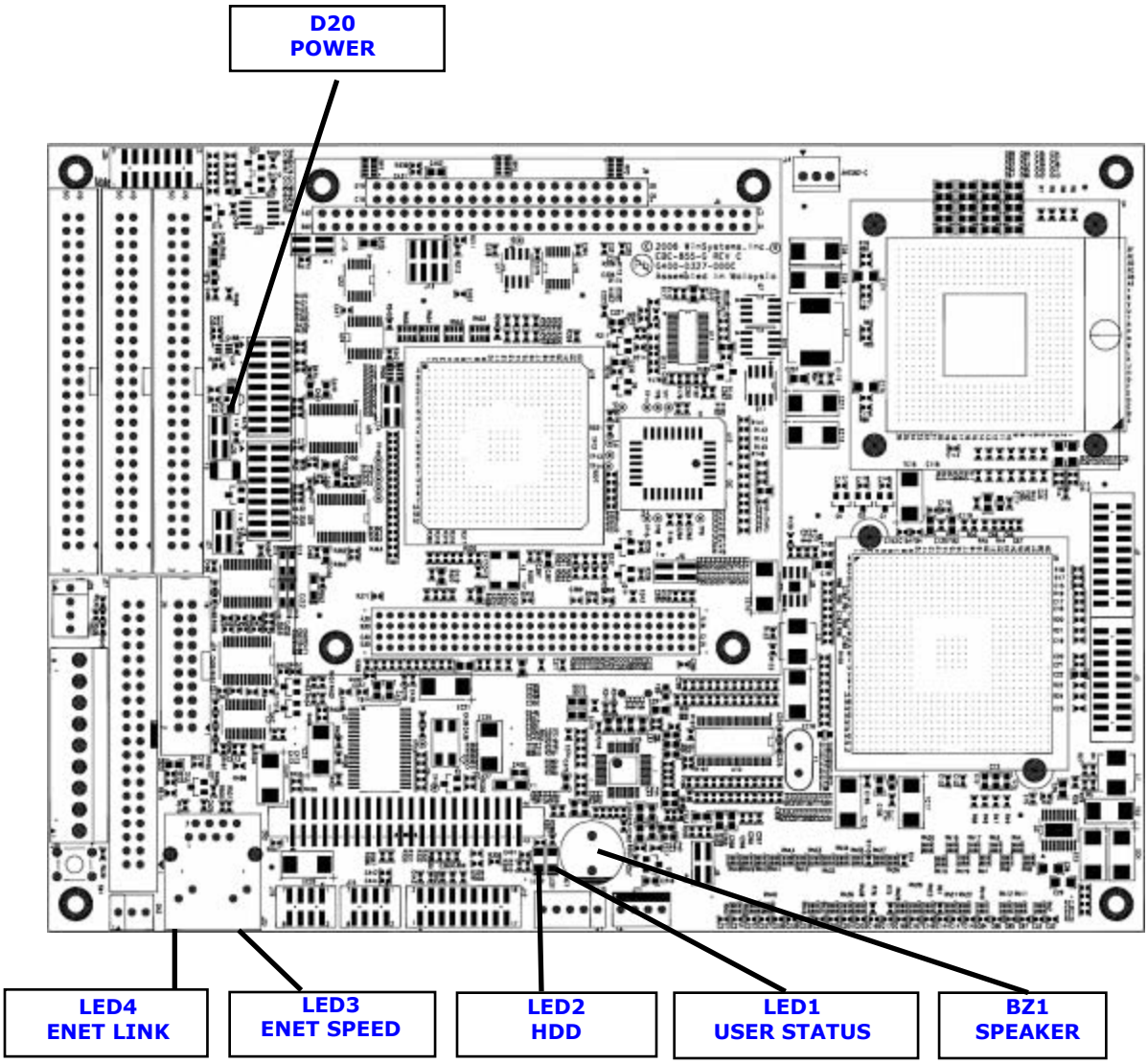
For the convenience of the user, a Visual Index has been provided with direct links to connector and jumper configuration data.



Visual Index – Quick Reference

Top View - LEDs

For the convenience of the user, a Visual Index has been provided with direct links to connector and jumper configuration data.



Introduction

This manual is intended to provide the necessary information regarding configuration and usage of the EBC-855 board. WinSystems maintains a Technical Support Group to help answer questions regarding usage or programming of the board. For answers to questions not adequately addressed in this manual, contact Technical Support at (817) 274-7553, Monday through Friday, between 8 AM and 5 PM Central Standard Time (CST).

General Information

Features

Processor
- Intel® 1 GHz ZCD™
- Intel® 1.8 GHz Pentium M™

Operating Systems Supported
- x86 RTOS, XP Embedded, Linux, DOS

Memory
- Up to 1028 MB of 200-pin SODIMM PC2700 DDR SDRAM (Socketed)

Video
- Up to 2048x1536 resolution

Ethernet
- Intel DA82562ET 10/100 Mbps controller

Wireless
- IEEE 802.11a/b/g via a miniPCI socket

Digital I/O
- 48 Bidirectional lines (WS16C48)

Serial I/O
- Four (4) serial ports (2-RS-232, 2-RS-232/422/485)

Line Printer Port
- SPP/EPP/ECP supported

USB
- Four (4) USB 2.0 ports

Interrupts
- Two (2) interrupt controllers
- Seven (7) DMA channels

Watchdog Timer
- Up to 300 second reset

CompactFlash
- Types I & II supported

IDE
- Two (2) IDE ports

Floppy Drive
- One (1) 3.5” drive supported

Power
- +5V @ 2.1 A required *
- Valid power supply: AT/ATX

Industrial Operating Temperature Range
- -40°C to 70°C (1.8 GHz Pentium M™ with fan, 1 GHz ZCD™ without fan)
- -40°C to 85°C (1 GHz ZCD™ with fan)

Form Factor
- EBX-compliant
- 5.75” x 8.00” (147 mm x 203 mm)

Additional Specifications
- RoHS compliant
- PC/104 and PC/104-*Plus* expansion connectors
- Phoenix® BIOS
- Backlight power supported
- Custom splash screen on start up
- Real-time clock
- Simultaneous CRT and LVDS flat panel supported
- Activity status LEDs onboard
- AC97 Support
- PS/2 Keyboard Supported
- PS/2 Mouse Supported

* (+5V @ 4.25 A required for Intel® 1.8 GHz Pentium M™)

Software Support

The EBC-855 is an x86-compatible SBC. The architecture of the EBC-855 is designed for embedded board operation in the Windows XP / XP Embedded environment. This board is also capable of running Linux 2.6, DOS and other operating systems such as QNX or VxWorks. Its x86-PC software compatibility assures a wide range of tools to aid in developing and checkout of your application’s program.

Software Developers Kit

WinSystems offers software developers kits to provide the necessary hardware, software and cables to aid program development with the EBC-855 board. The configuration consists of an operating system, DVD-ROM drive, a hard disk, a 3.5” floppy disk, plus the required cables and a triple output power supply housed in an enclosure. This packaging permits easy access to the board, PC/104 modules and peripherals during program development.

Functional Capability

System Processor

The EBC-855 is based upon the Intel Pentium M or Zero Cache Dothan (ZCD) CPU which supports two speeds: Pentium M 1.8 GHz and ZCD 1.0 GHz. It uses a Micro-FCBGA Package of 479-pins based on 90 nm process technology featuring up to 2 MB L2 Cache and 400 MHz Front-Side Bus(FSB).

System Controllers

The EBC-855 uses Intel 855GME for the North Bridge to interface to the CPU, DDR SDRAM memory and the graphics interface. The 732-pin Micro-FCBGA packages support: a 400 MHz Front-Side Bus (FSB), host bus dynamic bus inversion (DBI), 64-bit host data bus and 32-bit addressing. The memory system supports 200/266/333 MHz DDR SDRAM device (up to 1 GB). There is also a graphics controller with LVDS and CRT support.

The Intel ICH4 South Bridge provides many I/O features. It contains two IDE ports – Primary (HDD) and Secondary (CF) with ATA100, audio codec AC97, four USB ports (2.0), SM Bus, LAN link to Intel Ethernet controller, general purpose I/O ports, low pin count bus interface, PCI Bus interface, Real-Time Clock (RTC), watchdog timer and power management.

Memory

Visual Index

The EBC-855 can support a maximum of 1 GB of RAM with the 200-pin SODIMM socket located on the back of the board at **DIMM1**.

Qualified SODIMMS are available directly from WinSystems. WinSystems cannot warrant the operation of systems using nonqualified SODIMM modules.

The RAM can be user supplied, but must meet the following criteria:

200-Pin SODIMM PC2700 DDR SDRAM with gold fingers (up to 1 GB)

Installation is accomplished by inserting the module into the connector at approximately a 30 degree angle. Press firmly to fully seat the module into the connector and then press the module downward to snap it into the retaining clamps.

Removal is accomplished by gently pulling outward on the retaining clamps until the module springs up to the appropriate removal angle.

DMA

DMA is supported. Channel 2 is dedicated to the floppy disk controller. The LPT is plug-and-play configurable. The other 8-bit DMA channels are wired to the PC/104 connector. 16-bit channels are not supported.

Interrupt Routing

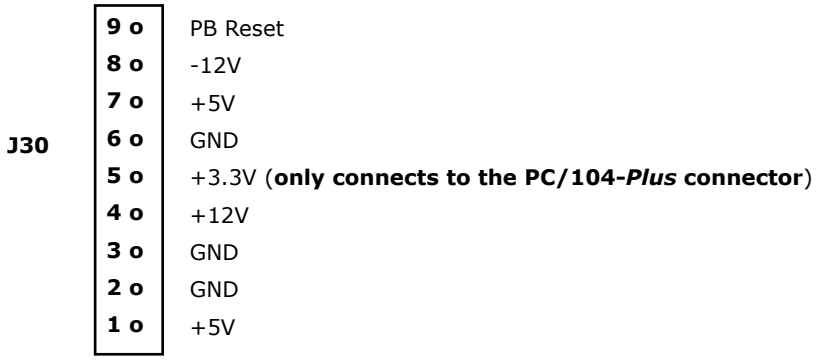
Visual Index

All interrupts are routed to their respective PC/104 bus pins. The Digital I/O is the only interrupt routing that is jumper selectable at **J13**. For further details, refer to the Digital I/O Section later in this manual.

Power and Reset Interface

Visual Index

Power is applied to the EBC-855 via the connector at **J30** (Molex part number 26-60-7091). The pin definitions for **J30** are given below. An optional push-button-reset (normally OPEN) may also be routed into **J30,** pin 9 if desired. Momentary closure to ground forces a hardware reset.

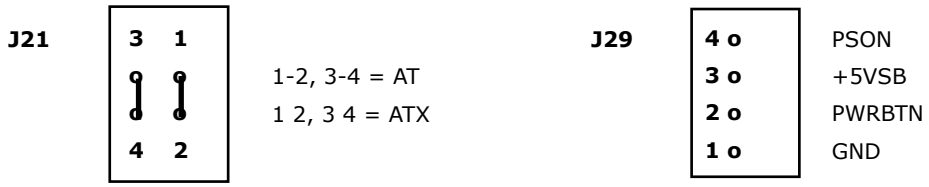


Power Supply Selection

The EBC-855 supports either AT or ATX type power supplies. **J21** specifies the style of supply connected to the single board computer (SBC). An AT power supply is a simple on/off supply with no interaction with the single board computer. Most embedded systems use this type of power supply and it is the default setting.

ATX type power supplies function with a "soft" on/off power button and a +5 VSB (standby). If an ATX compatible power supply is connected, **J21** should be set accordingly and a power button (momentary contact) connected between pin 2 (power button) and pin 1 (ground) of **J29**. The +5 VSB signal on **J29** provides the standby voltage to the EBC-855 but does not power any other features of the board. When the power button is pressed, the EBC-855 pulls PSON (Power Supply On) low and the power supply turns on all voltages to the single board computer. When the power button is pressed again, the BIOS signals the event so ACPI-compliant operating systems can be shutdown before the power is turned off. Since this is software driven, it is possible that a software lockup could prevent the power button from functioning properly. For the BIOS to report the ATX supply to ACPI-compatible operating systems, **J21** must be setup correctly.

Note: True ATX power supplies are not applicable for embedded systems. They are typically 300W supplies and may not regulate properly with low power embedded systems such as the EBC-855.



Power LED

An LED located at **D20** indicates the state of the system as reflected in this table.

Visual Index

LED	Description
OFF	Power OFF Mode
GREEN	Operating Mode
AMBER	Standby Mode

Power Fail Reset

A precision voltage comparator monitors the +5V status. Upon detection of an out-of-tolerance condition, the board is reset. This action is critically important in order to detect brownout or power fail conditions. The reset circuit also ensures that the power is nominal before executing a power-on reset. This circuit also inhibits the processor's memory write line, preventing invalid data from being written to nonvolatile memory during power fluctuations.

BIOS

Visual Index

The EBC-855 BIOS provides configuration flexibility, performance and AT-compatibility. It includes enhancements required for embedded applications like the ability to boot without a keyboard or video monitor present, and save settings to EEPROM. Configuration options and instructions are discussed in more detail in the BIOS Supplemental later in this manual.

Saving BIOS Setup

The EBC-855 provides two methods for saving BIOS setup data:
Standard battery backed CMOS RAM and **Nonvolatile EEPROM**.

The battery is enabled/disabled using connector **J31**. For further details, refer to the Battery Backup Section later in this manual.

The EEPROM write/read functionality is enabled/disabled at **J16**, pins 3 and 4.

J16

4 o–o 3
2 o o 1

3-4 Enables CMOS setup to/from EEPROM
1 2 Temporarily install to clear CMOS Memory

J16

4 o o 3
2 o o 1

3 4 Restores original factory default CMOS settings
1 2 Temporarily install to clear CMOS Memory

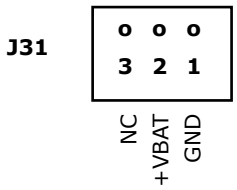
Real-Time Clock/Calendar

A real-time clock (RTC) is used as the AT-compatible clock/calendar. It supports a number of features, including periodic and alarm interrupt capabilities. In addition to the time and date keeping functions, the system configuration is kept in CMOS RAM contained within the clock section.

Battery Backup

Visual Index

A connector is available at **J31** to provide battery backup to the real-time clock and CMOS. The battery input voltage range is 3.0V to 3.6V, ±5%. An extended temperature lithium battery capable of backing up the EBC-855 is available from WinSystems, part number BAT-LTC-E-36-27-1 (or BAT-LTC-E-36-16-1 if applicable). Contact your WinSystems' Applications Engineer for additional information.



(Provides battery backup to RTC and BIOS CMOS.)

WARNING: BAT-LTC-E-36-27-1 (or BAT-LTC-E-36-16-1 if applicable) must be connected at J31. Improper connection may result in explosive failure. It is possible for the battery to violently explode if installed incorrectly. Please be careful to note correct connection at location J31.

Rotational Disk Support

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IDE Support

Two industry standard UDMA/100 capable 16-bit IDE controllers are provided to support up to four hard disk devices. A red status LED, **LED2**, provides visual status during IDE data transfers. The interface to the Primary controller is provided at connector **J27** for up to two 40-pin devices. The Secondary controller interface is provided at **CN2** for a 44-pin device, and at **IDE1** for a CompactFlash device. WinSystems offers the cable CBL-126-10 (40-pin) and CBL-266-1 (44-pin) to simplify the connection.

J27

Reset*	**1 o o 2**	GND
D7	**3 o o 4**	D8
D6	**5 o o 6**	D9
D5	**7 o o 8**	D10
D4	**9 o o 10**	D11
D3	**11 o o 12**	D12
D2	**13 o o 14**	D13
D1	**15 o o 16**	D14
D0	**17 o o 18**	D15
GND	**19 o o 20**	N/C
DRQ	**21 o o 22**	GND
IOW	**23 o o 24**	GND
IOR	**25 o o 26**	GND
RDY	**27 o o 28**	N/C
DACK	**29 o o 30**	GND
IRQ	**31 o o 32**	N/C
A1	**33 o o 34**	66/100 MHz
A0	**35 o o 36**	A2
HDSC0	**37 o o 38**	HDSC1
LED	**39 o o 40**	GND

CN2

Reset*	**1 o o 2**	GND
D7	**3 o o 4**	D8
D6	**5 o o 6**	D9
D5	**7 o o 8**	D10
D4	**9 o o 10**	D11
D3	**11 o o 12**	D12
D2	**13 o o 14**	D13
D1	**15 o o 16**	D14
D0	**17 o o 18**	D15
GND	**19 o o 20**	N/C
DRQ	**21 o o 22**	GND
IOW	**23 o o 24**	GND
IOR	**25 o o 26**	GND
RDY	**27 o o 28**	N/C
DACK	**29 o o 30**	GND
IRQ	**31 o o 32**	IOCS16*
A1	**33 o o 34**	66/100 MHz
A0	**35 o o 36**	A2
HDSC0	**37 o o 38**	HDSC1
LED	**39 o o 40**	GND
VCC	**41 o o 42**	VCC
GND	**43 o o 44**	GND

Floppy Drive Support

Optional usage of the WinSystems cable CBL-308-1 is supported to interface to a 3.5” 1.44 MB floppy drive device via the LPT port. To enable the LPT Floppy option, two CMOS settings are required:

1) Select **Advanced** | **I/O Device Configuration** | Set **FDC Signals on Parallel Port** = **[Enabled]**

2) Select **Advanced** | **I/O Device Configuration** | Set **Floppy Disk Controller** = **[Enabled]**

The detailed listing of the pinout for the connector and cable is available in the cable drawings.

Optional Storage Media

The EBC-855 supports several USB storage devices, including floppy drive, CD-ROM drives, Flash drives and hard drives. Legacy USB boot operation is supported by the system BIOS. Compatibility with the Legacy USB boot operation depends on the USB device’s manufacturer and the media configuration. Not all operating systems support USB boot.

CompactFlash

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The EBC-855 supports solid state CompactFlash storage devices for applications where the environment is too harsh for mechanical hard disks or floppy drives.

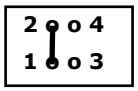
The CompactFlash socket at **IDE1**, on the back of the board, supports modules with TrueIDE support. WinSystems offers industrial grade CompactFlash modules that provide high performance and extended temperature operation (-40ºC to +85ºC). A red IDE activity LED is present at **LED2**.

IDE1

GND	**1 o o 2**	D3
D4	**3 o o 4**	D5
D6	**5 o o 6**	D7
HDCS0	**7 o o 8**	GND
GND	**9 o o 10**	GND
GND	**11 o o 12**	GND
CFVCC	**13 o o 14**	GND
GND	**15 o o 16**	GND
GND	**17 o o 18**	A2
A1	**19 o o 20**	A0
D0	**21 o o 22**	D1
D2	**23 o o 24**	N/C
N/C	**25 o o 26**	N/C
D11	**27 o o 28**	D12
D13	**29 o o 30**	D14
D15	**31 o o 32**	HDCS1
GND	**33 o o 34**	IOR
IOW	**35 o o 36**	CFWE
IRQ	**37 o o 38**	CFVCC
Slave/Master	**39 o o 40**	N/C
Reset	**41 o o 42**	RDY
SDDREQ	**43 o o 44**	DACK
LED	**45 o o 46**	N/C
D8	**47 o o 48**	D9
D10	**49 o o 50**	GND

When using a CompactFlash device, Master/Slave selection is made using jumper field **J8.**

CFLASH (J8)



3 4 not used

1-2 CFlash Master, 1 2 CFlash Slave

Serial Interface

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The EBC-855 provides four, 16C550 compatible, RS-232 serial ports. COM1 and COM2 are terminated at **J28,** the 50-pin Multi-I/O connector, and can be configured for RS-232, RS-485 or RS-422. An adapter cable, part number CBL-247-1, is available from WinSystems to adapt to the conventional I/O connectors. COM3 and COM4 are RS-232 only and are terminated at **J24**. WinSystems offers an adapter cable, CBL-173-1, which adapts **J24** to two standard DB9M connectors. For additional information on cable connection, refer to the cable drawings.

COM1 and COM2 Configuration

COM1 and COM2 addresses and interrupts are set using the BIOS CMOS setup. Both COM1 and COM2 can be individually jumpered for any one of the following operating modes:

1. RS-232 Mode
2. RS-422 Mode with RTS transmitter enable
3. RS-422 Mode with auto transmitter enable
4. RS-485 Mode with RTS transmitter enable
5. RS-485 Mode with RTS transmitter enable and echo back
6. RS-485 Mode with auto transmitter enable
7. RS-485 Mode with auto transmitter enable and echo back

Modes 2, 4 and 5 require the RTS bit (MCR Bit 1) be set in order to Transmit.
Mode 4 requires that RTS (MCR Bit 1) be de-asserted in order to receive.

Each of the RS-422/RS-485 modes allow for jumper selection of transmit and/or receive termination resistor(s). There is an 11-pin configuration jumper for COM1 and COM2 that allows the user to select the operating mode and its optional features and termination. The jumper numbers and corresponding port numbers are shown on the following pages. There are three choices for termination when RS-422 or RS-485 modes are used.

TX(100) : Places a 100Ω resistor across the **TX+/TX-** pair

RX(100) : Places a 100Ω resistor across the **RX+/RX-** pair

TX/RX(300) : Places a 100Ω Resistor from +5V to **TX/RX+**, a 100Ω resistor from **TX/RX-** to ground and a 100Ω resistor between **TX/RX+** and **TX/RX-**.

J28 – COM1/COM2 50-pin Multi-I/O Connector

COM1

RS-485	RS-422	RS-232	J28 Pin#	RS-232	RS-422	RS-485
N/A	N/A	DCD	1-2	DSR	RX+	N/A
TX/RX+	TX+	RXD	3-4	RTS	RX+	N/A
TX/RX-	TX-	TXD	5-6	CTS	N/A	N/A
N/A	N/A	DTR	7-8	RI	N/A	N/A
GND	GND	GND	9			

COM2

RS-485	RS-422	RS-232	J28 Pin#	RS-232	RS-422	RS-485
			10	DCD	N/A	N/A
N/A	RX+	DSR	11-12	RXD	TX+	TX/RX+
N/A	RX-	RTS	13-14	TXD	TX-	TX/RX-
N/A	N/A	CTS	15-16	DTR	N/A	N/A
N/A	N/A	RI	17-18	GND	GND	GND

COM1/COM2 RS-232/RS-422/RS-485 Modes

COM1 is configured by setting jumpers at **J17** and COM2 is configured by setting jumpers at **J18**, as shown in the tables below. The tables provide the appropriate jumpering for the various modes.

COM1

Mode #	Description	J17	Termination J17		
			TX (100)	RX (100)	TX/RX (300)
1	RS-232	1-2	N/A	N/A	N/A
2	RS-422 RTS ENABLE	3-4 9-10	13-14	17-18	11-12 13-14 15-16
3	RS-422 AUTO ENABLE	3-5, 9-10 (One node must use TX-RX 300 Termination)	N/A	17-18	11-12 13-14 15-16
4	RS-485 RTS ENABLE	3-4, 7-8	13-14	N/A	11-12 13-14 15-16
5	RS-485 RTS ENABLE with Echo-Back	3-4, 6-8	13-14	N/A	11-12 13-14 15-16
6	RS-485 AUTO ENABLE	3-5, 7-8 (One node must use TX/RX 300 Termination)	13-14	N/A	11-12 13-14 15-16
7	RS-485 AUTO ENABLE with Echo-Back	3-5, 6-8 (One node must use TX/RX 300 Termination)	N/A	N/A	11-12 13-14 15-16

COM2

Mode #	Description	J18	Termination J18		
			TX (100)	RX (100)	TX/RX (300)
1	RS-232	1-2	N/A	N/A	N/A
2	RS-422 RTS ENABLE	3-4 9-10	13-14	17-18	11-12 13-14 15-16
3	RS-422 AUTO ENABLE	3-5, 9-10 (One node must use TX-RX 300 Termination)	N/A	17-18	11-12 13-14 15-16
4	RS-485 RTS ENABLE	3-4, 7-8	13-14	N/A	11-12 13-14 15-16
5	RS-485 RTS ENABLE with Echo-Back	3-4, 6-8	13-14	N/A	11-12 13-14 15-16
6	RS-485 AUTO ENABLE	3-5, 7-8 (One node must use TX/RX 300 Termination)	13-14	N/A	11-12 13-14 15-16
7	RS-485 AUTO ENABLE with Echo-Back	3-5, 6-8 (One node must use TX/RX 300 Termination)	N/A	N/A	11-12 13-14 15-16

COM3 and COM4 Configuration
The I/O base addresses for COM3 and COM4 are set in CMOS setup. COM3 and COM4 are RS-232 only and are terminated at **J24**.

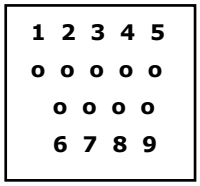
J24 - COM3/COM4 Connector

COM3 - DCD	**1 o o 2**	COM3 - DSR
COM3 - RX	**3 o o 4**	COM3 - RTS
COM3 - TX	**5 o o 6**	COM3 - CTS
COM3-DTR	**7 o o 8**	COM3 - RI
GND	**9 o o 10**	N/C
COM4 - DCD	**11 o o 12**	COM4 - DSR
COM4 - RX	**13 o o 14**	COM4 - RTS
COM4 - TX	**15 o o 16**	COM4 - CTS
COM4 - DTR	**17 o o 18**	COM4 - RI
GND	**19 o o 20**	N/C

WinSystems offers an adapter cable, CBL-173-1, which adapts **J24** to two standard DB9M connectors.

Serial Connector Summary (DB9 Pinout)

Visual Index



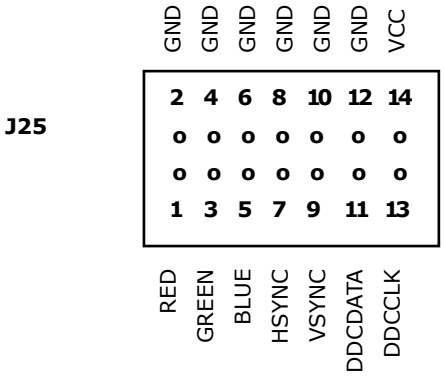
RS-232 Mode	RS-422 Mode	RS-485 Mode
1. DCD	1. N/A	1. N/A
2. RX	2. TX+	2. TX/RX+
3. TX	3. TX-	3. TX/RX-
4. DTR	4. N/A	4. N/A
5. GND	5. GND	5. GND
6. DSR	6. RX+	6. N/A
7. RTS	7. RX-	7. N/A
8. CTS	8. N/A	8. N/A
9. RI	9. N/A	9. N/A

Video Interface

The EBC-855 has an integrated display controller that provides both a CRT and flat panel display interface.

CRT Output Connection

Video output to a standard VGA monitor is made via the connector at **J25**. An adapter cable, part number CBL-234-1, is available from WinSystems to adapt from **J25** to the standard DB15 VGA connector. The pin definitions for the **J25** connector are:

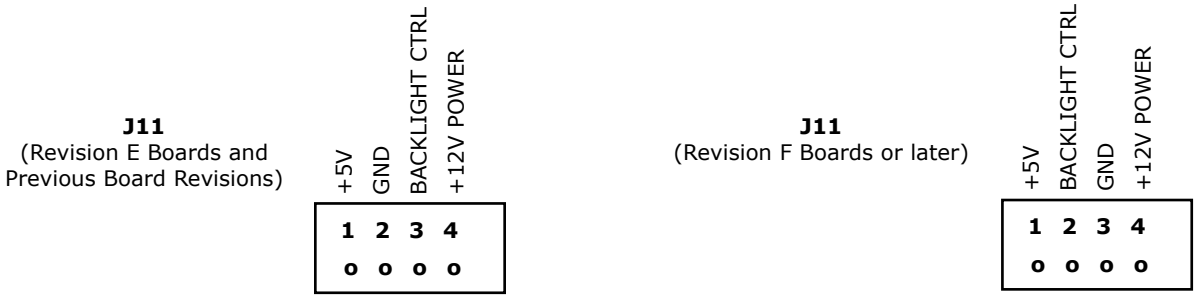


Flat Panel Connections

WinSystems provides flat panel support with a series of cables and support hardware. Contact your WinSystems' Applications Engineer for the most current list of supported panels. **This manual does not attempt to provide any information about how to connect to specific LCDs**. Attempted connection to any flat panel not directly supported by WinSystems is at the user's risk. Extreme care should be exercised to avoid damaging or destroying the panel. For additional information contact your WinSystems' Applications Engineer.

HAZARD WARNING: LCD panels can require a high voltage for the panel backlight. This high-frequency voltage can exceed 1000 volts and can present a shock hazard. Care should be taken when wiring and handling the inverter output. To avoid the danger of shock and to avoid the panel, make all connection changes with the power removed.

Panel Backlight Connection – Panel backlight connection is made via the connector at **J11**. The pinout for **J11** is shown here for reference.



J14

2	4
o	o
o	o
1	3

Avoid Simultaneous Jumpering

Misjumpering could cause damage to the board and/or the Backlight Panel.

(Only One Jumper Selection)

3-4 = Active Low Backlight Enable

1-2 = Active High Backlight Enable

LVDS Connector

There is a dual Low Voltage Differential Signal (LVDS) channel interface available on the EBC-855. Connection is made via the connectors at **J2** and **J3**. The two LVDS connectors at **J2** and **J3** provide a single video interface. **J2** is used for lower resolution panels and high resolution displays may require both connectors.

Visual Index

J2

LV_VDD	**1 o o 2**	GND
A0-	**3 o o 4**	A0+
A1-	**5 o o 6**	A1+
LV_VDD	**7 o o 8**	GND
A2-	**9 o o 10**	A2+
A3-	**11 o o 12**	A3+
LV_VDD	**13 o o 14**	GND
ACLK-	**15 o o 16**	ACLK+
DDC_CLK	**17 o o 18**	GND
DDC_DAT	**19 o o 20**	GND

J3

LV_VDD	**1 o o 2**	GND
B0-	**3 o o 4**	B0+
B1-	**5 o o 6**	B1+
LV_VDD	**7 o o 8**	GND
B2-	**9 o o 10**	B2+
B3-	**11 o o 12**	B3+
LV_VDD	**13 o o 14**	GND
BCLK-	**15 o o 16**	BCLK+
DDC_CLK	**17 o o 18**	GND
DDC_DAT	**19 o o 20**	GND

Flat Panel Power

Panel power is -3.3V.

Visual Index

Fan Power is made by using jumper field **J4.**

J4

1 o	GND
2 o	VCC
3 o	TACH

Ethernet Controller

Visual Index

A DA82562ET is a single chip 10/100 Mbps Ethernet controller in a 48-pin shrink small outline package with Wake-On-LAN (WOL). It is a low power 3.3V CMOS design. The DA82562ET is IEEE 802.3 10Base-T/100Base-T compliant physical layer interface with IEEE 802.3U auto-negotiation support. The RJ-45 connection is available at **J22**.

There are status LEDs for link, speed and activity.

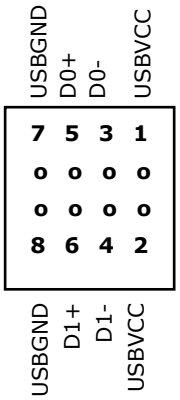
LED4	LINK/ACTIVITY
LED3	10/100

USB

Visual Index

The EBC-855 provides four USB 2.0 channels. These are terminated to two 8-pin, 2 mm connectors at **J15** and **J19**. An adapter cable, CBL-275-1, is available from WinSystems for connection. The pinout for the connectors are:

J15 (ports 2-3)
J19 (ports 0-1)



Audio Interface

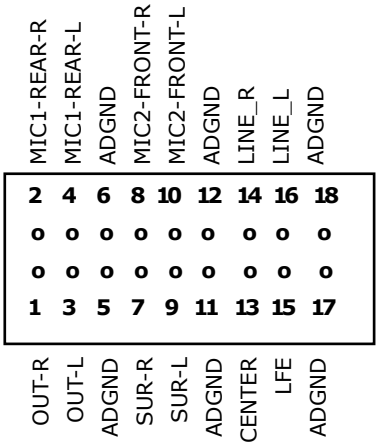
Visual Index

The EBC-855 has an audio interface designed to provide high-quality audio reproduction for embedded systems use. The EBC-855 provides three stereo line level channels (or 5.1 surround), line level input and microphone.

Audio External Connection

J12 provides connection to line and microphone inputs. WinSystems offers cable CBL-270-2 to simplify this connection. The pin definitions for **J12** are provided below:

J12



A small PC speaker at **BZ1** is also available. It works separately from the more advanced audio interface. The **BZ1** speaker is intended for simple audio tones.

Digital I/O

Visual Index

The EBC-855 utilizes the WinSystems WS16C48 ASIC high-density I/O chip mapped at a base address of 120H. The first 24 lines are capable of fully latched event sensing with sense polarity being software programmable. Two 50-pin connectors allow for easy mating with industry standard I/O racks.

Digital I/O Connectors

The 48 lines of digital I/O are terminated through two 50-pin connectors at **J23** and **J26**. The **J23** connector handles I/O Ports 0 through 2 while **J26** handles Ports 3 through 5. The pin definitions for **J23** and **J26** are shown below.

J23

GND	**50 o o 49**	+5V
GND	**48 o o 47**	Port 0 Bit 0
GND	**46 o o 45**	Port 0 Bit 1
GND	**44 o o 43**	Port 0 Bit 2
GND	**42 o o 41**	Port 0 Bit 3
GND	**40 o o 39**	Port 0 Bit 4
GND	**38 o o 37**	Port 0 Bit 5
GND	**36 o o 35**	Port 0 Bit 6
GND	**34 o o 33**	Port 0 Bit 7
GND	**32 o o 31**	Port 1 Bit 0
GND	**30 o o 29**	Port 1 Bit 1
GND	**28 o o 27**	Port 1 Bit 2
GND	**26 o o 25**	Port 1 Bit 3
GND	**24 o o 23**	Port 1 Bit 4
GND	**22 o o 21**	Port 1 Bit 5
GND	**20 o o 19**	Port 1 Bit 6
GND	**18 o o 17**	Port 1 Bit 7
GND	**16 o o 15**	Port 2 Bit 0
GND	**14 o o 13**	Port 2 Bit 1
GND	**12 o o 11**	Port 2 Bit 2
GND	**10 o o 9**	Port 2 Bit 3
GND	**8 o o 7**	Port 2 Bit 4
GND	**6 o o 5**	Port 2 Bit 5
GND	**4 o o 3**	Port 2 Bit 6
GND	**2 o o 1**	Port 2 Bit 7

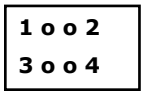
J26

GND	**50 o o 49**	+5V
GND	**48 o o 47**	Port 3 Bit 0
GND	**46 o o 45**	Port 3 Bit 1
GND	**44 o o 43**	Port 3 Bit 2
GND	**42 o o 41**	Port 3 Bit 3
GND	**40 o o 39**	Port 3 Bit 4
GND	**38 o o 37**	Port 3 Bit 5
GND	**36 o o 35**	Port 3 Bit 6
GND	**34 o o 33**	Port 3 Bit 7
GND	**32 o o 31**	Port 4 Bit 0
GND	**30 o o 29**	Port 4 Bit 1
GND	**28 o o 27**	Port 4 Bit 2
GND	**26 o o 25**	Port 4 Bit 3
GND	**24 o o 23**	Port 4 Bit 4
GND	**22 o o 21**	Port 4 Bit 5
GND	**20 o o 19**	Port 4 Bit 6
GND	**18 o o 17**	Port 4 Bit 7
GND	**16 o o 15**	Port 5 Bit 0
GND	**14 o o 13**	Port 5 Bit 1
GND	**12 o o 11**	Port 5 Bit 2
GND	**10 o o 9**	Port 5 Bit 3
GND	**8 o o 7**	Port 5 Bit 4
GND	**6 o o 5**	Port 5 Bit 5
GND	**4 o o 3**	Port 5 Bit 6
GND	**2 o o 1**	Port 5 Bit 7

Digital I/O VCC Enable

The I/O connectors can provide +5V to an I/O rack or for miscellaneous purposes by jumpering **J20**. When **J20** is jumpered (1-2), +5V is provided at pin 49 of both **J23** and **J26**. It is the user's responsibility to limit current to a safe value (less than 400 mA) to avoid damaging the CPU board.

J20

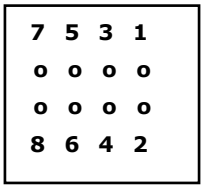


1-2 +5V is provided at pin 49 of both **J23** and **J26**

3 4 DIO enabled (OPEN)

3-4 DIO disabled

J13



DIO Interrupt Selection (only one selection)

1-2	none
3-4	IRQ 15
5-6	IRQ 10 (default)
7-8	IRQ 5

MiniPCI/802.11 Wireless Support

Visual Index

The EBC-855 includes a MiniPCI socket (**CN1**), located on the back of the board, as another means to add functionality. Though the socket can support other devices, it is most often used to add wireless Ethernet cards from Intel®, Broadcom®, Foxconn® (Atheros), or others.

MiniPCI Device Interface (CN1)

PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	N/C	2	N/C	63	3.3V	64	FRAME#
	KEY		KEY	65	CLKRUN#	66	TRDY#
3	N/C	4	N/C	67	SERR#	68	STOP#
5	N/C	6	N/C	69	GROUND	70	3.3V
7	N/C	8	N/C	71	PERR#	72	DEVSEL#
9	N/C	10	N/C	73	C/BE(1)#	74	GROUND
11	N/C	12	N/C	75	AD(14)	76	AD(15)
13	N/C	14	N/C	77	GROUND	78	AD(13)
15	N/C	16	RESERVED	79	AD(12)	80	AD(11)
17	INTB#	18	5V	81	AD(10)	82	GROUND
19	3.3V	20	INTA#	83	GROUND	84	AD(09)
21	RESERVED	22	RESERVED	85	AD(08)	86	C/BE(0)#
23	GROUND	24	3.3V AUX	87	AD(07)	88	3.3V
25	CLK	26	RST#	89	3.3V	90	AD(06)
27	GROUND	28	3.3V	91	AD(05)	92	AD(04)
29	REQ#	30	GNT#	93	RESERVED	94	AD(02)
31	3.3V	32	GROUND	95	AD(03)	96	AD(00)
33	AD(31)	34	PME#	97	5V	98	RESERVED_WIP[5]
35	AD(29)	36	RESERVED	99	AD(01)	100	RESERVED_WIP[5]
37	GROUND	38	AD(30)	101	GROUND	102	GROUND
39	AD(27)	40	3.3V	103	N/C	104	M66EN
41	AD(25)	42	AD(28)	105	N/C	106	N/C
43	RESERVED	44	AD(26)	107	N/C	108	N/C
45	C/BE(3)#	46	AD(24)	109	N/C	110	N/C
47	AD(23)	48	IDSEL	111	N/C	112	RESERVED_WIP5
49	GROUND	50	GROUND	113	N/C	114	GROUND
51	AD(21)	52	AD(22)	115	N/C	116	N/C
53	AD(19)	54	AD(20)	117	N/C	118	N/C
55	GROUND	56	PAR	119	N/C	120	N/C
57	AD(17)	58	AD(18)	121	RESERVED	122	N/C
59	C/BE(2)#	60	AD(16)	123	N/C	124	3.3V AUX
61	IRDY#	62	GROUND				

Line Printer Port

The LPT port is a multimode parallel printer port that supports the Standard Bidirectional Parallel Port (SPP), Enhanced Parallel Port (EPP) or Extended Capabilities Port (ECP). The output drivers support 14 mA per line.

Interface is provided at the Multi-I/O connector, **J28,** which is a 50-pin high density connector. WinSystems offers the cable CBL-247-1 to simplify the connection.

If a printer is not required, the printer port can also be used as two additional general-purpose I/O ports. The first port is configured as eight input or output only lines. The other port is configured as five input and three output lines. Optionally, the LPT port can be used for a single 3.5" 1.44 MB floppy interface using CBL-308-1.

Keyboard

An integrated 80C42 equivalent keyboard controller supports a PS/2 keyboard. Interface is provided at connector **J28**, which is a 50-pin high density connector. WinSystems offers the cable CBL-247-1 to simplify the connection. The pinout for the connector and cable is detailed in the cable drawing. Optionally, a USB keyboard can be connected in addition to, or instead of the standard PS/2 keyboard.

Multi-I/O Connector

Visual Index

The I/O to the primary two serial channels, the printer port and keyboard, are all terminated via the connector at **J28**. An adapter cable, part number CBL-247-1, is available from WinSystems to adapt to the conventional I/O connectors. The pin definitions for **J28** are shown below.

J28

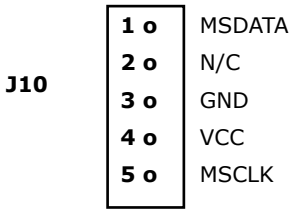
KEYBD-+5V	**50 o o 49**	KEYBD-+5V
KEYBD-CLK	**48 o o 47**	KEYBD-KDATA
KEYBD-GND	**46 o o 45**	KEYBD-GND
KEYBD-GND	**44 o o 43**	LPT-SLCT
LPT-GND	**42 o o 41**	LPT-PE
LPT-GND	**40 o o 39**	LPT-BUSY
LPT-GND	**38 o o 37**	LPT-ACK
LPT-GND	**36 o o 35**	LPT-PD7
LPT-GND	**34 o o 33**	LPT-PD6
LPT-GND	**32 o o 31**	LPT-PD5
LPT-GND	**30 o o 29**	LPT-PD4
LPT-GND	**28 o o 27**	LPT-PD3
LPT-SLCTIN	**26 o o 25**	LPT-PD2
LPT-INIT	**24 o o 23**	LPT-PD1
LPT-ERROR	**22 o o 21**	LPT-PD0
LPT-AUTOFD	**20 o o 19**	LPT-STROBE
COM2*	**18 o o 17**	COM2*
COM2*	**16 o o 15**	COM2*
COM2*	**14 o o 13**	COM2*
COM2*	**12 o o 11**	COM2*
COM2*	**10 o o 9**	COM1*
COM1*	**8 o o 7**	COM1*
COM1*	**6 o o 5**	COM1*
COM1*	**4 o o 3**	COM1*
COM1*	**2 o o 1**	COM1*

*** NOTE:** Pins 1-9 are used for COM1, pins 10-18 are used for COM2. Pin definitions for use as RS-232, RS-422 or RS-485 are shown in the Serial Interface section of this manual.

Mouse Interface

Visual Index

A PS/2 mouse may be attached via the connector at **J10**. An adapter cable, CBL-225-1, is available from WinSystems to adapt to a conventional PS/2 mouse connector. The pinout for **J10** is shown here for reference.



Optionally, a USB mouse can be connected in addition to, or instead of the standard PS/2 mouse.

Watchdog Timer

The EBC-855 features a watchdog timer, which can be used to guard against software lockups. The watchdog can be configured from the CMOS setup utility or directly from software. (See its description in BIOS Supplemental.) The selection in the CMOS setting serves as the default timeout value as the processor boots. The BIOS option is for enabling the watchdog only during boot.

The watchdog powers up disabled (566h = 00h) unless it is enabled in the CMOS setting. When the watchdog is disabled at boot, it can be re-enabled through application software. The watchdog is enabled by writing a timeout value other than zero into the I/O address 566h. Writing **00h** to the I/O address 566h will disable the watchdog.

The watchdog timer is serviced by writing the timeout to I/O port 566H. If the watchdog has not been serviced within the allotted time, the circuit resets the CPU.

The timeout value written into port 566h is in *seconds* if port 565 bit 7 equals **1.** If port 565 bit 7 equals **0**, the timeout value written into port 566h is in *minutes*.

Note: It is recommended that the long timeout (300 seconds) be used with the watchdog enabled when trying to boot any operating system.

Watchdog Timer Examples

Port Address	Port Bit 7 Value	Port Address	Value	Reset Interval
565H	x	566H	00h	DISABLED
565H	1	566H	03h	3 SECONDS
565H	1	566H	1Eh	30 SECONDS
565H	0	566H	05h	300 SECONDS (5 MINUTES)

Software watchdog timer PET = PORT 566H, write the timeout value.

Status LED

Visual Index

A green LED is populated on the board at **LED1,** and can be used for any application specific purpose. The LED can be turned on in software (LED IO address = 0x55e).

write 0x03 to turn it on
write 0x00 to turn it off
write 0x01 to blink once every second (50% duty)
write 0x02 to blink once every 2 seconds (25% duty)

PC/104 Bus Interface

Visual Index

The PC/104 bus is electrically equivalent to the ISA bus. The standard PC/104 I/O card can be populated on EBC-855's PC/104 bus, located at **J5** and **J9**. The interface does not support hot swap capability. The PC/104 bus connector pin definitions are provided here for reference. Refer to the PC/104 Bus Specification for specific signal and mechanical specifications.

J5

GND	**D0 o o C0**	GND
MEMCS16#	**D1 o o C1**	SBHE#
IOCS16#	**D2 o o C2**	LA23
IRQ10	**D3 o o C3**	LA22
IRQ11	**D4 o o C4**	LA21
IRQ12	**D5 o o C5**	LA20
IRQ15	**D6 o o C6**	LA19
IRQ14	**D7 o o C7**	LA18
DACK0#	**D8 o o C8**	LA17
DRQ0	**D9 o o C9**	MEMR#
DACK5#	**D10 o o C10**	MEMW#
DRQ5	**D11 o o C11**	SD8
DACK6#	**D12 o o C12**	SD9
DRQ6	**D13 o o C13**	SD10
DACK7#	**D14 o o C14**	SD11
DRQ7	**D15 o o C15**	SD12
+5V	**D16 o o C16**	SD13
MASTER#	**D17 o o C17**	SD14
GND	**D18 o o C18**	SD15
GND	**D19 o o C19**	KEY

J9

IOCHK#	**A1 o o B1**	GND
SD7	**A2 o o B2**	RESET
SD6	**A3 o o B2**	+5V
SD5	**A4 o o B4**	IRQ9
SD4	**A5 o o B5**	-5V
SD3	**A6 o o B6**	DRQ2
SD2	**A7 o o B7**	-12V
SD1	**A8 o o B8**	SRDY#
SD0	**A9 o o B9**	+12V
IOCHRDY	**A10 o o B10**	KEY
AEN	**A11 o o B11**	SMEMW#
SA19	**A12 o o B12**	SMEMR#
SA18	**A13 o o B13**	IOW#
SA17	**A14 o o B14**	IOR#
SA16	**A15 o o B15**	DACK3#
SA15	**A16 o o B16**	DRQ3
SA14	**A17 o o B17**	DACK1#
SA13	**A18 o o B18**	DRQ1
SA12	**A19 o o B19**	REFRESH#
SA11	**A20 o o B20**	BCLK
SA10	**A21 o o B21**	IRQ7
SA9	**A22 o o B22**	IRQ6
SA8	**A23 o o B23**	IRQ5
SA7	**A24 o o B24**	IRQ4
SA6	**A25 o o B25**	IRQ3
SA5	**A26 o o B26**	DACK2#
SA4	**A27 o o B27**	TC
SA3	**A28 o o B28**	BALE
SA2	**A29 o o B29**	+5V
SA1	**A30 o o B30**	OSC
SA0	**A31 o o B31**	GND
GND	**A32 o o B32**	GND

= Active Low Signal

NOTES:
1. Rows C and D are not required on 8-bit modules.
2. B10 and C19 are key locations. WinSystems uses key pins as connections to GND.
3. Signal timing and function are as specified in ISA specification.
4. Signal source/sink current differ from ISA values.

PC/104-*Plus* Bus Interface

Visual Index

The PC/104-*Plus* is electrically equivalent to the 33 MHz PCI bus and is terminated to a 120-pin, nonstackthrough connector. The standard PC/104-*Plus* I/O modules can be populated on EBC-855's PC/104-*Plus* bus. The interface does not support hot swap capability. The PC/104-*Plus* bus connector is located at **J7**. Refer to the PC/104-*Plus* Bus Specification for specific signal and mechanical specifications. The pin definitions are:

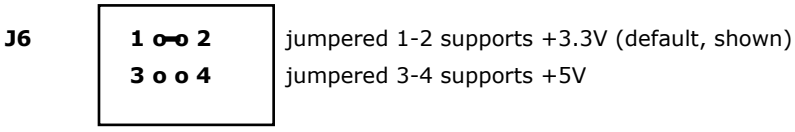
Pin	A	B	C	D
1	GND	RESERVED	+5	AD00
2	VI/O	AD02	AD01	+5V
3	AD05	GND	AD04	AD03
4	C/BE0#	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3V	C/BE1#	AD15	+3.3V
9	SERR#	GND	RESERVED	PAR
10	GND	PERR#	+3.3V	RESERVED
11	STOP#	+3.3V	LOCK#	GND
12	+3.3V	TRDY#	GND	DEVSEL#
13	FRAME#	GND	IRDY#	+3.3V
14	GND	AD16	+3.3V	C/BE2#
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3#	VI/O	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0#	GND	REQ1#	VI/O
24	GND	REQ2#	+5V	GNT0#
25	GNT1#	VI/O	GNT2#	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND
28	GND	INTD#	+5V	RST#
29	+12V	INTA#	INTB#	INTC#
30	-12V	REQ3#	GNT3#	GND

Note: 1. The shaded area denotes power or ground signals.

PC/104-*Plus* VIO Voltage

Visual Index

PC/104-*Plus* VIO Voltage is selected by jumpering **J6**.



BIOS Supplemental

General Information
The EBC-855 comes equipped with a Phoenix® BIOS to assure full compatibility with PC operating systems and software. The basic system configuration is stored in battery backed CMOS RAM within the clock/calendar. As an alternative to operate without a battery, the configuration may be stored in an EEPROM. Access to this setup information is via the Setup Utility in the Phoenix® BIOS.

Entering Setup
To enter setup, power up the computer and press **F2** when either the splash screen is displayed (when enabled) or when the **Press F2 for Setup** message is displayed. Alternately, under certain error conditions a message similar to: **Press F1 to Continue or F2 for Setup** may be displayed. Press the desired key for the appropriate action. The BIOS will display the message: **Entering Setup** and will continue with the remainder of the POST routines. It may take a number of seconds before the main setup menu screen is displayed.

Navigation of the Menus
Use the **Up** and **Down** arrow keys to move among the selections and press **ENTER** when a selection is highlighted to enter a sub-menu or to see a list of choices. Use the **-** and **+** keys to change values for particular items. Pressing the letter corresponding to each menu option is a shortcut that opens the next dialogue box with one key press.

The default configuration of each menu screen is shown on the following pages and is followed by a brief description of each option where applicable. Values shown in **bold** typeface are factory defaults while descriptions and options are italicized.

BIOS Configuration Location
The EBC-855 BIOS configuration table (CMOS image) is located in CMOS RAM. The values of this table can be populated from either three (3) locations:

(1) CMOS RAM (when battery backed) and is user configurable
(2) EEPROM (nonvolatile) and is user configurable
(3) FLASH PROM – contains the BIOS and factory default configuration

Saving the BIOS Configuration
The Real-Time Clock and the CMOS RAM can be powered by an optional battery connected to **J31**. If no battery is present, CMOS defaults are normally loaded each time the board is powered on.

The EEPROM feature allows the user to save BIOS configuration options without requiring a battery. When a jumper is installed between **J16** (3-4), the user can save the CMOS settings to the EEPROM.

At system boot, the BIOS first performs a checksum validation on the contents of the CMOS RAM. Upon successful validation, the BIOS continues the process using values stored in CMOS RAM. If a checksum error occurs, the BIOS attempts to load the configuration table from the EEPROM. Checksum errors usually occur due to a low or disabled battery.

After a checksum validation, the BIOS configuration is loaded from the EEPROM and the boot process continues. If the EEPROM is disabled or another checksum error occurs, the BIOS loads the minimum BIOS configuration settings from the FLASH PROM and the boot process continues.

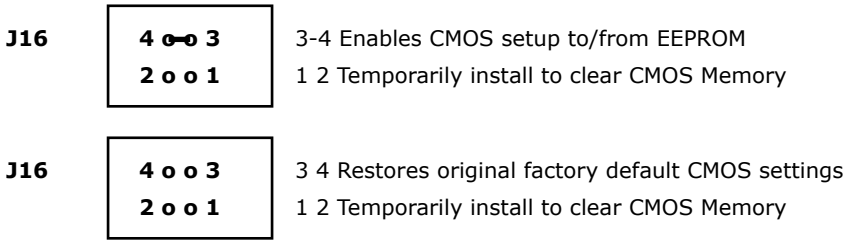
For applications where the battery is enabled, it is recommended to save the BIOS configuration to both the CMOS RAM and the EEPROM. If a battery fails at a later point, the BIOS defaults will be loaded from the EEPROM so operation can continue without user interaction. The disadvantage to saving the CMOS setting to the battery backed CMOS RAM is that all of the custom settings are lost when the battery fails or if the CMOS gets corrupted (CMOS checksum error).

Resetting Factory Defaults
The EBC-855 can normally be returned to the factory default BIOS configuration by selecting **Load Setup Defaults** in the Phoenix® BIOS Setup Utility.

When using battery backup, the CMOS setup data can be reset to defaults by momentarily adding a jumper at **J16** (1-2) with the system power off. Make sure to disable the EEPROM backup of CMOS data when clearing CMOS to ensure that data within the EEPROM does not load instead of factory CMOS setup defaults. (See below.)

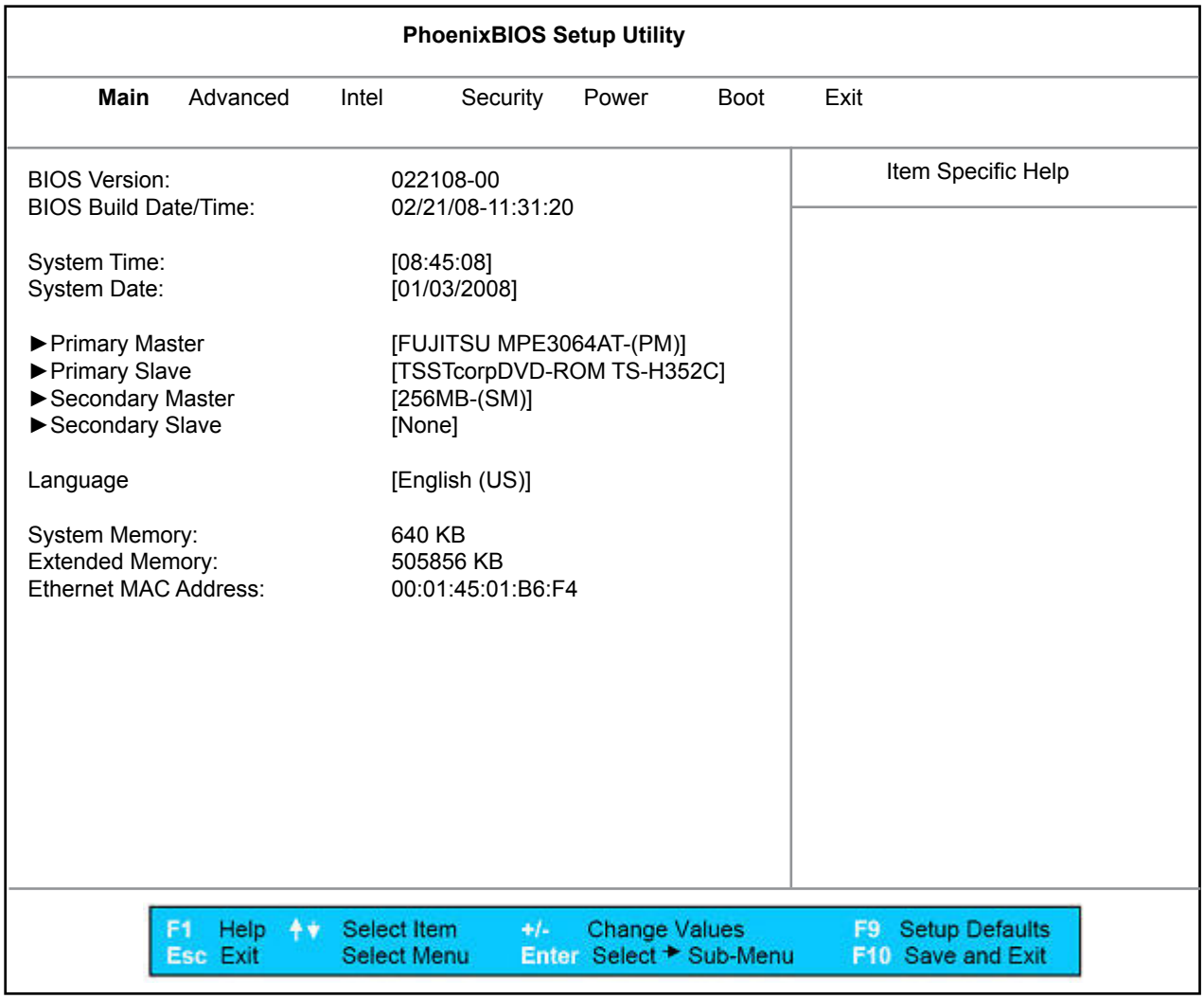
To Disable EEPROM CMOS
To disable EEPROM CMOS backup data from loading at power-on, remove the jumper at **J16** (3-4) prior to boot up. After booting up, the **J16** (3-4) jumper can be replaced and new CMOS setup information saved to EEPROM through CMOS setup.

It is advisable to remove the jumper from **J16** (3-4) when updating the BIOS. Follow the steps below to ensure that data from a previous BIOS version in the EEPROM does not affect operation.
1) Reboot with jumper at **J16** (3-4) removed after any BIOS update.
2) Enter Phoenix® BIOS Setup Utility.
3) Install a jumper at **J16** (3-4).
4) Save settings to EEPROM from CMOS setup



Updating the BIOS FLASH PROM
The most recent EBC-855 BIOS is available on the WinSystems website, but it is highly recommended that an Applications Engineer be consulted prior to any BIOS FLASH PROM update. If a BIOS update is required, please follow the steps Resetting Factory Defaults above to ensure that the data from a previous version is cleared from EEPROM.

Main Menu Screen



NOTE: Available device options may vary based on system configuration.

System Time Sets the time in the clock/calendar. The time is *hour:minute:second*. The time is calculated on 24-hour, military-time clock such that 1:00 PM is 13:00:00.

System Date Sets the calendar to the current *month/day/year*.

Primary Master See the Primary Master Sub-menu on the following page(s).

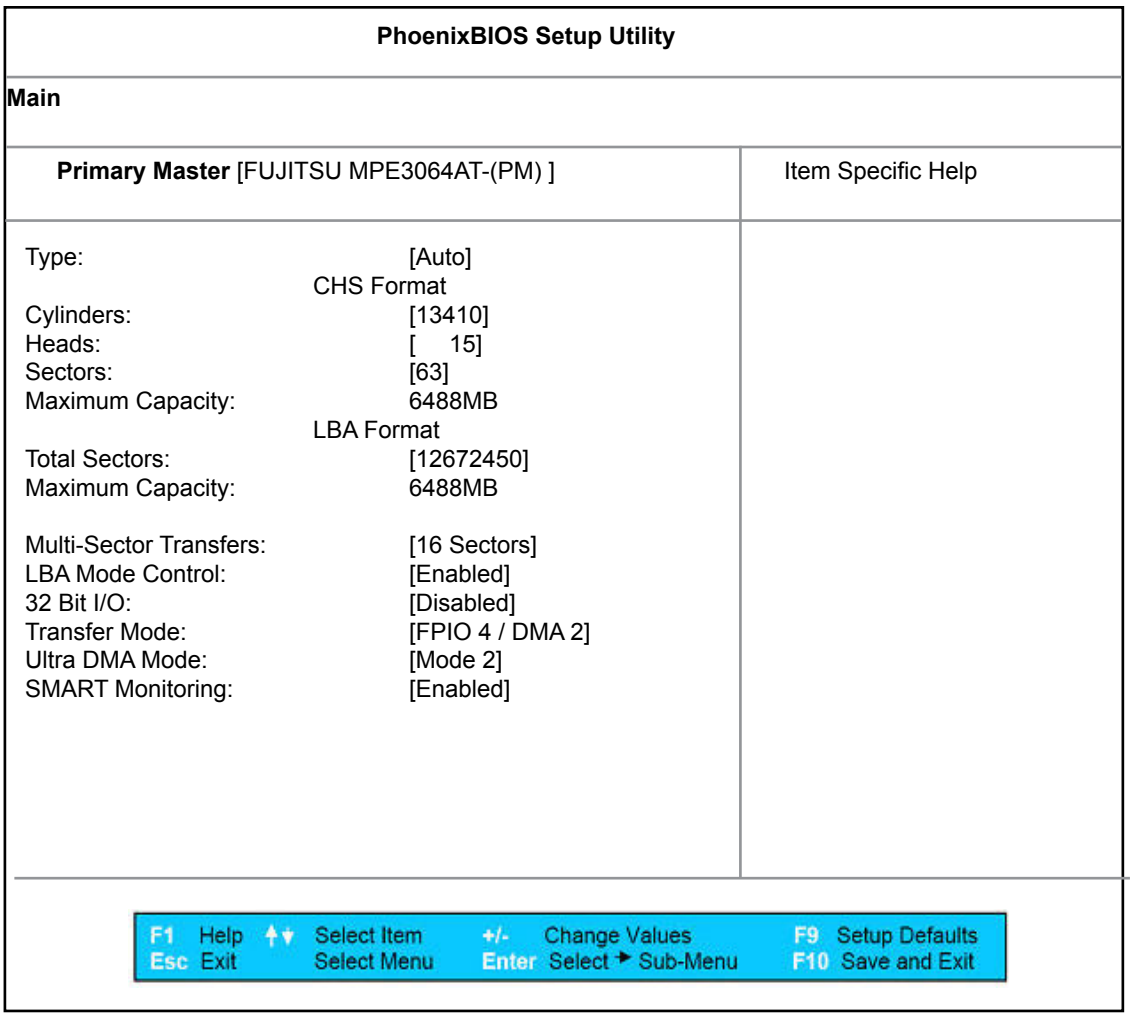
Primary Slave See the Primary Slave Sub-menu on the following page(s).

Secondary Master See the Secondary Master Sub-menu on the following page(s).

Secondary Slave See the Secondary Slave Sub-menu on the following page(s).

Language	Sets the display language for the BIOS. The available options are: ***[*English (US)*]*** *[Espanol]* *[Deutsch]* *[Chinese]* *[Japanese]*
System Memory	Displayed by the BIOS and cannot be changed. It shows the amount of memory below 1 MB that the system found.
Extended Memory	Displayed by the BIOS and cannot be changed. It shows the amount of extended memory that the system found.
Ethernet MAC Address	Displays the Ethernet MAC address of the board. This will be a unique address for the Ethernet Controller on every board.

Main Menu Screen - Primary Master - Sets the drive type for the first fixed disk. Unlike older systems with fixed drive type numbers, the Phoenix® BIOS relies primarily on the self-identification feature of modern IDE drives. This allows the BIOS to auto-detect the drive type and parameters. Support is also provided for user defined drive parameter definitions as well as support for bootable CD-ROMs and removable ATAPI drives.



NOTE: Available device options may vary based on system configuration.

Many of these characteristics are displayed by the BIOS and cannot be changed. For characteristics that can be modified, their descriptions and available options are listed below.

Type Sets the drive type for the first fixed disk. The available options are:

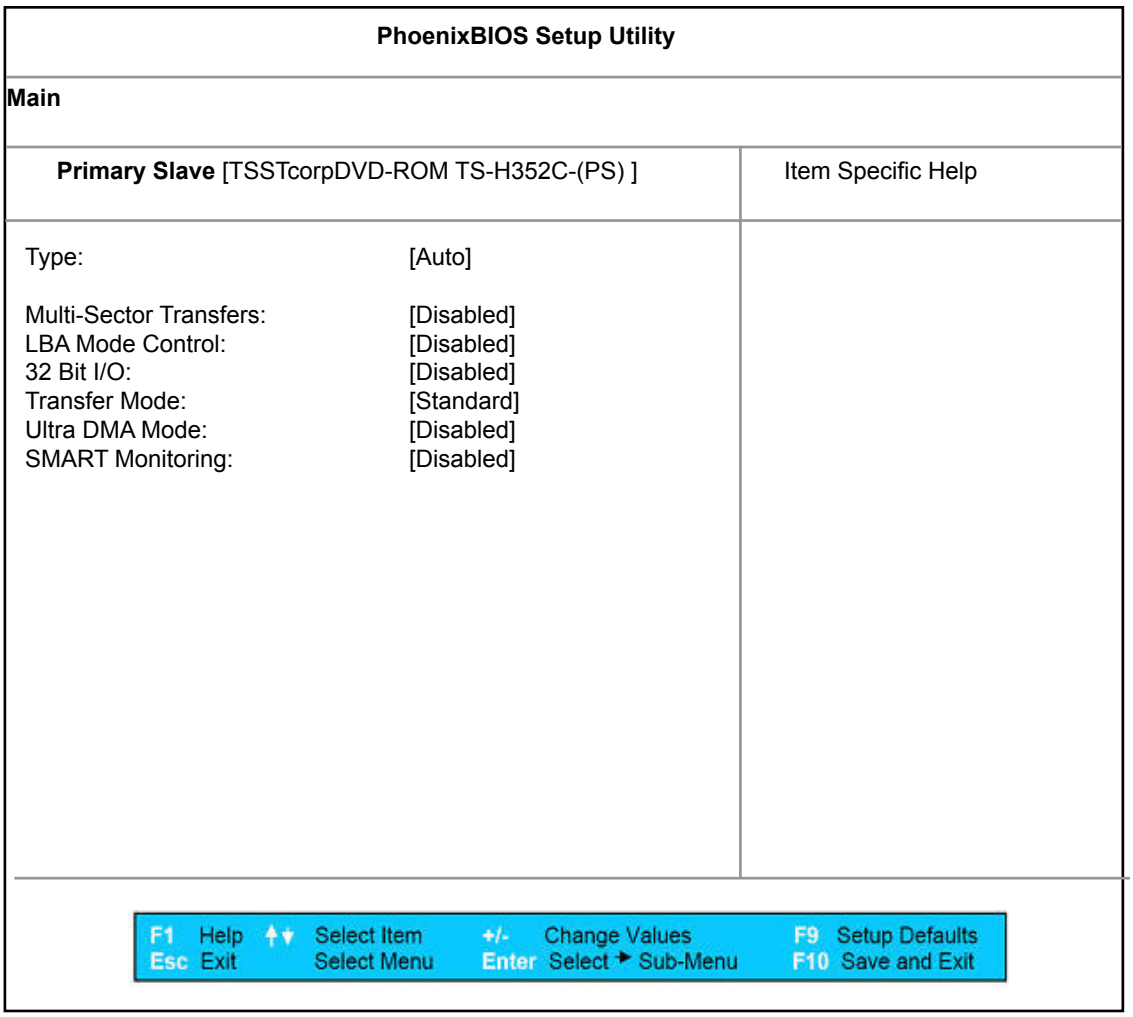
[None]
[ATAPI Removable]
[CD-ROM]
[IDE Removable]
[Other ATAPI]
[User]
[Auto]

* Screens vary based on Type option selected.

32 Bit I/O Enables/disables 32 bit IDE data transfers. The available options are:

[Disabled]
[Enabled]

Main Menu Screen - Primary Slave - Sets the drive type for the second fixed disk. Unlike older systems with fixed drive type numbers, the Phoenix® BIOS relies primarily on the self-identification feature of modern IDE drives. This allows the BIOS to auto-detect the drive type and parameters.



NOTE: Available device options may vary based on system configuration.

Many of these characteristics are displayed by the BIOS and cannot be changed. For characteristics that can be modified, their descriptions and available options are listed below.

Type Sets the drive type for the second fixed disk. The available options are:

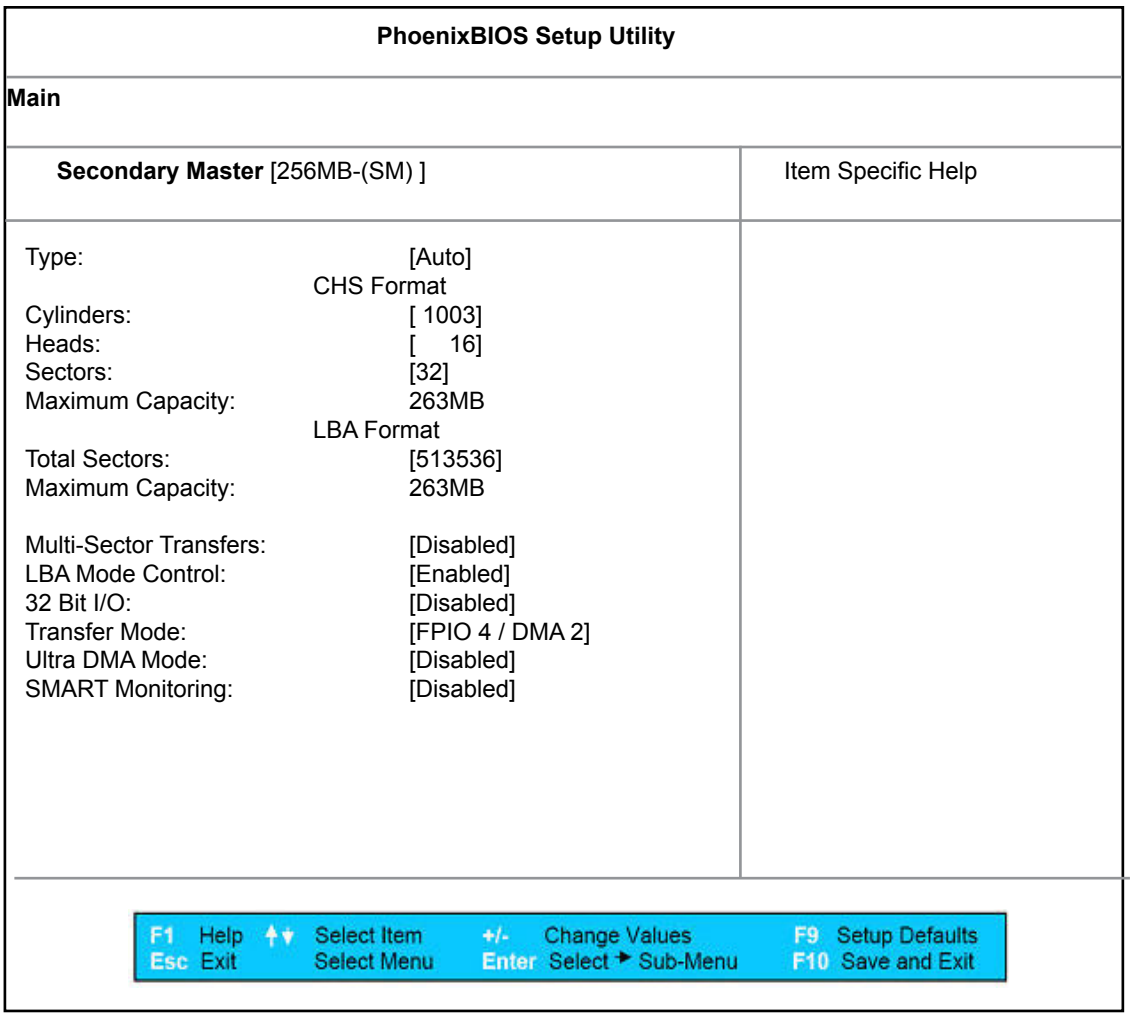
[None]
[ATAPI Removable]
[CD-ROM]
[IDE Removable]
[Other ATAPI]
[User]
[Auto]

* Screens vary based on Type option selected.

32 Bit I/O Enables/disables 32 bit IDE data transfers. The available options are:

[Disabled]
[Enabled]

Main Menu Screen - Secondary Master - The selection is the same as the Primary Master above.



NOTE: Available device options may vary based on system configuration.

Many of these characteristics are displayed by the BIOS and cannot be changed. For characteristics that can be modified, their descriptions and available options are listed below.

Type Sets the drive type for the first fixed disk (Secondary). The available options are:

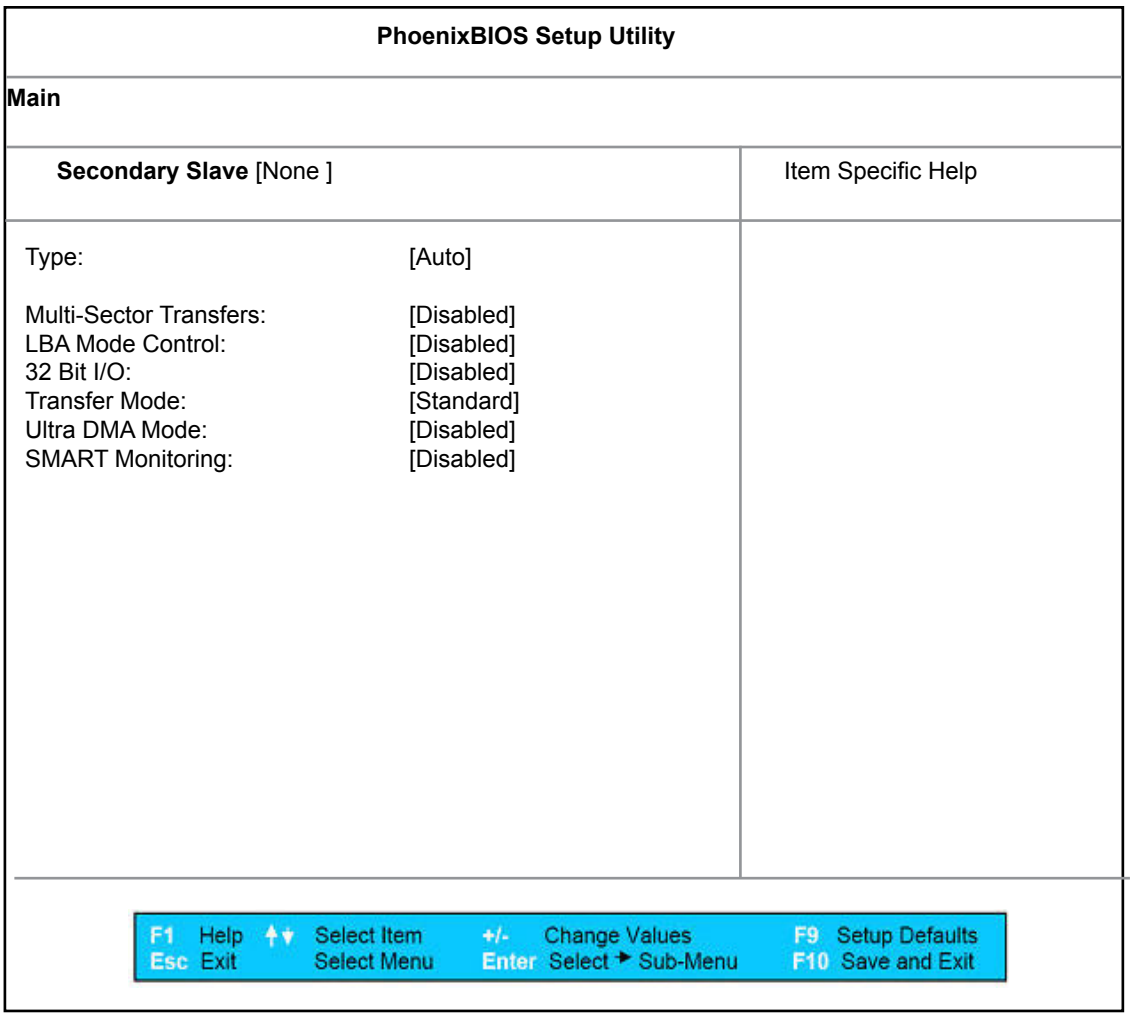
[None]
[ATAPI Removable]
[CD-ROM]
[IDE Removable]
[Other ATAPI]
[User]
[Auto]

* Screens vary based on Type option selected.

32 Bit I/O Enables/disables 32 bit IDE data transfers. The available options are:

[Disabled]
[Enabled]

Main Menu Screen - Secondary Slave - The selection is the same as the Primary Slave above.



NOTE: Available device options may vary based on system configuration.

Many of these characteristics are displayed by the BIOS and cannot be changed. For characteristics that can be modified, their descriptions and available options are listed below.

Type Sets the drive type for the second fixed disk (Secondary). The available options are:

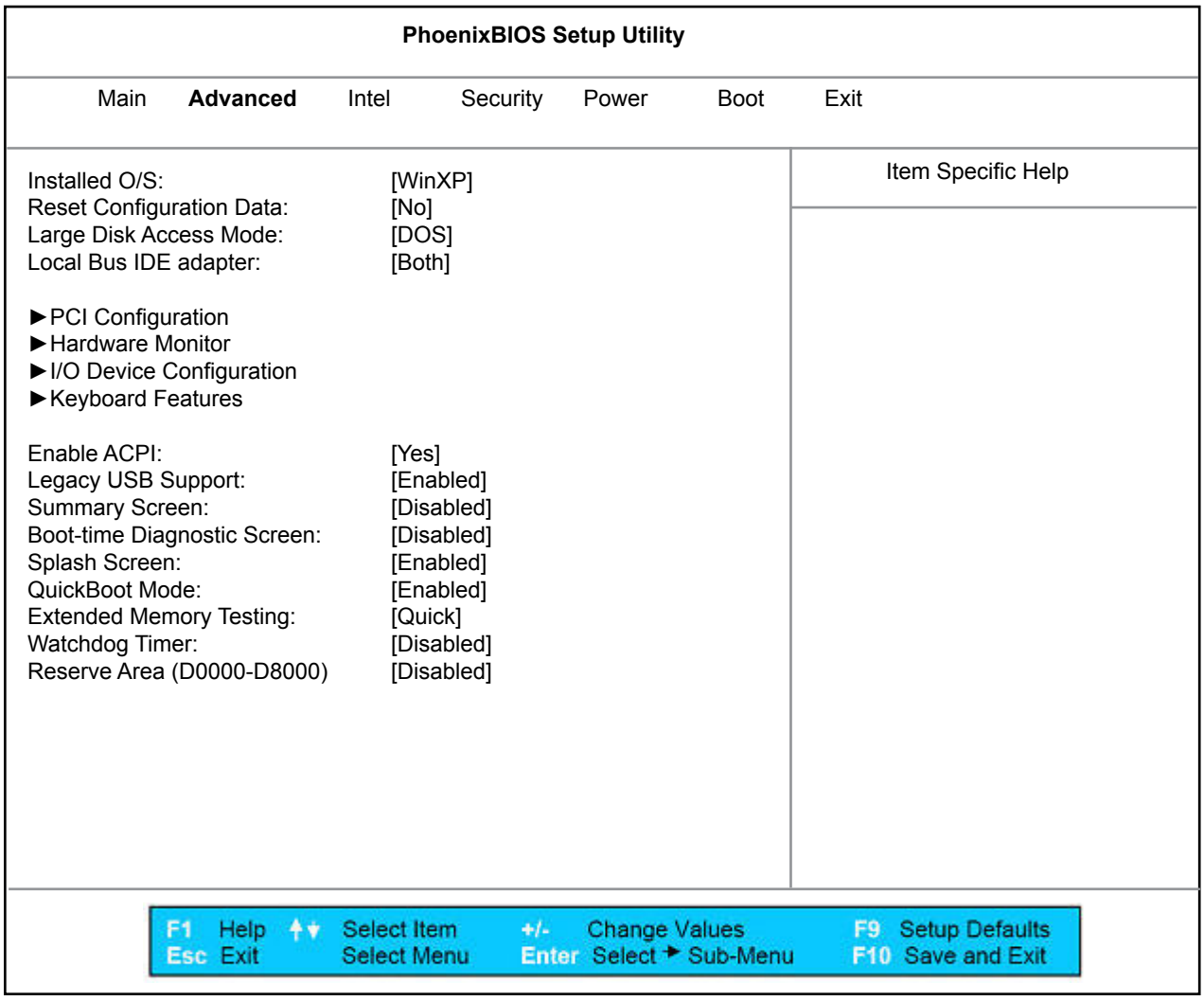
[None]
[ATAPI Removable]
[CD-ROM]
[IDE Removable]
[Other ATAPI]
[User]
[Auto]

* Screens vary based on Type option selected.

32 Bit I/O Enables/disables 32 bit IDE data transfers. The available options are:

[Disabled]
[Enabled]

Advanced Setup - The Advanced setup allows for the configuration of all of the nondisk related setup items. There are several sub-menus that allow control of a number of System and Chipset Features. Each of the setup options will be discussed in the sections that follow.



NOTE: All default settings in these examples are based on the Windows XPe operating system. If using a different operating system (LINUX, Windows® CE or DOS) selections will be appropriate to that operating system.

Installed O/S

Select the operating system installed on your system which you will use most commonly. NOTE: An incorrect setting can cause some operating systems to display unexpected behavior. The available options are:

[Other]
[Win98]
[WinME]
[Win2000]
[WinXP]

Reset Configuration Data

Select 'Yes' if you want to clear the Extended System Configuration Data (ESCD) area. The available options are:

[Yes]
[No]

Large Disk Access Mode

UNIX, Novell Netware, or other operating systems select 'Other'. If you are installing new software and the drive fails, change this selection and try again. Different operating systems require different representation of drive geometries. The available options are:

[DOS]
[Other]

Local Bus IDE adapter

Enables the integrated local bus IDE adapter. The available options are:

[Primary]
[Secondary]
[Both]
[Disabled]

PCI Configuration

Additional setup menus to configure PCI devices. See the PCI Configuration sub-menu on the following page(s).

Hardware Monitor

Show hardware monitor current state. See the Hardware Monitor sub-menu on the following page(s).

I/O Device Configuration

Peripheral Configuration. See the I/O Device Configuration sub-menu on the following page(s).

Keyboard Features

Select keyboard options. See the Keyboard Features sub-menu on the following page(s).

Enable ACPI

Enables/Disables the ACPI BIOS (Advance Configuration and Power Interface). The available options are:

[Yes]
[No]

Legacy USB Support

Enables/Disables support for Legacy Universal Serial Bus. The available options are:

[Enabled]
[Disabled]

Summary Screen

Displays system configuration on boot. The available options are:

[Enabled]
[Disabled]

Boot-Time Diagnostic Screen

Displays the diagnostic screen during boot. The available options are:

[Enabled]
[Disabled]

Splash Screen

Selecting 'Enabled' means the Splash Screen is displayed. Selecting 'Disabled' means the Splash Screen is not displayed. The available options are:

[Enabled]
[Disabled]

QuickBoot Mode

Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system. The available options are:

[Disabled]
[Enabled]

Extended Memory Testing

Determines which type of tests will be performed on extended memory (above 1 MB). The available options are:

[None]
[Normal]
[Quick]

Watchdog Timer

Selecting 'Enabled' enables the Watchdog Timer, and the system will reset if timer is allowed to time-out. Selecting 'Disabled' means no watchdog function is in system. The available options are:

[Enabled] *When timeouts expire, system will reboot

[Disabled]

Watchdog Timeouts:

[30 seconds]

[300 seconds]

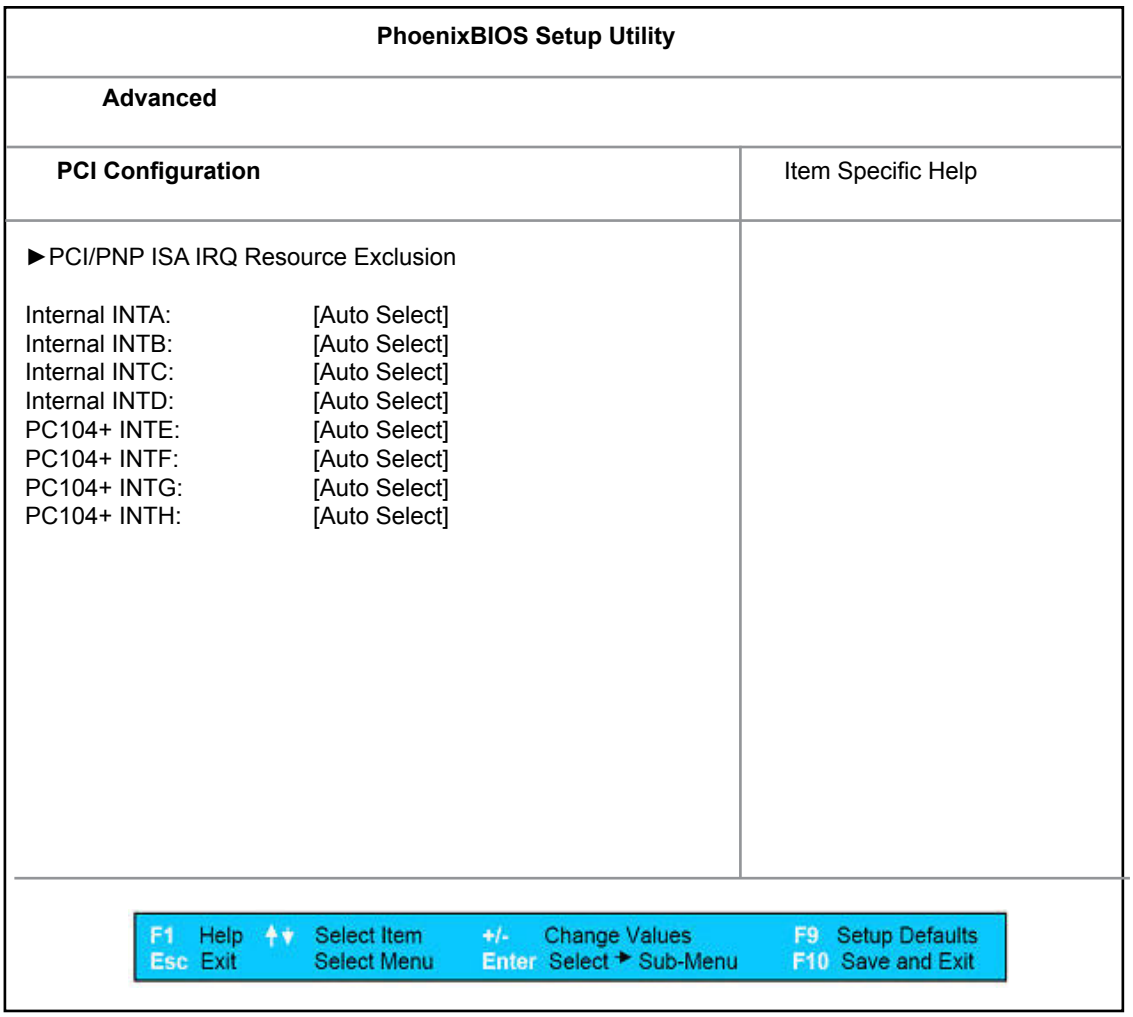
Reserve Area (D0000-D8000)

Selecting 'Enabled' always reserves the memory area (from D0000-D8000) for expansion ISA ROM, that will disable LAN PXE function. Selecting 'Disabled' makes the area (from D0000-D8000) shadowed to any OPROM. The available options are:

[Enabled]

[Disabled]

Advanced Screen - PCI Configuration



PCI/PNP ISA IRQ Resource Exclusion

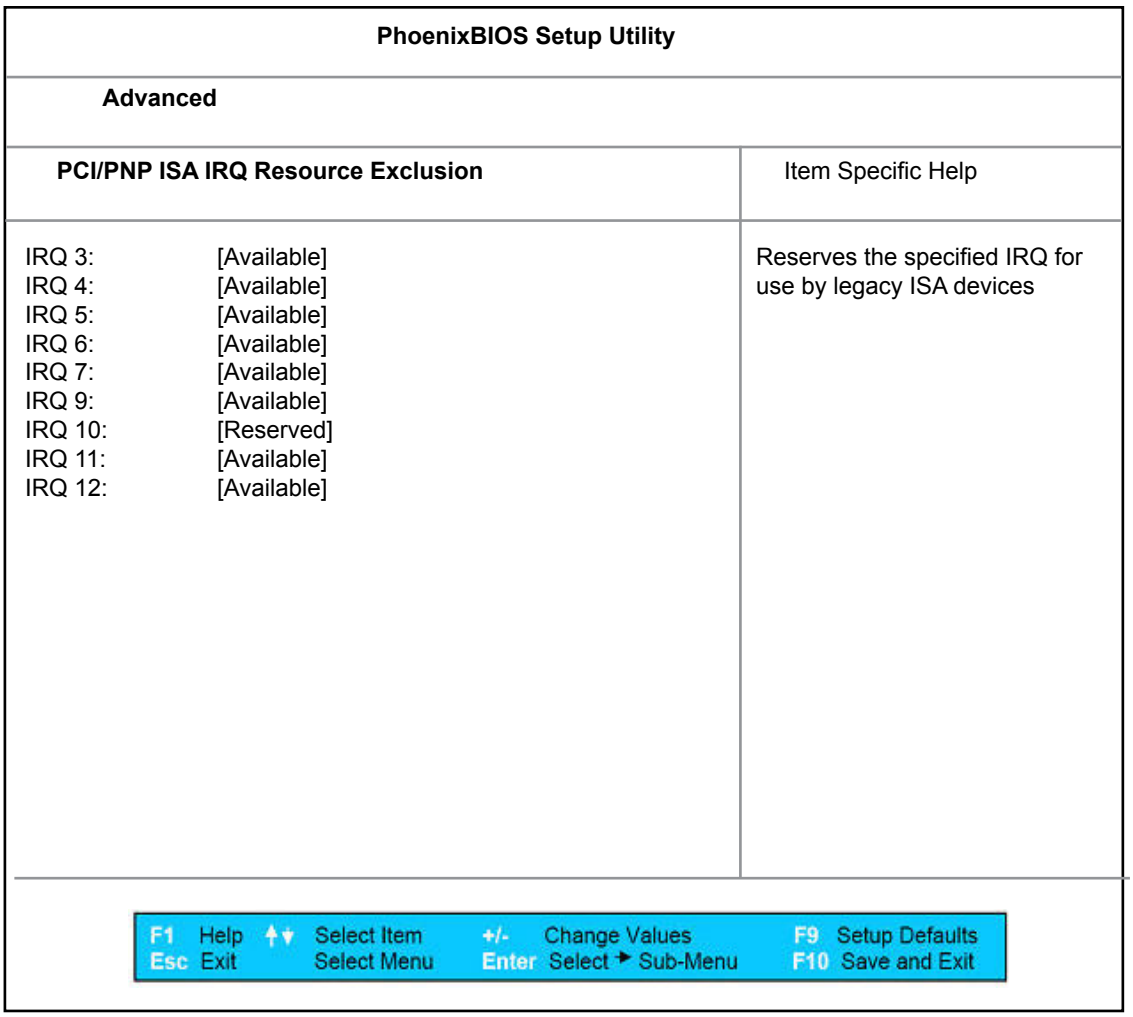
Reserves specific IRQs for use by legacy ISA devices. See the PCI/PNP ISA IRQ Resource Exclusion sub-menu on the following page(s).

Internal INTA, Internal INTB, Internal INTC, Internal INTD, PC104+ INTE, PC104+ INTF, PC104+ INTG, PC104+ INTH

PCI devices can use hardware interrupts called IRQs. A PCI device cannot use IRQs already in use by ISA or EISA devices. Use 'Auto Select' if no ISA or EISA legacy cards are installed. The available options are:

[Disabled]
[Auto Select]
[3]
[4]
[5]
[6]
[7]
[9]
[10]
[11]
[12]
[14]
[15]

Advanced Screen - PCI Configuration - PCI/PNP ISA IRQ Resource Exclusion

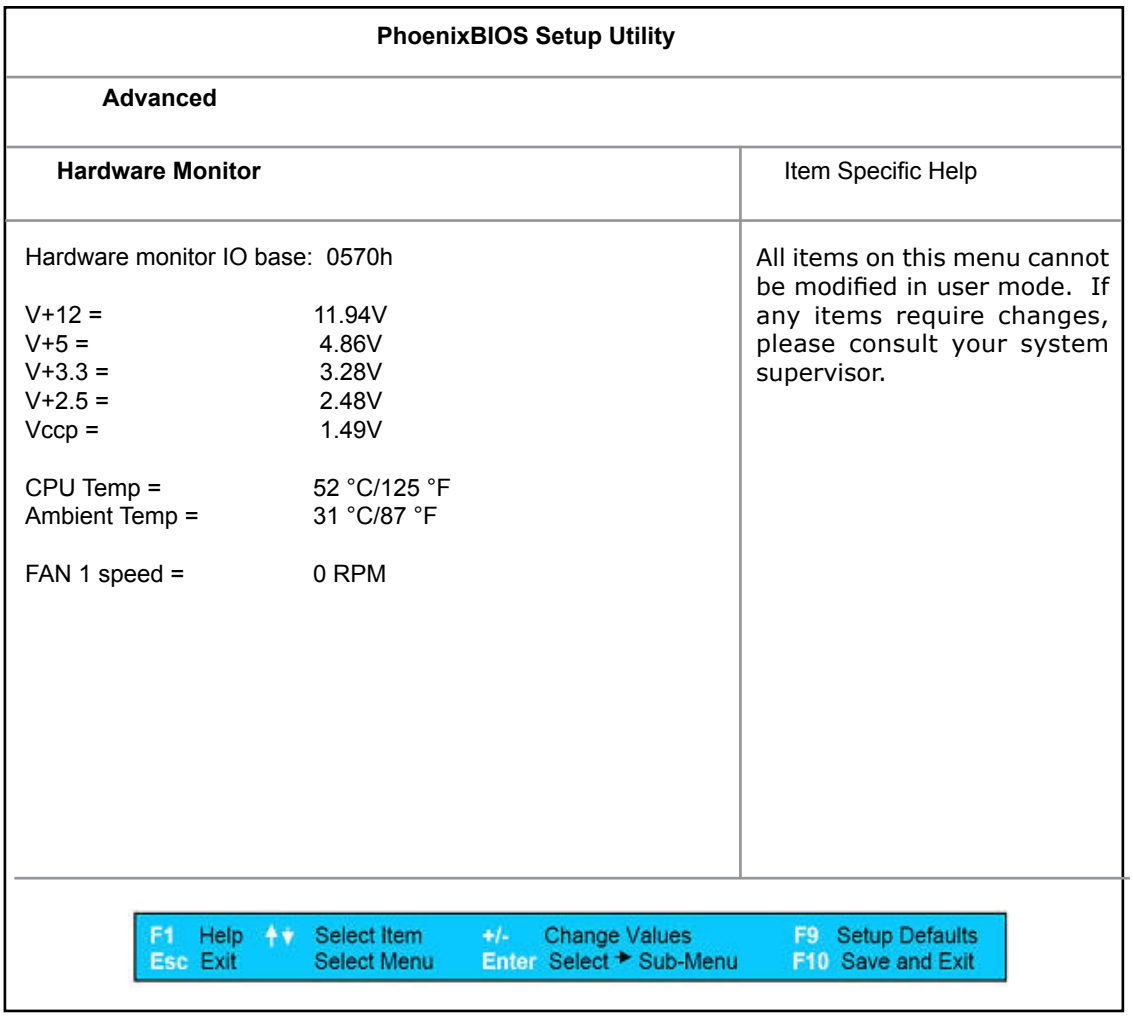


IRQ 3,
IRQ 4,
IRQ 5,
IRQ 6,
IRQ 7,
IRQ 9,
IRQ 10,
IRQ 11,
IRQ 12:

Reserves the specified IRQ for use by legacy ISA devices. The available options are:

[Available]
[Reserved]

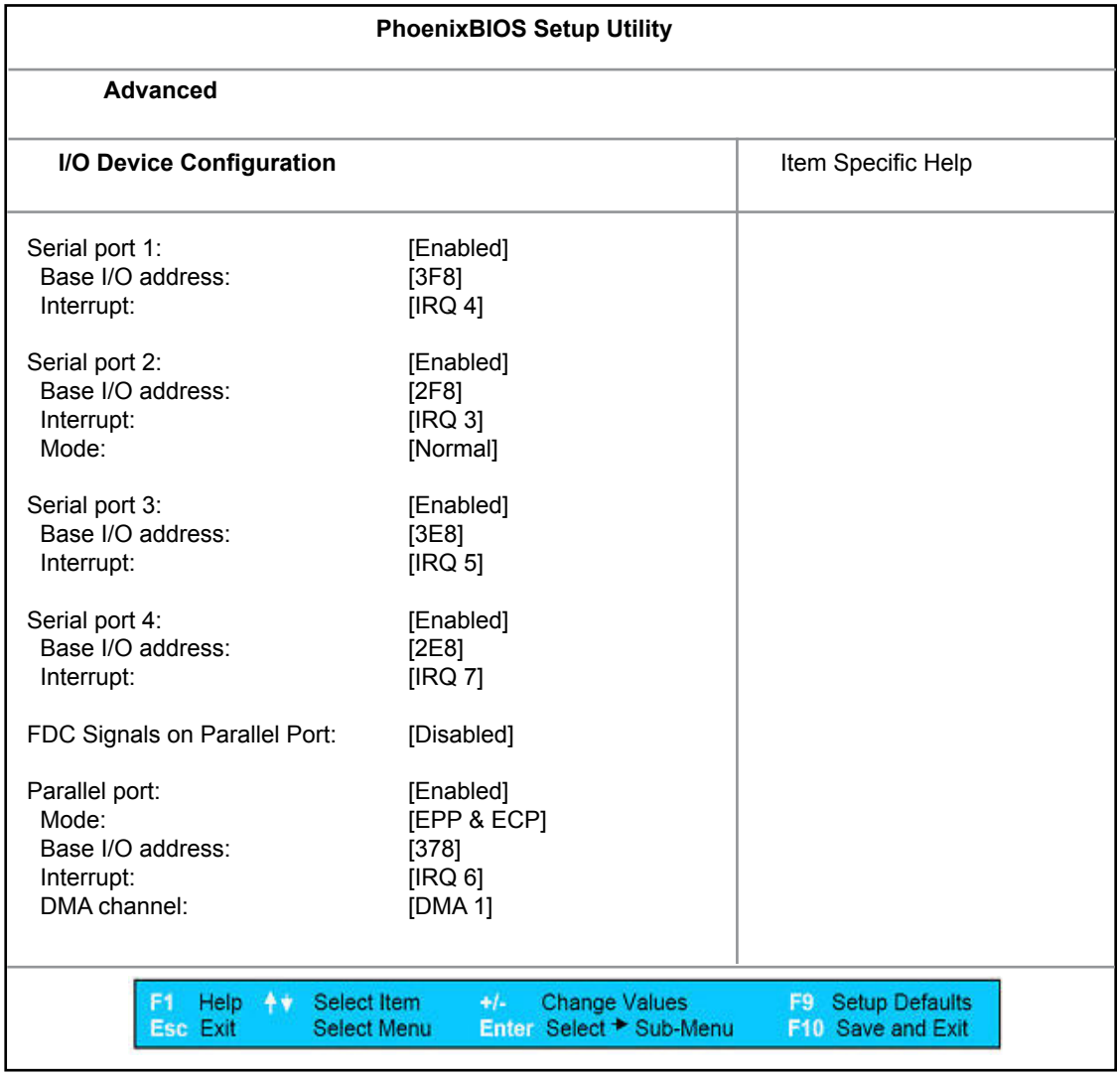
Advanced Screen - Hardware Monitor



NOTE: Displayed characteristics may vary based on system configuration.

All of the items on this menu cannot be modified in user mode. If any items require changes, please consult your system supervisor.

Advanced Screen - I/O Device Configuration



Serial Port 1 Configures serial port 1. The available options are:

[Disabled] *No configuration
[Enabled] *User configuration
[Auto] *BIOS or OS chooses configuration
(OS Controlled) *Displayed when controlled by OS

Base I/O address Sets the base I/O address for serial port 1. The available options are:

[3F8]
[2F8]
[3E8]
[2E8]

Interrupt Sets the interrupt for serial port 1. The available options are:

[IRQ 3]
[IRQ 4]

Serial Port 2 Configures serial port 2. The available options are:

[Disabled] *No configuration
[Enabled] *User configuration
[Auto] *BIOS or OS chooses configuration
(OS Controlled) *Displayed when controlled by OS

Base I/O address Sets the base I/O address for serial port 2. The available options are:

[3F8]
[2F8]
[3E8]
[2E8]

Interrupt Sets the interrupt for serial port 2. The available options are:

[IRQ 3]
[IRQ 4]

Mode Sets the mode for serial port 2. The available options are:

[Normal]
[IrDA]
[ASK-IR]

Serial Port 3 Configures serial port 3. The available options are:

[Disabled] *No configuration
[Enabled] *User configuration
[Auto] *BIOS or OS chooses configuration
(OS Controlled) *displayed when controlled by OS

Base I/O address Sets the base I/O address for serial port 3. The available options are:

[2E8]
[3E8]

Interrupt Set the interrupt for serial port 3. The available options are:

[IRQ 5]
[IRQ 7]

Serial Port 4 Configures serial port 4. The available options are:

[Disabled] *No configuration
[Enabled] *User configuration
[Auto] *BIOS or OS chooses configuration
(OS Controlled) *Displayed when controlled by OS

Base I/O address Sets the base I/O address for serial port 4. The available options are:

[2E8]
[3E8]

Interrupt Set the interrupt for serial port 4. The available options are:

[IRQ 5]
[IRQ 7]

FDC Signals on Parallel Port When enabled, the parallel port is not available, it works as a floppy connector. When disabled, the parallel port works as a normal LPT port. The available options are:

[Disabled]
[Enabled]

Parallel Port Configures parallel port. The available options are:

[Disabled] *No configuration
[Enabled] *User configuration
[Auto] *BIOS or OS chooses configuration
(OS Controlled) *Displayed when controlled by OS

Mode Sets the mode for the parallel port. The available options are:

[Bi-directional]
[EPP]
[ECP]
[EPP & ECP]

Base I/O address Sets the base I/O address for the parallel port. The available options are:

[378]
[278]
[3BC]

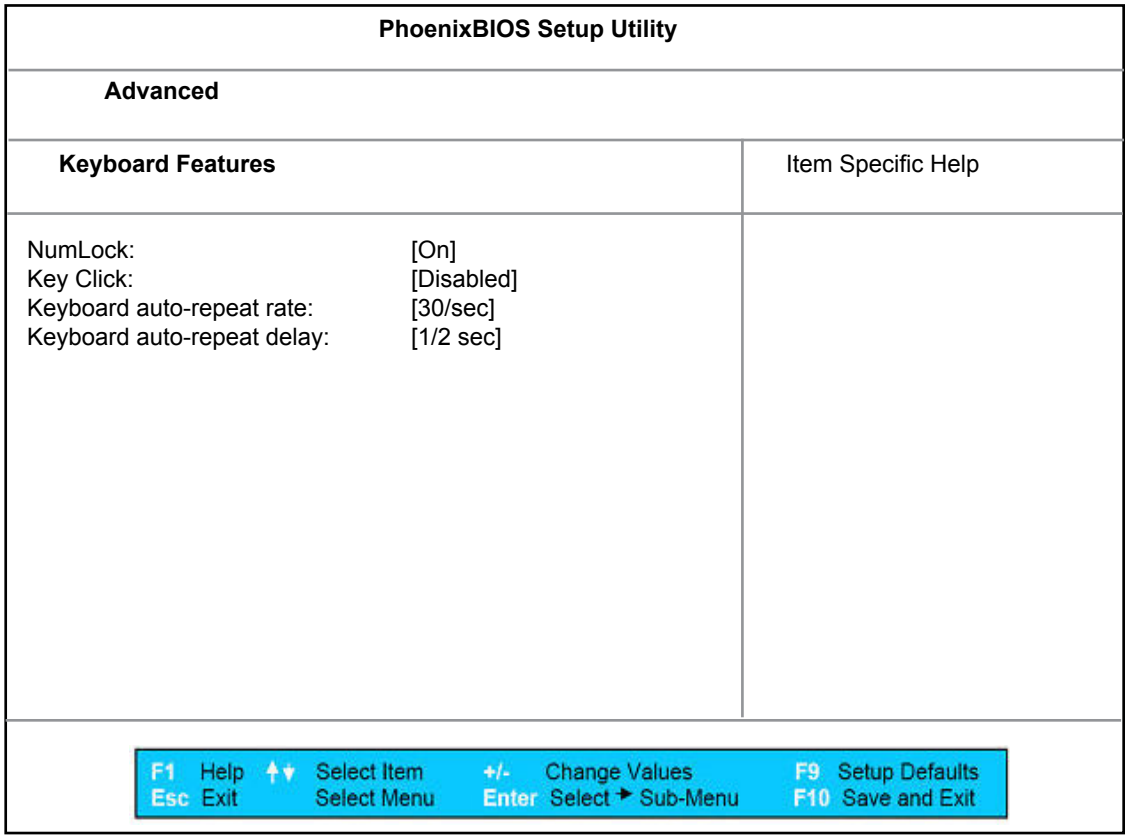
Interrupt Sets the base I/O address for the parallel port. The available options are:

[IRQ 6]

DMA channel Sets the DMA channel for the parallel port. The available options are:

[DMA 1]
[DMA 3]

Advanced Screen - Keyboard Features



NumLock

Selects Power-on state for NumLock. The available options are:

[Auto]
[On]
[Off]

Key Click

Enables/disables key click. The available options are:

[Disabled]
[Enabled]

Keyboard auto-repeat rate

Selects key repeat rate. The available options are:

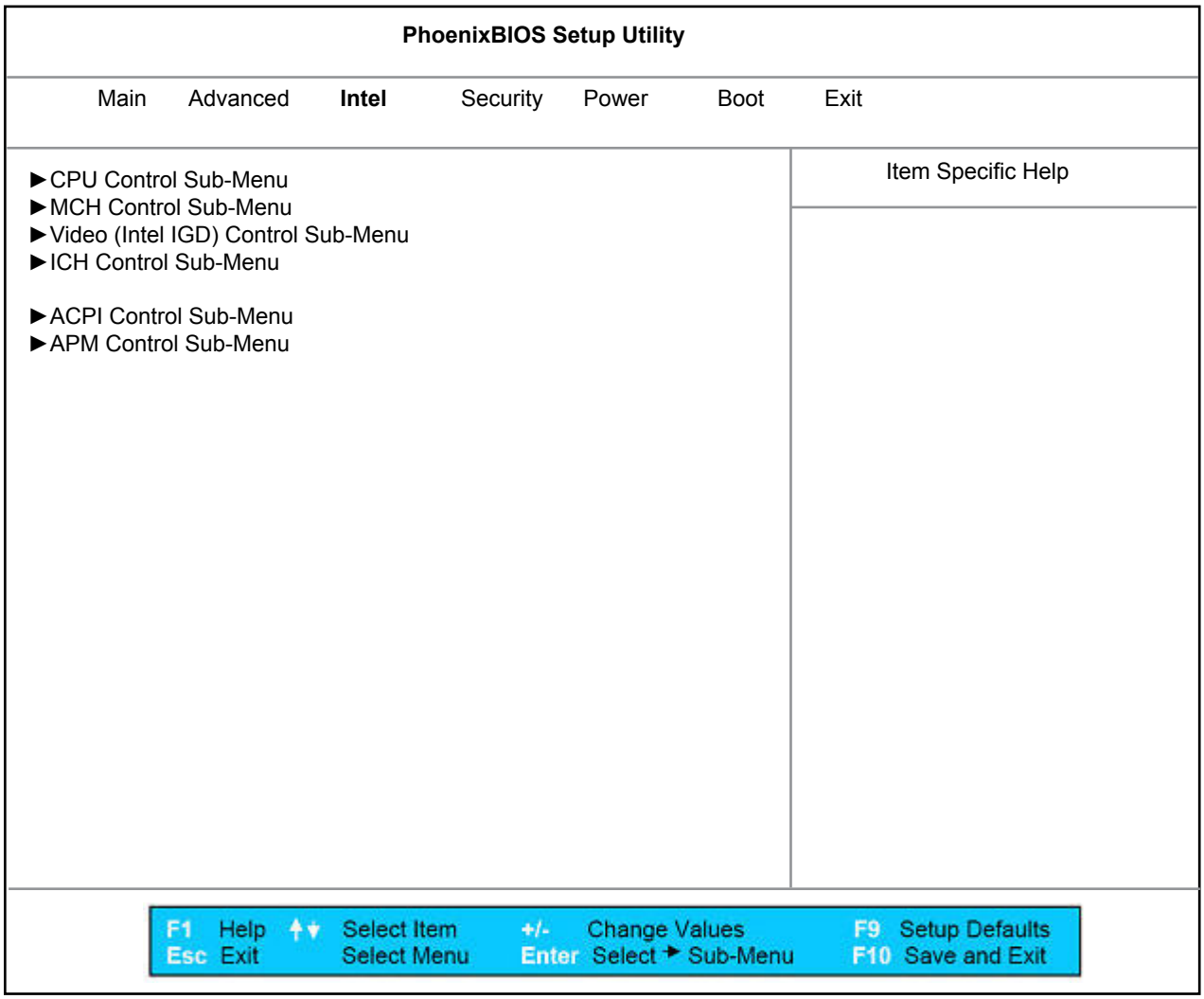
[30/sec] *[18.5/sec]* *[6/sec]*
[26.7/sec] *[13.3/sec]* *[2/sec]*
[21.8/sec] *[10/sec]*

Keyboard auto-repeat delay

Select delay before key repeat. The available options are:

[¼ sec]
[½ sec]
[¾ sec]
[1 sec]

Intel Setup Menu



CPU Control Sub-menu — Controls various CPU parameters. See the CPU Control Sub-menu on the following page(s).

MCH Control Sub-menu — Controls various MCH parameters. See the MCH Control Sub-menu on the following page(s).

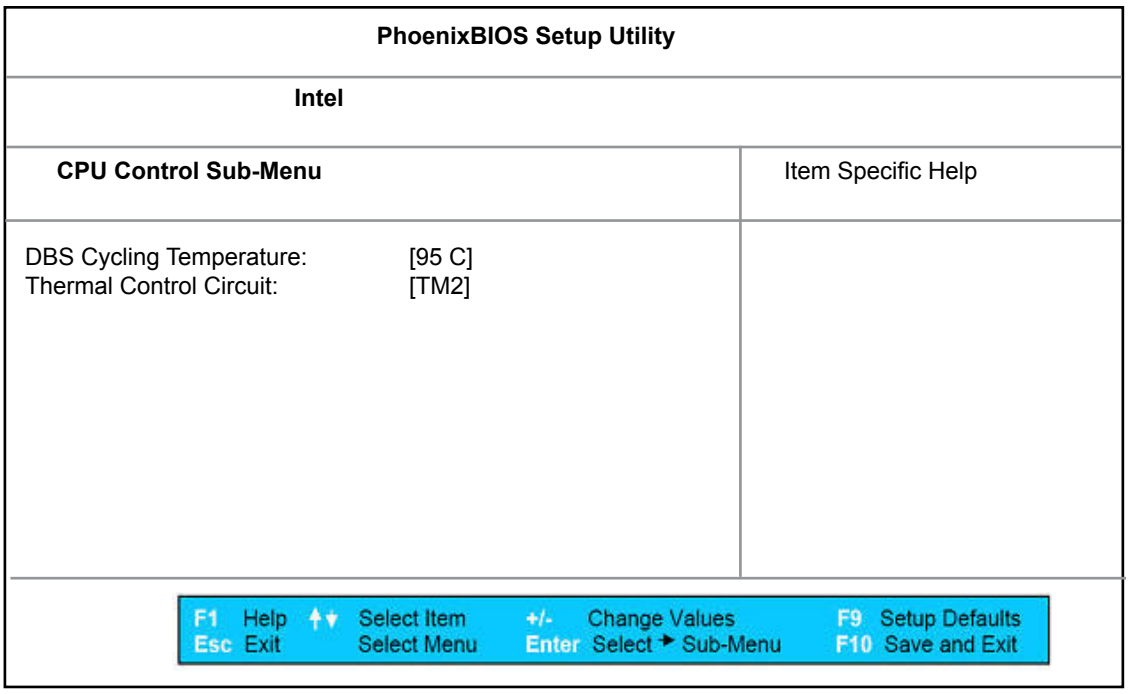
Video (Intel IGD) Control Sub-menu — Controls configuration of the Internal Graphics Display Device. See the Video (Intel IGD) Control Sub-menu on the following page(s).

ICH Control Sub-menu — Controls configuration of the ICH Integrated PCI Devices. See the ICH Control Sub-menu on the following page(s).

ACPI Control Sub-menu — These items control which ACPI tables will be included in the RSDT Entry Table Field, the values stored in specific ACPI Table Fields and the enabling of specific ACPI Features. See the ACPI Control Sub-menu on the following page(s).

APM Control Sub-menu — Controls selective functionality when an APM OS is loaded. See the APM Control Sub-menu on the following page(s).

Intel Screen - CPU Control Sub-Menu - Controls various CPU parameters.



DBS Cycling Temperature

Sets the temperature at which the IST Applet will limit the CPU speed to Battery Optimized mode. The available options are:

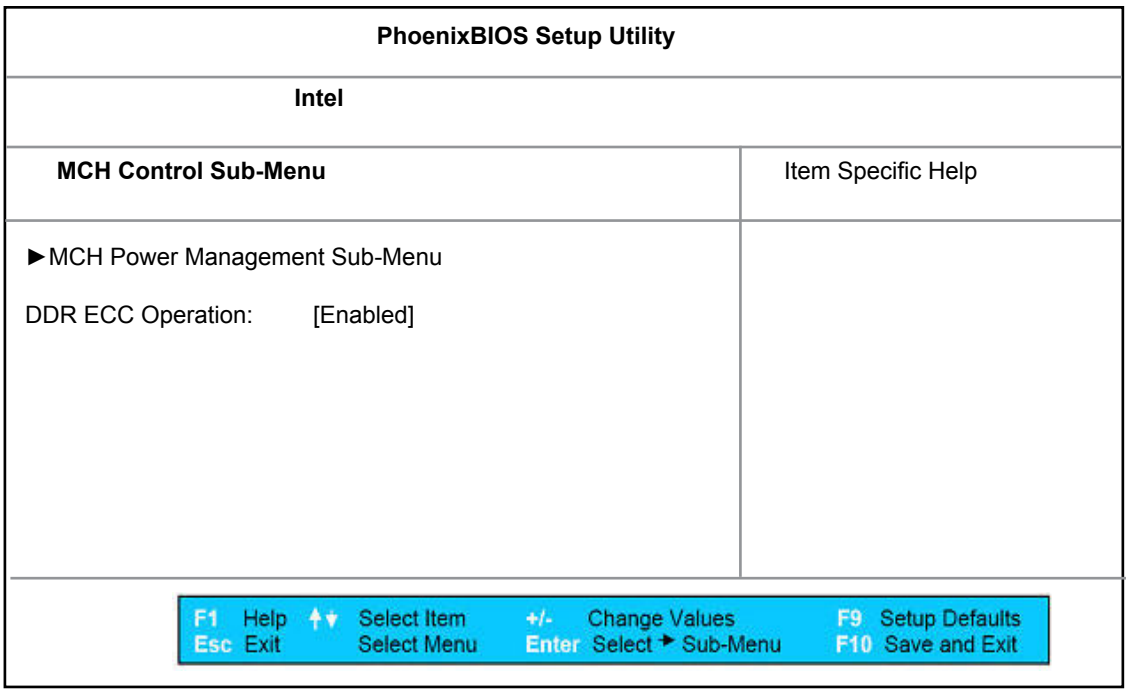
[15 C]
[23 C]
[31 C]
[39 C]
[47 C]
[55 C]
[63 C]
[71 C]
[79 C]
[87 C]
[95 C]
[103 C]
[111 C]
[119 C]

Thermal Control Circuit

Setting this bit enables the thermal control circuit (TCC) portion of the Thermal Monitor feature of the CPU. Intel Thermal Monitor TM1 = 50% duty cycle, and Intel Thermal Monitor TM2 = Geyserville III. The available options are:

[Disabled]
[TM1]
[TM2]

Intel Screen - MCH Control Sub-Menu - Controls various MCH parameters.



MCH Power Management Sub-Menu

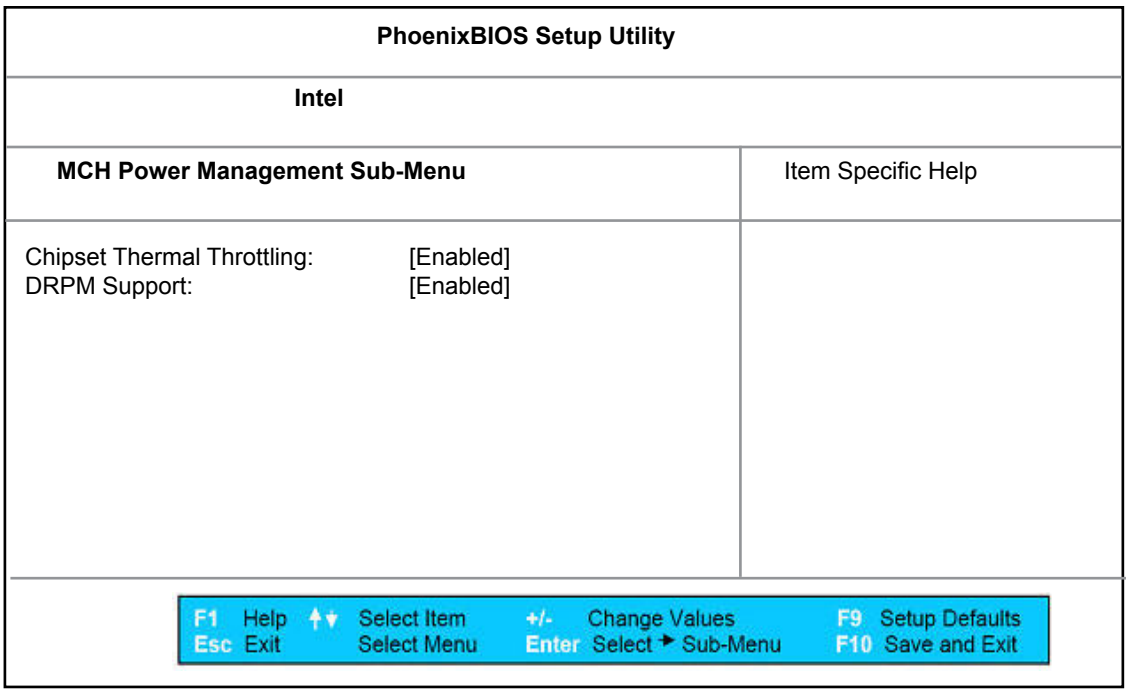
Controls setup items which control the Power Management features of the MCH. See the MCH Power Management Sub-menu on the following page(s).

DDR ECC Operation

Controls ECC Enabling. If 'Enabled', code will determine if SODIMMs support ECC before enabling ECC. The option will not be selectable if ECC is not supported by the SODIMMs or if MGML. The available options are:

[Enabled]
[Disabled]

Intel Screen - MCH Control Sub-Menu - MCH Power Management Sub-Menu - Contains setup items which control the power management features of the MCH.



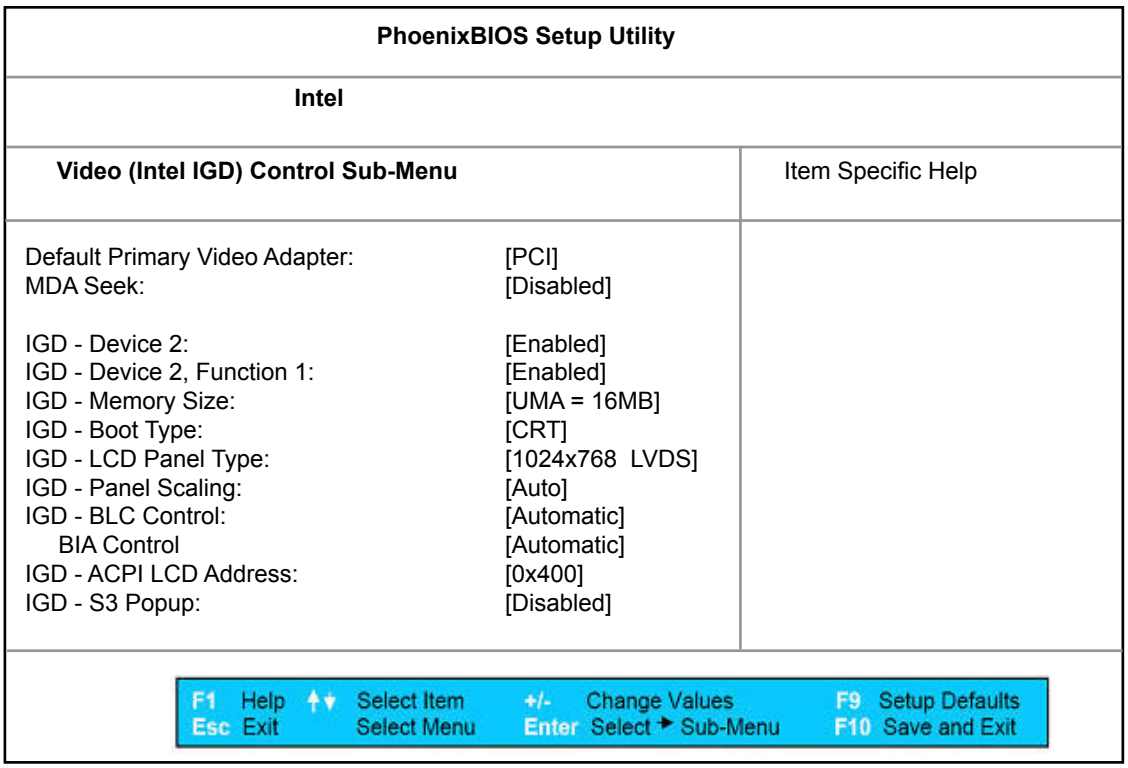
Chipset Thermal Throttling Enables/disables Chipset Thermal Throttling. *Enabled* means that thermal events will trigger read and write DRAM throttling (20%). The available options are:

[Disabled]
[Enabled]

DRPM Support Controls DRPM Support in the MCH. Enabling this feature turns off the memory clocks when not in use. The available options are:

[Disabled]
[Enabled]

Intel Screen - Video (Intel IGD) Control Sub-Menu - Contains setup items which control the configuration of the Internal Graphics Display Device.



Default Primary Video Adapter Select 'PCI' to have a PCI video card, if installed, used for the boot display device. Select 'AGP' to have the AGP video card, if installed, used for the boot display device. The available options are:

[PCI]
[AGP]

MDA Seek Enables/disables seek of MDA Video adapter during boot. The available options are:

[Disabled]
[Enabled]

IGD - Device 2 Enables/disables the Internal Graphics Device by setting item to desired value. The available options are:

[Disabled]
[Enabled]

IGD - Device 2, Function 1 Enables/disables Function 1 of the Internal Graphics Device by setting item to desired value. The available options are:

[Disabled]
[Enabled]

IGD - Memory Size Selects the amount of Main memory that the Internal Graphics Device will use. The available options are:

[UMA = 1MB]
[UMA = 8MB]
[UMA = 16MB]
[UMA = 32MB]

IGD - Boot Type Selects the Video Device that will be activated during POST. The available options are:

[VBIOS Default]
[CRT]
[LCD]
[CRT+LCD]

IGD - LCD Panel Type Selects the LCD Panel used by the Internal Graphics Device by selecting the appropriate setup item. The first item is Panel 1, the last item is Panel 16. Some Panels are not numbered due to size constraints. The available options are:

[640x480 LVDS]
[800x600 LVDS]
[1024x768 LVDS]
[1280x1024 LVDS]
[1400x1050 LVDS1]
[1400x1050 LVDS2]
[1600x1200 LVDS]
[8: Reserved]
[9: Reserved]
[10:Reserved]
[11:Reserved]
[12:Reserved]
[13:Reserved]
[14:Reserved]
[15:Reserved]
[16:1024x768 LVDS]

IGD - Panel Scaling Selects the LCD Panel scaling option used by the Internal Graphics Device. The available options are:

[Auto]
[Force Scaling]
[Off]

IGD - BLC Control Select Backlight control through this Setup item. Select 'Automatic' to use the VBT default. Select 'Disabled' to force disabled or use external inverter. Select 'Enabled' to force enabled. The available options are:

[Automatic]
[Disabled]
[Enabled]

BIA Control Selects the BIA control and agressiveness level through this setup item. Select 'Automatic' to use the VBT default, or 'Disabled' to force disabled or select Level 1 to 4 to force enabled with selected agressiveness level. The available options are:

[Automatic]
[Disabled]
[Level 1]
[Level 2]
[Level 3]
[Level 4]
[Level 5]

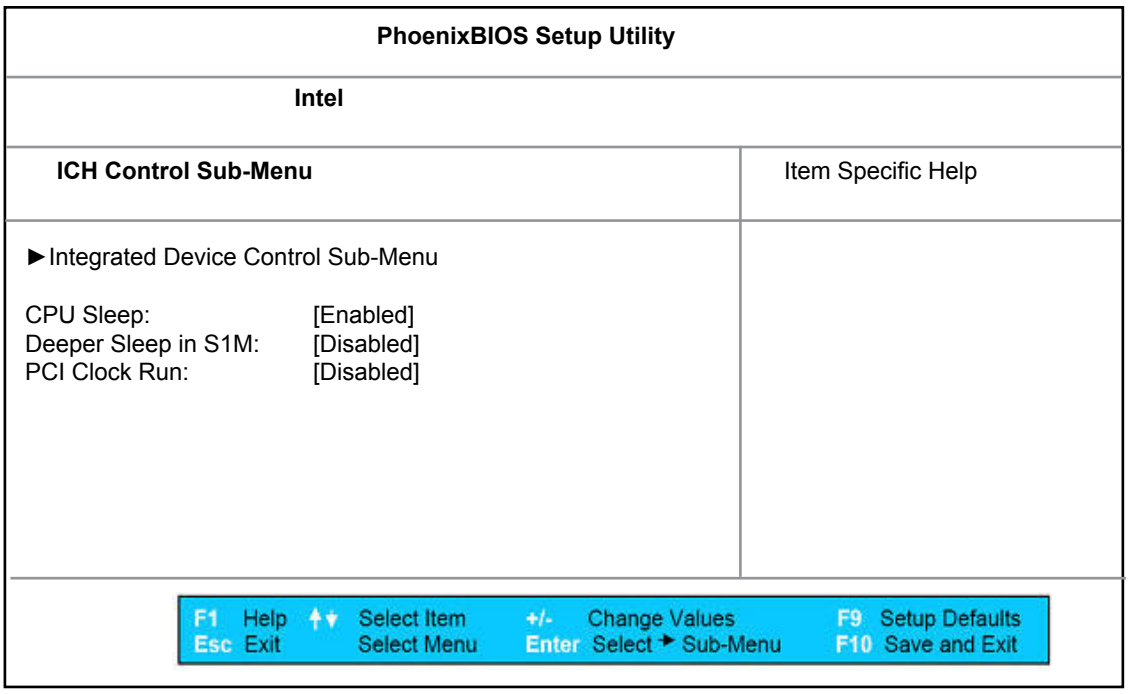
IGD - ACPI LCD Address Select the address to be used for the LCD in the case where the OS supports ACPI Video Extensions. The available options are:

[0x100]
[0x400]

IGD - S3 Popup If the IGD is the primary display device and this option is set to enabled, a popup icon will be displayed for 5 seconds during ACPI S3 resume. The available options are:

[Disabled]
[Enabled]

Intel Screen - ICH Control Sub-Menu - Contains setup items which control the configuration of the ICH Integerated PCI Devices.



Integrated Device Control Sub-Menu

Contains setup items that determine which ICH Integrated PCI Devices will be enabled in PCI Config Space. See the Integrated Device Control Sub-menu on the following page(s).

CPU Sleep

Enables/Disables the CPU_SLP# signal to go active in the C3, C4 and S1D states to reduce CPU power. CPU_SLP# will go active during IST and S1M or greater Sx states independent of this setup option. The available options are:

[Disabled]
[Enabled]

Deeper Sleep in S1M

Causes the ICH4M to use the C4 sequence instead of the standard sequence when entering an S1M state. The available options are:

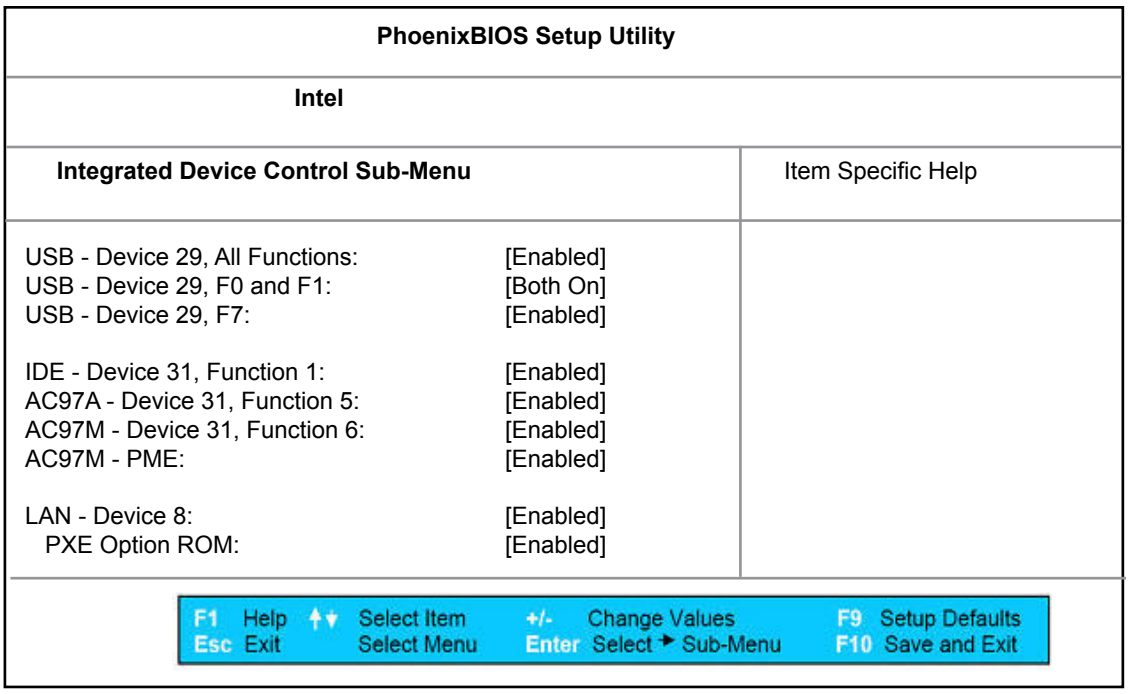
[Disabled]
[Enabled]

PCI Clock Run

If Enabled, the CLKRUN# logic will stop the PCI Clocks. The available options are:

[Disabled]
[Enabled]

Intel Screen - ICH Control Sub-Menu - Integrated Device Control Sub-Menu - Contains setup items that determine which ICH Integerated PCI Devices will be enabled in PCI Config Space.



USB - Device 29, All Functions Enables/disables USB UHCI Controllers #1, #2, #3 and USB 2.0 EHCI Controller. The available options are:

[Disabled]
[Enabled]

USB - Device 29, F0 and F1 Selecting 'F0 On Only' enables USB UHCI Controller #1. Selecting 'Both On' enables USB UHCI Controllers #1 and #2. The available options are:

[F0 On Only]
[Both On]

USB - Device 29, F0 and F1 Enables/disables USB 2.0 EHCI Controller. The available options are:

[Disabled]
[Enabled]

IDE - Device 31, Function 1 Enables/disables the IDE Controller. The available options are:

[Disabled]
[Enabled]

AC97A-Device 31, Function 5 Enables/disables the AC97 Audio Device if an AC97 audio MDC is present. The available options are:

[Disabled]
[Enabled]

AC97M-Device 31, Function 6 Enables/disables the AC97 Modem Device if an AC97 modem MDC is present. The available options are:

[Disabled]
[Enabled]

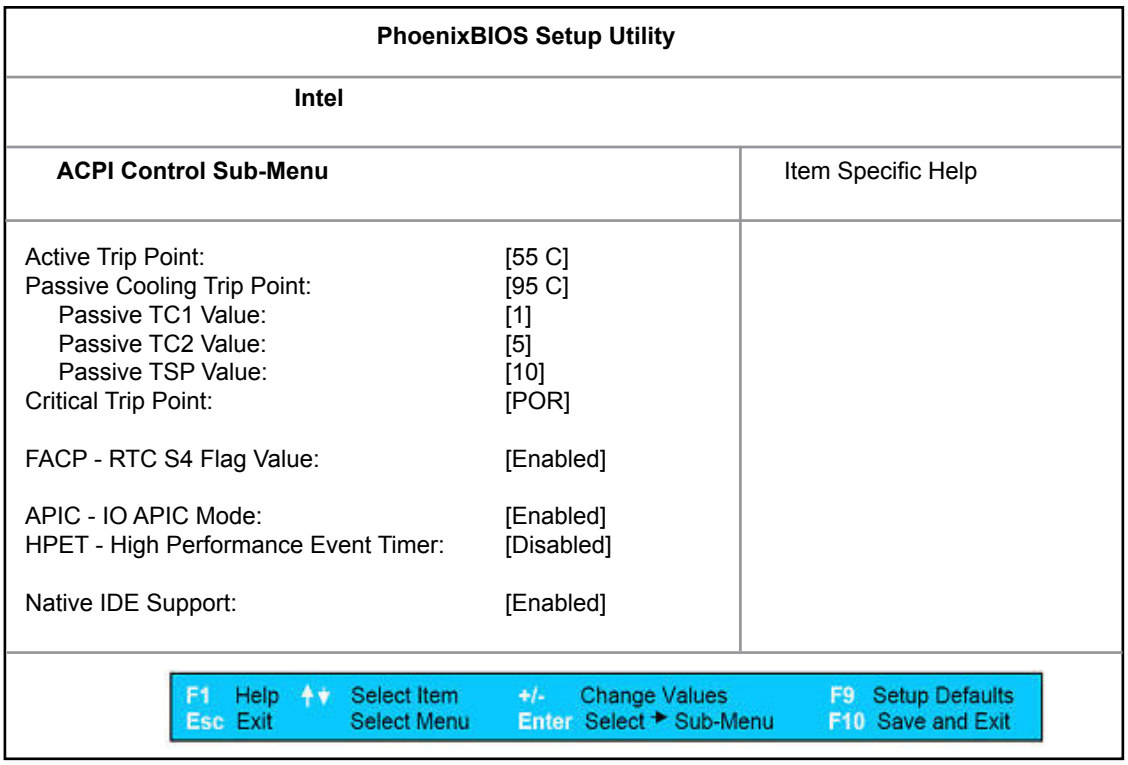
AC97M - PME Controls the ability of the AC97 Modem Device to wake the system. The available options are:

[Disabled]
[Enabled]

LAN - Device 8 Enables/disables the LAN Controller. The available options are:
[Disabled]
[Enabled]

PXE Option ROM Enables/disables the PXE Option ROM. The available options are:
[Disabled]
[Enabled]

Intel Screen - ACPI Control Sub-Menu - Contains setup items which control the configuration of the ACPI Table and Features.



Active Trip Point

This value controls the temperature of the ACPI Active Trip Point - the point at which the OS will turn the CPU Fan on. Tcontrol = Prescott processors will use the Tcontrol value to determine the active trip point. The available options are:

[Disabled]
[15 C]
[23 C]
[31 C]
[39 C]
[47 C]
[55 C]
[63 C]
[71 C]
[79 C]
[87 C]
[95 C]
[103 C]
[111 C]
[119 C]

Passing Cooling Trip Point This value controls the temperature of the ACPI Passive Trip Point - the point at which the OS will begin throttling the CPU. The available options are:

[Disabled]
[15 C]
[23 C]
[31 C]
[39 C]
[47 C]
[55 C]
[63 C]
[71 C]
[79 C]
[87 C]
[95 C]
[103 C]
[111 C]
[119 C]

Passive TC1 Value This value sets the TC1 value for the ACPI Passive Cooling Formula. The available options are:

[1]
[2]
[3]
[4]
[5]
[6]
[7]
[8]
[9]
[10]
[11]
[12]
[13]
[14]
[15]
[16]

Passive TC2 Value This value sets the TC2 value for the ACPI Passive Cooling Formula. The available options are:

[1]
[2]
[3]
[4]
[5]
[6]
[7]
[8]
[9]
[10]
[11]
[12]
[13]
[14]
[15]
[16]

Passive TSP Value This value sets the TSP value for the ACPI Passive Cooling Formula. It represents in tenths of a second how often the OS will read the temperature when Passive Cooling is Enabled. The available options are:

[2]
[4]
[6]
[8]
[10]
[12]
[14]
[16]
[18]
[20]
[22]
[24]
[26]
[28]
[30]
[32]

Critical Trip Point This value controls the temperature of the ACPI Critical Trip Point - the point at which the OS will shut the system off. POR stands for Power-On-Reset, the default assumed by the SCH-3114. The available options are:

[POR]
[15 C]
[23 C]
[31 C]
[39 C]
[47 C]
[55 C]
[63 C]
[71 C]
[79 C]
[87 C]
[95 C]
[103 C]
[111 C]
[119 C]
[127 C]

FACP - RTC S4 Flag Value Valid only for ACPI. Controls the value for the RTC S4 Flag in the FACP Table. The available options are:

[Disabled]
[Enabled]

APIC - IO APIC Mode

This item is valid only for WIN2000 and Windows XP. Also, a fresh install of the OS must occur when APIC Mode is desired.

Test the IOAPIC by setting item to 'Enabled'. The APIC Table will then be pointed to by the RSDT, the Local APIC will be initialized, and the proper enable bits will be set in ICH4M.

The available options are:

[Disabled]
[Enabled]

HPET - High Performance Event Timer

This item is valid only in the Windows XP OS.

Test the High Performance Event Timer by setting item to 'Enabled'. The HPET Table will then be pointed to by the RSDT and the proper enable bits will be set in ICH4M.

The available options are:

[Disabled]
[Enabled]

Native IDE Support

Enable Native IDE support for WINXP by setting this item.

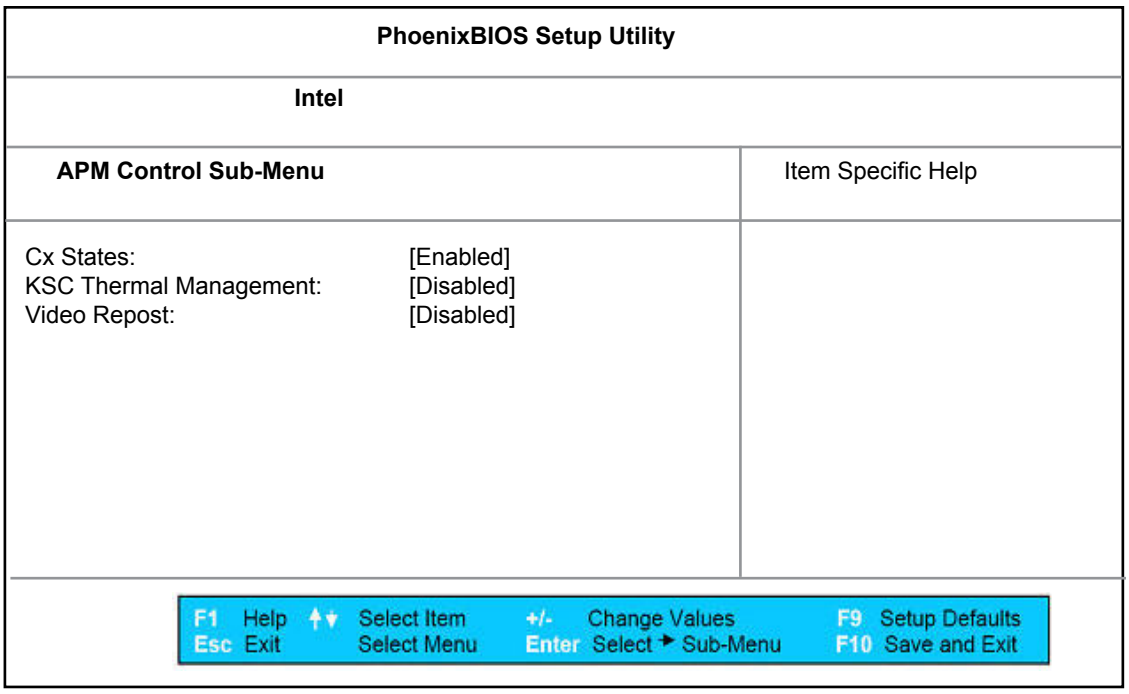
The NATA Package will be created if this item is set to 'Enabled'.

Changing this item will have no effect in WIN98, WINME or WIN2K.

The available options are:

[Disabled]
[Enabled]

Intel Screen - APM Control Sub-Menu - Controls selective functionality when an APM OS is loaded.



Cx States

Controls the ability to enter into CPU C-States when running an APM OS. The available options are:

[Disabled]
[Enabled]

KSC Thermal Management

When running an APM OS, the KSC has the ability to control the thermal policy of the platform. Select which policy the KSC should implement.

Selecting 'Disabled' means the fan is always on and throttling will not occur. Selecting 'Enabled' means the fan and throttling will both be conditionally used to cool the CPU.

The available options are:

[Disabled]
[Enabled]

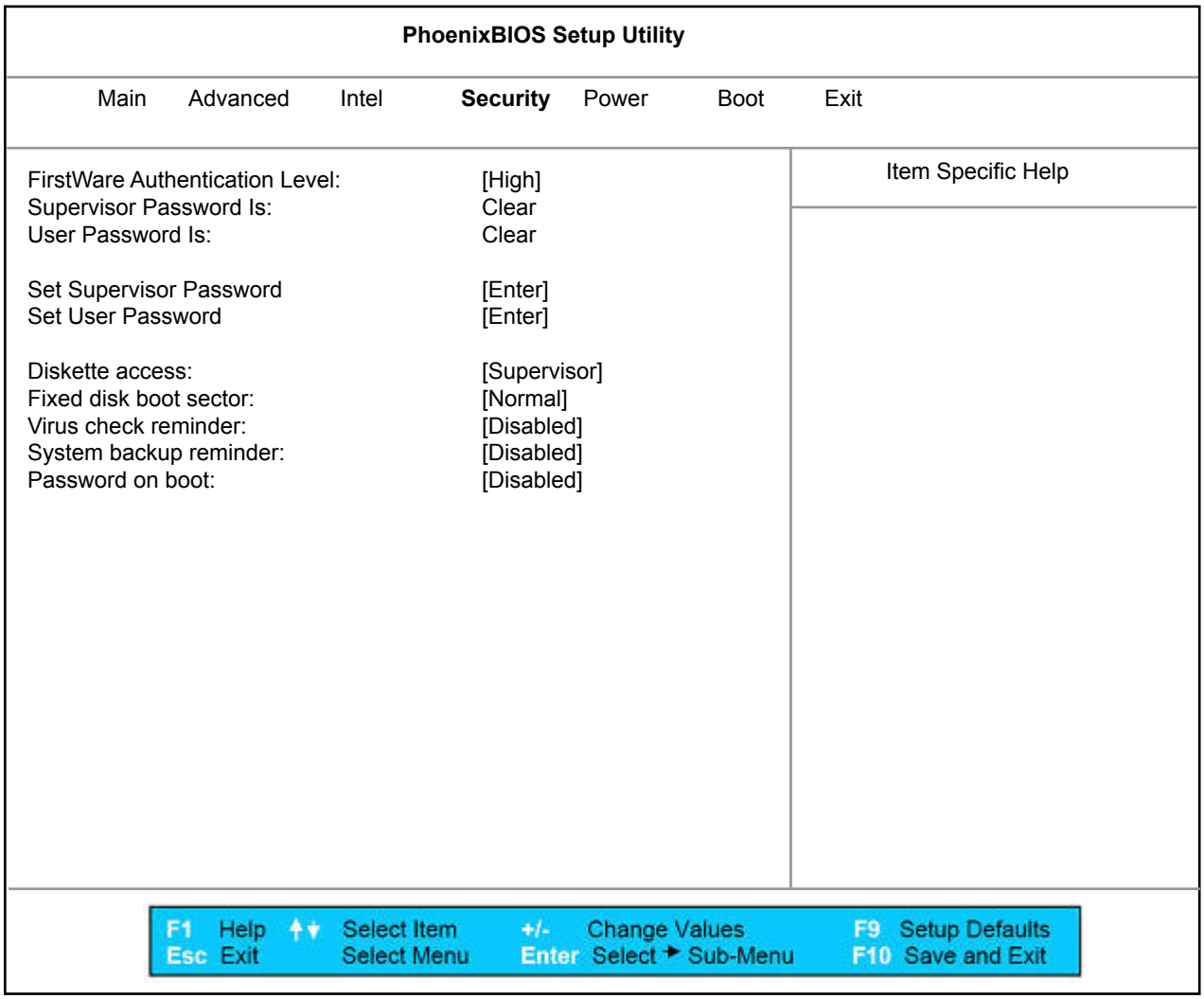
Video Repost

Controls the calling of a Video Repost to the VBIOS of any Graphics Device during a resume from APM STR.

The available options are:

[Disabled]
[Enabled]

Security Menu - Configures security options for the board.



NOTE: Displayed characteristics may vary based on system configuration.

Some of the items on this menu cannot be modified in user mode. If any items require changes, please consult your system supervisor.

FirstWare Authentication Level Select the FirstWare authentication level. The available options are:
[High]
[Medium]
[Low]

Supervisor Password Is 'Set' indicates that a Supervisor Password is set. 'Clear' indicates a Supervisor Password has not been entered.

User Password Is 'Set' indicates that a User Password is set. 'Clear' indicates a User Password has not been entered.

Set Supervisor Password

Controls access to the setup utility. Selecting '[Enter]' will allow updating of the password.

Set User Password

User Password controls access to the system at boot.

Diskette access

Specifies who has diskette access. Defaults to System Supervisor. The available options are:

[Supervisor]
[User]

Fixed disk boot sector

Write protects boot sector on hard disk to protect against viruses. The available options are:

[Normal]
[Write Protect]

Virus check reminder

Displays reminder message at boot (daily, every Monday or 1st of every month. The available options are:

[Disabled]
[Daily]
[Weekly]
[Monthly]

System backup reminder

Displays reminder message at boot (daily, every Monday or 1st of every month. The available options are:

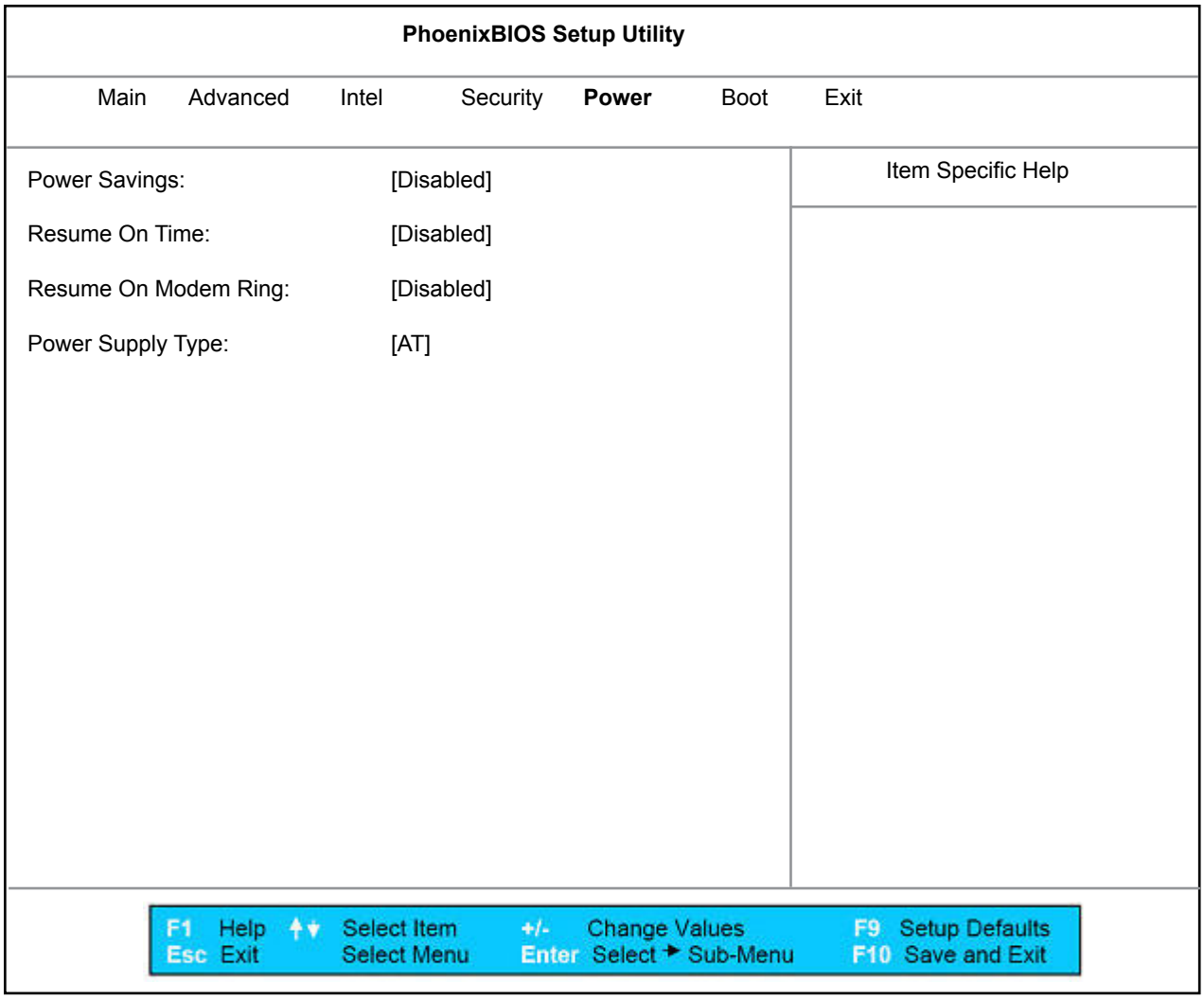
[Disabled]
[Daily]
[Weekly]
[Monthly]

Password on boot

Specifies whether a password is required on boot. The available options are:

[Disabled]
[Enabled]

Power Menu - Configures the power options for the board.



Power Savings Maximum Power Savings conserves the greatest amount of system power. Maximum Performance conserves power but allows greatest system performance. To alter these settings, choose 'Customized'. To turn off power management, choose 'Disabled'. The available options are:

[Disabled]
[Customized]
[Maximum Power Savings]
[Maximum Performance]

Resume On Time Selecting 'Enabled' wakes the system up at a specific time. Selecting 'Disabled' does not. The available options are:

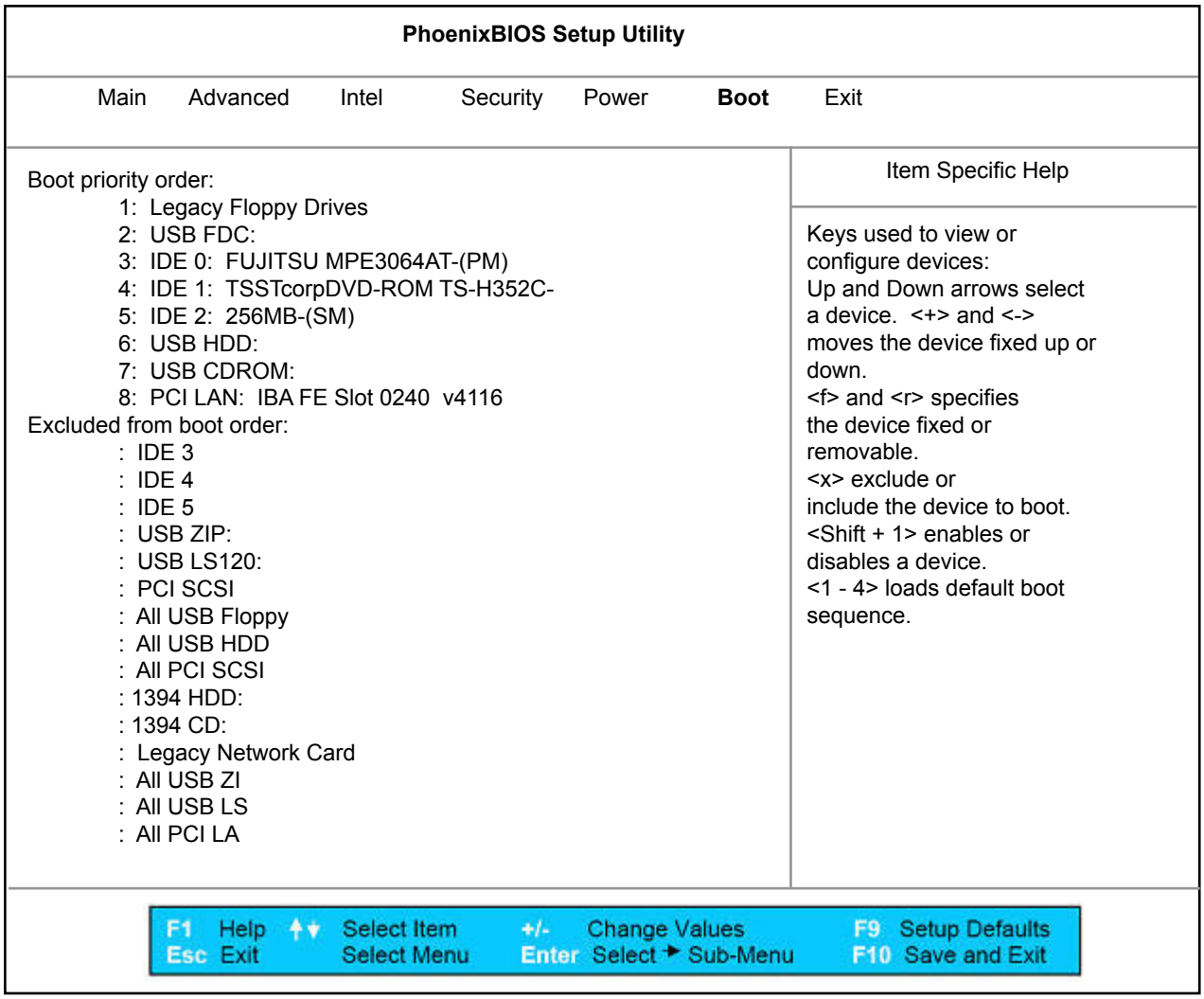
[Disabled]
[Enabled]

Resume On Modem Ring Selecting 'Enabled' wakes the system when an incoming call is detected on your modem. Selecting 'Disabled' does not. The available options are:

[Disabled]
[Enabled]

Power Supply Type Displays the current power supply type.

Boot Menu - Configures the devices to boot and in what order.

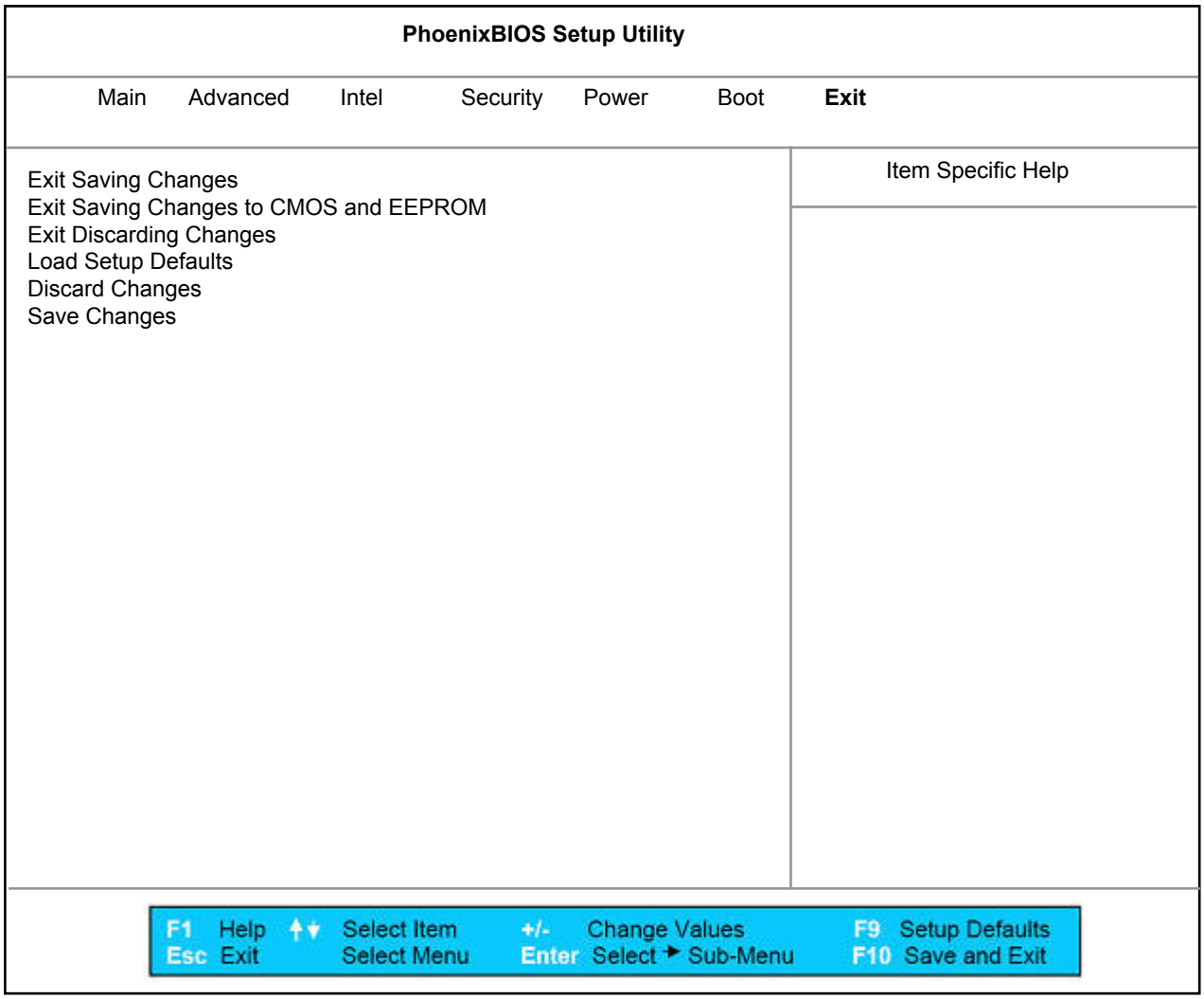


NOTE: Available device options may vary based on system configuration.

Boot priority order Displays available system devices to be included in the boot order configuration and their boot priority.

Excluded from boot order Displays system devices not to be included in the boot order configuration.

Exit Setup - This menu screen is used for exiting the setup menu and for saving or discarding any changes made.



Exit Saving Changes Exit System Setup and save your changes to CMOS.

Exit Saving Changes to CMOS and EEPROM Exit System Setup and save your changes to CMOS and EEPROM for batteryless operation.

Exit Discarding Changes Exit utility without saving Setup data to CMOS.

Load Setup Defaults Loads default values for all Setup items.

Discard Changes Load previous values from CMOS for all Setup items.

Save Changes Save Setup Data to CMOS.

Phlash Utility

The Phoenix® BIOS on-board the EBC-855 is stored in Flash memory. BIOS updates may be programmed on board using the Phoenix® Phlash Utility. PHLASH.EXE is a DOS executable that may be run from the command prompt such as: **phlash BIOS.BIN /mode=3 /C**

This will execute the PHLASH.EXE program and start reprogramming the BIOS with the specified file, BIOS.BIN. The utility can be run from floppy, hard disk, or CompactFlash. It may also be run "in the blind" without keyboard or video present by adding its invocation into the AUTOEXEC.BAT file on the boot media.

The most up-to-date BIOS is located on the WinSystems website. Additional information on flashing the BIOS for the EBC-855 can be found on the website at http://www.winsystems.com/EBC-855/On the EBC-855 BIOS Flashing Issue.pdf.

I/O Port Map

The following is a list of PC I/O ports. I/O addresses marked with '**' are generally unused and should be the basis for the first choices in I/O address selection. Addresses marked with a '!!' support 16-bit I/O addressing and should only be used if no other I/O device conflict will exist on the ISA bus for the I/O bit devices (except for 55E and 565-566).

Hex Range	Usage
000-00F	8237DMA Controller #1
**010-01F	Free
020-021	8259 PIC #1
**022-03F	Free
040-043	8254 PIC
**044-05F	Free
060-06F	8042 Keyboard / Mouse Controller
070-07F	CMOS RAM, Clock / Calendar
080-09F	DMA Page Registers
0A0-0BF	8259 PIC #2
0C0-0DF	8237 DMA Controller #2
**0E0-0EF	Free
0F0-0F1	Math Co-processor Control
**0F2-0F7	Free
0F8-0FF	Math Co-processor
100-102	Video Controllers
**103-11F	Free
120-127	Digital I/O (Default)
**128-14F	Free
150	LPC GPIO Port, EEPROM Access
**151-16F	Free
170-17F	IDE1, Controller #2
**1E8-1EF	Free
1F0-1FF	IDE Controller #1
**200-277	Free
**278-27F	Free (Option for LPT)
**280-2A7	Free
**2A8-2AF	Free (Option for on-board serial ports)
2B0-2DF	Video Controllers
**2E0-2E7	Free
2E8-2EF	COM4 – (Default)
**2F0-2F7	Free
2F8-2FF	COM2 – (Default)
**300-377	Free
378-37B	LPT (Default)
**37C-3AF	Free
3B0-3BB	Video Controllers
3BC-3BF	Free (Option for LPT)
3C0-3DF	Video Controllers
**3E0-3E7	Free
3E8- 3EF	COM3 – (Default)
3F0-3F7	Floppy Disk Controller #1
3F8-3FF	COM1 – (Default)
!!400-55E	Free
!!55E	Status LED
!!55F-564	Free
!!565-566	Watchdog
!!567-FFF	Free

Interrupt Map

Hardware Interrupts (IRQs) are supported for both PC/104 (ISA) and PC/104Plus (PCI) devices. The table below lists IRQ resources as used by the EBC-855.

IRQ0	18.2 Hz heartbeat
IRQ1	Keyboard
IRQ2	Chained to Slave controller
IRQ3	COM2 *
IRQ4	COM1 *
IRQ5	COM3 *
IRQ6	LPT or Floppy
IRQ7	COM4 *
IRQ8	Real Time Clock
IRQ9	ACPI (only under ACPI compliant OS)
IRQ10	DIO
IRQ11	PCI Interrupts
IRQ12	Mouse
IRQ13	Floating point processor
IRQ14	IDE1
IRQ15	IDE2

Cables

Part Number	Description
CBL-115-4	4-ft., Opto rack interface
CBL-126-10	Dual IDE UDMA/66 Cable
CBL-266-1	44-pin, 2-mm., IDE Drive
CBL-308-1	3.5-in. floppy drive to LPT interface cable
CBL-SET-327-G-1	Various cables for the EBC-855 and Battery includes:
CBL-173-1	20-pin ribbon to two 9-pin male D connector adapter
CBL-225-1	PS/2 Mouse Adapter
CBL-234-1	14-pin ribbon to 15-pin D-sub CRT adapter
CBL-236-2	Power cable (unterminated)
CBL-247-1	1-ft., Multi-I/O adapter
CBL-270-2	Audio Access Cable
CBL-275-1	Two 2-mm., 8-pin, Dual USB
BAT-LTC-E-36-16-1	External 3.6V, 1600 mAH battery with plug-in connector

Software Drivers & Examples

BIOS	
EBC-855 BIOS	EBC-855_BIOS.zip
INF Install File	
EBC-855 Driver	infinst_enu.exe
Hardware Monitor File	
EBC-855 HW Monitor	hwmon.zip
EEPROM Utility	
EBC-855 EEPROM Utility	EBC-855_EEPROM.zip
Video Driver	
Windows 2000/XP	win2k_xp141950.exe
Windows 9x	win9x1361.exe
Windows NT4	winnt41361.exe
Linux	i915Graphics.tar.gz
Linux list available at http://www.intelllinuxgraphics.org	
Audio Driver	
Windows 2000/XP	Audio_Drivers.zip
Ethernet Driver	
(Drivers for 82551Q/82559 10/100 Ethernet Controller)	
Windows 2000 and XP Network Adapter Base Drivers	pro2kxpm.zip
Windows NT 4.0 Network Adapter Driver Set	pront4.zip
Windows 98 SE/Me Network Adapter Base Drivers	pro98mem.zip
Windows 95 Driver Release	pro95.zip
MS-DOS and OS/2 Drivers	prodos.zip
NetWare Drivers for PRO Network Adapters	pronware.zip
Linux 2.2 10/100 Adapter Base Driver	e100-2.1.15.tar.gz
Linux 2.4, 2.6 10/100 Adapter Base Driver	e100-3.5.14.tar.gz
DOS Packet Drivers	packet.zip
Examples	
(For WS16C48 Digital I/O Chip)	
DOS Driver - C Functions	uio48ebc.zip
Linux Drivers - Kernel 2.2, 2.4	linux_uio48_96.zip
Linux Drivers - Kernel 2.6	uio48io_kernel_2.6.zip
Windows XP Driver	wsuio48_96xp.zip
Reprogramming DOS tick for high resolution timing	tickdemo.zip
Serial Console Utilities	
Generic 38400baud Serial console redirect for COM1	scon1.zip
Generic 38400baud Serial console redirect for COM2	scon2.zip
Generic 9600baud Serial console redirect for COM1	sc19600.zip
Generic 9600baud Serial console redirect for COM2	sc29600.zip

Software Summary

WS16C48 Register Definitions – The EBC-855 uses the WinSystems exclusive ASIC device, the WS16C48. This device provides 48 lines of digital I/O. There are 17 unique registers within the WS16C48. The following table summarized the registers and the text that follows provides details on each of the internal registers.

I/O Address Offset	Page 0	Page 1	Page 2	Page 3
00H	Port 0 I/O	Port 0 I/O	Port 0 I/O	Port 0 I/O
01H	Port 1 I/O	Port 1 I/O	Port 1 I/O	Port 1 I/O
02H	Port 2 I/O	Port 2 I/O	Port 2 I/O	Port 2 I/O
03H	Port 3 I/O	Port 3 I/O	Port 3 I/O	Port 3 I/O
04H	Port 4 I/O	Port 4 I/O	Port 4 I/O	Port 4 I/O
05H	Port 5 I/O	Port 5 I/O	Port 5 I/O	Port 5 I/O
06H	Int_ Pending	Int_ Pending	Int_ Pending	Int_ Pending
07H	Page/Lock	Page/Lock	Page/Lock	Page/Lock
08H	N/A	Pol_0	Enab_0	Int_ID0
09H	N/A	Pol_1	Enab_1	Int_ID1
0AH	N/A	Pol_2	Enab_2	Int_ID2

Register Details

Port 0 through 5 I/O – Each I/O bit in each of the six ports can be individually programmed for input or output. Writing a **0** to a bit position causes the corresponding output pin to go to a high-impedance state (pulled high by external 10 KΩ resistors). This allows it to be used as an input. When used in the input mode, a read reflects the inverted state of the I/O pin, such that a high on the pin will read as a **0** in the register. Writing a **1** to a bit position causes that output pin to sink current (up to 12 mA), effectively pulling it low.

INT_PENDING – This read-only register reflects the combined state of the INT_ID0 through INT_ID2 registers. When any of the lower three bits are set, it indicates that an interrupt is pending on the I/O port corresponding to the bit position(s) that are set. Reading this register allows an Interrupt Service Routine to quickly determine if any interrupts are pending and which I/O port has a pending interrupt.

PAGE/LOCK – This register serves two purposes. The upper two bits select the register page in use as shown here:

D7	D6	Page
0	0	Page 0
0	1	Page 1
1	0	Page 2
1	1	Page 3

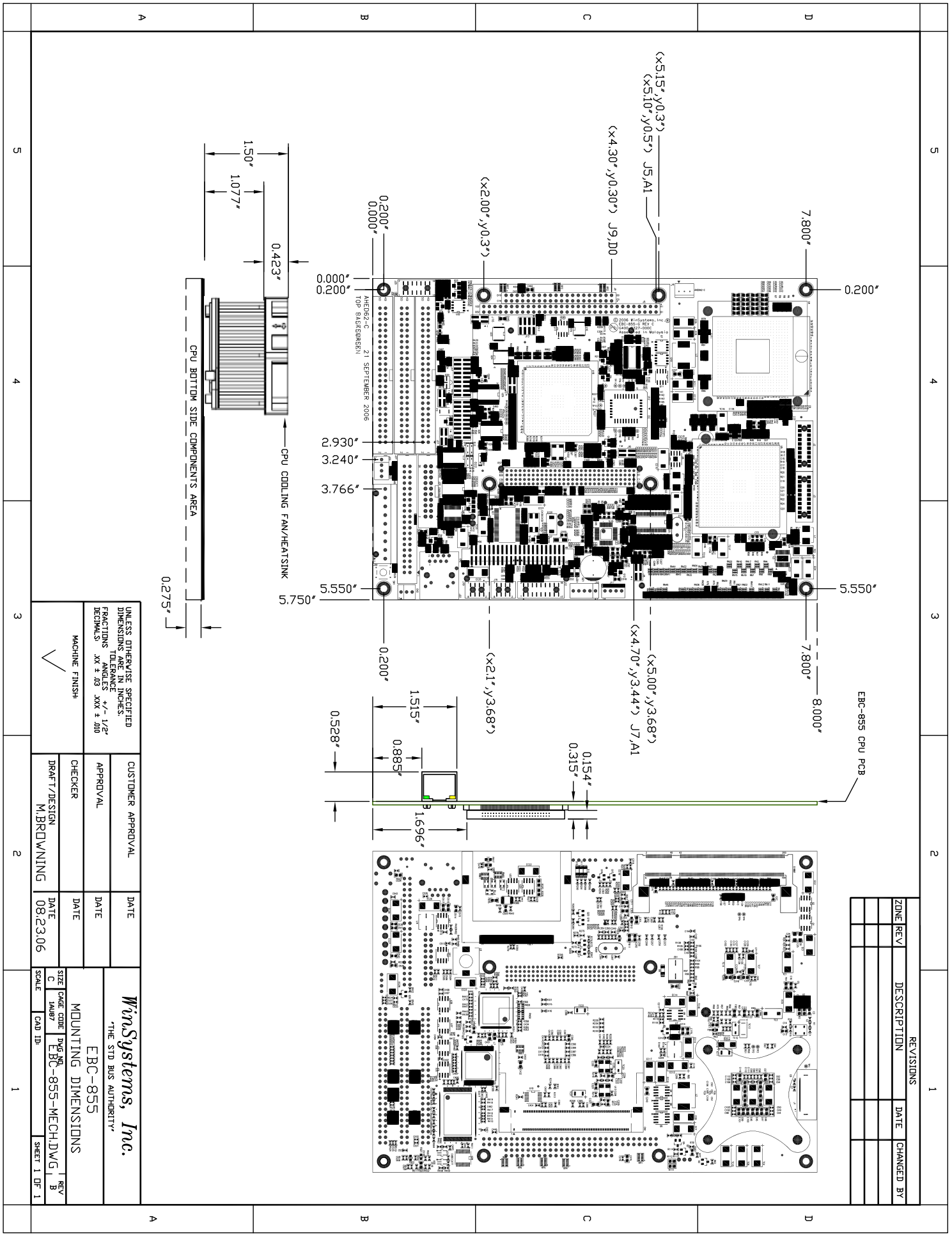
Bits 5-0 allow for locking the I/O ports. A **1** written to the I/O port position will prohibit further writes to the corresponding I/O port.

POL0 - POL2 – These registers are accessible when Page 1 is selected. They allow interrupt polarity selection on a port–by–port and bit-by-bit basis. Writing a **1** to a bit position selects the rising edge detection interrupts while writing a **0** to a bit position selects falling edge detection interrupts.

ENAB0 - ENAB2 – These registers are accessible when Page 2 is selected. They allow for port-by-port and bit-by-bit enabling of the edge detection interrupts. When set to a **1** the edge detection interrupt is enabled for the corresponding port and bit. When cleared to **0**, the bit's edge detection interrupt is disabled. Note that this register can be used to individually clear a pending interrupt by disabling and re-enabling the pending interrupt.

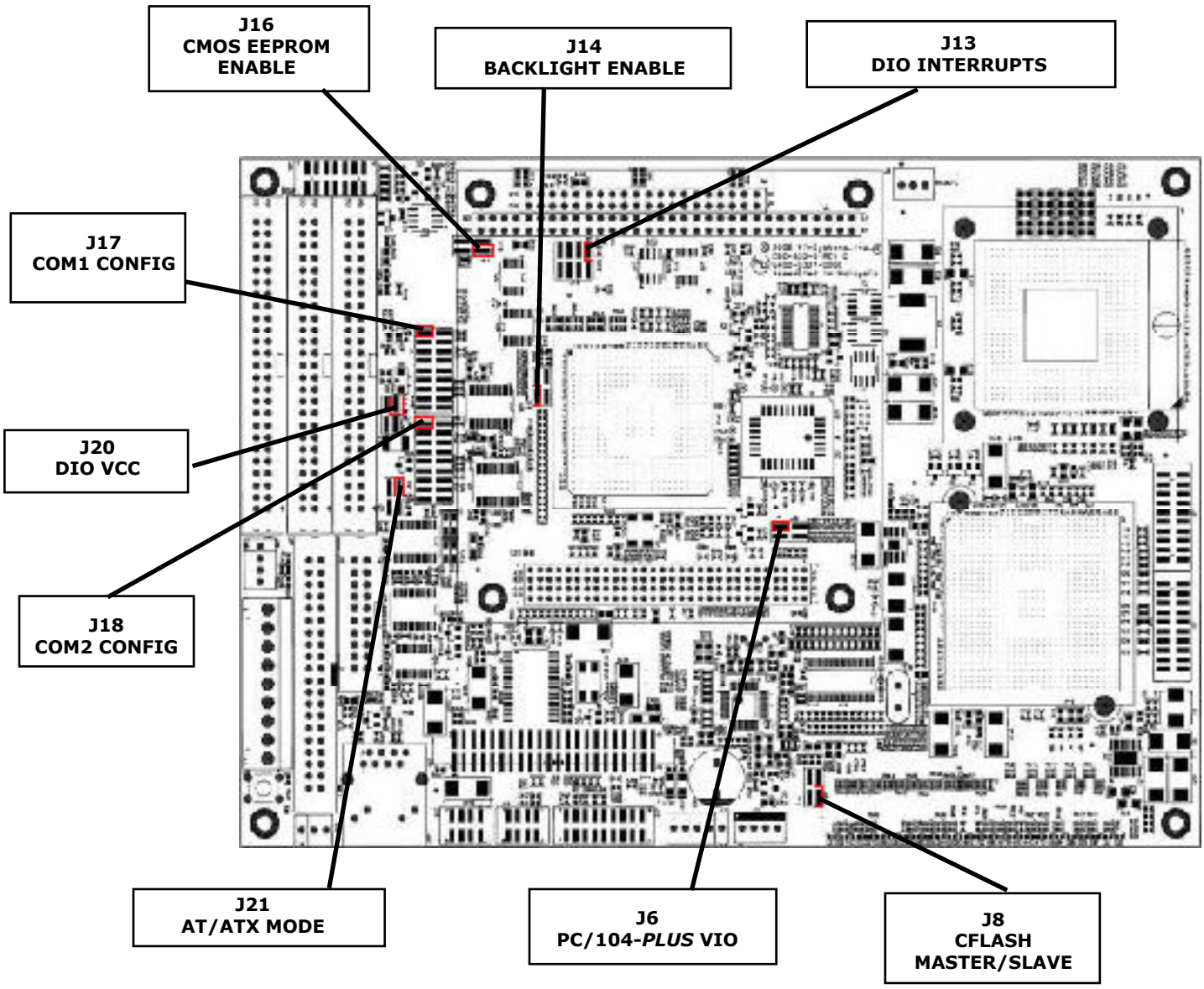
INT_ID0 – INT_ID2 – These registers are accessible when Page 3 is selected. They are used to identify currently pending edge interrupts. A bit when read as a **1** indicates that an edge of the polarity programmed into the corresponding polarity register has been recognized. Note that a write to this register (value ignored) clears ALL of the pending interrupts in this register.

Mechanical Drawing



Jumper Reference

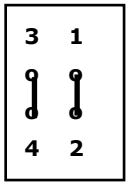
Drawings ONLY - for more detailed information on these parts, refer to the descriptions shown previously in this manual.



NOTE: The reference line to each component part has been drawn to Pin 1, where applicable. Pin 1 is also highlighted with a red square, where applicable.

Power Supply Selection

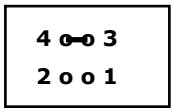
J21



1-2, 3-4 = AT
1 2, 3 4 = ATX

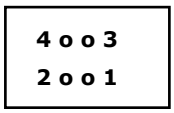
BIOS

J16



3-4 Enables CMOS setup to/from EEPROM
1 2 Temporarily install to clear CMOS Memory

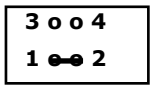
J16



3 4 Restores original factory default CMOS settings
1 2 Temporarily install to clear CMOS Memory

CFLASH

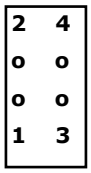
J8



3 4 not used
1-2 CFlash Master, 1 2 CFlash Slave

Backlight Enable

J14

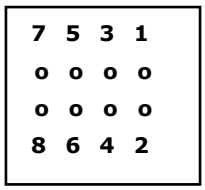


(Only One Jumper Selection)
3-4 = Active Low Backlight Enable
1-2 = Active High Backlight Enable

Avoid Simultaneous Jumpering
Misjumpering could cause damage to the board and/or the Backlight Panel.

Digital I/O Interrupt

J13

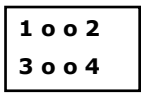


DIO Interrupt Selection

1-2	none
3-4	IRQ 15
5-6	IRQ 10
7-8	IRQ 5

Digital I/O Enable & Power

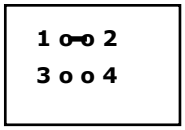
J20



1-2 +5 volts is provided at pin 49 of both J23 and J26
3 4 DIO enabled (OPEN)

PC/104-*Plus* VIO Voltage

J6



jumpered 1-2 supports +3.3V (default, shown)
jumpered 3-4 supports +5V

COM1/COM2 RS-232/RS-422/RS-485 Modes

COM1

Mode #	Description	J17	Termination J17		
			TX (100)	RX (100)	TX/RX (300)
1	RS-232	1-2	N/A	N/A	N/A
2	RS-422 RTS ENABLE	3-4 9-10	13-14	17-18	11-12 13-14 15-16
3	RS-422 AUTO ENABLE	3-5, 9-10 (One node must use TX-RX 300 Termination)	N/A	17-18	11-12 13-14 15-16
4	RS-485 RTS ENABLE	3-4, 7-8	13-14	N/A	11-12 13-14 15-16
5	RS-485 RTS ENABLE WITH Echo-Back	3-4, 6-8	13-14	N/A	11-12 13-14 15-16
6	RS-485 AUTO ENABLE	3-5, 7-8 (One node must use TX/RX 300 Termination)	13-14	N/A	11-12 13-14 15-16
7	RS-485 AUTO ENABLE WITH Echo-Back	3-5, 6-8 (One node must use TX/RX 300 Termination)	N/A	N/A	11-12 13-14 15-16

COM2

Mode #	Description	J18	Termination J18		
			TX (100)	RX (100)	TX/RX (300)
1	RS-232	1-2	N/A	N/A	N/A
2	RS-422 RTS ENABLE	3-4 9-10	13-14	17-18	11-12 13-14 15-16
3	RS-422 AUTO ENABLE	3-5, 9-10 (One node must use TX-RX 300 Termination)	N/A	17-18	11-12 13-14 15-16
4	RS-485 RTS ENABLE	3-4, 7-8	13-14	N/A	11-12 13-14 15-16
5	RS-485 RTS ENABLE WITH Echo-Back	3-4, 6-8	13-14	N/A	11-12 13-14 15-16
6	RS-485 AUTO ENABLE	3-5, 7-8 (One node must use TX/RX 300 Termination)	13-14	N/A	11-12 13-14 15-16
7	RS-485 AUTO ENABLE WITH Echo-Back	3-5, 6-8 (One node must use TX/RX 300 Termination)	N/A	N/A	11-12 13-14 15-16

Specifications

Electrical

EBC-855 CPU	: 1 GHz Intel ZCD or 1.8 GHz Pentium M
PC/104 Interface	: 16-bit, nonstackthrough
PC/104-*Plus* Interface	: 32-bit PCI, nonstackthrough
Ethernet	: 10/100 Mbps with RJ-45 connector
USB 2.0	: Four (4) ports
Serial Interface	: Four (4) Serial channels with RS-232 levels Two (2) channels with optional RS-422/485
802.11	: Optional MiniPCI card supported
Audio	: AC97 with MIC, SPKR and LINE OUT
LPT Interface	: Bidirectional LPT with ECP/EPP
Digital I/O Interface	: 48 I/O lines, TTL compatible
EIDE interface	: Supports four (4) drives
VCC	: +5V ±5% at 2.1A typical for Intel® 1.0 GHz ZCD +5V at 4.25A required for Intel® 1.8 GHz Pentium M™

System Memory

Addressing	: Up to 1 GB 200-pin SDRAM (supplied and installed by user)

Solid State Disk

CompactFlash	: One (1) Type I/II socket

Mechanical

Dimensions	:5.75” x 8.0” (147 mm x 203 mm)
Weight	:17.2 oz (487.61 g)

Connectors

Keyboard	: Standard PS/2 or USB interface
Mouse	: Standard PS/2 or USB interface

Environmental

Operating Temperature	: -40°C to +70°C (1GHz without fan or 1.8GHz with fan) -40°C to +85°C (1GHz with fan)

WARRANTY REPAIR INFORMATION

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2. You must send the product postage prepaid and insured. You must enclose the products in an anti-static bag to protect from damage by static electricity. WinSystems is not responsible for damage to the product due to static electricity.