ETe-P3T / CET
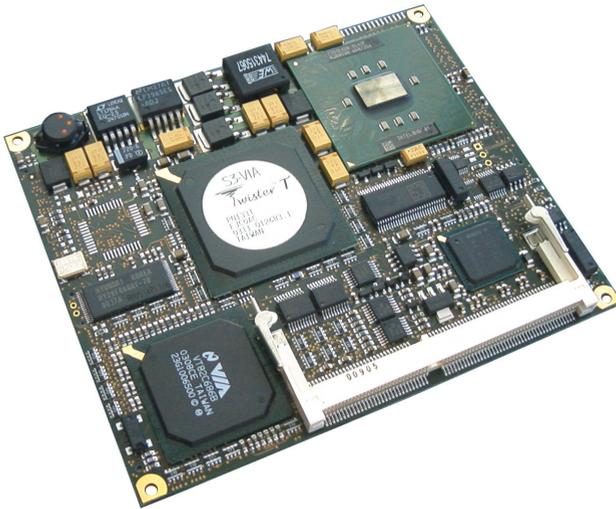**Pentium III ETX Module**

User's Manual
Version 1.1

23 / 06 / 2004

MSC Vertriebs GmbH
Design Center Neufahrn

Copyright Notice

☝ Important Information

This product is not an end user product. It was developed and manufactured for further processing by trained personnel.

EMC Rules

This unit has to be installed in a shielded housing. If not installed in a properly shielded enclosure, and used in accordance with the instruction manual, this product may cause radio interference in which case the user may be required to take adequate measures at his or her own expense.

Contents

1. General Information

1.1. Revision History

Rev.	Description
1.0	Initial Release
1.1	1.2 Website address updated 2.3.2 Max dram module height specified 5. BIOS manual rev. 0.5

1.2. Introduction

The ETe-P3T / CET is an all-in-one Pentium III cpu module. It is fully compliant with the ETX standard.

The module is based on Mobile INTEL Tualatin CPUs and the VIA Twister-T Chipset PN133T. The performance ranges from 400 or 650MHz Ultra Low Voltage (ULV) Celeron CPUs (ETe-CET) up to 800 or 933MHz Pentium III (ETe-P3T) embedded processors. All these cpus are on the embedded roadmap of INTEL, which means that the processors are long term available.

Since there is, except for the cpu, no functional difference between ETe-P3T and ETe-CET, the module in this manual is always referenced as ETe-P3T.

The VIA Twister-T Chipset PN133T supports 100MHz (Celeron) or 133MHz (Pentium III) front side bus.

The ETE-P3T supports 3.3V SDRAM. It provides a 144-pin standard SO-DIMM socket giving you the flexibility to configure your system up to 512 MB of SDRAM .

The PN133T integrates an S3 Savage4 graphics controller (AGP4x) with up to 32MB Video RAM (UMA).

On board features include an PCI 100MBit Ethernet controller (82551ER), two EIDE ports, audio, parallel / floppy, serial, keyboard and mouse interfaces, four usb ports and a TV encoder option.

Please visit our website **http://www.msc-ge.com** where you can find drivers, firmware updates and documentation (--> IPC Systems & Boards --> IPC Embedded --> ET(e)/ETX).

2. Technical Information

2.1. Specifications

Core:

    CPU :

        Intel Embedded Tualatin processor (µFCBGA, soldered) :
        Celeron ULV (Ultra Low Voltage) 400, 650MHz
        Pentium III Embedded LV (Low Voltage) 800, 933MHz

    ChipSet:

        VIA Twister-T Chipset PN133T
            VT8606 North Bridge
            VT82C686B South Bridge

    Cache:

        256KB (Celeron) or 512KB (Pentium III) second level cache (on chip)

Memory:

    1 Standard 144-Pin SO-DIMM socket (max. 512MByte)
    optional second SO-DIMM socket on solder side
        (max 512MB, requires higher baseboard ETX connectors)

ISA-Bus Interface:

    VT82C686B South Bridge
    ETX connector X2

PCI-Bus Interface:

    VT8606 North Bridge
     3 external PCI bus masters (if onboard ethernet enabled)
     4 external PCI bus masters (if onboard ethernet disabled)
    ETX connector X1

Video:

    VT8606 North Bridge
    S3 Savage4 AGP 4x VGA Controller
    up to 32MB RAM (UMA)
    CRT-Interface
    Flat Panel Interface (LVDS, two 18bit channels)

TV Out (option):

    VT1621 TV-Encoder
    Note: If this option is used, no flat panel interface available !

Ethernet :

    INTEL 82551ER PCI 10/100 MBit Ethernet controller

Audio:

    VT82C686B AC97 Audio controller
    VT1612A AC97 Codec

USB:

    integrated in VT82C686B South Bridge
    4 USB 1.1 ports (1.5MBit/s or 12MBit/s)

EIDE:

    integrated in VT82C686B South Bridge
    2 Ports (primary, secondary) for up to 4 devices
    Ultra ATA/66/100
    PIO Mode 4
    PCI IDE Busmaster

Floppy Disk:

    integrated in VT82C686B South Bridge
    shared with parallel port

Serial, COM1, COM2 :

    2 x TTL
    IrDA on COM2

Parallel:

    integrated in VT82C686B South Bridge
    1 Parallel Port (PS/2-compatible/ECP/EPP via SETUP configurable)
    shared with floppy port

Keyboard, Mouse:

    MFII-Keyboard Interface, PS/2-Mouse Interface
    integrated in VT82C686B South Bridge

Realtime Clock:

    integrated in VT82C686B South Bridge,
    external battery required

Watchdog

    PIC12C509A
    Start delay and timeout configurable via SETUP
    creates hardware reset

BIOS:
> *512 KByte Flash ROM 29F040 (TSOP32)*
> *PhoenixBIOS 4.0 Release 6.1*

EEPROM:
> *EEPROM for CMOS Setup backup*

Systemmonitoring:
> *1 fan with speed input (valid only if optional fan connector is used)*
>
> *2 temperatures*
> > *CPU :   MAX1618*
> > *Board :   VT82C686B South Bridge)*
>
> *4 voltages (CPU core, +2.5V, +3.3V, + 5V)*

Power supply:

+5V	±5%	

Supply current (DOS prompt) :

+5V	2.0 A	*ULV Celeron 400MHz*
+5V	2.5 A	*ULV Celeron 650MHz*
+5V	2.7 A	*LV Pentium III 800MHz*
+5V	2.8 A	*LV Pentium III 933MHz*
+5V	3.1 A	*LV Pentium III 1GHz (*)*

(*) the 1 GHz version is not long term available !

CMOS battery power consumption:

+3V	2.5µA	*RTC / CMOS integrated in VT82C686B southbridge*

Environment:

Temperature	operating	0 .. + 60°C
	non operating	-25 .. + 85°C
Humidity (rel.)	operating	0 - 95 %
	non operating	5 - 95 %

*A heat spreader plate is available from MSC providing a standard thermal interface for the module. **The heat spreader is not a heat sink !**
The heat spreader is thermally connected to the cpu and the VT8606 (Twister-T north bridge) using a 3mm aluminium plate (for the cpu) and thermal gap pads. About 75% of the power dissipated by the module is conducted to the heat spreader. The thermal solution (passive or active) has to be designed for 7.5W (400MHz) to about 13W (1GHz).*

Dimensions:

95 x 114 x 12 mm

2.2. Block Diagram
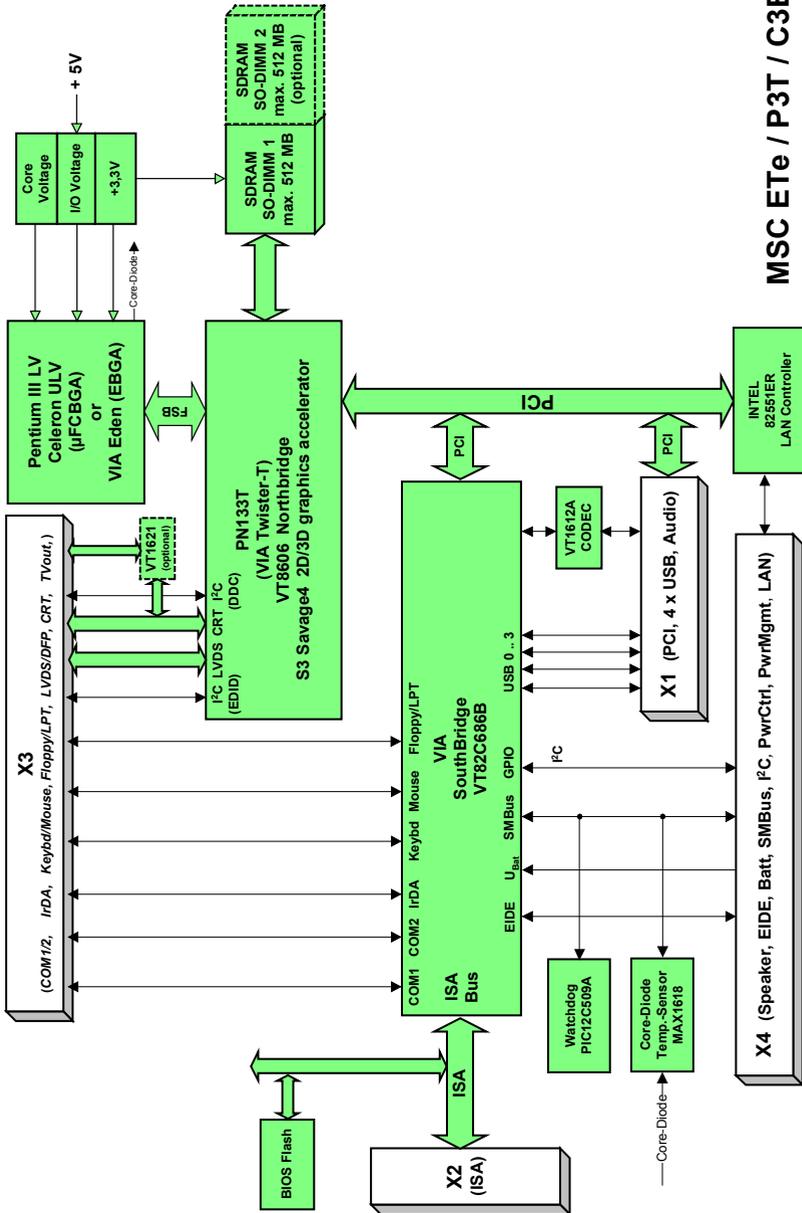
2.3. Installation

2.3.1. Jumpers and switches

There are no jumpers or switches.

2.3.2. Installing a DRAM SO-DIMM module

The ETe-P3T board has a standard SO-DIMM socket for 3.3V SDRAM SO-DIMM modules :

Module organization	Capacity
8M x 64	64 MByte
16M x 64	128 MByte
32M x 64	256 MByte
64M x 64 (see note)	512MByte

PC133 type modules are required.

Note :   Module height should not exceed 1200mil (= 30.48 mm)

2.4. Watchdog

The ETe-P3T board has a watchdog function implemented using a PIC microcontroller with an SMBus interface. Via SETUP the watchdog can be enabled and configured.
 If the watchdog is enabled a counter is started which creates a reset if it is not retriggered within a programmable time window.

Watchdog :	*Enabled /* **Disabled (default***)*
Initial Delay :	*1s, 5s, 10s,* **30s (default),** *1min, 5min, 10min, 30min*
Timeout :	*0,4s, 1s, 5s, 10s,* **30s (default***), 1min, 5 min, 10min*
Start on Boot:	*if yes, watchdog starts at the end of POST (power on selftest) before the OS is loaded*

The watchdog is controlled by an ISA I/O port .
The ISA I/O address can be configured via SETUP (250h / 270h / 290h / disabled)

Watchdog Control Register :

Bit	Dir	Function
Bit 0	*RUN (R/W)*	*Watchdog Enable, timeout counter active*
Bit 1	*TRIGGER (R/W)*	*Bit has to be toggled within the selected timeout window*
Bit 2	*TIMEOUT (R)*	*Bit is 0 after power up or after Bit 0 is set to 1. The Bit is set to 1 by a Watchdog Timeout . Transition 0 -->1 clears Bit 0.*

2.5. Interrupts, DMA channels, Upper memory

IRQ	used for	available	comment
0	Timer 0	No	
1	Keyboard	No	
2	Slave 8259	No	
3	COM2	No	(1)
4	COM1	No	(1)
5	Audio / LPT2	Yes	(1) / (2) / (3)
6	Floppy Disk Controller	No	(1)
7	LPT1	No	(1)
8	Real Time Clock	No	
9	PCI	Yes	(1)
10	PCI / COM3	Yes	(1) / (3)
11	PCI / COM4	Yes	(1) / (3)
12	PS/2 Mouse	No	(1)
13	Floating Point Unit	No	
14	Primary IDE	No	(1)
15	Secondary IDE	No	(1)

(1) If the device is disabled in SETUP, the interrupt is available.

(2) Can be used by legacy audio (sound blaster)

(3) Can be used by external Super I/O controller FDC37C669

PCI Devices

PCI Device	PCI Interrupt	REQ/GNT (0..3)	IDSEL
AGP	INTA	---	
Ethernet Controller 82551ER	INTC	2	AD13
Sound (MODEM, not used)	INTA / INTB	---	
USB 0..3 (Southbridge)	INTC	---	AD18

DMA channels

DMA	used for	available	comment
0		Yes	
1		(Yes)	Can be used by legacy audio (sound blaster)
2	Floppy Disk Controller	No	
3	(ECP, if enabled)	(No)	LPT ECP mode (default)
4	Cascade	No	
5..7	- - -	Yes	

Memory map

Upper Memory	used for	available	comment
C0000h..CFFFFh	VGA BIOS	No	64 KB VGA BIOS
D0000h..DBFFFh		Yes	ISA bus or shadow RAM
DC000h..DFFFFh	USB Buffer	No	
E0000h..FFFFFh	System BIOS	No	

SMBus address map

Device	A6	A5	A4	A3	A2	A1	A0	R/W	address *)
SMBus host (82C686B slave)	0	0	0	1	0	0	0	x	10_h / 08_h
core temperature (MAX1618)	0	1	0	1	0	1	0	x	54_h / $2A_h$
clock synthesizer (ICS9250-08)	1	1	0	1	0	0	1	x	$D2_h$ / 69_h
watchdog (PIC12C509)	1	0	1	1	0	0	0	x	$B0_h$ / 58_h
CMOS backup EEPROM #1	1	0	1	0	1	0	0	x	$A8_h$ / 54_h
CMOS backup EEPROM #2	1	0	1	0	1	0	1	x	AA_h / 55_h
SPD EEPROM (SO-DIMM)	1	0	1	0	0	0	0	x	$A0_h$ / 50_h

*) 8 bit address (with R/W) / 7 bit address (without R/W)

3. Mechanical Specification

Top view :

X1 **X3**

X2 **X4**

Bottom view :

X2 **X4**

X1 **X3**
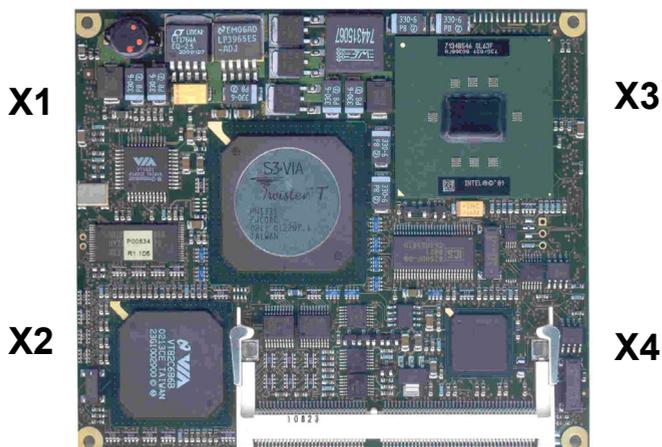
Mechanical drawing

Heat spreader options for ETe-P3T/CET :

- Heat spreader with through hole standoffs (3mm)

- Heat spreader with threaded corner standoffs (2,5mm)

4. ETX Connectors

Connector X1 (PCI, USB, Audio)

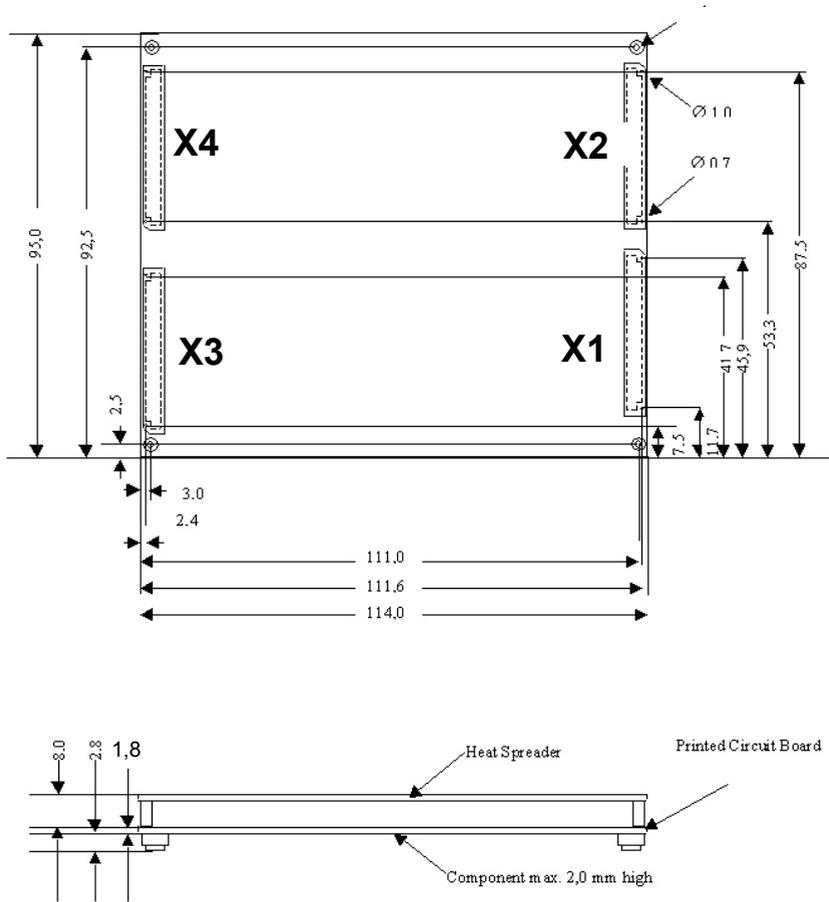| Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	VCC	52	VCC
3	PCICLK3	4	PCICLK4	53	PAR	54	SERR#
5	GND	6	GND	55	GPERR#	56	RESERVED
7	PCICLK1	8	PCICLK2	57	PME#	58	USB2#
9	REQ3#	10	GNT3#	59	LOCK#	60	DEVSEL#
11	GNT2# (*)	12	3.3V	61	TRDY#	62	USB3#
13	REQ2# (*)	14	GNT1#	63	IRDY#	64	STOP#
15	REQ1#	16	3.3V	65	FRAME#	66	USB2
17	GNT0#	18	RESERVED	67	GND	68	GND
19	VCC	20	VCC	69	AD16	70	CBE2#
21	SERIRQ	22	REQ0#	71	AD17	72	USB3
23	AD0	24	3.3V	73	AD19	74	AD18
25	AD1	26	AD2	75	AD20	76	USB0#
27	AD4	28	AD3	77	AD22	78	AD21
29	AD6	30	AD5	79	AD23	80	USB1#
31	CBE0#	32	AD7	81	AD24	82	CBE3#
33	AD8	34	AD9	83	VCC	84	VCC
35	GND	36	GND	85	AD25	86	AD26
37	AD10	38	AUXAL	87	AD28	88	USB0
39	AD11	40	MIC	89	AD27	90	AD29
41	AD12	42	AUXAR	91	AD30	92	USB1
43	AD13	44	ASVCC	93	PCIRST#	94	AD31
45	AD14	46	SNDL	95	INTC#	96	INTD#
47	AD15	48	ASGND	97	INTA#	98	INTB#
49	CBE1#	50	SNDR	99	GND	100	GND

(*) REQ / GNT 2 used by onboard ethernet controller (82551ER)

Signal	Description	I/O	Note
VCC	Power Supply +5V, +/-5%	I	external supply
GND	Power Ground	I	external supply
3V	Power Supply +3.3V	O	Do not use externally
RESERVED	Not connected	n.a.	Do not connect
SERIRQ	Serial interrupt request	n.c.	Not supported

Signal	Description of PCI Bus Signals	I/O	Note
			PCI outputs 3,3V signal level PCI inputs 5V tolerant
PCICLK1..4.	PCI clock output	O	
REQ0..3#	PCI bus request	I	REQ2# used by onboard LAN controller 82551ER
GNT0..3#	PCI bus grant	O	GNT2# used by onboard LAN controller 82551ER
AD0..31	PCI Adress-/ Databus	I/O	
CBE0..3#	PCI bus command/byte enables	I/O	
PAR	PCI bus parity	I/O	
SERR#	PCI bus system error	I/O	
GPERR#	PCI bus grant parity error	I/O	
PME#	PCI bus power management event	I/O	Not supported
LOCK#	PCI bus lock	I/O	
DEVSEL#	PCI bus device select	I/O	
TRDY#	PCI bus target ready	I/O	
IRDY#	PCI bus initiator ready	I/O	
STOP#	PCI bus stop	I/O	
FRAME#	PCI bus frame	I/O	
PCIRST#	PCI bus reset	O	
INTA#	PCI bus interrupt A	I	
INTB#	PCI bus interrupt B	I	
INTC#	PCI bus interrupt C	I	
INTD#	PCI bus interrupt D	I	

Signal	Description of USB Signals	I/O	Note
USB0, USB0#	USB Port 0	I/O	
USB1, USB1#	USB Port 1	I/O	
USB2, USB2#	USB Port 2	I/O	
USB3, USB3#	USB Port 3	I/O	

Signal	Description of Audio Signals	I/O	Note
SNDL	Line-Level stereo output left	O	0.7V$_{RMS}$
SNDR	Line-Level stereo output right	O	0.7V$_{RMS}$
AUXAL	Auxiliary input A left	I	
AUXAR	Auxiliary input A right	I	
MIC	Microphone input	I	
ASGND	Analog ground of sound controller	I	
ASVCC	Analog supply of sound controller	O	3.3V

Connector X2 (ISA)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	VCC	52	VCC
3	SD14	4	SD15	53	SA6	54	IRQ5
5	SD13	6	MASTER#	55	SA7	56	IRQ6
7	SD12	8	DREQ7	57	SA8	58	IRQ7
9	SD11	10	DACK7#	59	SA9	60	SYSCLK
11	SD10	12	DREQ6	61	SA10	62	REFSH#
13	SD9	14	DACK6#	63	SA11	64	DREQ1
15	SD8	16	DREQ5	65	SA12	66	DACK1#
17	MEMW#	18	DACK5#	67	GND	68	GND
19	MEMR#	20	DREQ0	69	SA13	70	DREQ3
21	LA17	22	DACK0#	71	SA14	72	DACK3#
23	LA18	24	IRQ14	73	SA15	74	IOR#
25	LA19	26	IRQ15	75	SA16	76	IOW#
27	LA20	28	IRQ12	77	SA18	78	SA17
29	LA21	30	IRQ11	79	SA19	80	SMEMR#
31	LA22	32	IRQ10	81	IOCHRDY	82	AEN
33	LA23	34	IO16#	83	VCC	84	VCC
35	GND	36	GND	85	SD0	86	SMEMW#
37	SBHE#	38	M16#	87	SD2	88	SD1
39	SA0	40	OSC	89	SD3	90	NOWS#
41	SA1	42	BALE	91	DREQ2	92	SD4
43	SA2	44	TC	93	SD5	94	IRQ9
45	SA3	46	DACK2#	95	SD6	96	SD7
47	SA4	48	IRQ3	97	IOCHK#	98	RSTDRV
49	SA5	50	IRQ4	99	GND	100	GND

Signal	Description	I/O	Note
VCC	Power Supply +5V, +/-5%	I	external supply
GND	Power Ground	I	external supply

Signal	Description of ISA Bus Signals	I/O	Note
SD0..15	ISA Databus	I/O	all ISA outputs 3,3V signal level all ISA inputs 5V tolerant
SA0..19	ISA Addressbus	O	
LA17..23	ISA Addressbus	O	
SBHE#	ISA Byte High Enable	O	
BALE	ISA Address Latch Enable	O	
AEN	ISA Address Enable	O	
MEMR#	ISA memory read	O	
SMEMR#	ISA memory read in lowest 1MB address range	O	
MEMW#	ISA memory write	O	
SMEMW#	ISA memory write in lowest 1MB address range	O	
IOR#	ISA IO read	O	
IOW#	ISA IO write	I	
IOCHK#	ISA IO check	I	
IOCHRDY	ISA IO channel ready	I	
M16#	ISA 16Bit memory device	I	
IO16#	ISA 16Bit IO device	O	
REFSH#	ISA memory refresh cycle pending	I	
NOWS#	ISA No waitstates	n.c.	Not supported
MASTER#	ISA Master	O	
SYSCLK	ISA System clock (8 MHz)	O	
OSC	ISA Oscillator (14,31818 MHz)	O	
RSTDRV	ISA Reset signal	I	
DREQ0..7	ISA DMA request	I	DRQ2 used by onboard floppy controller (see 2.5)
DACK0#..7#	ISA DMA acknowledge	O	DACK2# used by onboard floppy controller (see 2.5)
TC	ISA DMA end	I/O	
IRQ3..7	ISA Interrupt request	I	Interrupt table see 2.5
IRQ9..12	ISA Interrupt request	I	Interrupt table see 2.5
IRQ14..15	ISA Interrupt request	I	Interrupt table see 2.5

Connector X3 (CRT, Display, TVout, Serial, Parallel, Mouse, Keyboard)

Standard pinout with LVDS and LPT

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	LPT/FLPY#	52	RESERVED
3	R	4	B	53	VCC	54	GND
5	HSY	6	G	55	STB#/RES	56	AFD#/DENSEL
7	VSY	8	DDCK	57	RESERVED	58	PD7/RES
9	DETECT#	10	DDDA	59	IRRX	60	ERR#/HDSEL#
11	LCDDO16	12	LCDDO18	61	IRTX	62	PD6/RES
13	LCDDO17	14	LCDDO19	63	RXD2	64	INIT#/DIR#
15	GND	16	GND	65	GND	66	GND
17	LCDDO13	18	LCDDO15	67	RTS2#	68	PD5/RES
19	LCDDO12	20	LCDDO14	69	DTR2#	70	SLIN#/STEP#
21	GND	22	GND	71	DCD2#	72	PD4/DSKCHG#
23	LCDDO8	24	LCDDO11	73	DSR2#	74	PD3/RDATA#
25	LCDDO9	26	LCDDO10	75	CTS2#	76	PD2/WP#
27	GND	28	GND	77	TXD2	78	PD1/TRK0#
29	LCDDO4	30	LCDDO7	79	RI2#	80	PD0/INDEX#
31	LCDDO5	32	LCDDO6	81	VCC	82	VCC
33	GND	34	GND	83	RXD1	84	ACK/DRV1
35	LCDDO1	36	LCDDO3	85	RTS1#	86	BUSY#/MOT1#
37	LCDDO0	38	LCDDO2	87	DTR1#	88	PE/WDATA#
39	VCC	40	VCC	89	DCD1#	90	SLCT#/WGATE#
41	JILI_DAT	42	LTGIO0	91	DSR1#	92	MSCLK
43	JILI_CLK	44	BLON#	93	CTS1#	94	MSDAT
45	BIASON	46	DIGON	95	TXD1	96	KBCLK
47	COMP	48	Y	97	RI1#	98	KBDAT
49	SYNC	50	C	99	GND	100	GND

Signal	Description	I/O	Note
VCC	Power Supply +5VDC, 5%	I	external supply
GND	Power Ground	I	external supply
N.C.	Not connected	n.a.	Do not connect
LTGIO0	General Purpose IO	O	Used for parallel display option (VSYNC)

Signal	Description of analog CRT signals	I/O	Note
HSYNC	Horizontal Sync	O	
VSYNC	Vertical Sync	O	
R	Red channel RGB Analog Video Output	O	
G	Green channel RGB Analog Video Output	O	
B	Blue channel RGB Analog Video Output	O	
DDCK	Display Data Channel Clock	I/O	
DDDA	Display Data Channel Data	I/O	

Signal	Description of TV signals (option)	I/O	Note
SYNC	Composite sync	O	TVout option only
Y	Luminance for S-Video or Red for SCART	O	TVout option only
C	Chrominance for S-Video or Green for SCART	O	TVout option only
COMP	Composite Video or Blue for SCART	O	TVout option only

Signal	Description of COMx signals	I/O	Note
DTR1..2#	Data terminal ready of COM1/COM2	I	
RI1..2#	Ring indicator of COM1/COM2	I	
TXD1..2	Data transmit of COM1/COM2	O	
RXD1..2	Data receive of COM1/COM2	I	
CTS1..2#	Clear to send of COM1/COM2	I	
RTS1..2#	Request to send of COM1/COM2	O	
DCD1..2#	Data carrier detect of COM1/COM2	O	
DSR1..2#	Data set ready of COM1/COM2	I	

Signal	Description of keyboard and infrared signals	I/O	Note
KBDAT	Keyboard Data	I/O	
KBCLK	Keyboard Clock	O	
MSDAT	Mouse Data	I/O	
MSCLK	Mouse Clock	O	
IRTX	Infrared Transmit	O	
IRRX	Infrared Receive	I	

Signal	Description of FDC signals (shared with LPT)	I/O	Note
LPT/FLPY#	LPT or Floppy Interface configuration input	I	Connect to GND
STB#/RES	nc	-	
AFD#/DENSEL	density select: low = 250/300Kb/s high = 500/1000Kb/s	O	
PD0/INDEX#	Index signal	I	
PD1/TRK0#	Track signal	I	
PD2/WP#	Write protect signal	I	
PD3/RDATA#	Raw data read	I	
PD4/DSKCHG#	Disc changed	I	
PD5/RES	nc	-	
PD6/RES	nc	-	
PD7/RES	nc	-	
ERR#/HDSEL#	Head select	O	
INIT#/DIR#	Direction	O	
SLIN#/STEP#	Motor step	O	
ACK/DRV1	Drive 1 select	O	
BUSY#/MOT1#	Motor 1 select	O	
PE/WDATA#	Raw write data	O	
SLCT#/WGATE#	Write enable	O	

Signal	Description of LPT signals (shared with FDC)	I/O	Note
LPT/FLPY#	LPT or Floppy Interface configuration input	I	Connect to VCC (resistor 4K7)
STB#/RES	Strobe signal	O	
AFD#/DENSEL	Automatic feed	O	
PD0/INDEX#	Databus D0	I/O	
PD1/TRK0#	Databus D1	I/O	
PD2/WP#	Databus D2	I/O	
PD3/RDATA#	Databus D3	I/O	
PD4/DSKCHG#	Databus D4	I/O	
PD5/RES	Databus D5	I/O	
PD6/RES	Databus D6	I/O	
PD7/RES	Databus D7	I/O	
ERR#/HDSEL#	LPT error	I	
INIT#/DIR#	Initiate	O	
SLIN#/STEP#	Select	O	
ACK/DRV1	Acknowledge	I	
BUSY#/MOT1#	Busy	I	
PE/WDATA#	Paper empty	I	
SLCT#/WGATE#	Power ON	I	

Signal	Description of LVDS Flatpanel signals	I/O	Note
BIASON	Display contrast voltage ON	O	
DIGON	Display Power ON	O	
BLON#	Display Backlight ON	O	
LCDDO0	Y0-	O	
LCDDO1	Y0+	O	
LCDDO2	Y1-	O	
LCDDO3	Y1+	O	
LCDDO4	Y2-	O	
LCDDO5	Y2+	O	
LCDDO6	YCLK-	O	
LCDDO7	YCLK+	O	
LCDDO8	nc	O	(*)
LCDDO9	nc	O	(*)
LCDDO10	Z0-	O	
LCDDO11	Z0+	O	
LCDDO12	Z1-	O	
LCDDO13	Z1+	O	
LCDDO14	Z2-	O	
LCDDO15	Z2+	O	
LCDDO16	ZCLK-	O	
LCDDO17	ZCLK+	O	
LCDDO18	nc	O	(*)
LCDDO19	nc	O	(*)

(*) 24 Bit displays are not supported by Twister-T display controller

Signal	Description of TTL Flatpanel signals	I/O	Note
DIGON	Display Power ON	O	
BLON#	Display Backlight ON	O	
			VT8606 Pins
LCDDO0	R0	O	FPD0
LCDDO1	R1	O	FPD2
LCDDO2	R2	O	FPD4
LCDDO3	R3	O	FPD6
LCDDO4	R4	O	FPD8
LCDDO5	R5	O	FPD10
LCDDO6	G0	O	FPD12
LCDDO7	G1	O	FPD14
LCDDO8	G2	O	FPD16
LCDDO9	G3	O	FPD18
LCDDO10	G4	O	FPD20
LCDDO11	G5	O	FPD22
LCDDO12	B0	O	FPD24
LCDDO13	B1	O	FPD26
LCDDO14	B2	O	FPD28
LCDDO15	B3	O	FPD30
LCDDO16	B4	O	FPD32
LCDDO17	B5	O	FPD34
			LVDS mode pin description
SHFCLK	Shift Clock	O	LCDDO18
EN	Display Enable	O	LCDDO19
HSYNC	Horizontal Sync	O	BIASON
VSYNC	Vertical Sync	O	LTGIO0

Note:
Displays with 2 pixels/clock are not supported in parallel mode

Alternate X3 pinouts

LCD Parallel (assembly option)					Floppy (LPT/FLPY# = low)			
Pin	**Signal**	**Pin**	**Signal**		**Pin**	**Signal**	**Pin**	**Signal**
1	GND	2	GND		51	**LPT/FLPY#**	52	RESERVED
3	R	4	B		53	VCC	54	GND
5	HSY	6	G		55	RESERVED	56	DENSEL
7	VSY	8	DDCK		57	RESERVED	58	RESERVED
9	DETECT#	10	DDDA		59	IRRX	60	HDSEL#
11	B4	12	SHFCLK		61	IRTX	62	RESERVED
13	B5	14	EN		63	RXD2	64	DIR#
15	GND	16	GND		65	GND	66	GND
17	B1	18	B3		67	RTS2#	68	RESERVED
19	B0	20	B2		69	DTR2#	70	STEP#
21	GND	22	GND		71	DCD2#	72	DSKCHG#
23	G2	24	G5		73	DSR2#	74	RDATA#
25	G3	26	G4		75	CTS2#	76	WP#
27	GND	28	GND		77	TXD2	78	TRK0#
29	R4	30	G1		79	RI2#	80	INDEX#
31	R5	32	G0		81	VCC	82	VCC
33	GND	34	GND		83	RXD1	84	DRV
35	R1	36	R3		85	RTS1#	86	MOT
37	R0	38	R2		87	DTR1#	88	WDATA#
39	VCC	40	VCC		89	DCD1#	90	WGATE#
41	JILI_DAT	42	VSYNC		91	DSR1#	92	MSCLK
43	JILI_CLK	44	BLON#		93	CTS1#	94	MSDAT
45	HSYNC	46	DIGON		95	TXD1	96	KBCLK
47	COMP	48	Y		97	RI1#	98	KBDAT
49	SYNC	50	C		99	GND	100	GND

Connector X4 (EIDE, Ethernet, Speaker, Batterie, I2C, SMBus, etc.)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	SIDE_IOW#	52	PIDE_IOR#
3	5V_SB	4	PWGIN	53	SIDE_DRQ	54	PIDE_IOW#
5	PS_ON	6	SPEAKER	55	SIDE_D15	56	PIDE_DRQ
7	PWRBTN#	8	BATT	57	SIDE_D0	58	PIDE_D15
9	KBINH	10	LILED	59	SIDE_D14	60	PIDE_D0
11	RSMRST#	12	ACTLED	61	SIDE_D1	62	PIDE_D14
13	ROMKBCS#	14	SPEEDLED	63	SIDE_D13	64	PIDE_D1
15	EXT_PRG	16	I2CLK	65	GND	66	GND
17	VCC	18	VCC	67	SIDE_D2	68	PIDE_D13
19	OVCR#	20	GPCS#	69	SIDE_D12	70	PIDE_D2
21	EXTSMI#	22	I2DAT	71	SIDE_D3	72	PIDE_D12
23	SMBCLK	24	SMBDATA	73	SIDE_D11	74	PIDE_D3
25	SIDE_CS3#	26	SMBALRT#	75	SIDE_D4	76	PIDE_D11
27	SIDE_CS1#	28	DASP_S	77	SIDE_D10	78	PIDE_D4
29	SIDE_A2	30	PIDE_CS3#	79	SIDE_D5	80	PIDE_D10
31	SIDE_A0	32	PIDE_CS1#	81	VCC	82	VCC
33	GND	34	GND	83	SIDE_D9	84	PIDE_D5
35	PDIAG_S	36	PIDE_A2	85	SIDE_D6	86	PIDE_D9
37	SIDE_A1	38	PIDE_A0	87	SIDE_D8	88	PIDE_D6
39	SIDE_INTRQ	40	PIDE_A1	89	GPE2#	90	CBLID_P#
41	BATLOW#	42	GPE1#	91	RXD#	92	PIDE_D8
43	SIDE_AK#	44	PIDE_INTRQ	93	RXD	94	SIDE_D7
45	SIDE_RDY	46	PIDE_AK#	95	TXD#	96	PIDE_D7
47	SIDE_IOR#	48	PIDE_RDY	97	TXD	98	HDRST#
49	VCC	50	VCC	99	GND	100	GND

Signal	Description	I/O	Note
VCC	Power Supply +5VDC, 5%	I	external supply
GND	Power Ground	I	external supply
N.C.	Not connected	n.a.	Do not connect

Signal	Description of IDE signals	I/O	Note
PIDE_D0..15	Primary IDE Databus	I/O	
PIDE_A0..2	Primary IDE Addressbus	O	
PIDE_CS1#	Primary IDE chip select channel0	O	
PIDE_CS3#	Primary IDE chip select channel1	O	
PIDE_DRQ	Primary IDE dma request	I	
PIDED_AK#	Primary IDE dma acknowledge	O	
PIDE_RDY	Primary IDE ready	I	
PIDE_IOR#	Primary IDE IO read	O	
PIDE_IOW#	Primary IDE IO write	O	
PIDE_INTRQ	Primary IDE interrupt request	I	
CBLID_P#	Cable ID primary	I	VT82C686B GPI1
SIDE_D0..15	Secondary IDE Databus	I/O	
SIDE_A0..2	Secondary IDE Addressbus	O	
SIDE_CS1#	Secondary IDE chip select channel0	O	
SIDE_CS3#	Secondary IDE chip select channel1	O	
SIDE_DRQ	Secondary IDE dma request	I	
SIDED_AK#	Secondary IDE dma acknowledge	O	
SIDE_RDY	Secondary IDE ready	I	
SIDE_IOR#	Secondary IDE IO read	O	
SIDE_IOW#	Secondary IDE IO write	O	
SIDE_INTRQ	Secondary IDE interrupt request	I	
DASP_S	Secondary IDE Drive active	n.a.	
PDIAG_S	Secondary IDE Master/Slave negotiation	n.a.	
HDRST#	HardDrive reset	O	

Signal	Description of Ethernet signals	I/O	Note
TXD+, TXD-	Ethernet Twisted Pair transmit signal pair	O	
RXD+, RXD-	Ethernet Twisted Pair receive signal pair	I	
ACTLED	Ethernet activity LED	O	
LILED	Ethernet link LED	O	
SPEEDLED	Ethernet speed LED, ON at 100Mb/s	O	

Signal	Description of Misc. signals	I/O	Note
SPEAKER	Speaker output	O	3.3V signal level Connect the speaker between SPEAKER and VCC
BATT	Battery supply	I	
PWGIN	Power good input	I	
I²CLK	I²C Bus clock	O	
I²DAT	I²C Bus Data	I/O	
SMBCLK	SM Bus clock	O	3.3V tolerant input
SMBDAT	SM Bus Data	I/O	3.3V tolerant input
SMBALRT#	Not supported	I	
KBINH	Keyboard inhibit	n.a.	
5V_SB	Supply of internal suspend circuit	I	
PS_ON	Power Save ON	O	
PWRBTN#	Power Button	I	
OVCR#	Over current detect for USB	I	
ROMKBCS#	Do not connect	n.a.	
EXT_PRG#	Do not connect	n.a.	
GPCS#	General purpose chip select	n.a.	
GPE1#	LID input	I	
GPE2#	Ring Input	I	
BATLOW#	Battery low	I	3.3V tolerant input
EXTSMI#	External SMI	I	3.3V tolerant input
RSMRST#	Resume Reset	I	3.3V tolerant input

5. BIOS

PhoenixBIOS 4.0

User's Manual

for MSC ETe-P3T/CET/C3E

Version 0.5

The information contained in this users manual is subject to change without previous notice.

The programs are provided "as is" without warranty of any kind either expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. This publication could contain technical

inaccuracies or typographical errors.

Furthermore, MSC and Phoenix Technologies will not be held liable for errors in this users manual as well as coincidental or sequential damages in connection with the delivery, performance and use of this material.

MS-DOS, Windows and Microsoft are registered trademarks of the Microsoft Corporation.

PS/2 and IBM are trademarks of the International Business Machines Corporation.

Purpose of Document

This guide explains how to configure your PC and optimize its performance using the Setup program. It also explains how to use the BIOS function calls in writing computer programs.

History of Changes

Date	Paragraph	Description
04.06.03	Rev. 0.1	Initial Revision
27.10.03	Rev. 0.2	
04.11.03	Rev. 0.3	
13.02.04	Rev. 0.4	Add LAN boot ROM description add option to configure VGA IRQ assignment
22.06.04	Rev. 0.5	PCI/PnP ISA UMB Region Exclusion CC00 – CFFF [Available] removed. Add option to boot from USB-Device: USB Boot Device: [Floppy;Other]. Suspend Mode removed.

Contents

Appendix : BIOS Post Codes

About This Manual

This manual is divided into the following chapters:

Chapter 1 - The Setup Guide

This chapter describes a typical menu-driven Phoenix Setup program, which allows you to specify changes in the computer hardware (e.g. add a new diskette drive) and optimize system performance. Setup maximizes your control over your system's features and performance.

This Setup Guide is only an example. The Setup menus on your computer may be quite different. Consult the Setup manual supplied with your computer.

Chapter 2 - PhoenixBIOS Utilities

This chapter describes two new features that give you more control over the boot process:

- Phoenix QuietBoot
- Phoenix MultiBoot

Chapter 3 – BIOS Update

This chapter describes how to use BIOS update disk and the Phoenix Phlash utility for upgrading your BIOS without having to replace the BIOS ROM chip.

Chapter

1 The Setup Guide

With the **PhoenixBIOS Setup** program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning the special features on or off.
Note: The menus shown here are from a typical system. The actual menus displayed on your screen may be quite different and depend on the hardware and features installed in your computer.

The Main Menu

To start the *Phoenix*BIOS Setup utility:

1. Turn on or reboot your system. PhoenixBIOS displays this message:

   Press <F2> to enter SETUP

2. Pressing <F2> displays the Main Menu, which looks like this:

```
                         PhoenixBIOS Setup Utility
            Advanced      Security      Power      Boot      Exit
                                                          Item Specific Help

                                                          <Tab>, <Shift-Tab>, or
     CPU Type             Intel(R) Celeron(TM) CPU        <Enter> selects field.
     CPU Speed            400 MHz
     System Memory        640 kB
     Extended Memory      56320 kB

     System Time:         [16:19:20]
     System Date:         [03/06/2003]

     Legacy Diskette A:   [1.44MB, 3¹/₂"]

   ▶ Primary IDE Master:    [WDC WD200EB-32CPF0-(PM)]
   ▶ Primary IDE Slave:     [None]
   ▶ Secondary IDE Master:  [FX5401W-(SM)]
   ▶ Secondary IDE Slave:   [None]

   ▶ POST Options


 F1    Help     ↑↓   Select Item    -/+     Change Values    F9    Setup Defaults
 ESC   Exit     ←→   Select Menu    Enter   Select▶Sub-Menu  F10   Save and Exit
```

See p. 6 for a description of the fields on this menu.

The Menu Bar

The Menu Bar at the top of the window lists these selections:

Main	Use this menu for basic system configuration.
Advanced	Use this menu to set the Advanced Features available on your system's chipset.
Security	Use this menu to set User and Supervisor Passwords and the Backup and Virus-Check reminders.
Power	Use this menu to configure Power-Management features.
Boot	Use this menu to configure Boot options.
Exit	Exits the current menu.

Use the left and right ↔ arrow keys to make a selection.
See the section below, "Exiting Setup," for a description on exiting the Main Menu.

The Legend Bar

Use the keys listed in the legend bar on the bottom to make your selections or exit the current menu. The chart on the following page describes the legend keys and their alternates:

Key	Function
<F1> or <Alt-H>	General Help window (See below).
<Esc>	Exit this menu.
↔ arrow keys	Select a different menu.
↑ or ↓ arrow keys	Move cursor up and down.
<Tab> or <Shift-Tab>	Cycle cursor up and down.
<Home> or <End>	Move cursor to top or bottom of window.
<PgUp> or <PgDn>	Move cursor to next or previous page.
<F5> or <->	Select the Previous Value for the field.
<F6> or <+> or <Space>	Select the Next Value for the field.
<F9>	Load the Default Configuration values for this menu.
<F10>	Save and exit.
<Enter>	Execute Command or Select P Submenu.
<Alt-R>	Refresh screen.

To select an item, use the arrow keys to move the cursor to the field you want. Then use the plus-and-minus value keys to select a value for that field. The Save Values commands in the Exit Menu save the values currently displayed in all the menus.

To display a sub menu, use the arrow keys to move the cursor to the sub menu you want. Then press **<Enter>**.

A pointer (▸) marks all sub menus.

The Field Help Window

The help window on the right side of each menu displays the help text for the currently selected field. It updates as you move the cursor to each field.

The General Help Window

Pressing **<F1>** or **<Alt-H>** on any menu brings up the General Help window that describes the legend keys and their alternates:

```
                          General Help

Setup changes system behavior by modifying the BIOS
configuration. Selecting incorrect values may
cause system boot failure; load Setup Default values to
recover

<Up/Down> arrows select fields in current menu.
<PgUp/PgDn> moves to previous/next page on scrollable menus.
<Home/End> moves to top/bottom item of current menu.

Within a field, <F5> or <-> selects next lower value and
<F6>, <+>, or <Space> selects next higher value.

<Left/Right> arrows select menus on menu bar.
<Enter> displays more options for items marked with a  ▶ .

<F9> loads factory-installed Setup Default values.
<F10> save current settings and exit Setup.

<ESC> or <Alt-X> exits Setup; in sub-menus, pressing these
keys returns to the previous menu.

<F1> or <Alt-H> displays General Help (this screen).


                          [Continue]
```

The scroll bar on the right of any window indicates that there is more than one page of information in the window. Use **<PgUp>** and **<PgDn>** to display all the pages. Pressing **<Home>** and **<End>** displays the first and last page. Pressing **<Enter>** displays each page and then exits the window.
Press **<Esc>** to exit the current window.

Main Menu Selections

You can make the following selections on the Main Menu itself. Use the sub menus for other selections.

Feature	Options	Description
CPU Type	N/A	Displays type of processor detected during bootup.
CPU Speed	N/A	Displays the clock rate detected during bootup.
System Memory	N/A	Displays amount of conventional memory detected during bootup.
Extended Memory	N/A	Displays the amount of extended memory detected during bootup.
System Time	HH:MM:SS	Set the system time.
System Date	MM/DD/YYYY	Set the system date.
LegacyDiskette A:	Disabled 1.44 MB, 3 ½" 2.88 MB, 3 ½"	Select the type of floppy-disk drive installed in your system.

You can set the boot sequence of the bootable drives by selecting Boot Sequence on the Main Menu or opening the Boot Menu.

Masters and Slaves

The **Master** and **Slave** settings on the Main Menu control these types of devices:

- Hard-disk drives

- Removable-disk drives

- CD-ROM drives

There is one IDE connector on your motherboard, usually labeled "Primary IDE". There are usually two connectors on each ribbon cable attached to IDE connector. When you have connected two drives to this connector, the one on the end of the cable is the Master.

When you enter Setup, the Main Menu displays the results of **Autotyping–** information each drive provides about its own size and other characteristics–and how they are arranged as Masters or Slaves on your machine.

Note: Do not attempt to change these settings unless you have an installed drive that does not autotype properly (such as an older hard-disk drive that does not support autotyping).

If you need to change your drive settings, select one of the Master or Slave drives on the Main Menu. This will display a menu like this:

```
                        PhoenixBIOS Setup Utility

          Primary IDE Master [ST34321A-(PM)]                  Item Specific Help

   Type:                   [    ]               None = disabled any
                  CHS Format                    attached drive
   Cylinders:           [ 8894]
   Heads:               [ 15]                   CD-ROM = a CD-ROM drive is
   Sectors/Track:       [ 63]                   installed
   Maximum Capacity:       4104MB
                                                ATAPI Removable = removable disk
                  LBA Format                    drive is installed
   Total Sectors:          8404830
   Maximum Capacity:       4104MB               User = drive parameters
                                                must be entered by user
   Multi-Sector Transfers: [16 Sectors]
   LBA Mode Control:       [Enabled]            Auto = detect drive
   32-bit I/O:             [Disabled]           parameters automatically
   Transfer Mode:          [FPIO 4 / DMA 2]
   Ultra DMA Mode:         [Mode 2]
   SMART Monitoring:       Enabled

  F1    Help    ↑↓    Select Item    -/+     Change Values    F9    Setup Defaults
  ESC   Exit    ←→    Select Menu     Enter  Select ▶ Sub-Menu  F10   Save and Exit
```

Use the legend keys listed on the bottom to make your selections and exit to the Main Menu.

Note: that capacity is displayed in 'real' Mbytes (1MB=1024*1024 Bytes)
Drives with a total capacity greater than 8Gbyte operate in LBA format only.

The CHS parameters are not displayed by the fixed disk menu.
In this case the menu is shown like this:

```
                        PhoenixBIOS Setup Utility

        Primary IDE Master [IBM-DPTA-372050-(PM)]              Item Specific Help


     Type:                    [Auto]                    User = you enter
                         LBA Format                     parameters of hard-disk drive
     Total Sectors:           40088160                  installed at this connection.
     Maximum Capacity:        20525MB                   Auto = autotypes
                                                        hard-disk drive
                                                        installed here.
     Multi-Sector Transfers: [16 Sectors]               1-39 = you select
     LBA Mode Control:        [Enabled]                 pre-determined type of
     32-bit I/O:             [Disabled]                 hard-disk drive
     Transfer Mode:          [FPIO 4 / DMA 2]           installed here.
     Ultra DMA Mode:         [Mode 2]                    CD-ROM = a CD-ROM drive
     SMART Monitoring:       Enabled                    is installed here.
                                                        ATAPI Removable =
                                                        removable disk drive is
                                                        installed here.




    F1   Help    ↑↓   Select Item  -/+   Change Values    F9   Setup Defaults
    ESC  Exit    ←→   Select Menu  Enter Select ▶Sub-Menu F10  Save and Exit
```

Use the chart on the following page to configure the hard disk drive with Advanced
Hard Disk Features:

Feature	Options	Description
Type	None Auto User IDE Removable ATAPI Removable CD-ROM	None = Autotyping is not able to supply the drive type or end user has selected None, disabling any drive that may be installed. Auto = Autotyping, the drive itself supplies the information. User = You supply the hard-disk drive information in the following fields. IDE Removable = Removable Disk Drive ATAPI Removable = Removable disk drive. CD-ROM = CD-ROM drive.
Cylinders	1 to 65536	Number of cylinders.
Heads	1 to 16	Number of read/write heads.
Sectors/Track	1 to 63	Number of sectors per track.
Multi-Sector Transfers	Disabled 2 sectors 4 sectors 8 sectors 16 sectors	Any selection except Disabled determines the number of sectors transferred per block
LBA Mode Control	Disabled Enabled	Enabling LBA causes Logical Block Addressing to be used in place of Cylinders, Heads, & Sectors.
32-Bit I/O	Disabled Enabled	Enables 32-bit communication between CPU and IDE card. Requires PCI or local bus.
Transfer Mode	Standard Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4 FPIO 3 / DMA 1 FPIO 4 / DMA 2	Selects the method for transferring the data between the hard disk and system memory. The Setup menu only lists those options supported by the drive and platform.
Ultra DMA Mode	Disabled Mode 0 Mode 1 Mode 2 Mode 3 Mode 4 Mode 5	Ultra DMA Mode supports 33/ 66/100 MB/sec transfer rate for fixed disk drives.

SMART Monitoring	Enabled Disabled	'Enabled' installs Self-Monitoring Analysis-Reporting Technology, which issues a warning if an IDE failure is imminent.

WARNING: Incorrect settings can cause your system to malfunction.

POST Options

Selecting "POST Options" on the Main Menu displays the POST Options menu.

```
                        PhoenixBIOS Setup Utility

                        POST Options                    Item Specific Help


      QuietBoot Mode:        [       ]          Display the diagnostic
      QuickBoot Mode:        [Enabled]          Screen during boot
      Floppy Check:          [Disabled]
      Summary screen:        [Disabled]
      Boot with keyboard:    [Enabled]
      SETUP prompt:          [Enabled]
      POST Errors:           [Disabled]
      POST Warmstart Reset   [Enabled]

      Boot Video Device:     [Both]
      LCD Panel Type:        [1024x768 TFT]




 F1   Help     ↑↓   Select Item   -/+    Change Values    F9    Setup Defaults
 ESC  Exit     ←→   Select Menu    Enter  Select▶Sub-Menu  F10   Save and Exit
```

Use the legend keys to make your selections and exit to the Main Menu.

Use the following chart to select your boot options.

Feature	Options	Description
QuietBoot Mode	**Disabled** Enabled	Suppress the diagnostic screen during boot. Optionally a customer-specific graphic illustration can be displayed.
QuickBoot Mode	**Enabled** Disabled	Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.
Floppy Check	**Disabled** Enabled	Enabled verifies floppy type on boot; disabled speeds boot
Summary screen	**Disabled** Enabled	Displays system summary screen during bootup.
Boot with keyboard	Disabled **Enabled**	Allow system bootup without an attached keyboard. POST will not report keyboard errors if this option is set to Enabled

Setup Prompt	Disabled **Enabled**	Display during POST an information text how to enter Setup; Disabled doesn't display this info.
POST Errors	Disabled **Enabled**	Pauses and displays SETUP entry or resume boot prompt if error occurs on boot. If disabled, system always attempts to boot.
POST Warmstart Reset	Disabled **Enabled**	If Enabled POST performs a Hard Reset on ISA and PCI bus after a warmstart. This feature is recommended if any PCI busmaster is enabled by Setup (Submenu Advanced PCI configuration). Disabled is the default setting which should normally be used.
Boot Video Device	**Auto** Both	Auto: If CRT is connected CRT will be active; otherwise flatpanel will be used. Both: CRT and flatpanel are active.
LCD Panel Type	**Auto** 800x600 TFT 1024x768 TFT 2ppc 1280x1024 TFT 2ppc 640x480 DSTN 800x600 DSTN 1600x1200 TFT 2ppc 1024x768 TFT 640x480 TFT 800x600 TFT 1024x768 TFT 1280x1024 TFT 1400x1050 TFT 2ppc 1024x768 TFT parallel 800x600 TFT parallel 640x480 TFT parallel	Select from this list the flat panel display which is actually mounted to your system. ppc = pixel per clock parallel : used for the "parallel option" of the ETe display interface

Note: Default BIOS settings are highlighted.

Help for invalid Display Type selection

If an invalid display type has been selected, flat panel display becomes dark or unreadable. In this case the following recommendations help to get a valid system configuration:

- If possible attach a CRT monitor to VGA connector and reboot the system with a system reset. In many cases BIOS sign on is displayed on monitor. Enter Setup and select correct flat panel type. Save & Exit to restart the system.
- If BIOS sign on is not displayed although a CRT monitor is attached, do the following: Turn off the system. Turn on again and immediately press <F2> key on your keyboard to enter Setup (note that <F2> key is detected after BIOS keyboard detection has passed after some seconds; this is indicated by flashing keyboard LEDs). Although the screen is dark, Setup is executed. Press <F9> and then <Enter> to force BIOS default settings (Boot display is set to CRT/Flat panel simultaneous mode, Display type is set to 640x480 TFT). Press <F10> and <Enter> to save Setup configuration and restart the system. BIOS sign on should be displayed on monitor. Enter Setup again and select correct flat panel type of your system.
- If no CRT monitor can be attached try the following:
  Turn off the system. Turn on again and immediately press <F2> key on your keyboard to enter Setup (note that <F2> key is detected after BIOS keyboard detection has passed after some seconds; this is indicated by flashing keyboard LEDs). Although the screen is dark, Setup is executed. Press <F9> and then <Enter> to force BIOS default settings
  Press <End> key and then <Enter>. Now you are in the submenu 'Display Type' at position of the highlighted default type (640x480 TFT). Use <Up> and <Down> cursor keys to select the display type of your system. Note that the menu wraps if cursor reaches the top or bottom menu item. Display type is selected with <Enter> key.
  Press <F10> and <Enter> to save Setup configuration and restart the system. BIOS sign on should be displayed on flat panel display.

The Advanced Menu

Selecting "Advanced" from menu bar on the Main Menu displays a menu like this:

```
┌─────────────────────────────────────────────────────────────────────────┐
│                      PhoenixBIOS Setup Utility                            │
├─────────────────────────────────────────────────────────────────────────┤
│   Main            Security        Power       Boot        Exit           │
├──────────────────────────────────────────────┬──────────────────────────┤
│                                               │     Item Specific Help   │
│                  Setup Warning                │                          │
│      Setting items on this menu to incorrect values  │ UNIX, Novell NetWare, │
│      may cause your system to malfunction.    │  or other operating      │
│                                               │  systems, select         │
│      Large Disk Access Mode:       [    ]     │  'Other', If you are     │
│      Small LBA-Disk CHS Translation [Yes]     │  installing new          │
│      Processor Serial Number:      [Disabled] │  software and the drive  │
│                                               │  fails, change this      │
│    ▶ Memory Cache                             │  selection and try       │
│    ▶ PCI Configuration                        │  again. Different        │
│    ▶ I/O Device Configuration                 │  operating systems       │
│    ▶ Memory Shadow                            │  require different       │
│    ▶ Advanced Chipset Control                 │  representations of      │
│    ▶ Hardware Monitor                         │  drive geometries.       │
│                                               │                          │
│                                               │                          │
│                                               │                          │
├──────────────────────────────────────────────┴──────────────────────────┤
│  F1   Help     ↑↓  Select Item   -/+   Change Values    F9   Setup Defaults│
│  ESC  Exit    ←→   Select Menu   Enter Select▶Sub-Menu  F10  Save and Exit │
└─────────────────────────────────────────────────────────────────────────┘
```

Use the legend keys to make your selections and exit to the Main Menu.

Use the chart on the following page to configure the Large Disk Access Mode Features:

Feature	Options	Description
Large Disk Access Mode	Other **DOS**	Select 'DOS' if you have DOS. Select 'Other' if you have UNIX, Novell NetWare or other operating systems. If you are installing new operating system software and the drive fails, change this setting and try again. A large disk is one that has more than 1024 cylinders, more than 16 heads, or more than 63 tracks per sector.

Warning: Incorrect settings can cause your system to malfunction.

Feature	Options	Description
Small LBA-Disk CHS Translation	Yes **No**	Select if CHS translation should be made for LBA-capable harddisk with less than 1024 cylinders, e.g. CompactFlash(R). If you have problems with booting from a CompactFlash(R), try to change this setting. No – translate CHS only if HDD has >1024 cyls. Yes – translate CHS for all LBA-capable disks.

Feature	Options	Description
Processor Serial Number	Enabled **Disabled**	Each CPU has a unique serial number. When 'disabled', access to this serial number is denied. The system must be reset or restarted from power-on for setting to take effect.

Memory Cache

Enabling **cache** saves time for the CPU by holding data most recently accessed in regular memory (dynamic RAM or DRAM) in a special storage area of static RAM (SRAM), which is faster. Before accessing regular memory, the CPU first accesses the cache. If it does not find the data it is looking for there, it accesses regular memory.

Selecting "Memory Cache" from the Advanced Menu displays a menu like the one shown here. The actual features displayed depend on your system's hardware.

```
                      PhoenixBIOS Setup Utility


                    Memory Cache                      Item Specific Help

    Memory Cache:                [       ]         Sets the state of the
    Cache System BIOS area:      [Write Protect]   memory cache.
    Cache Video BIOS area:       [Write Protect]
    Cache Extended Memory Area:  [Write Back]

    Cache D000 - D3FF:           [Disabled]
    Cache D400 - D7FF:           [Disabled]
    Cache D800 - DBFF:           [Disabled]
    Cache DC00 - DFFF:           [Disabled]
    Cache E000 - E3FF:           [Write Protect]
    Cache E400 - E7FF:           [Write Protect]
    Cache E800 - EBFF:           [Write Protect]
    Cache EC00 - EFFF:           [Write Protect]


 F1    Help      ↑↓   Select Item    -/+     Change Values    F9    Setup Defaults
 ESC   Exit      ←→   Select Menu    Enter   Select▶Sub-Menu  F10   Save and Exit
```

Use the legend keys listed on the bottom to make your selections and exit to the Main Menu.

Use the chart on the following page to configure the memory cache.

Feature	Options	Description
Memory Cache	Disabled **Enabled**	Generally enables or disables all memory caching.
Cache System BIOS area	uncached **Write Protect**	Caches the system BIOS and improves performance.
Cache Video BIOS area	uncached **Write Protect**	Caches the video BIOS and improves performance.
Cache Extended Memory area	uncached Write Through Write Protect **Write Back**	Controls caching of system memory above one megabyte.
Cache segments, e.g., D000-D3FF	**Disabled** Write Through Write Protect Write Back	Controls caching of individual segments of memory usually reserved for shadowing system or option ROMs.

WARNING: Incorrect settings can cause your system to malfunction.

NOTE: The contents of this menu depend on the chipset installed on your motherboard, and chipsets vary widely. Consult your dealer or the computer manual before changing the items on this menu. Incorrect settings can cause your system to malfunction.

PCI / PnP Configuration

Selecting "PCI / PnP Configuration" from menu bar on the Advanced menu displays a menu like this:

```
                         PhoenixBIOS Setup Utility

              PCI Configuration                     Item Specific Help

     Installed O/S:                [Other]
     ISA graphics device installed: [No]
     Default Primary Video Adapter: [AGP]
     VGA IRQ Assignment            [Enabled]

   ▶ PCI/PNP ISA UMB Region Exclusion
   ▶ PCI/PNP ISA IRQ Resource Exclusion
   ▶ PCI IRQ Routing

     PCI Slot 1 Master             [Disabled]
     PCI Slot 2 Master             [Disabled]
     PCI Slot 3 Master             [Disabled]
     PCI Slot 4 Master             [Disabled]

     Reset Configuration Data:     [No]

 F1    Help    ↑↓   Select Item    -/+    Change Values    F9    Setup Defaults
 ESC   Exit    ←→   Select Menu    Enter  Select▶Sub-Menu  F10   Save and Exit
```

PCI Devices are devices equipped for operation with a **PCI** (Peripheral Component Interconnect) **bus**, a standardized hardware system that connects the CPU with other devices. Use this menu to configure the PCI devices installed on your system and to reserve system resources for non-PnP ISA devices.
Use the legend keys to make your selections and exit to the Advanced menu.

The following table illustrates the possible selections:

Feature	Options	Description
Installed O/S	**Other** Plug&Play	Select 'Yes' if you are using a Plug & Play capable operating system. Select 'No' if you need the BIOS to configure non-boot devices.
ISA graphics device installed	**No** Yes	Enable ISA (non-VGA) graphics device to access palette data in PCI VGA device.
Default Primary Video Adapter	PCI **AGP**	Select Bootdisplay on either PCI VGA card or AGP VGA.
VGA IRQ Assignment	Disabledl **Enabled**	Select if an IRQ should be assigned to the integrated VGA adapter
eg. PCI Slot 1 Master	**Disabled** Enabled	Enable selected device as a PCI bus master.
Reset Configuration Data	**No** Yes	'Yes' erases all configuration data in ESCD, which stores the configuration settings for non-PnP plug-in devices. Select 'Yes' when required to restore the manufacturer's defaults.

PCI/PnP ISA UMB Region Exclusion

Selecting "PCI/PNP ISA UMB Region Exclusion" from menu bar on the PCI Configuration menu displays a menu like this:

```
                    PhoenixBIOS Setup Utility

           PCI/PNP ISA UMB Region Exclusion              Item Specific Help

      D000 - D3FF:          [Available]          Reserves the specified
      D400 - D7FF:          [Available]          block of upper memory
      D800 - DBFF:          [Available]          for use by legacy ISA
      DC00 - DFFF:          [Available]          devices.




    F1    Help    ↑↓    Select Item   -/+    Change Values    F9    Setup Defaults
    ESC   Exit    ←→    Select Menu   Enter  Select ▶ Sub-Menu F10   Save and Exit
```

Use the following chart in reserving upper memory:

Feature	Options	Description
Upper Memory Block:		
e.g. D400 – D7FF	Available Reserved	Reserves the specified block of upper memory for use by legacy ISA devices.

PCI/PnP ISA IRQ Resource Exclusion

Selecting "PCI/PNP ISA IRQ Resource Exclusion" from menu bar on the PCI Configuration menu displays a menu like this:

```
┌─────────────────────────────────────────────────────────────────────────┐
│                       PhoenixBIOS Setup Utility                           │
│                                                                           │
├─────────────────────────────────────────────┬─────────────────────────────┤
│      PCI/PNP ISA IRQ Resource Exclusion       │     Item Specific Help      │
│                                               │                             │
│   IRQ 3:   [        ]                         │  Reserves the specified     │
│   IRQ 4:   [Available]                        │  IRQ for use by legacy      │
│   IRQ 5:   [Available]                        │  ISA devices.               │
│   IRQ 7:   [Available]                        │                             │
│   IRQ 9:   [Available]                        │                             │
│   IRQ 10:  [Available]                        │                             │
│   IRQ 11:  [Available]                        │                             │
│                                               │                             │
│                                               │                             │
│                                               │                             │
│                                               │                             │
├─────────────────────────────────────────────┴─────────────────────────────┤
│ F1   Help    ↑↓   Select Item   -/+    Change Values    F9   Setup Defaults │
│ ESC  Exit    ←→   Select Menu   Enter  Select▶Sub-Menu  F10  Save and Exit  │
└─────────────────────────────────────────────────────────────────────────┘
```

NOTE: IRQ 15 exclusion depends upon Secondary IDE channel selection
Use the following chart in reserving IRQs:

Feature	Options	Description
IRQ:		
e.g. IRQ 7	Available Reserved	Reserves the specified IRQ for use by legacy ISA devices.

PCI IRQ Routing

Selecting "PCI IRQ Routing" from menu bar on the PCI /PnP Configuration menu displays a menu like this:

```
                        PhoenixBIOS Setup Utility

              PCI IRQ Routing                        Item Specific Help

     Shared PCI IRQs:        [Auto]            PCI devices can use
     PCI IRQ line 1:         [Auto Select]     hardware interrupts
     PCI IRQ line 2:         [Auto Select]     called IRQ's. A PCI
     PCI IRQ line 3:         [Auto Select]     device cannot use
     PCI IRQ line 4:         [Auto Select]     IRQ's already in use
                                               by ISA devices.




    F1    Help     ↑↓   Select Item    -/+    Change Values      F9    Setup Defaults
    ESC   Exit     ←→   Select Menu     Enter  Select ▶Sub-Menu   F10   Save and Exit
```

Use the chart on the following page in configuring the PCI devices:

Feature	Options	Description
Shared PCI IRQs	Share One IRQ Share Two IRQs Share Three IRQs Auto	Share 'n' IRQ's: Forces PCI devices to use at most 'n' IRQs. 'Share One IRQ' means that all PCI devices in system are shared to one IRQ line. This frees up remaining IRQ lines for non-PnP ISA devices. Auto: Minimizes PCI IRQ Sharing
PCI IRQ line 1 PCI IRQ line 2 PCI IRQ line 3 PCI IRQ line 4	Disabled Auto Select IRQ 3 IRQ 4 IRQ 5 IRQ 7 IRQ 9 IRQ 10 IRQ 11 IRQ 12 IRQ 14 IRQ 15	Disabled : Do not use IRQ with PCI interrupt. Auto Select: IRQ assigment is selected by Plug&Play with priority. IRQ n Selection: Forces PCI device to use selected IRQ. This selection is used for drivers which rely on a specific IRQ. Be careful to choose an IRQ which is NOT used by any ISA device.

I/O Device Configuration Menu

Most devices on the computer require the exclusive use of **system resources** for operation. These system resources can include Input and Output (I/O) port addresses and Interrupt lines for getting the attention of the CPU. Allocating these resources to various devices is called **device configuration**.

- Manually by you.

- Automatically by the BIOS during POST (See "ROM BIOS Functions" in the PhoenixBIOS Programmer's Guide)

- Automatically by a PnP Operating System such as Windows 9x after the Operating System boots

To configure the serial and parallel ports, the diskette controller, the USB Controller and the IDE Controller, select "I/O Device Configuration" on the Advanced Menu to display this menu and specify how you want to configure these I/O Devices:

```
┌─────────────────────────────────────────────────────────────────────────┐
│                      PhoenixBIOS Setup Utility                            │
├─────────────────────────────────────────────────────────────────────────┤
│                                                                           │
│            I/O Device Configuration              │   Item Specific Help  │
├──────────────────────────────────────────────────┼───────────────────────┤
│                                                  │                        │
│     Serial Port A:              [Auto]           │                        │
│     Serial Port B:              [Auto]           │                        │
│       Mode :                    [Normal]         │                        │
│     Onboard Parallel Port       [Disabled]       │  (*)                   │
│     Serial Port C:              [Auto]           │                        │
│     Serial Port D:              [Auto]           │                        │
│     External Parallel Port      [Auto]           │                        │
│       Mode :                    [Bi-directional] │                        │
│     Onboard Diskette Controller [Enabled]        │  (*)                   │
│     External Diskette Controller [Disabled]      │                        │
│     Local LAN Controller:       [Enabled]        │                        │
│       Local LAN Boot            [Disabled]       │                        │
│     Local Bus IDE Controller:   [Both]           │                        │
│     Legacy USB Support:         [Disabled]       │                        │
│     USB Boot Device:            [Floppy]         │                        │
│     OnChip USB Device:          [Enabled]        │                        │
│     OnChip USB 2 Device:        [Enabled]        │                        │
│     Onboard Legacy Audio:       [Disabled]       │                        │
│     PS/2 Mouse:                 [Auto Detect]    │                        │
│                                                  │                        │
│     Watchdog:                   [250h]           │                        │
│     Watchdog delay:             [5 seconds]      │                        │
│     Watchdog timeout:           [30 seconds]     │                        │
│     Watchdog start on boot:     [No]             │                        │
├──────────────────────────────────────────────────┴───────────────────────┤
│  F1   Help    ↑↓   Select Item   -/+    Change Values   F9   Setup Defaults│
│  ESC  Exit    ←→   Select Menu   Enter  Select▶Sub-Menu F10  Save and Exit │
└─────────────────────────────────────────────────────────────────────────┘
```

(*) "Onboard Parallel Port" or "Onboard Diskette Controller" are alternatives since
they share the same signal pins. Only one of both selections will appear
depending on the status of the LPT/FLPY# signal on pin 51 of ETe-connector X3.

Use the legend keys to make your selections and exit to the Main Menu.

Use the following charts to configure the Input/Output settings:

Serial Ports

Feature	Options	Description
Serial Port A: Serial Port B: Serial Port C: Serial Port D :	Disabled Enabled **Auto**	Configure Serial Port using options: Disabled: No configuration Enabled: User configuration Auto: BIOS or OS chooses configuration.
Base I/O Address (Port A-D)	3F8 2F8 3E8 2E8	If you select Enabled, choose one of these combinations.
Interrupt (Port A-D)	IRQ 3 IRQ 4	If you select Enabled, choose one of these combinations.
Mode (Port B, Port D)	Normal, ASK-IR, IRDA	Select the mode for Serial Port B or D

Onboard Diskette Controller

Feature	Options	Description
Floppy Disk Controller	Disabled **Enabled** Auto	Configure diskette controller using options: Disabled: No configuration Enabled: User configuration Auto: BIOS or OS chooses configuration.

Parallel Port

Feature	Options	Description
LPT:	Disabled Enabled **Auto**	Configure parallel port using options: Disabled: No configuration Enabled: User configuration Auto: BIOS or OS chooses configuration.
Mode	**Uni-directional** ECP EPP Bi-directional	Set the mode for the parallel options: Uni-directional ECP EPP Bi-directional
Base I/O Address	**378** 278 3BC	If you select Enabled for the Parallel Port, choose one of these I/O addresses.
Interrupts	IRQ5 **IRQ7**	If you select Enabled for the Parallel Port, choose one of these interrupt options.
DMA Channel	DMA 1 DMA 3	Set the DMA channel for the parallel port

Other Devices

Feature	Options	Description
Local LAN Controller	Disabled **Enabled**	Enables the local LAN controller.
Local LAN Boot:	**Disabled** Enabled	Enable boot from the local LAN controller (installs the PXE Boot ROM)
Local Bus IDE adapter	Disabled Primary Secondary **Both**	Enable the integrated local bus IDE adapter
Legacy USB Support	**Disabled** Enabled	Enable support for Legacy Universal Serial Bus
USB Boot Device	**Floppy** Other	USB Boot Device: choose Floppy for USB Floppy device or Other for any other mass storage device
On chip USB Device	**Enabled**	Enable USB Port 0 – 1
On chip USB 2 Device	Disabled **Enabled**	Enable / Disable USB Port 2 – 3
PS/2 Mouse	Disabled Enabled **Auto Detect**	'Disabled' disables any installed PS/2 mouse and frees up IRQ 12. 'Enabled' forces the PS/2 mouse port to be enabled regardless if a mouse is present. 'Auto Detect' lets the BIOS control the mouse.
Watchdog:	**Disabled** 250h 270h 290h	Watchdog base i/o address
Watchdog delay:	1second 5 seconds 10 seconds **30 seconds** 1 minute 5 minutes 10 minutes 30 minutes	Initial watchdog delay before starting the down counter
Watchdog timeout:	0.4 seconds 1second 5 seconds 10 seconds **30 seconds** 1 minute 5 minutes 10 minutes	Watchdog trigger timeout period. If the watchdog is enabled and not triggered within the specified time window a system reset will be generated.
Watchdog start on boot:	**No** Yes	If YES is selected, the watchdog starts automatically at the end of POST, before OS is booted.

Warning: If you choose the same I/O address or Interrupt for more than one port, the menu displays an asterisk (*) at the conflicting settings. It also displays this message at the bottom

of the menu:

* Indicates a DMA, Interrupt, I/O, or memory resource conflict with another device.

Resolve the conflict by selecting another setting for the devices.

Memory Shadow

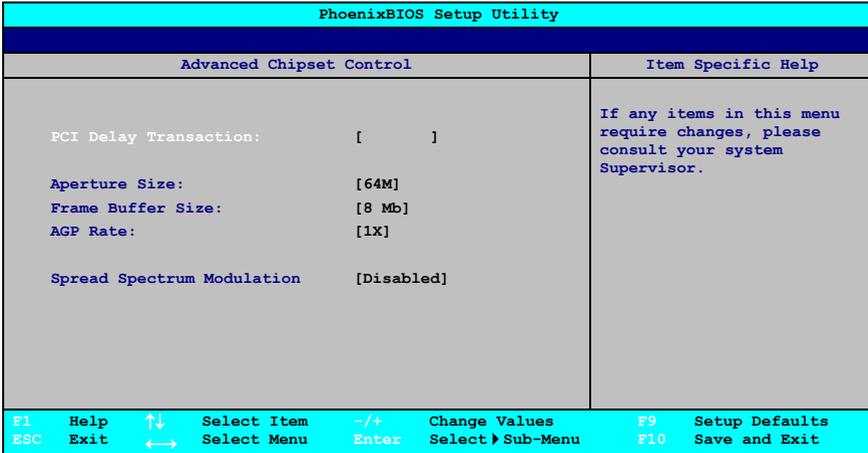Shadowing for System BIOS and Video BIOS improves performance, if enabled.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                        PhoenixBIOS Setup Utility                          │
├─────────────────────────────────────────────────────────────────────────┤
│                                                                           │
├───────────────────────────────────────────────┬───────────────────────────┤
│                 Memory Shadow                  │      Item Specific Help   │
├───────────────────────────────────────────────┼───────────────────────────┤
│                                                │                           │
│  System Shadow:          [Enabled]             │  Enabled copies Video BIOS to │
│  Video Shadow:           [       ]             │  shadow RAM. Improves     │
│                                                │  performance.             │
│                                                │                           │
│                                                │                           │
│                                                │                           │
│                                                │                           │
│                                                │                           │
│                                                │                           │
│                                                │                           │
│                                                │                           │
├───────────────────────────────────────────────┴───────────────────────────┤
│  F1    Help    ↑↓  Select Item   -/+    Change Values      F9   Setup Defaults │
│  ESC   Exit    ←→  Select Menu    Enter Select ▶ Sub-Menu  F10  Save and Exit  │
└─────────────────────────────────────────────────────────────────────────┘
```

Use the following chart in shadowing BIOS:

Feature	Options	Description
System Shadow	**Enabled**	Is always enabled
Video Shadow	Disabled **Enabled**	Enabled copies Video BIOS to shadow RAM. Improves performance

Advanced Chipset Control

Selecting "Advanced Chipset Control" from menu bar on the PCI /PnP
Configuration menu displays a menu like this:

```
                    PhoenixBIOS Setup Utility

            Advanced Chipset Control                  Item Specific Help

                                                   If any items in this menu
                                                   require changes, please
     PCI Delay Transaction:        [      ]        consult your system
                                                   Supervisor.
     Aperture Size:               [64M]
     Frame Buffer Size:           [8 Mb]
     AGP Rate:                    [1X]

     Spread Spectrum Modulation   [Disabled]




  F1   Help    ↑↓   Select Item    -/+    Change Values        F9    Setup Defaults
  ESC  Exit    ←→   Select Menu     Enter  Select ▶ Sub-Menu    F10   Save and Exit
```

Use the following chart in configuring the Advanced Chipset Control:

Feature	Options	Description
PCI Delay Transaction	**Enabled** Disabled	Enabling Delayed Transaction enables the chipset's embedded 32-bit posted write buffer to support delayed transaction cycles. This means that transactions to and from the ISA bus are buffered and the PCI bus can be freed to perform other transactions while the ISA transaction is underway.
Aperture Size	2 MB 4 MB 8 MB 16 MB 32 MB **64 MB** 128 MB 256 MB	Size of memory that can be used by your software for textures.

Frame Buffer Size	None **8 MB** 16 MB 32 MB	Increasing Size of framebuffer will decrease size of system memory, because of shared memory. Use None for external VGA card only.
AGP Rate	**1X** 2X 4X	Set AGP speed
Spread Spectrum Modulation	**Disabled** ±0.25% −0.5%	Clock controller spread spectrum modulation reduces system EMI by 8dB to 10dB

NOTE: The contents of this menu depend on the devices installed on your system. **Incorrect settings can cause your system to malfunction.**

Hardware Monitor

Hardware Monitor displays actual system voltages, temperatures and Fan speed.

```
                     PhoenixBIOS Setup Utility


              Hardware Monitor                        Item Specific Help

   Vcore                    1.21V                 If any items in this menu
   +2.5V Voltage            2.45V                 require changes, please
   +3.3V Voltage            3.23V                 consult your system
   +5V Voltage              4.97V                 Supervisor.

   CPU Temperature          51°C
   Board Temperature        41°C

   CPU Fan speed            No Function




 F1   Help      ↑↓    Select Item   -/+   Change Values     F9    Setup Defaults
 ESC  Exit      ←→    Select Menu   Enter Select▶Sub-Menu    F10   Save and Exit
```

Use the following chart in configuring the Advanced Chipset Control:

Feature	Options	Description
Voltages (e.g. Vcore)	none	Displays actual voltage on board
Temperature (e.g. CPU)	none	Displays actual temperature
Fan speed (e.g. CPU)	none	Displays actual fan speed

The Security Menu

Selecting "Security" from the Main Menu displays a menu like this:

```
┌────────────────────────────────────────────────────────────────────────┐
│                        PhoenixBIOS Setup Utility                          │
│   Main      Advanced                  Power      Boot      Exit            │
│                                                           Item Specific Help│
│     Supervisor Password Is:        Clear                                   │
│     User Password Is:              Clear                                   │
│                                                                           │
│     Set Supervisor Password        [    ]          Supervisor Password     │
│     Set User Password              [Enter]         controls access to the  │
│                                                    setup utility.          │
│     Diskette access:               [Supervisor]                           │
│     Fixed disk boot sector:        [Normal]                               │
│     Virus check reminder:          [Disabled]                             │
│     System backup reminder:        [Disabled]                             │
│     Password on boot:              [Disabled]                             │
│                                                                           │
│                                                                           │
│                                                                           │
│                                                                           │
│                                                                           │
├────────────────────────────────────────────────────────────────────────┤
│  F1   Help    ↑↓   Select Item   -/+    Change Values   F9   Setup Defaults│
│  ESC  Exit    ←→   Select Menu   Enter  Select ▶ Sub-Menu  F10  Save and Exit│
└────────────────────────────────────────────────────────────────────────┘
```

Use the legend keys to make your selections and exit to the Main Menu.
Enabling "Supervisor Password" requires a password for entering Setup. The passwords are not case sensitive.
Pressing <Enter> at either Set Supervisor Password or Set User Password displays a dialog box like this:

```
┌──────────────────────────────────────────┐
│              Set Password                  │
│   Enter new password:   [         ]        │
│   Confirm new password: [         ]        │
└──────────────────────────────────────────┘
```

Type the password and press <Enter>. Repeat.

Note: In some systems, the User and Supervisor passwords are related; you cannot have a User password without first creating a Supervisor password. In other systems, you can create and use them independently.

The User password is stored to system microcontroller. This allows to lock the keyboard by pressing CTL-ALT-S . The lock is indicated by flashing the keyboard LEDs. To unlock the keyboard enter the valid user password.

Use the following chart to configure the system-security and anti-virus options.

Feature	Options	Description
Set Supervisor Password	Up to seven alphanumeric characters	Pressing <Enter> displays dialog box for entering the supervisor password. In related systems, this password gives full access to Setup menus.
		To clear an existing Supervisor password, enter the password and hit <Enter> to clear. Note however that any existing User Password cannot be changed if Supervisor password has been cleared.
Set User Password	Up to seven alphanumeric characters	Pressing <Enter> displays the dialog box for entering the user password. In related systems, this password gives restricted access to SETUP menus.
		To clear an existing User password, enter the password and hit <Enter> to clear.
Diskette access	User **Supervisor**	Supervisor requires to enter the supervisor password to boot from or access the floppy disk.
Fixed disk boot sector	**Normal** Write Protect	Write protects the boot sector on the hard disk for virus protection. Requires a password to format or Fdisk the hard disk.

Virus check reminder System backup reminder	**Disabled** Daily Weekly Monthly	Displays a message during bootup asking (Y/N) if you have backed up the system or scanned it for viruses. Message returns on each boot until you respond with "Y". Daily displays the message on the first boot of the day, Weekly on the first boot after Sunday, and Monthly on the first boot of the month.
Password on boot	**Disabled** Enabled	Enabled requires a password on boot. Requires prior setting of the Supervisor password. If supervisor password is set and this option disabled, BIOS assumes user is booting.

The Power Menu

Selecting "Power" from the menu bar displays a menu like this:

```
                        PhoenixBIOS Setup Utility
    Main      Advanced     Security            Boot      Exit
                                                      Item Specific Help

    Power Savings:         [        ]
                                               Maximum Power Savings
    Idle Mode:             Off                 Conserves the greatest
    Standby Timeout:       Off                 Amount of system power.
    Auto Suspend Timeout:  Off                 Maximum performance
                                               Conserves power but
    Hard Disk Timeout:     Disabled            Allows greatest system
    Video Timeout:         Disabled            Performance. To alter
                                               These settings, choose
    Resume on Modem Ring:  [Off]               Customized. To turn off
    Resume on Time:        [Off]               Power management,
    Resume Time:           [00:00:00]          choose Disabled

  ▶ Temperature Management



 F1    Help    ↑↓    Select Item    -/+    Change Values    F9    Setup Defaults
 ESC   Exit    ←→    Select Menu    Enter  Select▶Sub-Menu  F10   Save and Exit
```

Use this menu to specify your settings for Power Management. Remember that the options available depend upon the hardware installed in your system. Those shown here are from a typical system.

A power-management system reduces the amount of energy used after specified periods of inactivity. The Setup menu pictured here supports a **Full On** state, and a **Standby** state with partial power reduction.

Use the Advanced Options on this menu to specify whether or not system activity can prevent entering Standby state (activity events) or terminate the Standby state and restore Full On (wakeup events).

Use the legend keys to make your selections and exit to the Main Menu.

Use the chart on the following page in making your selections:

Feature	Options	Description
Power Savings	**Disabled** Customize Maximum Power Savings Maximum Performance	Maximum options: pre-defined values. Select Customize to make your own selections from the following fields. Disabled turns off all power management.
Idle Mode	**Off** On	Turn on or off the Idle Mode power savings. Idle Mode slows down the CPU during brief periods when the system is not busy.
Standby Timeout	**Off** 1 Minute 2 Minutes 4 Minutes 6 Minutes 8 Minutes 12 Minutes 16 Minutes	Amount of time the system needs to be in Idle Mode before entering the Standby Mode. Standby Mode turns off various devices in the system, including the screen, until you start using the computer again.
Auto Suspend Timeout	**Off** 5 Minute 10 Minutes 15 Minutes 20 Minutes 30 Minutes 40 Minutes 60 Minutes	Amount of time the system needs to be in Standby before entering the SUSPEND Mode.
Hard Disk Timeout	**Disabled** 10 Seconds 15 Seconds 30 Seconds 45 Seconds 1 Minute 2 Minutes 4 Minutes 6 Minutes 8 Minutes 10 Minutes 15 Minutes	Amount of time the hard disk needs to be inactive before it is turned off.

Video Timeout	**Disabled**	Amount of time the
	10 Seconds	user input devices
	15 Seconds	need to be inactive
	30 Seconds	before the screen is
	45 Seconds	turned off.
	1 Minute	
	2 Minutes	
	4 Minutes	
	6 Minutes	
	8 Minutes	
	10 Minutes	
	15 Minutes	
Resume On Modem Ring	**Off**	Enabled wakes the
	On	system up, when an
		incoming call is
		detected on your
		modem.
Resume On Time	**Off**	On Time Enabled
	On	wakes the system
		up at a specific
		time.
Resume Time	**00:00:00**	Specify the time
		when the system is
		to wake up.
		<Tab>, >Shift-Tab>
		or <Enter> selects
		field.

Temperature Management

Selecting "Temperature Mangement " from menu bar on the Power menu displays a menu like this:

```
                          PhoenixBIOS Setup Utility

           Temperature Management                    Item Specific Help

    CPU Clock Throttling          [        ]       CPU clock will be
    Thermal Source Select         [CPU Sensor]     throttled to the selected
    CPU Alarm Temperature         [80°C]           value, when reaching the
    CPU Alarm Hysteresis          [5°C]            temperature threshold.
    Board Alarm Temperature       [60°C]




 F1    Help      ↑↓    Select Item    -/+    Change Values      F9    Setup Defaults
 ESC   Exit      ←→    Select Menu    Enter  Select ▶ Sub-Menu  F10   Save and Exit
```

Feature	Options	Description
CPU Clock Throttling	**Disabled** 75% 50% 25%	CPU clock will be throttled to the selected value when reaching the temperature threshold.
Thermal Source Select	**CPU Sensor** Board Sensor	Select thermal alarm sensor either from CPU or from board
CPU Alarm Temperature	65°C 70°C 75°C **80°C** 85°C 90°C	If CPU temperature exceeds given value clock throttling.
CPU Alarm Hysteresis	3°C 4°C 5°C 6°C	CPU temperature which must decrease below critical temperature until clock throttling is stopped.

Board Alarm Temperature	35°C 40°C 45°C 50°C 55°C 60°C 65°C 70°C	If board temperature exceeds given value clock throttling will start.

The Boot Menu

After you turn on your computer, it will attempt to load the operating system (such as Windows 98) from the device of your choice. If it cannot find the operating system on that device, it will attempt to load it from one or more other devices in the order specified in the Boot Menu. Boot devices (i.e., with access to an operating system) can include: hard drives, floppy drives, CD ROMs, removable devices (e.g., Iomega Zip drives), and network cards.

Note: Specifying any device as a boot device on the Boot Menu requires the availability of an operating system on that device. Most PCs come with an operating system already installed on hard-drive C:.

Selecting "Boot" from the Menu Bar displays the Boot menu, which looks like this:

```
                       PhoenixBIOS Setup Utility
    Main        Advanced      Security      Power              Exit
                                                         Item Specific Help

   -Removable Devices
        Legacy Floppy Drives
        LS - 120 COSM                       Keys used to view or
   -Hard Drive                              configure devices
        Bootable Add-in Cards               <Enter> expands or
        WDC AC1100H - (PM)                  collapses devices with
   CD-ROM Drive                             a + or - r in
   Network Boot                             <Ctrl+Enter> expands
   IBA FE Slot 0010 (*)                     all
                                            <Shift + 1> enables or
                                            disables a device.
                                            <+> and <-> moves the
                                            device up or down.
                                            <n> may move removable
                                            device between hard or
                                            removable disk.
                                            <d> removes a device
                                            that is not installed.

 F1   Help     ↑↓   Select Item   -/+    Change Values    F9    Setup Defaults
 ESC  Exit     ←→   Select Menu    Enter Select▶Sub-Menu  F10   Save and Exit
```

Use this menu to arrange to specify the order of the devices from which the BIOS will attempt to boot the Operating System. Use the <Enter> key to expand or collapse the devices marked with <+> or <->. Press <Ctrl+Enter> to expand all such devices.

To move a device, first select it with the up-or-down arrows, and move it up or down using the <+> and <-> keys. Pressing <n> moves a device between the Removable Devices and Hard Drive. Pressing <Shift+1> enables or disables a device.

(*) IBA FE Slot 0010: When "Local LAN Boot" is set to "enabled" this option appears here to select the priority of the LAN boot ROM

The Exit Menu

Selecting "Exit" from the menu bar displays this menu:

```
                    PhoenixBIOS Setup Utility
    Main    Advanced    Security    Power    Boot    Exit
                                                    Item Specific Help

    Exit Saving Changes
    Exit Discarding Changes                Exit System Setup and
    Load Setup Defaults                    save your changes to
    Discard Changes                        CMOS.
    Save Changes





 F1   Help     ↑↓    Select Item   -/+    Change Values     F9    Setup Defaults
 ESC  Exit     ←→    Select Menu    Enter  Execute Command   F10   Save and Exit
```
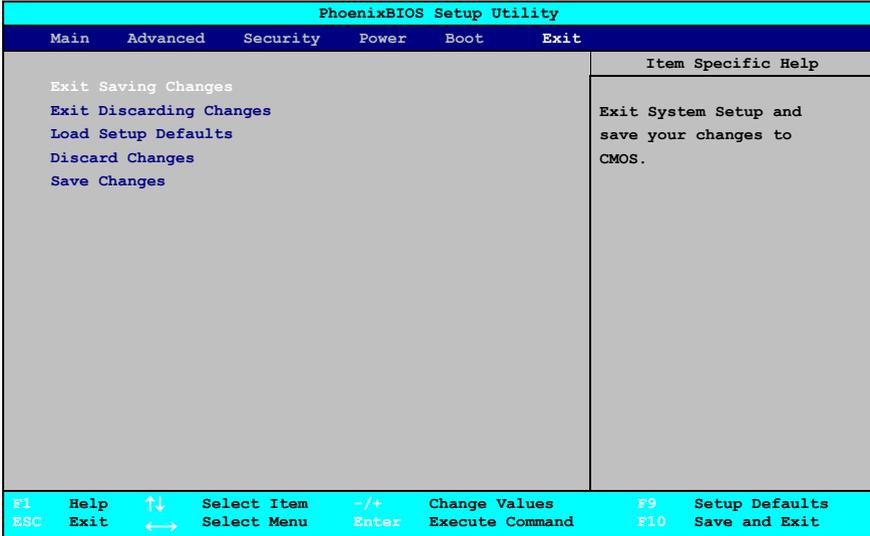
The following sections describe each of the options on this menu. Note that <Esc> does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Saving Values

After making your selections on the Setup menus, always select either "Saving Values" or "Save Changes." Both procedures store the selections displayed in the menus in **CMOS** (short for "battery-backed CMOS RAM") a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS.

After you save your selections, the program displays this message:

        Values have been saved to CMOS!
            Press <space> to continue

If you attempt to exit without saving, the program asks if you want to save before exiting.

During bootup, *Phoenix*BIOS attempts to load the values saved in CMOS. If those values cause the system boot to fail, reboot and press **<F2>** to enter Setup. In Setup, you can get the Default Values (as described below) or try to change the selections that caused the boot to fail.

Exit Discarding Changes

Use this option to exit Setup without storing in CMOS any new selections you may have made. The selections previously in effect remain in effect.

Load Setup Defaults

To display the default values for all the Setup menus, select "Load Setup Defaults" from the Main Menu. The program displays this message:

ROM Default values have been loaded!
Press <space> to continue

If, during bootup, the BIOS program detects a problem in the integrity of values stored in CMOS, it displays these messages:

System CMOS checksum bad – run SETUP
Press <F1> to resume, <F2> to Setup

The CMOS values have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS.

Press **<F1>** to resume the boot or **<F2>** to run Setup with the ROM default values already loaded into the menus. You can make other changes before saving the values to CMOS.

Discard Changes

If, during a Setup Session, you change your mind about changes you have made and have not yet saved the values to CMOS, you can restore the values you previously saved to CMOS.

Selecting "Discard Changes" on the Exit menu updates all the selections and displays this message:

```
CMOS values have been loaded!
     Press <space> to continue
```

Save Changes

Selecting "Save Changes" saves all the selections without exiting Setup. You can return to the other menus if you want to review and change your selections.

PhoenixBIOS Messages

The following is a list of the messages that the BIOS can display. Most of them occur during POST. Some of them display information about a hardware device, e.g., the amount of memory installed. Others may indicate a problem with a device, such as the way it has been configured. Following the list are explanations of the messages and remedies for reported problems.

*If your system displays one of the messages marked below with an asterisk (*****), write down the message and contact your dealer. If your system fails after you make changes in the Setup menus, reset the computer, enter Setup and install Setup defaults or correct the error.

0200 Failure Fixed Disk
Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run Setup. Find out if the fixed-disk type is correctly identified.

0210 Stuck key
Stuck key on keyboard.

0211 Keyboard error
Keyboard not working.

*0212 Keyboard Controller Failed
Keyboard controller failed test. May require replacing keyboard controller.

0213 Keyboard locked - Unlock key switch
Unlock the system to proceed.

0220 Monitor type does not match CMOS - Run SETUP
Monitor type not correctly identified in Setup

*0230 Shadow Ram Failed at offset: *nnnn*
Shadow RAM failed at offset *nnnn* of the 64k block at which the error was detected.

*0231 System RAM Failed at offset: *nnnn*
System RAM failed at offset *nnnn* of in the 64k block at which the error was detected.

*0232 Extended RAM Failed at offset: *nnnn* Extended memory not working or not configured properly at offset *nnnn*.

0250 System battery is dead - Replace and run SETUP
The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.

0251 System CMOS checksum bad - Default configuration used
System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter Setup and enter your own values. If the error persists, check the system battery or contact your dealer.

*0260 System timer error
The timer test failed. Requires repair of system board.

*0270 Real time clock error Real-Time Clock fails BIOS hardware test. May require board repair.

0271 Check date and time settings BIOS found date or time out of range and reset the Real-Time Clock. May require setting legal date (1991-2099).

0280 Previous boot incomplete - Default configuration used

Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with control of **wait states**, improper Setup settings can also terminate POST and cause this error on the next boot. Run Setup and verify that the wait-state configuration is correct. This error is cleared the next time the system is booted.

0281 Memory Size found by POST differed from CMOS

Memory size found by POST differed from CMOS.

02B0 Diskette drive A error

02B1 Diskette drive B error

Drive A: or B: is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is attached correctly.

02B2 Incorrect Drive A type - run SETUP

Type of floppy drive A: not correctly identified in Setup.

02B3 Incorrect Drive B type - run SETUP

Type of floppy drive B: not correctly identified in Setup.

02D0 System cache error - Cache disabled

RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace the cache. See your dealer. A disabled cache slows system performance considerably.

02F0: CPU ID:

CPU socket number for Multi-Processor error.

*02F4: EISA CMOS not writeable

ServerBIOS2 test error: Cannot write to EISA CMOS.

*02F5: DMA Test Failed

ServerBIOS2 test error: Cannot write to extended **DMA** (Direct Memory Access) registers.

*02F6: Software NMI Failed

ServerBIOS2 test error: Cannot generate software NMI (Non-Maskable Interrupt).

*02F7: Fail-Safe Timer NMI Failed

ServerBIOS2 test error: Fail-Safe Timer takes too long.

***device* Address Conflict**

Address conflict for specified *device.*

Allocation Error for: *device*

Run ISA or EISA Configuration Utility to resolve resource conflict for the specified *device*.

CD ROM Drive

CD ROM Drive identified.

Entering SETUP ...

Starting Setup program

*Failing Bits: *nnnn*

The hex number *nnnn* is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System, Extended, or Shadow memory.

Fixed Disk *n*

Fixed disk *n* (0-3) identified.

Invalid System Configuration Data
Problem with NVRAM (CMOS) data.

I/O device IRQ conflict
I/O device IRQ conflict error.

PS/2 Mouse Boot Summary Screen:
PS/2 Mouse installed.

nnnn kB Extended RAM Passed
Where _nnnn_ is the amount of RAM in kilobytes successfully tested.

nnnn Cache SRAM Passed
Where _nnnn_ is the amount of system cache in kilobytes successfully tested.

nnnn kB Shadow RAM Passed
Where _nnnn_ is the amount of shadow RAM in kilobytes successfully tested.

nnnn kB System RAM Passed
Where _nnnn_ is the amount of system RAM in kilobytes successfully tested.

One or more I2O Block Storage Devices were excluded from the Setup Boot Menu
There was not enough room in the IPL table to display all installed I$_2$O block-storage devices.

Operating system not found
Operating system cannot be located on either drive A: or drive C:. Enter Setup and see if fixed disk and drive A: are properly identified.

*Parity Check 1 _nnnn_
Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????.** Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.

*Parity Check 2 _nnnn_
Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????.**

Press <F1> to resume, <F2> to Setup, <F3> for previous
Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter Setup and change the settings. Press <F3> to display the previous screen (usually an initialization error of an **Option ROM**, i.e., an add-on card). Write down and follow the information shown on the screen.

Press <F2> to enter Setup
Optional message displayed during POST. Can be turned off in Setup.

PS/2 Mouse:
PS/2 mouse identified.

Run the I2O Configuration Utility
One or more unclaimed block storage devices has the Configuration Request bit set in the LCT. Run an I2O Configuration Utility (e.g. the SAC utility).

System BIOS shadowed
System BIOS copied to shadow RAM.

UMB upper limit segment address: *nnnn*

>Displays the address *nnnn* of the upper limit of **Upper Memory Blocks**, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.

Video BIOS shadowed

>Video BIOS successfully copied to shadow RAM.

2 Boot Utilities

Phoenix Boot Utilities are:

- Phoenix QuietBoot™
- Phoenix MultiBoot™

Phoenix QuietBoot displays a graphic illustration rather than the traditional POST messages while keeping you informed of diagnostic problems.

Phoenix MultiBoot is a boot screen that displays a selection of boot devices from which you can boot your operating system.

Phoenix QuietBoot

Right after you turn on or reset the computer, **Phoenix QuietBoot** displays the QuietBoot Screen, a graphic illustration created by the computer manufacturer instead of the text-based POST screen, which displays a number of PC diagnostic messages.

To exit the QuietBoot screen and run Setup, display the MultiBoot menu, or simply display the PC diagnostic messages, you can simply press one of the hot keys described below.

The QuietBoot Screen stays up until just before the operating system loads unless:

- You press <Esc> to display the POST screen.
- You press <F2> to enter Setup.
- POST issues an error message.
- The BIOS or an option ROM requests keyboard input.

The following explains each of these situations.

Press <ESC>

Pressing <Esc> switches to the POST screen and takes one of two actions:

1. If MultiBoot is installed, the boot process continues with the text-based POST screen until the end of POST, and then displays the **Boot First Menu**, with these options:

   - Load the operating system from a boot device of your choice.
   - Enter Setup.
   - Exit the Boot First Menu (with <Esc>) and load the operating system from the boot devices in the order specified in Setup.

2. If MultiBoot is not installed, the boot process continues as usual.

Press <F2>

Pressing <F2> at any time during POST switches to the POST screen (if not already displayed) and enters Setup.

POST Error

Whenever POST detects a non-fatal error, QuietBoot switches to the POST screen and displays the errors. It then displays this message:

        Press <F1> to resume, <F2> to Setup

Press <F1> to continue with the boot. Press <F2> if you want to correct the error in Setup.

Keyboard Input Request

If the BIOS or an **Option ROM** (add-on card) requests keyboard input, QuietBoot switches over to the POST screen and the Option ROM displays prompts for entering the information. POST continues from there with the regular POST screen.

Phoenix MultiBoot

Phoenix MultiBoot expands your boot options by letting you choose your boot device, which could be a hard disk, floppy disk, or CD ROM. You can select your boot device in Setup, or you can choose a different device each time you boot by selecting your boot device in **The Boot First Menu**.

MultiBoot consists of:

- The Setup Boot Menu
- The Removable Format Menu
- The Fixed Disk and Removable Disk Menus
- The Boot First Menu

The following describes each one of these menus.

The Setup Boot Menu

In the Setup **Boot Menu** you can select the order of the devices from which the BIOS attempts to boot the operating system. During POST, if the BIOS is unsuccessful at booting from one device, it will try the next one on the list. Please see "Boot Menu" in Chapter 1 for a detailed desription.

The Boot First Menu

Display the Boot First Menu by pressing <Esc> during POST. In response, the BIOS first displays the message, "Entering Boot Menu ..." and then displays the Boot Menu at the end of POST. Use the menu to select any of these options:

1. Override the existing boot sequence (for this boot only) by selecting another boot device. If the specified device does not load the operating system, the BIOS reverts to the previous boot sequence.

2. Enter Setup.

3. Press <Esc> to continue with the existing boot sequence.

```
                    Boot Menu

 Use <↑> or <↓> to select a boot
 device or the Setup utility
 Pres <Enter> to accespt or
 <Esc> to exit.
 1.    +Diskette Drive
 2.    +Removable Devices
 3.    +Hard Drive
 4.     ATAPI CD-ROM Drive
 5.     Network Boot
       <Enter Setup>
```
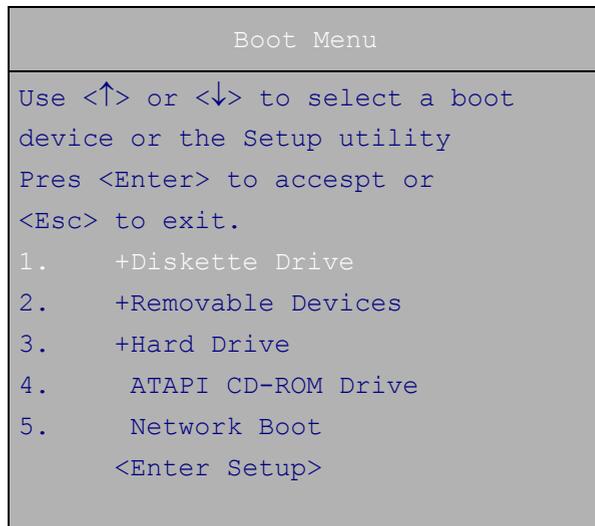
If there is more than one bootable hard drive, the first one in the Boot Connection Device Menu is the one represented here.

Boot with Blanked Video

For OEM purpose the BIOS allows booting with blanked Video. This feature is enabled by VGA utility VGACONF.EXE . Video can be enabled only by software executing extended VGA BIOS Function AX=5F54h (Set Panel ON/OFF). However the video is enabled by System BIOS in case of POST errors are encountered or if Setup is requested by user (F2 key).
In addition video is enabled by system BIOS for one of the following situations:

- Hot Key request for Multiboot Menu (ESC Hotkey)
- Summary Screen option is enabled

Note that the blanked video option should be enabled for OEMs only and should not be confused with Quiet Boot option supported by BIOS.

Chapter

3 BIOS Update

Update Disk

Update BIOS with MSC-Update-Disk:
- Insert an empty, writeable floppy disk in your desktop PC.
- Extract Update-Disk-Image-File to floppy disk by executing "Uxxxxvvv.exe".
- Insert the still writeable floppy disk to your system with MSC-Board.
- Switch on power.
- The system will boot FreeDOS from drive A:.
- If you want to update your system BIOS press [u] otherwise press [a].
- Parameters for VGA BIOS will be written to EEPROM.
- The System and VGA BIOS will be programmed.
- After programming has terminated press any key.
- Switch off power.
- Remove update disk and switch on power.
- Enter setup with "F2", change settings, if necessary, and exit setup with the option "Exit Saving Changes".

Note: After the system has been updated, the CMOS has been changed to defaults and therefore it is necessary to enter setup to configure the system and exit setup with the option "Exit Saving Changes".

Note: Even if you want to use default settings, enter setup and exit with the option "Exit Saving Changes". Otherwise BIOS will restore settings from EEPROM every boot process and display the message, which indicates this.

Note: If your Update-Disk is write-protected, your system will hang. In this case make your Update-Disk writeable and boot again.

Phoenix Phlash

Phoenix Phlash gives you the ability to update your BIOS from a floppy disk without having to install a new ROM BIOS chip.
Phoenix Phlash is a utility for "flashing" (copying) a BIOS to the Flash ROM installed on your computer from a floppy disk. A Flash ROM is a Read-Only Memory chip that you can write to using a special method called "flashing." Use Phoenix Phlash for the following tasks:

- Update the current BIOS with a new version.
- Restore a BIOS when it has become corrupted.

Installation

Phoenix Phlash is shipped on a floppy disk with your computer as a compressed file called CRISDISK.ZIP that contains the following files:

CRISDISK.BAT	Executable file for creating the Crisis Recovery Diskette.
PHLASH.EXE	Programs the flash ROM.
PLATFORM.BIN	Performs platform-dependent functions.
BIOS.ROM	Actual BIOS image to be programmed into flash ROM.
MINIDOS.SYS	Allows the system to boot in Crisis Recovery Mode.
MAKEBOOT.EXE	Creates the custom boot sector on the Crisis Recovery Diskette.

To install Phoenix Phlash on your hard disk, follow this simple procedure:

1. Insert the distribution diskette into drive A:
2. Unzip the contents of CRISDISK.ZIP into a local directory, presumably `C:\PHLASH`.
3. Store the distribution diskette in a safe place.

Create the Crisis Recovery Diskette

If the OEM or dealer from whom you purchased your system has not provided you with one, then you should create a **Crisis Recovery Diskette** before you use the Phlash utility. If you are unable to boot your system and successfully load the

Operating System, the BIOS may have been corrupted, in which case you will have to use the Crisis Recovery Diskette to reboot your system. There are several methods that you can use to create the Crisis Recovery Diskette. Below is one recommended procedure.

1. Be sure you have successfully installed the Phlash Utility onto your hard disk.

2. Insert a clean diskette into drive A: or B:

3. From the local directory, enter the following:

CRISDISK [drive]:

where [*drive*] is the letter of the drive into which you inserted the diskette. For help, type **/?** or **/h**.

CRISDISK.BAT formats the diskette, then copies MINIDOS.SYS, VGABIOS.EXE (if available), PHLASH.EXE, PLATFORM.BIN and BIOS.ROM to the diskette, and creates the required custom boot sector.

4. Write protect and label the Crisis Recovery Diskette.

NOTE: You can only supply a volume label after the Crisis Recovery Diskette has been formatted and the necessary files copied because MINIDOS.SYS must occupy the first directory entry for the diskette to boot properly.

Updating the Crisis Recovery Diskette

If the BIOS image (BIOS.ROM) changes due to an update or bug fix, you can easily update the Crisis Recovery Diskette. Simply copy the new BIOS.ROM image onto the Crisis Recovery Diskette. No further action is necessary.

Executing Phoenix Phlash

You can run Phoenix Phlash in one of two modes:

Command Line Mode

Crisis Recovery Mode

WARNING! For your own protection, be sure you have a Crisis Recovery Diskette ready to use before executing Phlash.

Command Line Mode

Use this mode to update or replace your current BIOS. To execute Phlash in this mode, move to the directory into which you have installed Phoenix Phlash and type the following:

```
phlash
```

Phoenix Phlash will automatically update or replace the current BIOS with the one which your OEM or dealer supplies you.

Phlash may fail if your system is using memory managers, in which case the utility will display the following message:

```
Cannot flash when memory managers are present.
```

If you see this message after you execute Phlash, you must disable the memory manager on your system. To do so, follow the instructions in the following sections.

Disabling Memory Managers

To avoid failure when flashing, you must disable the memory managers that load from CONFIG.SYS and AUTOEXEC.BAT. There are two recommended procedures for disabling the memory managers. One consists of pressing the <F5> key (only if you are using DOS 5.0 or above), and the other requires the creation of a boot diskette.

DOS 5.0 (or later version)

For DOS 5.0 and later, follow the two steps below to disable any memory managers on your system. If you are not using at least DOS 5.0, then you must create a boot diskette to bypass any memory managers (See Create a Boot Diskette, below).

1. Boot DOS 5.0 or later version. (In Windows 95, at the boot option screen, choose Option 8, "Boot to a previous version of DOS.")

2. When DOS displays the "Starting MS-DOS" message, press <F5>.

After you press <F5>, DOS bypasses the CONFIG.SYS and AUTOEXEC.BAT files, and therefore does not load any memory managers.

You can now execute Phlash.

Create a Boot Diskette

To bypass memory managers in DOS versions previous to 5.0, follow this recommended procedure:

1. Insert a diskette into your A: drive.

2. Enter the following from the command line:

   ```
   Format A: /S
   ```

3. Reboot your system from the A: drive.

Your system will now boot without loading the memory managers, and you can then execute Phlash.

NOTE: The boot diskette you create here is distinct from a *Crisis Recovery Diskette*. See previous pages for details about creating the Crisis Recovery Diskette.

Crisis Recovery Mode

You should only have to operate Phoenix Phlash in this mode only if your system does not boot the operating system when you turn on or reset your computer. In these cases, the BIOS on the Flash ROM has probably been corrupted. Boot your system with the Crisis Recovery Diskette taking these steps:

1. Insert the Crisis Recovery diskette (which your dealer supplied or one that you should have created from the instructions above) into drive A:.

2. Reset your computer, power on-off, or press <Ctrl> <Alt> <Del> to reboot the system.

3. When your system reboots, Phoenix Phlash will restore the BIOS from the diskette and successfully boot the operating system.

Index

POST Errors and Beep Codes

Recoverable POST Errors

Whenever a recoverable error occurs during POST, *Phoenix*BIOS displays an error message describing the problem.

*Phoenix*BIOS also issues a beep code (one long tone followed by two short tones) during POST if the video configuration fails (no card installed or faulty) or if an external ROM module does not properly checksum to zero.

An external ROM module (e.g. VGA) can also issue audible errors, usually consisting of one long tone followed by a series of short tones.

Terminal POST Errors

There are several POST routines that issue a **POST Terminal Error** and shut down the system if they fail. Before shutting down the system, the terminal-error handler issues a beep code signifying the test point error, writes the error to port 80h, attempts to initialize the video, and writes the error in the upper left corner of the screen (using both mono and color adapters).

The routine derives the beep code from the test point error as follows:

1. The 8-bit error code is broken down to four 2-bit groups (Discard the most significant group if it is 00).
2. Each group is made one-based (1 through 4) by adding 1.
3. Short beeps are generated for the number in each group.

Example:

Testpoint 01Ah = 00 01 10 10 = 1-2-3-3 beeps

Test Points and Beep Codes

At the beginning of each POST routine, the BIOS outputs the test point error code to I/O address 80h. Use this code during trouble shooting to establish at what point the system failed and what routine was being performed.

Some motherboards are equipped with a seven-segment LED display that displays the current value of port 80h. For production boards which do not contain the LED display, you can purchase a card that performs the same function.

If the BIOS detects a terminal error condition, it halts POST after issuing a terminal error beep code (See above) and attempting to display the error code on upper left corner of the screen and on the port 80h LED display. It attempts repeatedly to write the error to the screen. This may cause "hash" on some CGA displays.

If the system hangs before the BIOS can process the error, the value displayed at the port 80h is the last test performed. In this case, the screen does not display the error code.

The following is a list of the checkpoint codes written at the start of each test and the beep codes issued for terminal errors. Unless otherwise noted, these codes are valid for PhoenixBIOS 4.0 Release 6.0.

Code	Beeps	POST Routine Description
02h		Verify Real Mode
03h		Disable Non-Maskable Interrupt (NMI)
04h		Get CPU type
06h		Initialize system hardware
07h		Disable shadow and execute code from the ROM.
08h		Initialize chipset with initial POST values
09h		Set IN POST flag
0Ah		Initialize CPU registers
0Bh		Enable CPU cache
0Ch		Initialize caches to initial POST values
0Eh		Initialize I/O component
0Fh		Initialize the local bus IDE
10h		Initialize Power Management
11h		Load alternate registers with initial POST values
12h		Restore CPU control word during warm boot
13h		Initialize PCI Bus Mastering devices
14h		Initialize keyboard controller
16h	1-2-2-3	BIOS ROM checksum
17h		Initialize cache before memory Autosize
18h		8254 timer initialization
1Ah		8237 DMA controller initialization
1Ch		Reset Programmable Interrupt Controller
20h	1-3-1-1	Test DRAM refresh
22h	1-3-1-3	Test 8742 Keyboard Controller

Code	Beeps	POST Routine Description
24h		Set ES segment register to 4 GB
28h		Autosize DRAM
29h		Initialize POST Memory Manager
2Ah		Clear 512 kB base RAM
2Ch	1-3-4-1	RAM failure on address line *xxxx**
2Eh	1-3-4-3	RAM failure on data bits *xxxx** of low byte of memory bus
2Fh		Enable cache before system BIOS shadow
32h		Test CPU bus-clock frequency
33h		Initialize Phoenix Dispatch Manager
36h		Warm start shut down
38h		Shadow system BIOS ROM
3Ah		Autosize cache
3Ch		Advanced configuration of chipset registers
3Dh		Load alternate registers with CMOS values
41h		Initialize extended memory for RomPilot
42h		Initialize interrupt vectors
45h		POST device initialization
46h	2-1-2-3	Check ROM copyright notice
47h		Initialize I20 support
48h		Check video configuration against CMOS
49h		Initialize PCI bus and devices
4Ah		Initialize all video adapters in system
4Bh		QuietBoot start (optional)
4Ch		Shadow video BIOS ROM
4Eh		Display BIOS copyright notice
4Fh		Initialize MultiBoot
50h		Display CPU type and speed
51h		Initialize EISA board
52h		Test keyboard
54h		Set key click if enabled
55h		Enable USB devices
58h	2-2-3-1	Test for unexpected interrupts
59h		Initialize POST display service
5Ah		Display prompt "Press F2 to enter SETUP"
5Bh		Disable CPU cache
5Ch		Test RAM between 512 and 640 kB
60h		Test extended memory
62h		Test extended memory address lines
64h		Jump to UserPatch1
66h		Configure advanced cache registers
67h		Initialize Multi Processor APIC
68h		Enable external and CPU caches
69h		Setup System Management Mode (SMM) area

Code	Beeps	POST Routine Description
6Ah		Display external L2 cache size
6Bh		Load custom defaults (optional)
6Ch		Display shadow-area message
6Eh		Display possible high address for UMB recovery
70h		Display error messages
72h		Check for configuration errors
76h		Check for keyboard errors
7Ch		Set up hardware interrupt vectors
7Dh		Initialilze Intelligent System Monitoring
7Eh		Initialize coprocessor if present
80h		Disable onboard Super I/O ports and IRQs
81h		Late POST device initialization
82h		Detect and install external RS232 ports
83h		Configure non-MCD IDE controllers
84h		Detect and install external parallel ports
85h		Initialize PC-compatible PnP ISA devices
86h		Re-initialize onboard I/O ports.
87h		Configure Motheboard Configurable Devices (optional)
88h		Initialize BIOS Data Area
89h		Enable Non-Maskable Interrupts (NMIs)
8Ah		Initialize Extended BIOS Data Area
8Bh		Test and initialize PS/2 mouse
8Ch		Initialize floppy controller
8Fh		Determine number of ATA drives (optional)
90h		Initialize hard-disk controllers
91h		Initialize local-bus hard-disk controllers
92h		Jump to UserPatch2
93h		Build MPTABLE for multi-processor boards
95h		Install CD ROM for boot
96h		Clear huge ES segment register
97h		Fixup Multi Processor table
98h	1-2	Search for option ROMs. One long, two short beeps on checksum failure
99h		Check for SMART Drive (optional)
9Ah		Shadow option ROMs
9Ch		Set up Power Management
9Dh		Initialize security engine (optional)
9Eh		Enable hardware interrupts
9Fh		Determine number of ATA and SCSI drives
A0h		Set time of day
A2h		Check key lock
A4h		Initialize typematic rate
A8h		Erase F2 prompt

Code	Beeps	POST Routine Description
AAh		Scan for F2 key stroke
ACh		Enter SETUP
AEh		Clear Boot flag
B0h		Check for errors
B1h		Inform RomPilot about the end of POST.
B2h		POST done - prepare to boot operating system
B4h	1	One short beep before boot
B5h		Terminate QuietBoot (optional)
B6h		Check password (optional)
B7h		Initialize ACPI BIOS
B9h		Prepare Boot
BAh		Initialize DMI parameters
BBh		Initialize PnP Option ROMs
BCh		Clear parity checkers
BDh		Display MultiBoot menu
BEh		Clear screen (optional)
BFh		Check virus and backup reminders
C0h		Try to boot with INT 19
C1h		Initialize POST Error Manager (PEM)
C2h		Initialize error logging
C3h		Initialize error display function
C4h		Initialize system error handler
C5h		PnPnd dual CMOS (optional)
C6h		Initialize note dock (optional)
C7h		Initialize note dock late
C8h		Force check (optional)
C9h		Extended checksum (optional)
CAh		Redirect Int 15h to enable remote keyboard
CBh		Redirect Int 13h to Memory Technologies Devices such as ROM, RAM, PCMCIA, and serial disk
CCh		Redirect Int 10h to enable remote serial video
CDh		Remap I/O and memory for PCMCIA
CEh		Initialize digitizer and display message
D2h		Unknown interrupt
		The following are for boot block in Flash ROM
E0h		Initialize the chipset
E1h		Initialize the bridge
E2h		Initialize the CPU
E3h		Initialize system timer
E4h		Initialize system I/O
E5h		Check force recovery boot
E6h		Checksum BIOS ROM

Code	Beeps	POST Routine Description
E7h		Go to BIOS
E8h		Set Huge Segment
E9h		Initialize Multi Processor
EAh		Initialilze OEM special code
EBh		Initialize PIC and DMA
ECh		Initialize Memory type
EDh		Initialize Memory size
EEh		Shadow Boot Block
EFh		System memory test
F0h		Initialize interrupt vectors
F1h		Initialize Run Time Clock
F2h		Initialize video
F3h		Initialize System Management Manager
F4h		Output one beep
F5h		Boot to Mini DOS
F6h		Clear Huge Segment
F7h		Boot to Full DOS

* If the BIOS detects error 2C, 2E, or 30 (base 512K RAM error), it displays an additional word-bitmap (*xxxx*) indicating the address line or bits that failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. Note that error 30 cannot occur on 386SX systems because they have a 16 rather than 32-bit bus. The BIOS also sends the bitmap to the port-80 LED display. It first displays the check point code, followed by a delay, the high-order byte, another delay, and then the low-order byte of the error. It repeats this sequence continuously.