MB950

Intel® Core™ i3/i5/i7

ATX Motherboard

USER'S MANUAL

Version 1.0A

Acknowledgments

Table of Contents

IMPORTANT INFORMATION

1. When an Intel® Core™ i7 processor is installed on board, please install an external graphics card to have graphics output, because Intel® Core™ I7 processor does not support graphics in the microprocessor. Also, please note when an Intel® Core™ i7 processor is installed, the memory module should be installed in DIMM1 socket; otherwise, the system will not boot.

2. When an external graphics card is installed on the motherboard, regardless of they type of processor on board, the onboard VGA and DVI ports/ connectors will not function. Use the graphics output connector on the graphics card.

3. The onboard PCI-E(x8) slot supports PCI-E(x4) link only. Please note that a PCI-E(x8) card installed on the board may or may not function normally.

Introduction

Product Description

The MB950 ATX motherboard offers the latest Socket H (LGA1156) supporting the Intel® Core™ i7, Core™ i5, Core™ i3 processors or the Intel® Pentium® processor G6950, all developed on Intel's newest microarchitecture, formerly codenamed "Nehalem," and using Intel's 32nm and 45nm process technologies.

Designed as an enterprise-performance ATX motherboard, the MB950 is ideal for the latest generation of POS, kiosk, automation and multimedia applications such as gaming. Based on the Intel® Q57 chipset, the MB950 supports the processor-integrated graphics to provide two display streams in combination of the onboard VGA CRT and DVI-D video interfaces. Up to 16GB of maximum memory can be configured in four DDR3 socket at 1066/1333MHz.

In addition to the impressive computing performance, the board is equipped with high-end connectivity comprised of dual Gigabit LAN controllers, six SATA-II ports, one IDE, fourteen USB 2.0 ports, four COM ports and high-definition audio. Should greater performance or expansion be required, add-on cards can be connected to the onboard PCI-E(x16), PCI-E(x8) [(x4) Link], PCI-E(x1), four PCI, and ISA slot.

MB950 FEATURES

- Support Intel® Core™ i7 / Core™ i5 / Core™ i3 / Pentium® G6950 processors
- 4x DDR3 DIMM (w/o ECC), Max. 16GB
- 2x Gigabit LAN
- 6x SATA II, 14x USB 2.0, 4x COM
- 1x PCI-E(x16), 1x PCE-E(x8) [(x4) Link], 1x PCE-E(x1), 4x PCI, 1x ISA, 1x IDE, 1x CF
- Support dual display; VGA/DVI-D
- Support iAMT6.0 (MB950AF only)

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Checklist

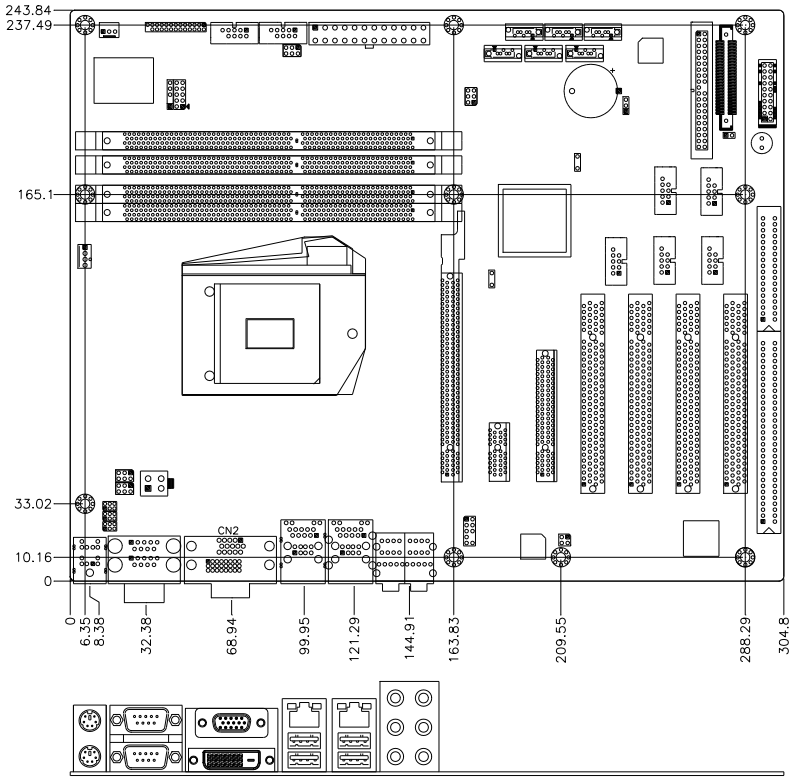
Your MB950 package should include the items listed below.

- The MB950 ATX motherboard
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Cable kit (IDE, Serial ATA)

MB950 Specifications

Product Name	MB950
Form Factor	Industrial Motherboard ATX
CPU Type	Intel® Core(TM) i3 / i5/ i7 Processor
CPU Speed	2.8GHz ~ 3.46GHz (73W)
Last Level Cache	4MB
CPU Socket	LGA1156
Chipset	Intel® Q57 PCH , 27x27 mm FCBGA
BIOS	AMI BIOS, support ACPI Function
Memory	DDRIII 1066/1333MHz - 240-pin DIMM x 4 (w/o ECC), Max.16GB
VGA / DVI	Clarkdale processor integrated graphic(2X), Two display streams supported in any combination of DP, DVI and VGA ; Dual Independent display - ASM 1142T level shifter for DVI - VGA
LAN	1. Q57 Gigabit MAC + PHY :Intel® 82578DM GbE 2. Intel® 82583V PCI-e Gigabit LAN controller x1
USB	Q57 built-in USB 2.0 host controller, supports 14 ports
Serial ATA	Q57 built-in SATA controller, supports 6 ports
Parallel IDE/ CF	JMicron JM368 (PCI-e to PATA) x1 for 1 PATA channel for IDE & CF - IDE 40 pin - CF x 1
PCI to ISA Bridge	ITE IT8888G x 1 for high ISA bus
Audio	Q57 built-in High Definition Audio controller + ALC888 Codec w/7.1 channels
LPC I/O	Winbond W83627UHG : COM1 (RS232/422/485), COM2(RS232), COM3 (RS232), COM4 (RS232) with pin-9 with power for 4 ports (500 mA for each port) Hardware monitor (2 thermal inputs, 4 voltage monitor inputs, VID0-4 & 2 Fan Headers)
Digital IO	4 in & 4 out
iAMT	Q57 built-in iAMT 6.0 (MB950AF only)
KB/Mouse	Supports PS/2 Keyboard/Mouse connector
Expansion Slots	1x PCI-e(x16) slot, 1x PCI-e [x8 slot](x4) slot, 1x PCI-e(x1), 4x PCI slot, 1x ISA
Edge Connector	PS/2 for Keyboard and Mouse GbE LAN RJ45 + dual USB stack connector GbE LAN RJ45 + dual USB stack connector Dual DB9 stack connector x1 for COM 1 & 3 DVI-D + DB15 stack connector x 1 for DVI + VGA RCA Jack 3x2 for HD Audio
On Board Header/Connector	2 x 5-pins header x 5 for 10 USB ports 12-pin header x1 for front audio outputs 10-pin box header x 2 for COM 2, 4 3-pin fan pin header x2 3-pin System fan pin header x1 (DC fan) 4-pin CPU fan pin header x1 (PWM fan control) 2 x 4 pins header for Digital I/O 5-pin header x 1 for IrDA 26-pin header x 1 for Parallel
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec/min)
System Voltage	+5V, +3.3V, +12V, -12V, 5VSB
Other	LAN Wakeup
Board Size	305mm x 244mm

Board Dimensions



Installations

This section provides information on how to use the jumpers and connectors on the MB950 in order to set up a workable system. The topics covered are:

Installing the CPU

The MB950 board supports an LGA1156 Socket (shown below) for Intel Clarkdale processors.

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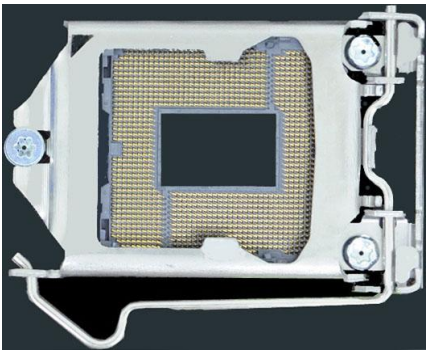
To install the CPU, unlock first the socket by pressing the lever sideways, then lift it up to a 90-degree. Then, position the CPU above the socket such that the CPU corner aligns with the gold triangle matching the socket corner with a small triangle. Carefully insert the CPU into the socket and push down the lever to secure the CPU. Then, install the heat sink and fan.



***NOTE**: Ensure that the CPU heat sink and the CPU top surface are in total contact to avoid CPU overheating problem that would cause your system to hang or be unstable.*

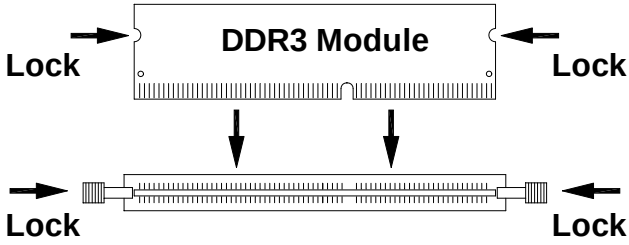
Installing the Memory

The MB950 board supports four DDR3 memory socket for a maximum total memory of 16GB in DDR3 DIMM memory type.

Installing and Removing Memory Modules

To install the DDR3 modules, locate the memory slot on the board and perform the following steps:

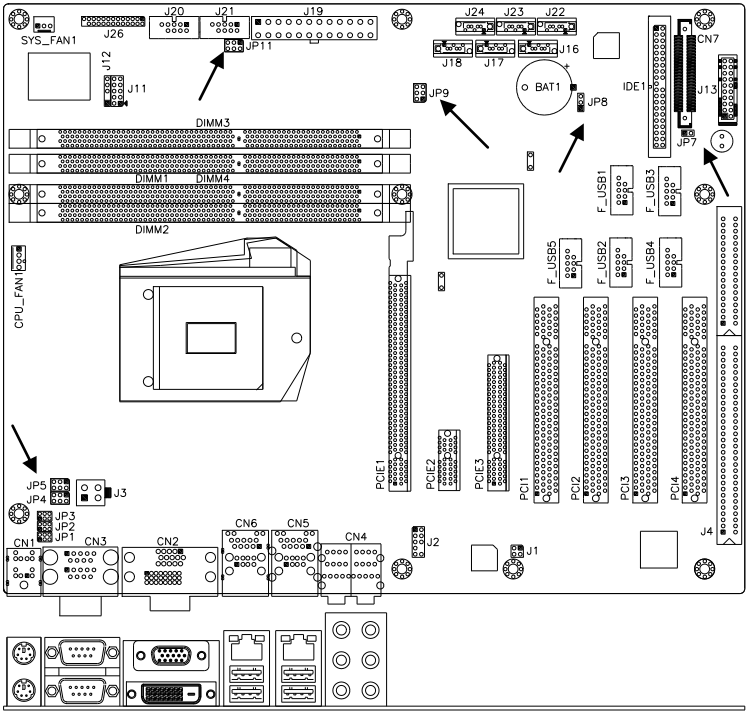
1. Hold the DDR3 module so that the key of the DDR3 module aligned with that on the memory slot.
2. Gently push the DDR3 module in an upright position until the clips of the slot close to hold the DDR3 module in place when the DDR3 module touches the bottom of the slot.
3. To remove the DDR3 module, press the clips with both hands.



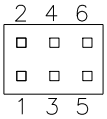
Setting the Jumpers

Jumpers are used on MB950 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on MB950 and their respective functions.

Jumper Locations on MB950

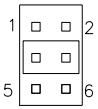


JP1, JP2, JP3: RS232/RS422/RS485 (COM1) Selection

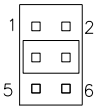


COM1 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP2: 1-2 JP1: 3-5 & 4-6 JP3: 3-5 & 4-6	JP2: 3-4 JP1: 1-3 & 2-4 JP3: 1-3 & 2-4	JP2: 5-6 JP1: 1-3 & 2-4 JP3: 1-3 & 2-4

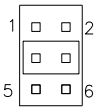
JP4: COM1 RS232 RI/+5V/+12V Power Setting

JP4	Setting	Function
	Pin 1-2 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-6 Short/Closed	+5V

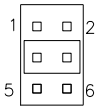
JP5: COM3 RS232 RI/+5V/+12V Power Setting

JP5	Setting	Function
	Pin 1-2 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-6 Short/Closed	+5V

JP9: COM4 RS232 RI/+5V/+12V Power Setting

JP9	Setting	Function
	Pin 1-2 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-6 Short/Closed	+5V

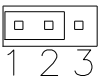
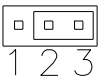
JP11: COM2 RS232 RI/+5V/+12V Power Setting

JP11	Setting	Function
	Pin 1-2 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-6 Short/Closed	+5V

JP7: Compact Flash Socket Master/Slave Setting

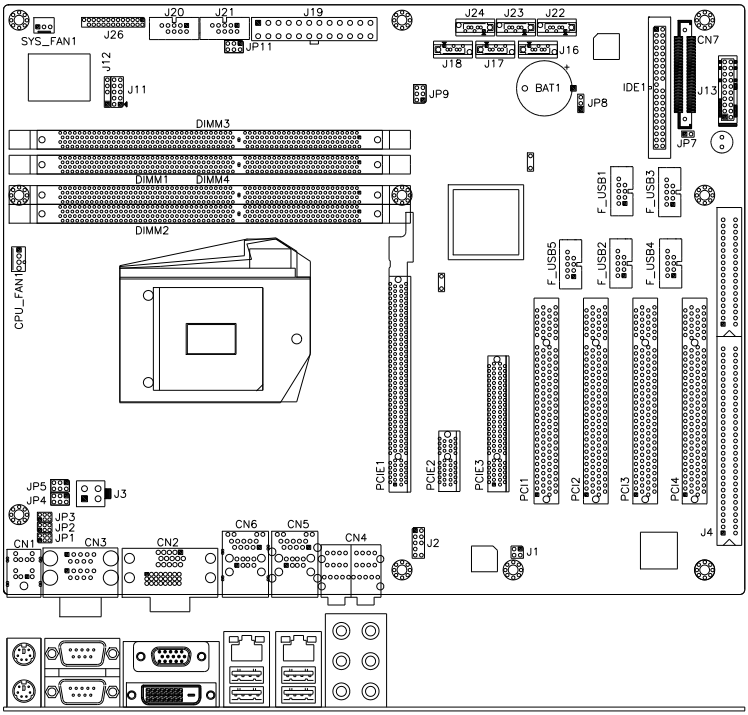
JP7	Compact Flash
	Master
	Slave

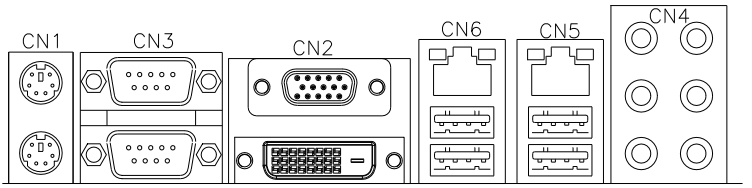
JP8: Clear CMOS Contents

JP8	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

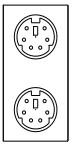
Connectors on MB950

Connector Locations on MB950





CN1: PS/2 Keyboard and PS/2 Mouse Connectors

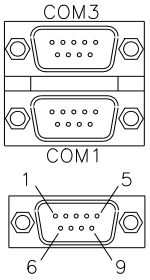


PS/2 Mouse

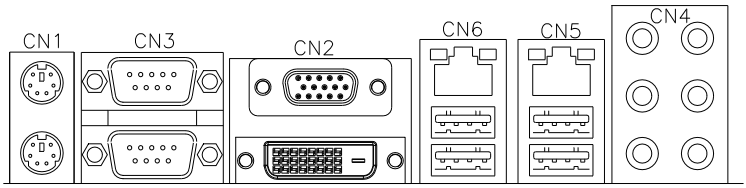
PS/2 Keyboard

Signal Name	Keyboard	Mouse	Signal Name
Keyboard data	1	1	Mouse data
N.C.	2	2	N.C.
GND	3	3	GND
5V	4	4	5V
Keyboard clock	5	5	Mouse clock
N.C.	6	6	N.C.

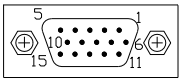
CN3: COM1 and COM3 Serial Ports



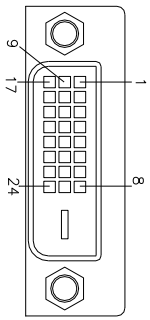
Pin #	Signal Name		
	RS-232	R2-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC



CN2: VGA and DVI



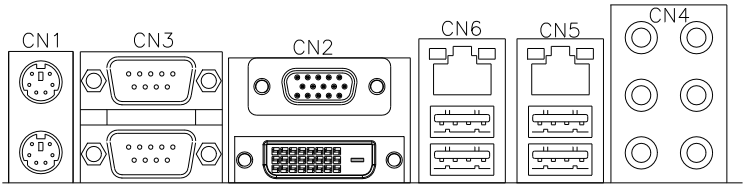
Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
VCC	9	10	GND
N.C.	11	12	DDCDATA
HSYNC	13	14	VSYNC
DDCCLK	15		



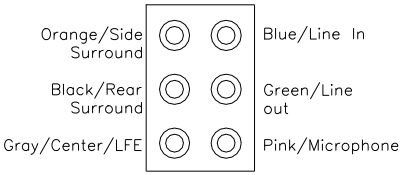
Signal Name	Pin #	Pin #	Signal Name
DATA2-	1	2	DATA2+
GND	3	4	N.C.
N.C.	5	6	DDCCLK
DDCDATA	7	8	N.C.
DATA1-	9	10	DATA1+
GND	11	12	N.C.
N.C.	13	14	VCC
GND	15	16	Hot Plug Detect
DATA0-	17	18	DATA0+
GND	19	20	N.C.
N.C.	21	22	GND
CLK+	23	24	CLK-

CN5: Gigabit LAN (82583V) + USB2/USB3

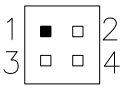
CN6: Gigabit LAN (82578DM) + USB0/USB1



CN4: HD Audio Connector

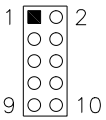


J1: SPDIF I/O



Pin #	Signal Name
1	SPDIF IN
2	Ground
3	SPDIF OUT
4	Ground

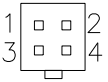
J2 : Audio Pin Header for Chassis Front Panel



Signal Name	Pin	Pin	Signal Name
MIC IN_L	1	2	Ground
MIC IN_R	3	4	DET
LINE_R	5	6	Ground
Sense	7	8	KEY
LINE_L	9	10	Ground

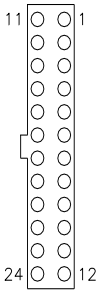
J3: ATX 12V Power Connector

This connector supplies the CPU operating voltage.



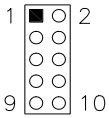
Pin #	Signal Name
1	Ground
2	Ground
3	+12V
4	+12V

J19: 24-pin ATX Power Connector



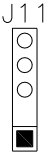
Signal Name	Pin #	Pin #	Signal Name
3.3V	13	1	3.3V
-12V	14	2	3.3V
Ground	15	3	Ground
PS-ON	16	4	+5V
Ground	17	5	Ground
Ground	18	6	+5V
Ground	19	7	Ground
-5V	20	8	Power good
+5V	21	9	5VSB
+5V	22	10	+12V
+5V	23	11	+12V
Ground	24	12	+3.3V

J11 : Digital I/O Connector (4 in, 4 out)



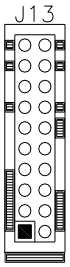
Signal Name	Pin #	Pin #	Signal Name
Ground	1	2	+5V
Out3	3	4	Out1
Out2	5	6	Out0
IN3	7	8	IN1
IN2	9	10	IN0

J12 : IRDA Connector



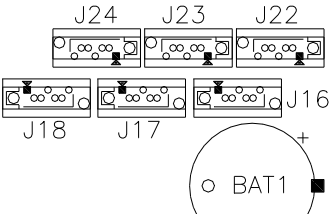
Pin #	Signal Name
5	SOUTB
4	GND
3	SINB
2	KEY
1	VCC5

J13: Front Panel Function Connector



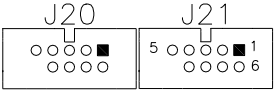
Signal Name	Pin #	Pin #	Signal Name
SPK +	1	2	PWR LED +
NC	3	4	PWR LED- (GND)
SPK – (GND)	5	6	PWR LED- (GND)
SPK – (GND)	7	8	NC
NC	9	10	NC
AMT LED -	11	12	AMT LED +
PWR_SW	13	14	PWR_SW
NC	15	16	NC
RST	17	18	GND
HDD LED -	19	20	HDD LED +

J16, J17, J18, J22, J23, J24: SATA II Connectors



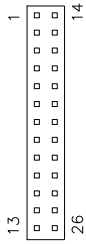
Pin #	Signal Name
1	Ground
2	TX+
3	TX-
4	Ground
5	RX-
6	RX+
7	Ground

J20, J21: COM4, COM2 RS232 Serial Ports

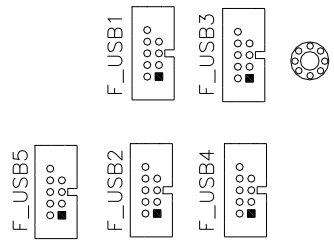


Signal Name	Pin #	Pin #	Signal Name
DCD#	1	6	DSR#
SIN#	2	7	RTS#
SOUT	3	8	CTS#
DTR#	4	9	RI#
GND	5	X	KEY

J26: Parallel Port Connector



Signal Name	Pin #	Pin #	Signal Name
Line printer strobe	1	14	AutoFeed
PD0, parallel data 0	2	15	Error
PD1, parallel data 1	3	16	Initialize
PD2, parallel data 2	4	17	Select
PD3, parallel data 3	5	18	Ground
PD4, parallel data 4	6	19	Ground
PD5, parallel data 5	7	20	Ground
PD6, parallel data 6	8	21	Ground
PD7, parallel data 7	9	22	Ground
ACK, acknowledge	10	23	Ground
Busy	11	24	Ground
Paper empty	12	25	Ground
Select	13	N/A	N/A



F_USB1: USB4/USB5 Connector

Signal Name	Pin	Pin	Signal Name
VCC	1	2	VCC
D0-	3	4	D1-
D0+	5	6	D1+
GND	7	8	GND
KEY	9	10	NC

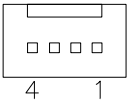
F_USB2: USB6/USB7 Connector

F_USB3: USB8/USB9 Connector

F_USB4: USB10/USB11 Connector

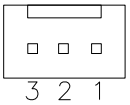
F_USB5: USB12/USB13 Connector

CPU_FAN1: CPU Fan Power Connector



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

SYS_FAN1: system Fan1 Power Connector



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

CN7: CF Socket

J4: ISA Slot (shared with PCI4)

PCIE1: PCI-E X16 (PEG)

PCIE2: PCI-E X1 Slot

PCIE3: PCI-E X8 Slot (X4 Link)

PCI1-PCI4: PCI 32-bit Slot

BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

BIOS Introduction

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

BIOS Setup

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

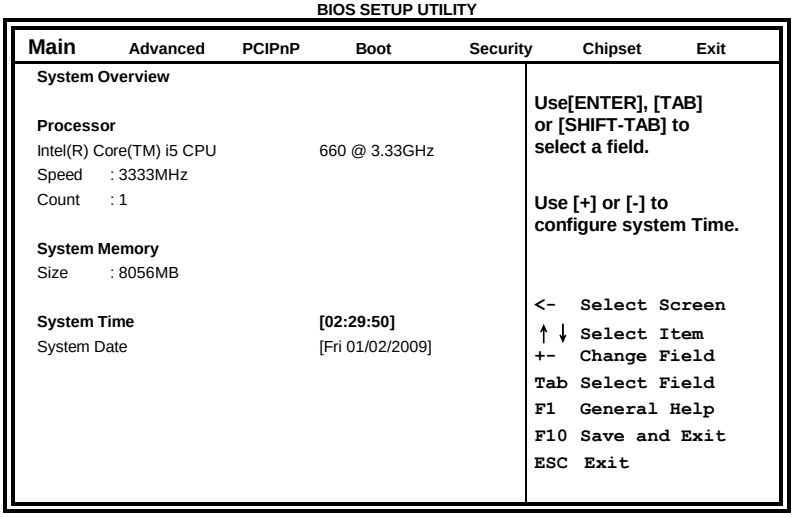
```
Press  <DEL>  to  Enter  Setup
```

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

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

Main BIOS Setup

This setup allows you to view processor configuration used in your computer system and set the system time and date.



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

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

Advanced Settings

BIOS SETUP UTILITY

Main	**Advanced**	PCIPnP	Boot	Security	Chipset	Exit

Advanced Settings

WARNING: Setting wrong values in below sections may cause system to malfunction.

- ► **CPU Configurations**
- ► IDE Configuration
- ► SuperIO Configuration
- ► Hardware Health Confguration
- ► ACPI Configuration
- ► AHCI Configuration
- ► Intel AMT Configuration
- ► Intel VT-d Configuration
- ► MPS Configuration
- ► PCI Express Configuration
- ► Remote Access Configuration
- ► USB Configuration

Configure CPU.

<- Select Screen
↑ ↓ Select Item
+- Change Field
Tab Select Field
F1 General Help
F10 Save and Exit
ESC Exit

The Advanced BIOS Settings configurations are shown in the following pages, as seen in the computer screen. Please note that setting the wrong values may cause the system to malfunction.

REMARKS: The Intel AMT Configuration is available only on MB950AF, not MB950F.

BIOS SETUP UTILITY

Main	**Advanced**	PCIPnP	Boot	Security	Chipset	Exit

Configure advanced CPU settings

Module Version: 01.08

Manufacturer: Intel	
Intel(R) Core(TM) i5 CPU	660 @ 3.33GHz
Frequency : 3.33GHz	
BLCK Speed : 133MHz	
Cache L1 : 128KB	
Cache L2 : 512KB	
Cache L3 : 4096KB	
Ratio Status: Unlocked (Min:09, Max:25)	
Ratio Actual Value: 9.5	
Ratio CMOS Setting	25
MPS and ACPI MADT ordering	Modern ordering
Max CPUID Value Limit	Disabled
Intel(R) Virtualization Tech	Enabled
Intel(R) HT Technology	Enabled
Active Processor Cores	All
A20M	Diabled
►Intel PPM Configuration	

Configure CPU.

<- Select Screen
↑ ↓ Select Item
+- Change Field
Tab Select Field
F1 General Help
F10 Save and Exit
ESC Exit

The CPU Configuration menu shows the following CPU details including the manufacturer, CPU type, its frequency and cache levels. Other options include:

Ratio CMOS Setting
Sets the ratio between CPU core clock and the FSB frequency.

MPS and ACPI MADT ordering
Modern ordering for Windows XP or later OSes. Legacy ordering for Windows 2000 or earlier OSes.

Max CPU ID Value Limit
Disabled for Windows XP.

Intel Virtualization Tech
When enabled, a VMM can utilize the additional HW Caps. Provided by Intel Vitualization Tech. Note: A full reset is required to change the setting.

Intel HT Technology
When disabled, only one thread per enabled core is enabled.

Active Processor Cores
Number of cores to enable in each processor package.

A20M
Legacy OSes and Aps may need A20 M enabled.

Intel PPM Configuration

This configuration includes the following options:

Intel SpeedStep tech

Disable: Disable GV3 Enable: Enable GV3

Intel TurboMode tech

Turbo mode allows processor cores to run faster than marked frequency in specific condition.

Intel C-STATE tech

CState: CPU idle is set to C2/C3/C4.

C State package limit setting

Selected option will program into C State package limit register.

C3 State / C6 State

Nehalem C state action select.

C1 Auto Demotion

When enabled, CPU will conditionally demote C3/C6/C7 requests to C1 based on uncore auto-demote information.

C1 Auto Demotion / C3 Auto Demotion

When enabled, CPU will conditionally demote C6/C7 requests to C3 based on uncore auto-demote information.

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit

IDE Configuration

Mirrored IDER Configuration	[Enabled]	
Configure SATA#1 as	[IDE]	
SATA#1 IDE Configuration	[Compatible]	
SATA#2 IDE Configuration	[Enhanced]	
► Primary IDE Master	: [Hard Disk]	
► Primary Slave Master	: [Not Detected]	
► Secondary IDE Master	: [Not Detected]	<- Select Screen
► Secondary IDE Slave	: [Not Detected]	↑↓ Select Item
► Third IDE Master	: [Not Detected]	+- Change Field
► Fourth IDE Master	: [Not Detected]	Tab Select Field
► Primary IDE Master	: [Not Detected]	F1 General Help
► Fifth IDE Master	: [Not Detected]	F10 Save and Exit
► Fifth IDE Slave	: [Not Detected]	ESC Exit
► Sixth IDE Master	: [Not Detected]	
► Sixth IDE Slave	: [Not Detected]	
Hark Disk Write Protect	{Disabled}	
IDE Detect Time Out (Sec)	[35]	
ATA(PI) 80Pin Cable Detection	[Host & Device]	
Jmicron 36x ATA Controller	[Enabled]	

The IDE Configuration menu is used to change and/or set the configuration of the IDE devices installed in the system.

Hard Disk Write Protect

Disable/Enable device write protection. This will be effective only if device is accessed through BIOS.

IDE Detect Time Out (Sec)

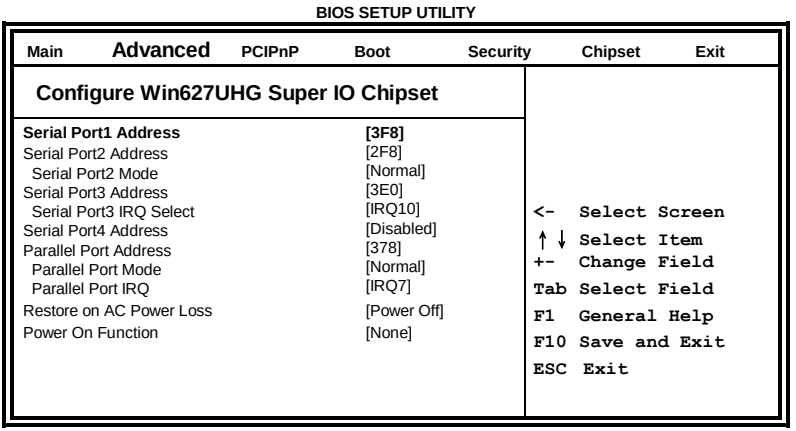
Select the time out value for detecting ATA/ATAPI device(s).

ATA(PI) 80pin Cable Detection

Select the mechanism for detecting 80pin ATA(PI) cable.

Jmicron 36x ATA Controller

Select ATA Controller Operate Mode



Onboard Serial Port/Parallel Port

These fields allow you to select the onboard serial ports and their addresses. The default values for these ports are:

Serial Port 1	3F8
Serial Port 2	2F8/
Serial Port 3	3E0/IRQ10
Serial Port 4	Disabled
Parallel Port	378/IRQ7

Parallel Port Mode

This field allows you to determine parallel port mode function.

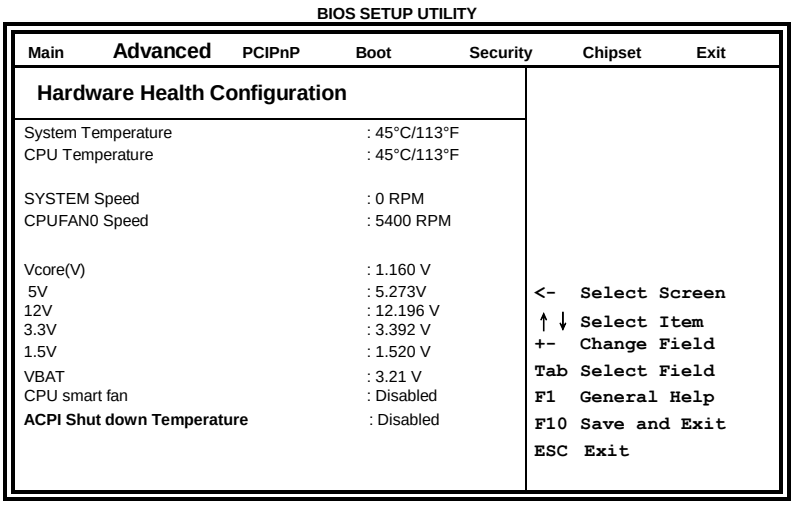
SPP	Standard Printer Port
EPP	Enhanced Parallel Port
ECP	Extended Capabilities Port
ECP+EPP	Combination of ECP and EPP capabilities
Normal	Normal function

Restore on AC Power Loss

This field sets the system power status whether *on or off* when power returns to the system from a power failure situation.

Power On Function

This field is related to how the system is powered on . The options are *None*, *Mouse Left*, *Mouse Right*, and *Any Key*.



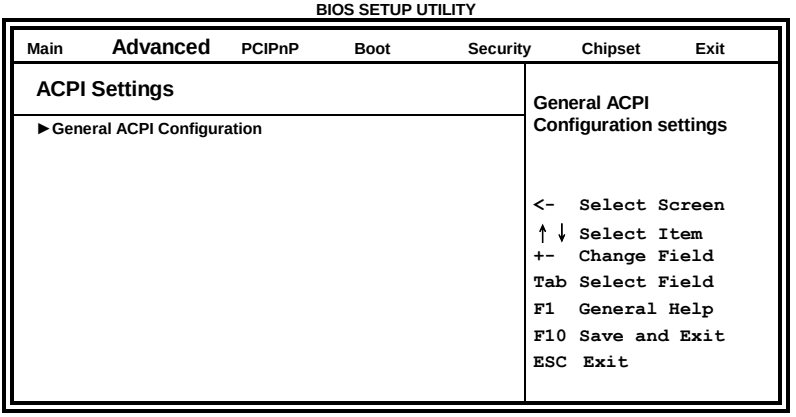
The Hardware Health Configuration menu is used to show the operating temperature, fan speeds and system voltages.

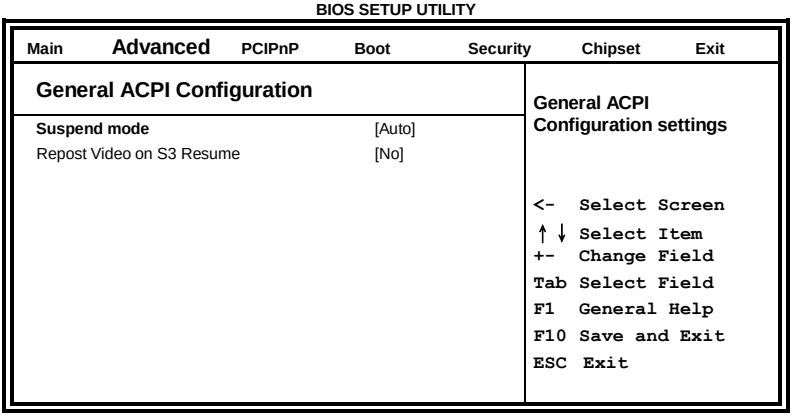
CPU smart fan

The options are *Disabled, 55℃, 60℃, 65℃, 70℃, 75℃, 80℃, and 85℃.*

ACPI Shutdown Temperature

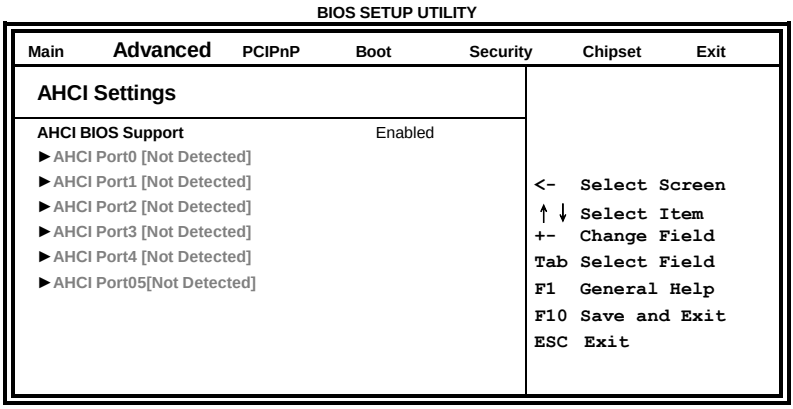
The options are *Disabled, 70℃/158℉, 75℃/167℉, 80℃/176℉, 85℃/185℉, 90℃/194℉,* and *95℃/203℉.*





Suspend Mode
The options of this field are *S1*, *S3* and *Auto*.

Repost Video on S3 Resumet
Determines whether to invoke VGA BIOS post on S3/STR resume.

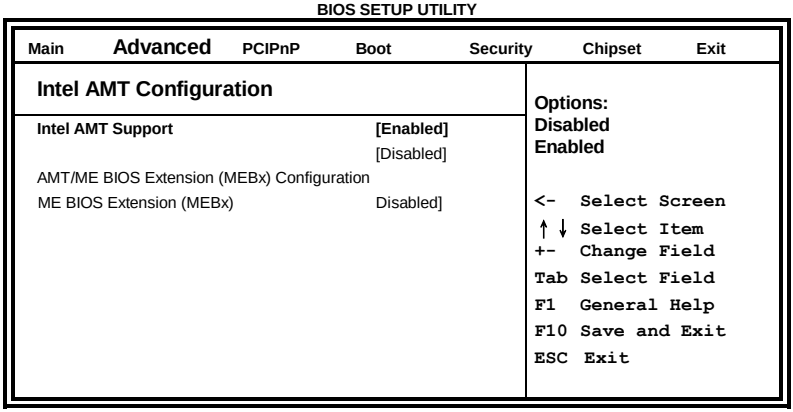


AHCI BIOS Support

Enables for supporting AHCI controller operates in AHCI mode during BIOS control otherwise operates in IDE mode

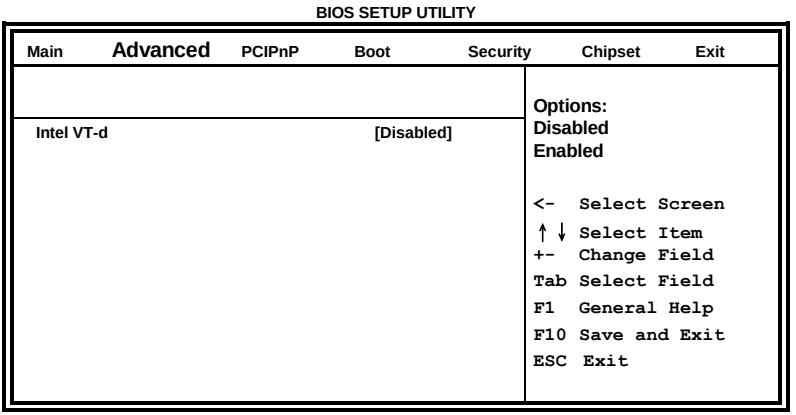
AHCI Port

While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.



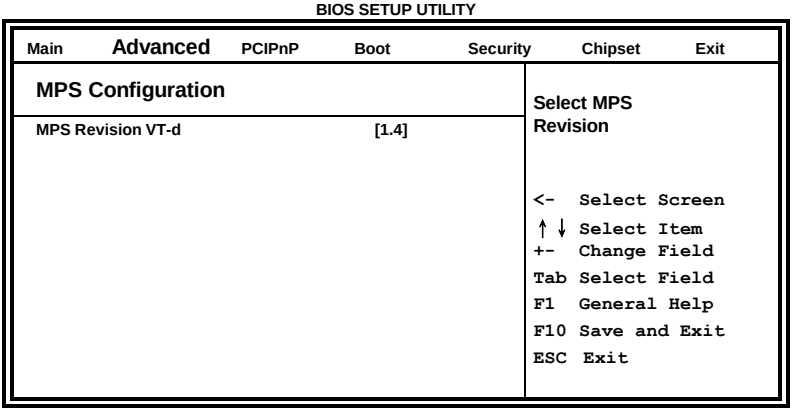
The Intel AMT Configuration configures the Intel Active Management Technology (AMT) options.

REMARKS: The Intel AMT Configuration is available only on MB950AF, not MB950F.



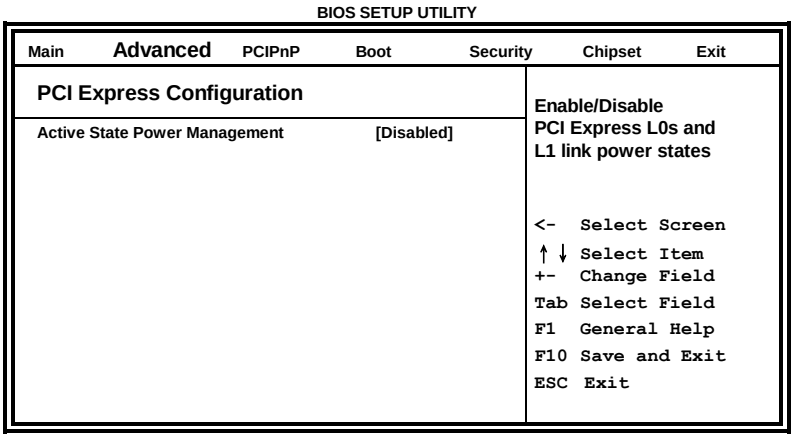
VT-d

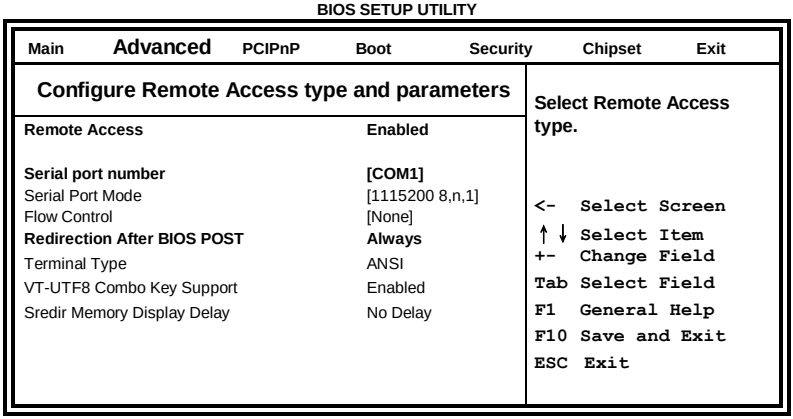
Virtualization solutions allow multiple operating systems and applications to run in independent partitions all on a single computer. Using virtualization capabilities, one physical computer system can function as multiple "virtual" systems.



MPS Version Control for OS

This option is specifies the MPS (Multiprocessor Specification) version for your operating system. MPS version 1.4 added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability. The default setting is ***1.4***.





When enabled, the Remote Acces type and parameters are shown:

Serial port number - Select Serial Port for console redirection.

Serial port mode - Select Serial Port settings.

Flow Control - Select Flow Control for console redirection.

Redirection After BIOS POST

Disable: Turns off the redirection after POST.

Boot Loader: Redirection is active during POST and during Boot Loader.

Always: Redirection is always active. (Some OSs may not work if set to Always.)

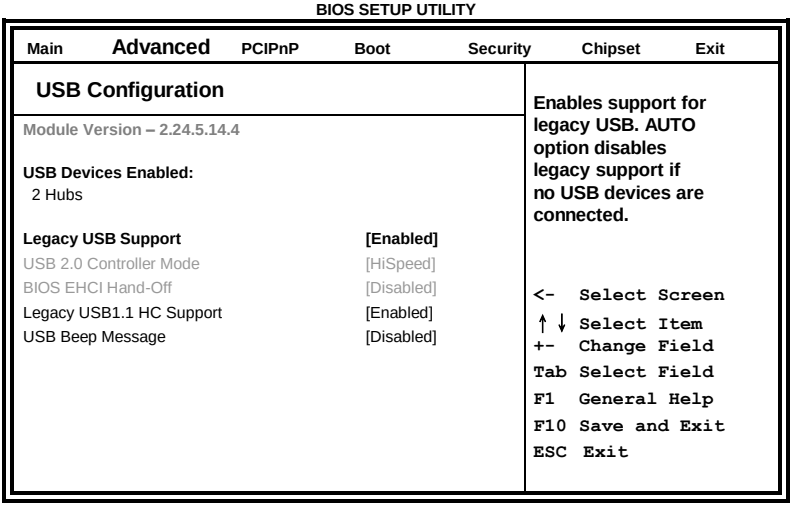
Terminal Type - Select the target terminal type.

VT-UTF8 Combo Key Support – Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.

Sredir Memory Display Delay – Gives the delay in seconds to display memory information.

USB Configuration

This option is used to configure USB mass storage class devices.



Legacy USB Support

Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.

Legacy USB1.1 HC Support

Support USB 1.1 HC.

USB Beep Message

Enables the beep during USB device enumeration.

PCIPnP Settings

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit

Advanced PCI/PnP Settings

WARNING: Setting wrong values in below sections may cause system to malfunction.

Clear NVRAM	**[No]**
Plug & Play O/S	[No]
PCI Latency Timer	[64]
Allocate IRQ to PCI VGA	[Yes]
Palette Snooping	[Disabled]
PCI IDE BusMaster	[Enabled]
OffBoard PCI/ISA IDE Card	**[Auto]**
IRQ3	[Available]
IRQ4	[Available]
IRQ5	[Available]
IRQ7	[Available]
IRQ9	[Available]
IRQ10	[Available]
IRQ11	[Available]
IRQ14	[Available]
IRQ15	[Available]
DMA Channel 0	[Available]
DMA Channel 1	[Available]
DMA Channel 3	[Available]
DMA Channel 5	[Available]
DMA Channel 6	[Available]
DMA Channel 7	[Available]
Reserved Memory Size	**[Disabled]**

Clear NVRAM during System Boot

<- Select Screen
↑ ↓ Select Item
+- Change Field
Tab Select Field
F1 General Help
F10 Save and Exit
ESC Exit

Clear NVRAM

This item is used for clearing NVRAM during system boot.

Plug & Play O/S

This lets BIOS configure all devices in the system or lets the OS configure PnP devices not required for boot if your system has a Plug and Play OS.

PCI Latency Timer

This item sets value in units of PCI clocks for PCI device latency timer register. Options are: 32, 64, 96, 128, 160, 192, 224, 248.

Allocate IRQ to PCI VGA
This assigns IRQ to PCI VGA card if card requests IRQ or doesn't assign IRQ to PCI VGA card even if card requests an IRQ.

Palette Snooping
This informs the PCI devices that an ISA graphics device is installed in the system so the card will function correctly.

PCI IDE BusMaster
This uses PCI busmastering for BIOS reading / writing to IDE devices.

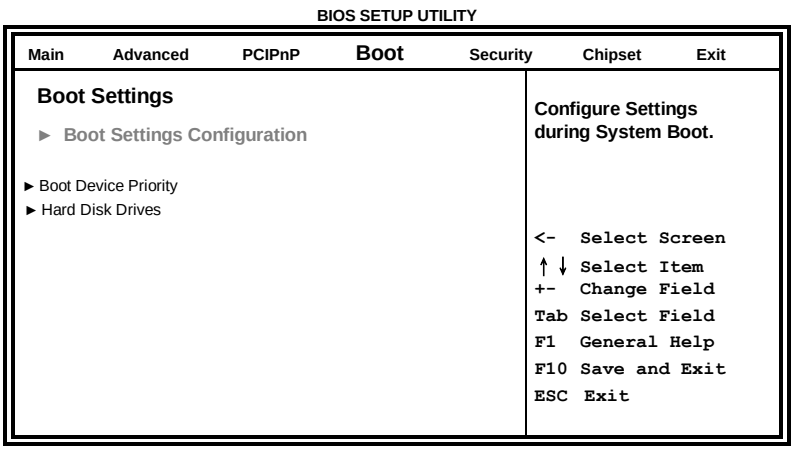
OffBoard PCI/ISA IDE Card
Some PCI IDE cards may require this to be set to the PCI slot number that is holiding the card. ***AUTO***: Works for most PCI IDE cards.

IRQ#
Use the IRQ# address to specify what IRQs can be assigned to a particular peripheral device.

Reserved Memory Size
Size of memory block to reserve for legacy ISA devices.

Boot Settings

This option configures the settings during system boot including boot device priority and HDD/CD/DVD drives.



Boot Settings Configuration

This configuration includes the following items:

Quick Boot - Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.

Quite Boot – ***Disabled***: Displays normal POST messages. ***Enabled***: Displays OEM Logo instead of POST messages.

Bootup Num-Lock – Select Power-on state for Numlock.

PS/2 Mouse Support – Select support for PS/2 Mouse.

Wait for 'F1' If Error – Wait for F1 key to be pressed if error occurs.

Hit 'DEL' Message Display – Displays "Press DEL to run Setup" in POST.

Interrupt 19 Capture – This allows option ROMS to trap interrupt 19.

Boot Device Priority

This specifies the boot sequence from the available devices. A device enclosed in parenthesis has been disabled in the corresponding type menu.

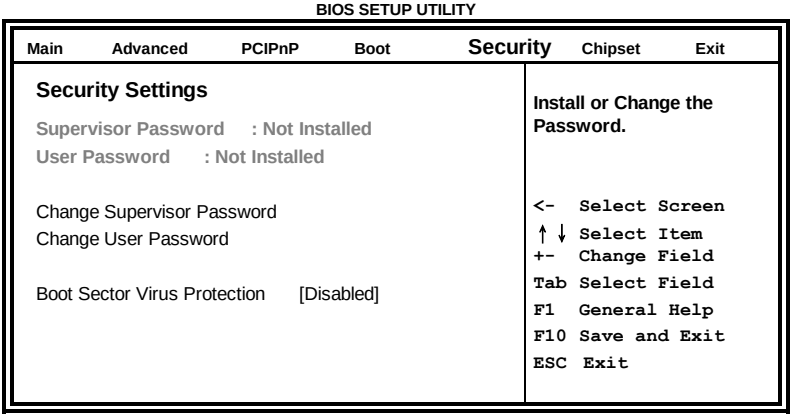
Hard Disk Drives

This specifies the Boot Device Priority sequence from available Hard Drives.

Security Settings

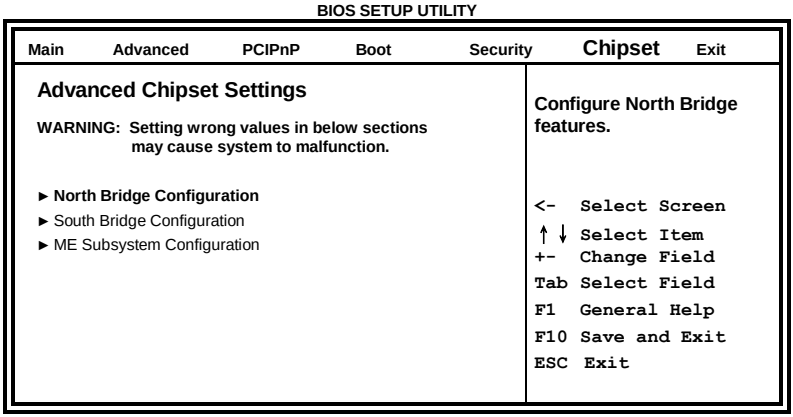
This setting comes with two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>.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

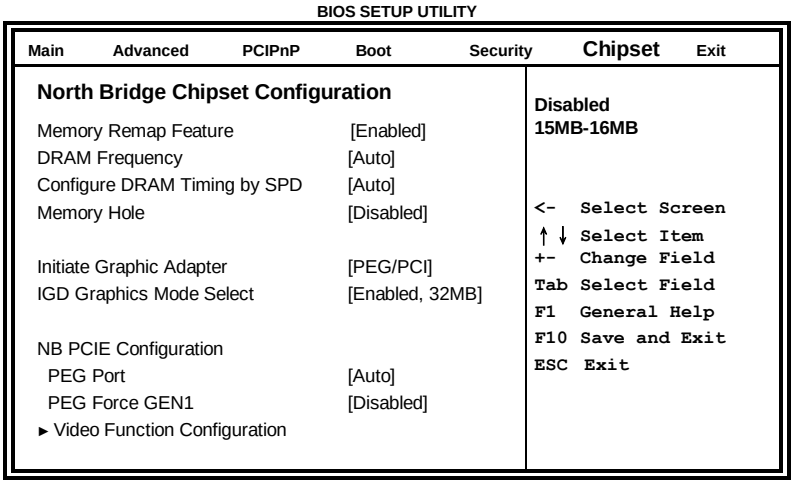
To disable a password, just press the <Enter> key when you are prompted to enter the password. A message will confirm the password to be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.



Advanced Chipset Settings

This setting configures the north bridge, south bridge and the ME subsystem. WARNING! Setting the wrong values may cause the system to malfunction. -





Memory Remap Feature

This allows remapping of overlaped PCI memory above the total physical memory.

DRAM Frequency

The options are ***Auto***, ***1067 MHz*** and ***1333 MHz***.

Configure DRAM Timing by SPD

The options are ***Auto*** and ***Manual***.

Memory Hole
This option is used to reserve memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly.

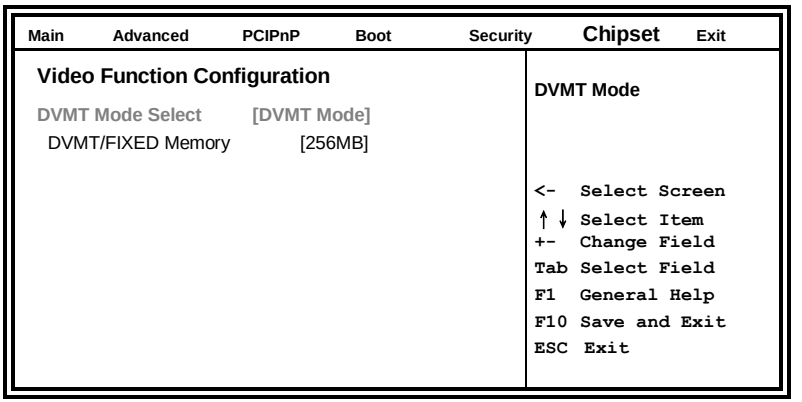
Initiate Graphic Adapter
This option selects which graphics controller to use as the primary boot device.

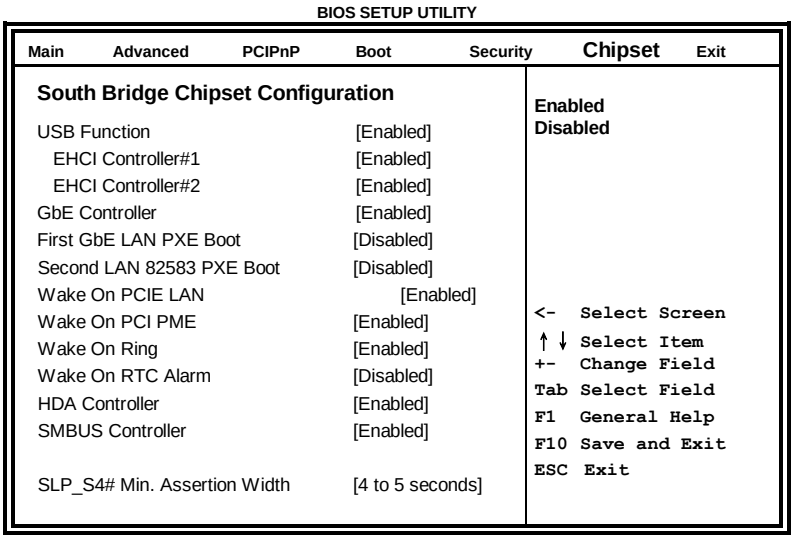
IGD Graphics Mode Select
This option selects the amount of system memory used by the internal graphics device.

PEG Port
The options are ***Auto*** and ***Disabled***.

PEG Force GEN1
Some non-graphics PCI-E devices may not follow PCI-E specifications and may incorrectly report their GEN capability or link width.

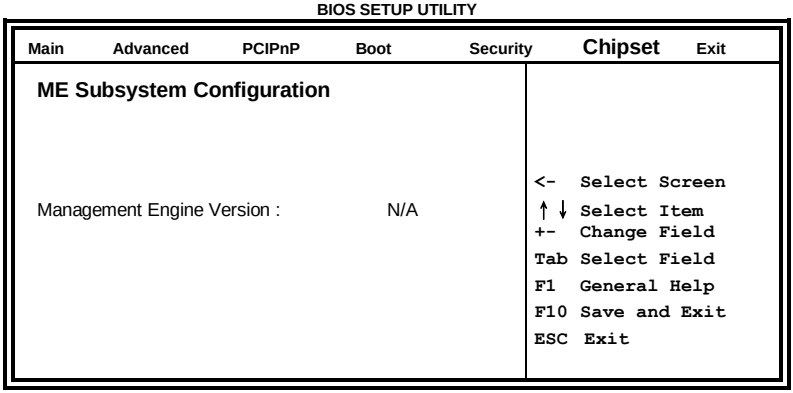
Video Function Configuration
The configuration allows setting to DVMT/FIXED memory.





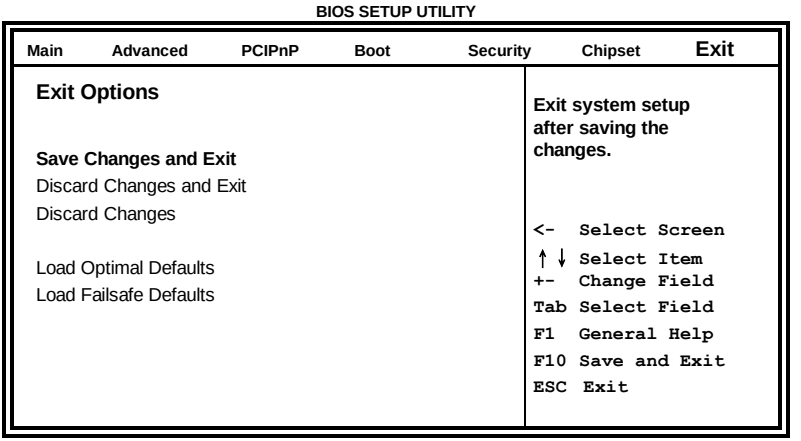
HDA Controller

This option is used to enable the Southbridge high definition audio controller.



Exit Setup

The exit setup has the following settings which are:



Save Changes and Exit

This option allows you to determine whether or not to accept the modifications and save all changes into the CMOS memory before exit.

Discard Changes and Exit

This option allows you to exit the Setup utility without saving the changes you have made in this session.

Discard Changes

This option allows you to discard all the changes that you have made in this session.

Load Optimal Defaults

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

Load Failsafe Defaults

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

Drivers Installation

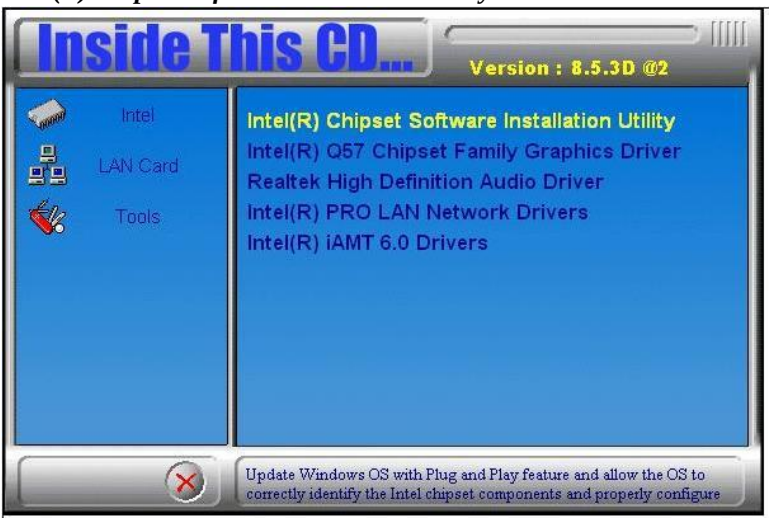
This section describes the installation procedures for software and drivers under the Windows 2000, Windows XP and Windows Vista. The software and drivers are included with the board. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

IMPORTANT NOTE:
After installing your Windows operating system (Windows 2000/XP/Vista), you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

Intel Chipset Software Installation Utility

The Intel® Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation under Windows 2000/XP/Vista. (Before installed Intel Chipset Software Installation Utility,Please update your system to Windows 2000 SP4 or Windows XP SP1A)

1. Insert the DVD that comes with the board. Click ***Intel*** and then ***Intel(R) Chipset Software Installation Utility.***



3. When the Welcome screen appears, click ***Next*** to continue.

4. Click ***Yes*** to accept the software license agreement and proceed with the installation process.

5. On the Readme Information screen, click ***Next*** to continue the installation.

6. When the Setup Progress screen appears, click ***Next*** to continue.

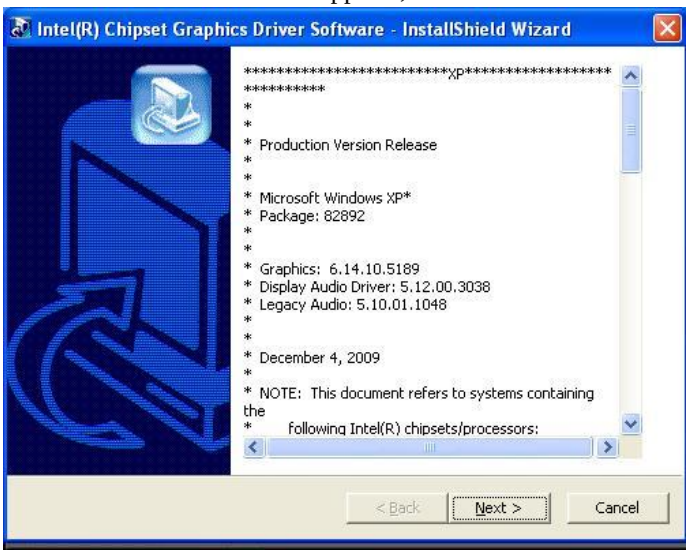
7. The Setup process is now complete. Click ***Finish*** then restart the computer and for changes to take effect.

Intel Graphics Driver Installation

1. Insert the DVD that comes with the board. Click ***Intel -> Intel® Q57 Chipset Family Graphics Driver***.

2. When the InstallShield Wizard screen appears, click ***Next***.

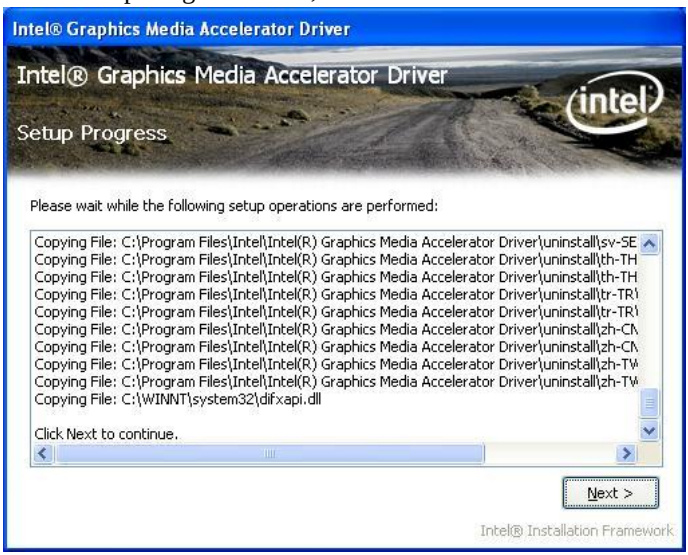
3. When the Welcome screen appears, click ***Next*** to continue.



4. Click ***Yes*** to accept the software license agreement and proceed with the installation process.

5. On Readme File Information screen, click ***Next*** to continue.

6. On Setup Progress screen, click ***Next*** to continue the installation.



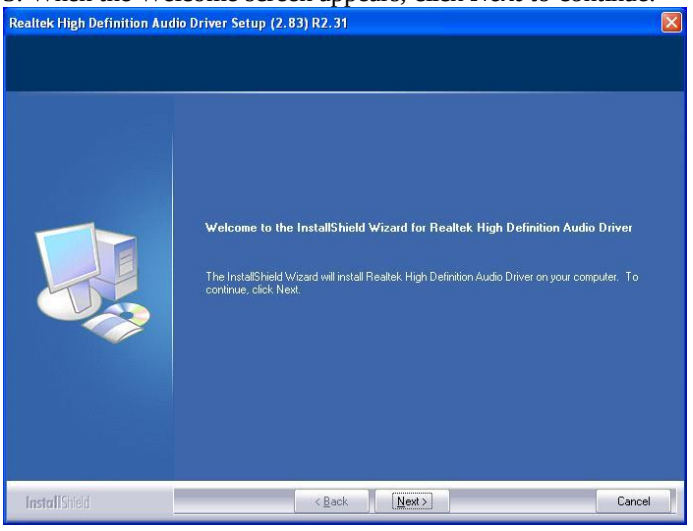
7. The Setup process is now complete. Click ***Finish*** to restart the computer and for changes to take effect.

Realtek HD Codec Audio Driver Installation

1. Insert the DVD that comes with the board. Click ***Intel*** and then ***Realtek High Definition Audio Driver***.

2. Click ***Realtek High Definition Codec Audio Driver***.

3. When the Welcome screen appears, click ***Next*** to continue.



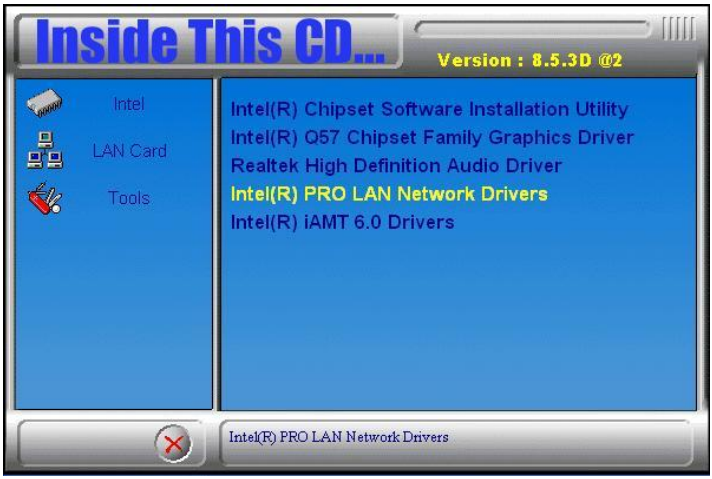
4. The Setup process is now complete. Restart the computer when prompted for changes to take effect.

LAN Drivers Installation

Follow the steps below to start installing the Intel 82578DM or Intel 82583V LAN drivers.

1. Insert the DVD that comes with the board. Click ***Intel*** and then ***Intel(R) PRO LAN Network Drivers***.

2. Click ***Intel(R) PRO LAN Network Drivers.***

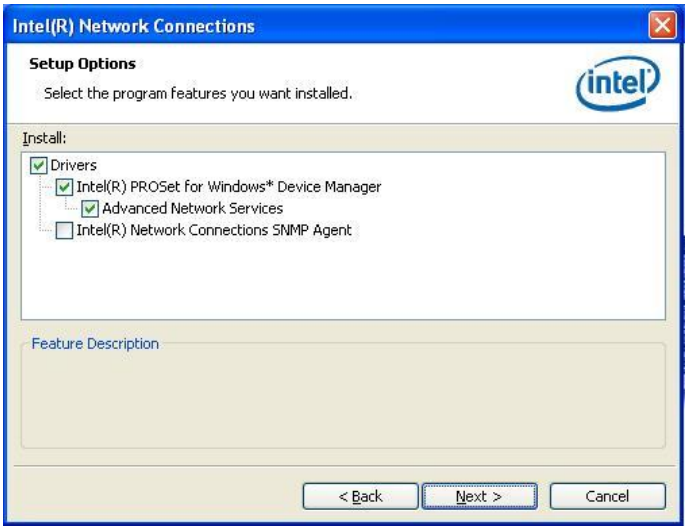


3. On the next screen, click ***Install Drivers*** to start the drivers installation.

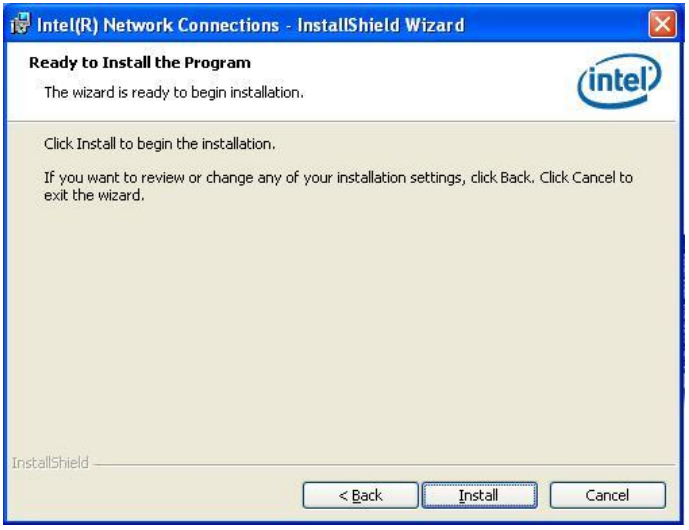
4. When the Welcome screen appears, click ***Next*** to continue.

5. In the License Agreement screen, click ***I accept the terms in license agreement*** and ***Next*** to accept the software license agreement and proceed with the installation process.

6. When the Setup Options appears, click ***Drivers*** as shown below and ***Next*** to continue.



7. When the Ready to Install the Program screen appears, click ***Install*** to continue.



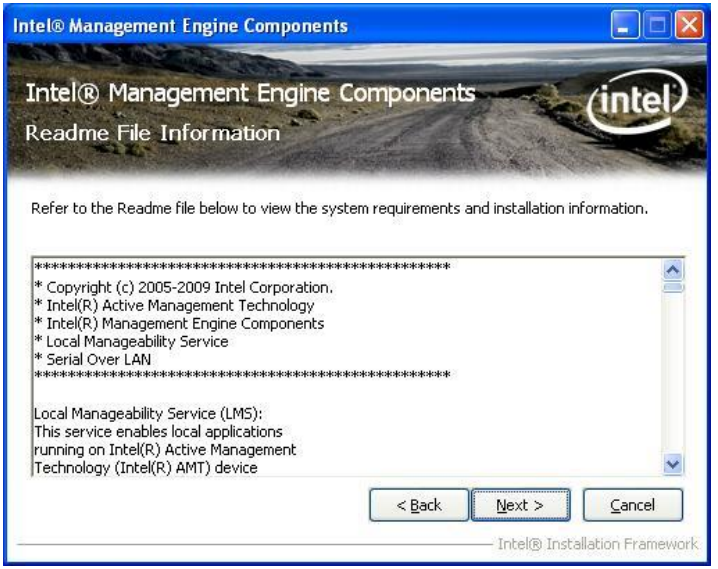
8. The Setup process is now complete (InstallShield Wizard Completed). Click ***Finish*** to restart the computer and for changes to take effect.

Intel® Management Engine Interface

REMARKS: The Intel iAMT 6.0 Drivers can be installed on MB950AF, not MB950F.

1. Insert the drivers disc that comes with the motherboard. Click ***Intel*** and then ***Intel(R) AMT 6.0 Drivers***. When the welcome screen of the Intel® Management Engine Components appears, click ***Next*** to continue. On the next screen, click ***Next*** to agree to the license agreement.

2. On the next screen, the Readme File Information shows the system requirements and installation information, click ***Next***.



3. When the Setup Progress screen appears, click ***Next*** to continue. Then, click ***Finish*** when the setup progress has been successfully installed to restart the computer.

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Appendix

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 07Fh	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
2E8h - 2FFh	Serial Port #4(COM4)
2F8h - 2FFh	Serial Port #2(COM2)
2B0 - 2DF	Graphics adapter Controller
3C0 - 3CF	EGA adapter
3D0 - 3DF	CGA adapter
3E8h – 3EFh	Serial Port #3(COM3)
3F8h - 3FFh	Serial Port #1(COM1)

B. Interrupt Request Lines (IRQ)

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

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

C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

```
//-----------------------------------------------------------------------------
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//-----------------------------------------------------------------------------
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81865.H"
//-----------------------------------------------------------------------------
int main (int argc, char *argv[]);
void EnableWDT(int);
void DisableWDT(void);
//-----------------------------------------------------------------------------
int main (int argc, char *argv[])
{
            unsigned char bBuf;
            unsigned char bTime;
            char **endptr;

            char SIO;

            printf("Fintek 81865 watch dog program\n");

            SIO = Init_F81865();
            if (SIO == 0)
            {
                        printf("Can not detect Fintek 81865, program abort.\n");
                        return(1);
            }//if (SIO == 0)

            if (argc != 2)
            {
                        printf(" Parameter incorrect!!\n");
                        return (1);
            }

            bTime = strtol (argv[1], endptr, 10);
            printf("System will reset after %d seconds\n", bTime);

            if (bTime)
            {           EnableWDT(bTime);   }
            else
            {           DisableWDT();       }

            return 0;
}
//-----------------------------------------------------------------------------
void EnableWDT(int interval)
{
            unsigned char bBuf;

            bBuf = Get_F81865_Reg(0x2B);
            bBuf &= (~0x20);
```

```
            Set_F81865_Reg(0x2B, bBuf);  //Enable WDTO
```

```
            Set_F81865_LD(0x07);         //switch to logic device 7
            Set_F81865_Reg(0x30, 0x01);  //enable timer

            bBuf = Get_F81865_Reg(0xF5);
            bBuf &= (~0x0F);
            bBuf |= 0x52;
            Set_F81865_Reg(0xF5, bBuf);  //count mode is second

            Set_F81865_Reg(0xF6, interval);  //set timer

            bBuf = Get_F81865_Reg(0xFA);
            bBuf |= 0x01;
            Set_F81865_Reg(0xFA, bBuf);    //enable WDTO output

            bBuf = Get_F81865_Reg(0xF5);
            bBuf |= 0x20;
            Set_F81865_Reg(0xF5, bBuf);    //start counting
}
//-----------------------------------------------------------------------------
void DisableWDT(void)
{
            unsigned char bBuf;

            Set_F81865_LD(0x07);         //switch to logic device 7

            bBuf = Get_F81865_Reg(0xFA);
            bBuf &= ~0x01;
            Set_F81865_Reg(0xFA, bBuf);  //disable WDTO output

            bBuf = Get_F81865_Reg(0xF5);
            bBuf &= ~0x20;
            bBuf |= 0x40;
            Set_F81865_Reg(0xF5, bBuf);    //disable WDT
}
//-----------------------------------------------------------------------------




//-----------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----------------------------------------------------------------------------
#include "F81865.H"
#include <dos.h>
//-----------------------------------------------------------------------------
unsigned int F81865_BASE;
void Unlock_F81865 (void);
void Lock_F81865 (void);
//-----------------------------------------------------------------------------
unsigned int Init_F81865(void)
{
            unsigned int result;
            unsigned char ucDid;

            F81865_BASE = 0x4E;
            result = F81865_BASE;

            ucDid = Get_F81865_Reg(0x20);
            if (ucDid == 0x07)                                  //Fintek 81865
            {           goto Init_Finish; }

            F81865_BASE = 0x2E;
            result = F81865_BASE;

            ucDid = Get_F81865_Reg(0x20);
            if (ucDid == 0x07)                                  //Fintek 81865
            {           goto Init_Finish; }

            F81865_BASE = 0x00;
            result = F81865_BASE;
```

```
Init_Finish:
            return (result);
}
//---------------------------------------------------------------------------
void Unlock_F81865 (void)
{
            outportb(F81865_INDEX_PORT, F81865_UNLOCK);
            outportb(F81865_INDEX_PORT, F81865_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_F81865 (void)
{
            outportb(F81865_INDEX_PORT, F81865_LOCK);
}
//---------------------------------------------------------------------------
void Set_F81865_LD( unsigned char LD)
{
            Unlock_F81865();
            outportb(F81865_INDEX_PORT, F81865_REG_LD);
            outportb(F81865_DATA_PORT, LD);
            Lock_F81865();
}
//---------------------------------------------------------------------------
void Set_F81865_Reg( unsigned char REG, unsigned char DATA)
{
            Unlock_F81865();
            outportb(F81865_INDEX_PORT, REG);
            outportb(F81865_DATA_PORT, DATA);
            Lock_F81865();
}
//---------------------------------------------------------------------------
unsigned char Get_F81865_Reg(unsigned char REG)
{
            unsigned char Result;
            Unlock_F81865();
            outportb(F81865_INDEX_PORT, REG);
            Result = inportb(F81865_DATA_PORT);
            Lock_F81865();
            return Result;
}
//---------------------------------------------------------------------------




//---------------------------------------------------------------------------
//
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// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#ifndef __F81865_H
#define __F81865_H                                          1
//---------------------------------------------------------------------------
#define      F81865_INDEX_PORT                    (F81865_BASE)
#define      F81865_DATA_PORT                     (F81865_BASE+1)
//---------------------------------------------------------------------------
#define      F81865_REG_LD                                  0x07
//---------------------------------------------------------------------------
#define F81865_UNLOCK                             0x87
#define      F81865_LOCK                                    0xAA
//---------------------------------------------------------------------------
unsigned int Init_F81865(void);
void Set_F81865_LD( unsigned char);
void Set_F81865_Reg( unsigned char, unsigned char);
unsigned char Get_F81865_Reg( unsigned char);
//---------------------------------------------------------------------------
#endif       //__F81865_H
```