

# MI956

Intel® Sandy Bridge / PCH  
Mini-ITX Motherboard

## USER'S MANUAL

Version 1.0

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# Table of Contents

<b>Introduction .....</b>	<b>1</b>
Product Description.....	1
Checklist.....	2
MI956 Specifications .....	3
Board Dimensions .....	5
<b>Installations .....</b>	<b>6</b>
Installing the CPU .....	7
Installing the Memory .....	8
Setting the Jumpers .....	9
Connectors on MI956.....	13
<b>BIOS Setup.....</b>	<b>22</b>
<b>Drivers Installation .....</b>	<b>51</b>
Intel Chipset Software Installation Utility.....	52
VGA Drivers Installation .....	53
Realtek HD Audio Driver Installation.....	54
LAN Drivers Installation.....	55
Intel® Management Engine Interface .....	57
ASMedia USB 3.0 Drivers.....	59
<b>Appendix .....</b>	<b>60</b>
A. I/O Port Address Map.....	60
B. Interrupt Request Lines (IRQ).....	61
C. Watchdog Timer Configuration.....	62

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# Introduction

## Product Description

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The MI956F Mini ITX motherboard is based on the latest Intel® QM67 chipset. The platform supports 2<sup>nd</sup> generation Intel® Core processor family with rPGA988B packing and features an integrated dual-channel DDR3 memory controller as well as a graphics core.

The latest Intel® processors provide advanced performance in both computing and graphics quality. This meets the requirement of customers in the gaming, POS, digital signage and server market segment.

The Intel® QM67 is made with 32 nanometer technology that supports Intel's first processor architecture to unite the CPU and the graphics core on the transistor level. The MI956F Mini ITX board utilizes the dramatic increase in performance provided by this Intel's latest cutting-edge technology. Measuring 170mm x 170mm, MI956F offers fast 6Gbps SATA support (2 ports), USB3.0 (2 ports) and interfaces for DVI-D, DVI-I, LVDS and HDMI displays. MI956AF features Intel Active Management Technology 7.0.

### MI956F FEATURES:

- Supports Intel® 2nd Generation Core i7/i5/i3 QC/DC mobile processors
- Two DDR3 SoDIMM, 1066/1333MHz, Max. 8GB memory
- Dual Intel® PCI-Express Gigabit LAN
- Integrated Graphics for DVI-I, DVI-D/HDMI/LVDS displays
- 4x SATA 2.0, 2x SATA 3.0, 8x USB 2.0, USB 3.0 (2 ports), 4x COM, Watchdog timer
- 1x PCI-E (x16), 1x Mini PCI-E
- Optional AMT (MI956AF only)

## **Checklist**

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Your MI956 package should include the items listed below.

- The MI956 Mini-ITX motherboard
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Serial ATA cable

## MI956 Specifications

<b>Product Name</b>	<b>MI956AF/MI956F</b>
<b>Form Factor</b>	Mini-ITX
<b>CPU Type</b>	- Intel® 2 <sup>nd</sup> generation Core™ i7/i5/i3 QC/DC mobile processor - rPGA package, 37.5 x 37.5 mm - TDP: QC = 45W~ 55W/ DC = 35W **Sandy Bridge CPU is <b>NOT</b> socket compatible with Arrandale
<b>CPU Speed</b>	Up to 2.7GHz
<b>Cache</b>	Up to 8MB
<b>CPU Socket</b>	rPGA 988B
<b>Chipset</b>	Intel® QM67 PCH; 25 x 27 mm package size
<b>BIOS</b>	AMI BIOS, support ACPI Function
<b>Memory</b>	Intel® 2 <sup>nd</sup> generation Core™ i7/i5/i3 QC/DC mobile processor integrated memory controller DDRIII 1067/1333 MHz - SO-DIMM x 2 (w/o ECC), Max. 8GB
<b>VGA</b>	- Intel® 2 <sup>nd</sup> generation Core™ i7/i5/i3 mobile processor integrated Gfx <ul style="list-style-type: none"> <li>• DVI-I X 1 (thru Level shifter ASM1442)</li> <li>• DVI-D X 1 (thru Level shifter ASM1442)</li> <li>• HDMI X 1 (thru Level shifter ASM1442)</li> <li>• LVDS : DF13 x 2 for supporting dual channel 24-bit</li> </ul>
<b>LAN</b>	1. Intel® Lewisville 82579LM GbE PHY [MI956AF only] or 82579V GbE PHY [MI956F only] 2. Intel® 82583V as 2 <sup>nd</sup> GbE
<b>USB</b>	USB 2.0 host controller, supports 8 ports w/ two EHCI, 7 UHCI controllers Integrated USB 2.0 Rate Matching Hub. - 4 ports in the rear panel - Others reserved for onboard pin header ( 4 ports, 2.54mm pitch) USB 3.0 host controller [ASMedia # ASM1042], support 2 ports - 2 ports in the rear panel
<b>Serial ATA</b>	Intel® QM67 PCH built-in SATA controller, supports total 6 ports 2 x SATA (3.0) 6Gbps+ 4 x SATA (2.0) 3Gbps ports (2 FIS based Port Multiplier)
<b>Audio</b>	Intel® QM67 PCH built-in High Definition Audio controller+ ALC892 w/ 7.1 CH
<b>LPC I/O</b>	Fintek F81865-I (Ver. C) COM1 (RS232/422/485), COM2/COM3/COM4 (RS232), Hardware Monitor (2 thermal inputs, 4 voltage monitor inputs & 2 fan headers) [CPU FAN controllabl, but not the system fan] COM1/2 with pin-9 with power for 2 ports (500 mA for each port)
<b>Digital IO</b>	4 in & 4 out
<b>IAMT(7.0)</b>	Intel® QM67 PCH built-in (MI956AF only) - Intel® Active Management Technology ver. 7.0
<b>Expansion Slots</b>	- PCI-Express (16x) *1 [PEG] - Mini PCI-Express (1x) *1 @ Solder side [Reserved mounting holes for Half-sized also]
<b>Edge Connector:</b>	DVI-D + DVI-I stack connector; Dual DB9 stack connector for COM #1, #2 Dual USB(3.0) dual stack connector; HDMI stack connector Gbit LAN RJ-45 + dual USB(2.0) stack connector x2 RCA Jack 3x1 for HD Audio
<b>Onboard Header/ Connector</b>	2 ports x SATA III [Blue color]; 4 ports x SATA II 2x5 pin-header x2 for 4 ports USB; 2x5 pin-header for front panel audio 2x10 pin-header for COM3 (RS232) & COM4 (RS232) 2x5 pin-header for Digital IO; 4-pin box header for LCD backlight control
<b>Watchdog Timer</b>	Yes (256 segments, 0, 1, 2...255 sec/min)
<b>System Voltage</b>	ATX
<b>Others</b>	LAN Wakeup, EuP/ErP feature (Fintek F75160), UL 60950-1 2 <sup>nd</sup> Edition compatible

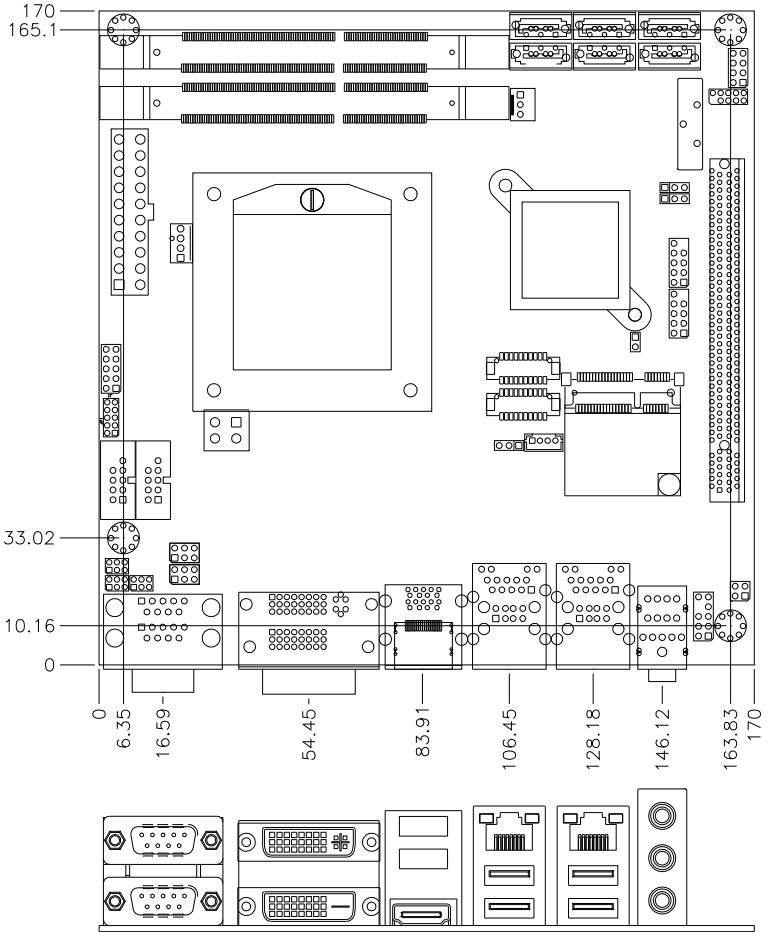
## *INTRODUCTION*

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<b>Board Size</b>	170mm x 170mm
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# Board Dimensions



## Installations

This section provides information on how to use the jumpers and connectors on the MI956 in order to set up a workable system. The topics covered are:

Installing the CPU.....	7
Installing the Memory.....	8
Setting the Jumpers.....	9
Connectors on MI956 .....	13

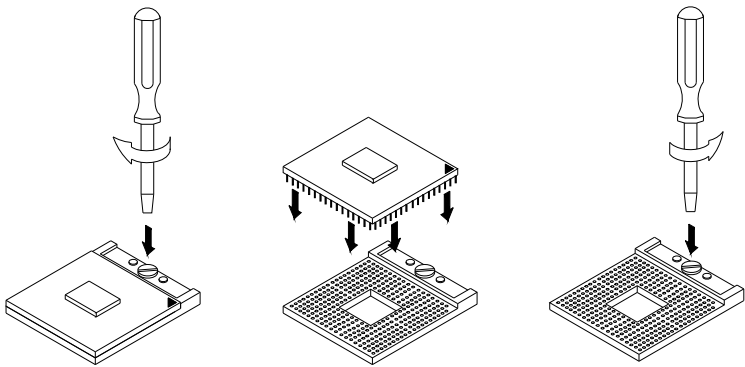
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## Installing the CPU

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The MI956 board supports rPGA988B socket for Intel® Sandy Bridge Dual Core mobile processors.

The processor socket comes with a screw to secure the processor. As shown in the left picture below, loosen the screw first before inserting the processor. Place the processor into the socket by making sure the notch on the corner of the CPU corresponds with the notch on the inside of the socket. Once the processor has slide into the socket, fasten the screw. Refer to the figures below.



**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

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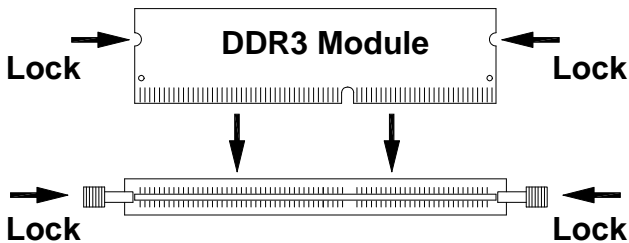
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The MI956 board supports two DDR3 memory socket for a maximum total memory of 8GB in DDR3 SO-DIMM memory type.

### 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

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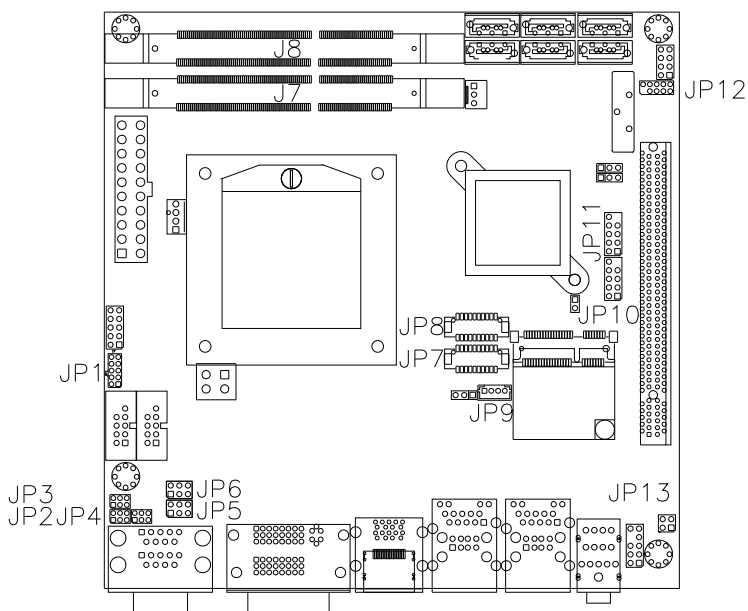


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Jumpers are used on MI956 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on MI956 and their respective functions.

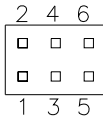
Jumper Locations on MI956.....	10
JP2, JP3, JP4: RS232/RS422/RS485 (COM1) Selection .....	11
JP5: COM1 RS232 RI/+5V/+12V Power Setting .....	11
JP6: COM2 RS232 RI/+5V/+12V Power Setting .....	11
J10: LCD Panel Power Selection.....	12
J14: Flash Descriptor Security Override (Factory use only).....	12
J22: Clear ME Contents.....	12
J23: Clear CMOS Contents .....	12

**Jumper Locations on MI956**



Jumpers on MI956 .....	Page
JP2, JP3, JP4: RS232/RS422/RS485 (COM1) Selection.....	11
JP5: COM1 RS232 RI/+5V/+12V Power Setting.....	11
JP6: COM2 RS232 RI/+5V/+12V Power Setting.....	11
J10: LCD Panel Power Selection.....	12
J14: Flash Descriptor Security Override (Factory use only).....	12
J22: Clear ME Contents.....	12
J23: Clear CMOS Contents.....	12

**JP2, JP3, JP4: RS232/RS422/RS485 (COM1) Selection**



COM1 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP2: 3-5&4-6	JP2: 1-3&2-4	JP2: 1-3&2-4
	JP3: 1-2	JP3: 3-4	JP3: 5-6
	JP4: 3-5 & 4-6	JP4: 1-3 & 2-4	JP4: 1-3 & 2-4



**JP5: COM1 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

**JP6: COM2 RS232 RI/+5V/+12V Power Setting**

JP6	Setting	Function
	Pin 1-2 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-6 Short/Closed	+5V



**J10: LCD Panel Power Selection**

J10	LCD Panel Power
 1 2 3	3.3V
 1 2 3	5V



**J14: Flash Descriptor Security Override (Factory use only)**

J14	Flash Descriptor Security Override
Open	Disabled (Default)
Close	Enabled

**J22: Clear ME Contents**

J22	Setting	Function
 1 2 3	Pin 1-2 Short/Closed	Normal
 1 2 3	Pin 2-3 Short/Closed	Clear ME

**J23: Clear CMOS Contents**

J23	Setting	Function
 1 2 3	Pin 1-2 Short/Closed	Normal
 1 2 3	Pin 2-3 Short/Closed	Clear CMOS



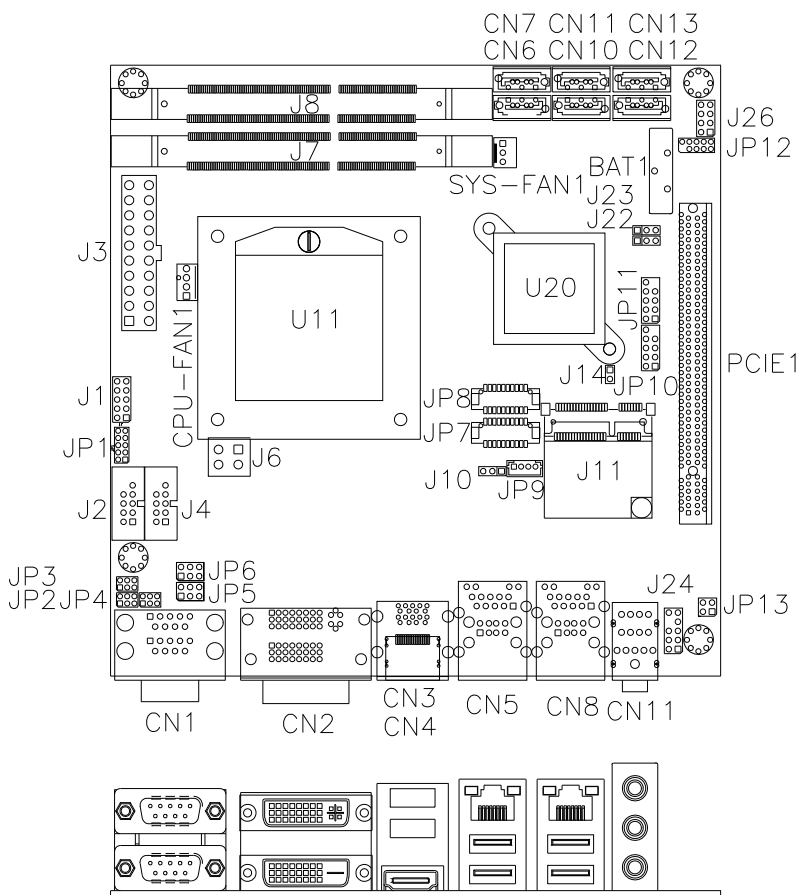
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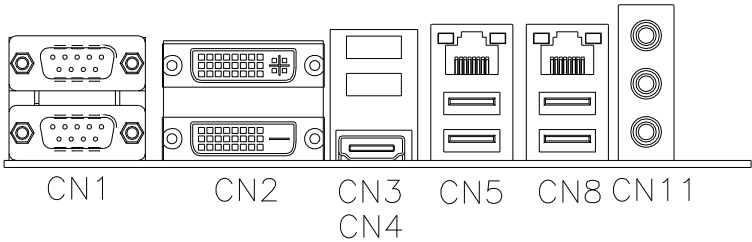
## Connectors on MI956

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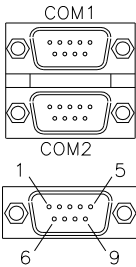
Connector Locations on MI956.....	14
CN1: COM1 and COM2 Serial Ports .....	15
CN2: DVI-D and DVI-I Connector.....	15
CN3: USB3.0 Connector .....	16
CN4: HDMI Connector .....	16
CN5: Gigabit LAN (Intel 82579LM) + USB 2/3 .....	16
CN8: Gigabit LAN (Intel 82583V) + USB 0/1 .....	16
CN11: HD Audio Connector .....	16
J1: Digital I/O .....	17
J3: ATX Power Supply Connector .....	17
J2, J4: COM3, COM4 RS232 Serial Ports .....	17
J6: ATX 12V Power Connector .....	17
JP8, JP7: LVDS Connectors (1st channel, 2nd channel).....	18
JP9: LCD Backlight Connector .....	18
JP10, JP11: USB Connectors .....	18
JP13: SPDIF I/O .....	18
J24: Audio Pin Header for Chassis Front Panel .....	19
J26: Front Panel Connector .....	19
CN6, CN7, CN9, CN10, CN12, CN13: SATA Connectors .....	19
CPU_FAN1: CPU Fan Power Connector.....	19
SYS_FAN1: System Fan1 Power Connector .....	19
JP1: LPC Debug Connector (Factory use only) .....	20
J11: Mini-PCIE Connector .....	20
JP12: SPI Flash Connector (Factory use only).....	20

Connector Locations on MI956



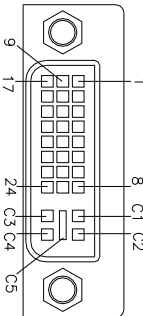


**CN1: COM1 and COM2 Serial Ports**

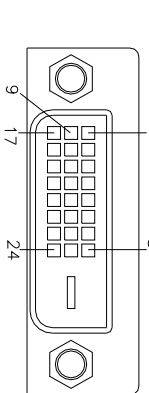
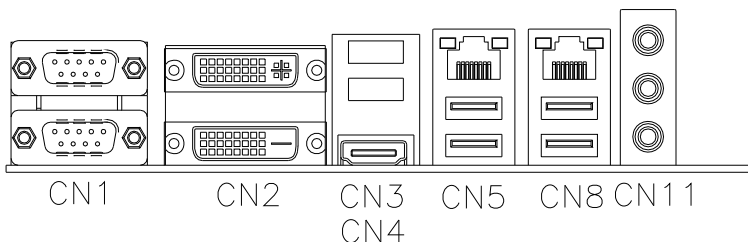


Pin #	Signal Name		
	RS-232	R2-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC

**CN2: DVI-D and DVI-I Connector**



Signal Name	Pin #	Pin #	Signal Name
DATA 2-	1	16	HOT POWER
DATA 2+	2	17	DATA 0-
Shield 2/4	3	18	DATA 0+
DATA 4-	4	19	SHIELD 0/5
DATA 4+	5	20	DATA 5-
DDC CLOCK	6	21	DATA 5+
DDC DATA	7	22	SHIELD CLK
N.C	8	23	CLOCK -
DATA 1-	9	24	CLOCK +
DATA 1+	10	C1	N.C
SHIELD 1/3	11	C2	N.C
DATA 3-	12	C3	N.C
DATA 3+	13	C4	N.C
DDC POWER	14	C5	A GROUND2
A GROUND 1	15	C6	A GROUND3



Signal Name	Pin #	Pin #	Signal Name
DATA 2-	1	16	HOT POWER
DATA 2+	2	17	DATA 0-
Shield 2/4	3	18	DATA 0+
DATA 4-	4	19	SHIELD 0/5
DATA 4+	5	20	DATA 5-
DDC CLOCK	6	21	DATA 5+
DDC DATA	7	22	SHIELD CLK
N.C	8	23	CLOCK -
DATA 1-	9	24	CLOCK +
DATA 1+	10	C1	N.C.
SHIELD 1/3	11	C2	N.C.
DATA 3-	12	C3	N.C.
DATA 3+	13	C4	N.C.
DDC POWER	14	C5	N.C.
A GROUND 1	15	C6	N.C.

**CN3: USB3.0 Connector**

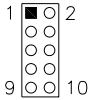
**CN4: HDMI Connector**

**CN5: Gigabit LAN (Intel 82579LM) + USB 2/3**

**CN8: Gigabit LAN (Intel 82583V) + USB 0/1**

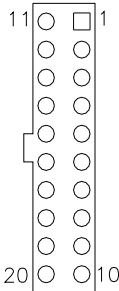
**CN11: HD Audio Connector**

**J1: Digital I/O**



Signal Name	Pin	Pin	Signal Name
GND	1	2	VCC
OUT3	3	4	OUT1
OUT2	5	6	OUT0
IN3	7	8	IN1
IN2	9	10	IN0

**J3: ATX Power Supply Connector**



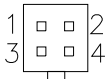
Signal Name	Pin #	Pin #	Signal Name
3.3V	11	1	3.3V
-12V	12	2	3.3V
Ground	13	3	Ground
PS-ON	14	4	+5V
Ground	15	5	Ground
Ground	16	6	+5V
Ground	17	7	Ground
-5V	18	8	Power good
+5V	19	9	5VSB
+5V	20	10	+12V

**J2, J4: COM3, COM4 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

**J6: ATX 12V Power Connector**

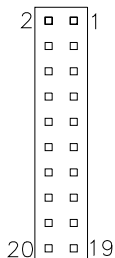
This connector supplies the CPU operating voltage.



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

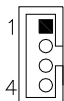
**JP8, JP7: LVDS Connectors (1st channel, 2nd channel)**

The LVDS connectors on board consist of the first channel (LVDS1) and second channel (LVDS2).



Signal Name	Pin #	Pin #	Signal Name
TX0-	2	1	TX0+
Ground	4	3	Ground
TX1-	6	5	TX1+
5V/3.3V	8	7	Ground
TX3-	10	9	TX3+
TX2-	12	11	TX2+
Ground	14	13	Ground
TXC-	16	15	TXC+
5V/3.3V	18	17	ENABKL
+12V	20	19	+12V

**JP9: LCD Backlight Connector**

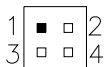


Pin #	Signal Name
1	+12V
2	Backlight Enable
3	Brightness Control
4	Ground

**JP10, JP11: USB Connectors**

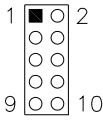
Signal Name	Pin	Pin	Signal Name
VCC	1	2	Vcc
D0-	3	4	D1-
D0+	5	6	D1+
GND	7	8	GND
KEY	9	10	NC

**JP13: SPDIF I/O**



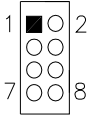
Pin #	Signal Name
1	SPDIF IN
2	Ground
3	SPDIF OUT
4	Ground

**J24: Audio Pin Header for Chassis Front Panel**



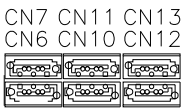
Signal Name	Pin	Pin	Signal Name
MIC IN_L	1	2	Ground
MIC IN_R	3	4	DET
LINE_R	5	6	Ground
Sense	7	8	KEY
LINE_L	9	10	Ground

**J26: Front Panel Connector**



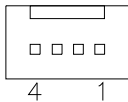
Signal Name	Pin #	Pin #	Signal Name
Power BTN	1	2	Power BTN
HDD LED+	3	4	HDD LED-
Reset BTN	5	6	Reset BTN
Power LED+	7	8	Power LED-

**CN6, CN7, CN9, CN10, CN12, CN13: SATA Connectors**



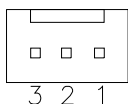
Pin #	Signal Name
1	Ground
2	TX+
3	TX-
4	Ground
5	RX-
6	RX+
7	Ground

**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	NC

**JP1: LPC Debug Connector (Factory use only)**

**J11: Mini-PCIE Connector**

**JP12: SPI Flash Connector (Factory use only)**



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# 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.....	23
BIOS Setup .....	23
Main BIOS Setup .....	24
Advanced Settings .....	25
Chipset Settings.....	40
Boot Settings.....	47
Security Settings .....	48
Save & Exit Settings.....	49

## 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 provides 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> or <F2> 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 record some basic hardware configurations in your computer system and set the system clock.

Aptio Setup Utility – Copyright © 2010 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
<b>BIOS INFORMATION</b>					
System Language		[English]			
System Date		[Tue 01/06/2009]			→ ← Select Screen
System Time		[00:08:21]			↑ ↓ Select Item
Access Level		Administrator			Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

**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.*

### System Language

Choose the system default language.

### System Date

Set the Date. Use Tab to switch between Data elements.

### System Time

Set the Time. Use Tab to switch between Data elements.

## Advanced Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
	Legacy OpROM Support				
	Launch PXE OpROM		[Disabled]		
	Launch Storage OpROM		[Enabled]		
	▶ PCI Subsystem Settings				
	▶ ACPI Settings				
	▶ Wake up event setting				
	▶ CPU Configuration				
	▶ EuP/ErP Power Saving Controller				
	▶ SATA Configuration				
	▶ Intel TXT(LT) Configuration				
	▶ PCH-FW Configuration				
	▶ AMT Configuration				
	▶ USB Configuration				
	▶ Super IO Configuration				
	▶ H/W Monitor				
	▶ Serial Port Console Redirection				
	▶ Sandybridge DTS Configuration				
	▶ Sandybridge PPM Configuration				
					→ ← Select Screen
					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save & EXIT
					ESC: Exit

**REMARKS: The Intel AMT Configuration is available only on MI956AF, not MI956F.**

### Launch PXE OpROM

Enable or Disable Boot Option for Legacy Network Devices.

### Launch Storage OpROM

Enable or Disable Boot Option for Legacy Mass Storage Devices with Option ROM.

## PCI Subsystem Settings

This section allows you to configure the PCI, PCI-X and PCI Express settings.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
<b>PCI Bus Driver Version</b>			V 2.03.00		
PCI ROM Priority			EFI Compatible ROM		
<b>PCI Common Settings</b>					
PCI Latency Timer			32 PCI Bus Clocks		
VGA Palette Snoop			Disabled		
PERR# Generation			Disabled		
SERR# Generation			Disabled		
<b>PCI Express Device Settings</b>					
Relaxed Ordering			Disabled		→ ← Select Screen
Extended Tag			Disabled		↑ ↓ Select Item
No Snoop			Enabled		Enter: Select
Maximum Payload			Auto		+ - Change Field
Maximum Read Request			Auto		F1: General Help
<b>PCI Express Link Settings</b>					
ASPM Support			Disabled		F2: Previous Values
<b>WARNING: Enabling ASPM may cause some PCI-E devices to fail</b>					F3: Optimized Default
Extended Synch			Disabled		F4: Save & Exit
					ESC: Exit

### PCI ROM Priority

In case of multiple Option ROMs (Legacy and EFI Compatible), specifies what PCI Option ROM to launch.

### PCI Latency Timer

Value to be programmed into PCI Latency Timer Register.

### VGA Palette Snoop

Enables or Disables VGA Palette Registers Snooping.

### PERR# Generation

Enables or Disables PCI Device to Generate PERR#.

### SERR# Generation

Enables or Disables PCI Device to Generate SERR#.

### Relaxed Ordering

Enables or Disables PCI Express Device Relaxed Ordering.

**Extended Tag**

If ENABLED allows Device to use 8-bit Tag field as a requester.

**No Snoop**

Enables or Disables PCI Express Device No Snoop option.

**Maximum Payload**

Set Maximum Payload of PCI Express Device or allow System BIOS to select the value.

**Maximum Read Request**

Set Maximum Read Request Size of PCI Express Device or allow System BIOS to select the value.

**ASPM Support**

Set the ASPM Level: Force L0- Force all links to L0 Stage:

AUTO – BIOS auto configure:

DISABLE- Disables ASPM.

**Extended Synch**

If ENABLED allows generation of Extended Synchronization patterns.

## ACPI Settings

System ACPI Parameters.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
	Enable ACPI Auto Configuration		Disabled		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit
	Enable Hibernation		Enabled		
	ACPI Sleep State		S3 (Suspend to R...)		
	Lock Legacy Resources		Disabled		

### Enable ACPI Auto Configuration

Enables or Disables BIOS ACPI Auto Configuration.

### Enable Hibernation

Enables or Disables System ability to Hibernate (OS/S4 Sleep State).

This option may be not effective with some OS.

### ACPI Sleep State

Select the highest ACPI sleep state the system will enter, when the SUSPEND button is pressed.

### Lock Legacy Resources

Enables or Disables System Lock of Legacy Resources.



## Wake up event settings

Enable/Disable Wake up event.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
	Wake system with Fixed Time		Disabled		
	Wake on Ring		Disabled		
	Wake on PCIE Wake Event		Disabled		
					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit

### Wake system with Fixed Time

Enables or Disables System wake on alarm event. When enabled, System will wake on the hr::min:: sec specified.

### Wake on Ring

The options are Disabled and Enabled.

### Wake on PCIE Wake Event

The options are Disabled and Enabled.

## CPU Configuration

This section shows the CPU configuration parameters.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
CPU Configuration					
Intel® Core™ i7-7210QE CPU @ 2.10GHz					
EMT64			Supported		
Max Processor Speed			2100 MHz		
Min Processor Speed			800 MHz		
Processor Speed			2100 MHz		
Processor Stepping			206a7		
Microcode Revision			D		
Processor Cores			4		
Intel HT Technology			Supported		
Hyper-threading			Enabled		→ ← Select Screen
Active Processor Cores			All		↑ ↓ Select Item
Limit CPUID Maximum			Disabled		Enter: Select
Execute Disable Bit			Enabled		+ - Change Field
Hardware Prefetcher			Enabled		F1: General Help
Adjacent Cache Line Prefetch			Enabled		F2: Previous Values
Intel Virtualization Technology			Disabled		F3: Optimized Default
Local x2APIC			Disabled		F4: Save & Exit
					ESC: Exit

### Hyper-threading

Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled, only one thread per enabled core is enabled.

### Active Processor Cores

Number of cores to enable in each processor package.

### Limit CPUID Maximum

Disabled for Windows XP.

### Execute Disable Bit

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)

### Hardware Prefetcher

To turn on/off the MLC streamer prefetcher.

## Adjacent Cache Line Prefetch

To turn on/off prefetching of adjacent cache lines.

## Intel Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology

## Local x2APIC

Enable Local x2APIC. Some OSES do not support this.

## EuP/ErP Power Saving Controller

Saving the power consumption on power off.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
					[Enable] Provide the Standby Power for devices. [Disable] Shutdown the standby power.
	Standby Power on S5		All Enable		

## SATA Configuration

SATA Device Options Settings

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
	<b>SATA Controller(s)</b>		<b>Enabled</b>		Enable or disable SATA Device.
	SATA Mode Selection		IDE		
	Serial ATA Port 0		Empty		
	Software Preserve		Unknown		
	Serial ATA Port 1		Empty		→ ← Select Screen
	Software Preserve		Unknown		↑ ↓ Select Item
	Serial ATA Port 2		Empty		Enter: Select
	Software Preserve		Unknown		+ - Change Field
	Serial ATA Port 3		Empty		F1: General Help
	Software Preserve		Unknown		F2: Previous Values
	Serial ATA Port 4		Empty		F3: Optimized Default
	Software Preserve		Unknown		F4: Save & Exit
	Serial ATA Port 5		Empty		ESC: Exit
	Software Preserve		Unknown		

## SATA Mode

Determines how SATA controllers(s) operate. The options are IDE, AHCI and RAID.

## PCH-FW Configuration

Configure Management Engine Technology Parameters.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
					Configure Management Engine Technology Parameters.
			0.0.0.0		
			Full Sku Firmware		
			Unidentified		
					→ ← Select Screen
					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

## AMT Configuration

Configure Active Management Technology Parameters.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
			Enabled		
			Enabled		
			Disabled		
			Disabled		
			Enabled		
			Disabled		
			Disabled		
			Disabled		
			Enabled		→ ← Select Screen
			0		↑ ↓ Select Item
			Enabled		Enter: Select
			0		+ - Change Field
			Enabled		F1: General Help
			Disabled		F2: Previous Values
			Enabled		F3: Optimized Default
			Disabled		F4: Save
			0		ESC: Exit
			Disabled		
			0		
			0		

### Intel AMT

Enable/Disable Intel® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.

**Intel AMT Setup Prompt**

OEMFLag Bit 0:

Enable/Disable Intel AMT Setup Prompt to wait for hot-key to enter setup.

**BIOS Hotkey Pressed**

OEMFLag Bit 1:

Enable/Disable BIOS hotkey press.

**MeBx Selection Screen**

OEMFLag Bit 2:

Enable/Disable MEBx selection screen.

**Verbose Mebx Output**

OEMFLag Bit 3:

Enable/Disable Verbose Mebx Output.

**Hide Un-Configure ME Confirmation**

OEMFLag Bit 6:

Hide Un-Configure ME without password Confirmation Prompt.

**MeBx Debug Message Output**

OEMFLag Bit 14:

Enable MEBx debug message output.

**Un-Configure ME**

OEMFLag Bit 15:

Un-Configure ME without password.

**Intel AMT Password Write Enabled**

Enable/Disable Intel AMT Password Write. Password is writeable when set Enable.

**Amt Wait Timer**

Set timer to wait before sending ASF\_GET\_BOOT\_OPTIONS.

**ASF**

Enable/Disable Alert Specification Format.

**Activate Remote Assistance Process**

Trigger CIRA boot.

## USB Configure

Enable/Disable USB Configure function.

## PET Progress

User can Enable/Disable PET Events progress to received PET events or not.

## Intel Amt SPI Protected

Enable/Disable Intel AMT SPI write protect.

## WatchDorg

Enable/Disable Intel AMT SPI write protect.

## ASF

Enable/Disable WatchDorg Timer.

## USB Configuration

USB Configuration Parameters.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
USB Configuration					
USB Devices: 1 Keyboard, 2 Hubs					
Legacy USB Support			Enabled		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
USB3.0 Support			Enabled		
XHCI Hand-off			Enabled		
EHCI Hand-off			Enabled		
USB hardware delays and time-outs:					
USB transfer time-out			20 sec		
Device reset time-out			20 sec		
Device power-up delay			Auto		

## Legacy USB Support

Enables Legacy USB support.

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

DISABLE option will keep USB devices available only for EFI applications.

## USB3.0 Support

Enable/Disable USB3.0 (XHCI) Controller support.

**XHCI Hand-off**

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

**EHCI Hand-off**

This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.

**USB transfer time-out**

The time-out value for Control, Bulk, and Interrupt transfers.

**Device reset time-out**

USB mass storage device Start Unit command time-out.

**Device power-up delay**

Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for aHub port the delay is taken from Hub Descriptor.

## Super IO Configuration

System Super IO Chip Parameters.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Super IO Configuration					
Super IO Chip		Fintek F81865		→ ← Select Screen	
-> Serial Port 0 Configuration				↑ ↓ Select Item	
-> Serial Port 1 Configuration				Enter: Select	
-> Serial Port 2 Configuration				+- Change Field	
-> Serial Port 3 Configuration				F1: General Help	
Power Failure		Always off		F2: Previous Values	
ACPI Shutdown Temperature		Disabled		F3: Optimized Default	
				F4: Save & Exit	
				ESC: Exit	

## Serial Port Configuration

Set Parameters of Serial Ports. User can Enable/Disable the serial port and Select an optimal settings for the Super IO Device.

### Power Failure

Options are:

Keep last state

Always on

Always off (default)

### ACPI Shutdown Temperature

The default setting is Disabled.



## H/W Monitor

Monitor hardware status.

### Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
PC Health Status					
CPU			+45 C		
System Temperature			+47 C		
CPU FAN Speed			5976 RPM		
VCC3V			+3.408 V		
Vcore			+1.104 V		→ ← Select Screen
+5V			+5.087 V		↑ ↓ Select Item
+12V			+12.232 V		Enter: Select
+1.5V			+1.600 V		+ - Change Field
VSB3V			+3.384 V		F1: General Help
VBAT			+3.296 V		F2: Previous Values
Fan1 Smart Fan Control			Disabled		F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

## Temperatures/Voltages

These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

## Fan1 Smart Fan Control

This field enables (50C/60C/70C) or disables the smart fan feature. At a certain temperature, the fan starts turning. Once the temperature drops to a certain level, it stops turning again.

## Serial Port Console Redirection

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit	
COM0 (Disabled)		Console Redirection			Port is Disabled	
COM4(PCI Dev0, Func0) (Disabled)		Console Redirection			Port is Disabled	
Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS)		Console Redirection			Enabled	→ ← Select Screen
Out-of-Band Mgmt Port		Data Bits			8	↑ ↓ Select Item
Parity		Stop Bits			1	Enter: Select
Terminal Type		Terminal Type			VT-UTF8	+ - Change Field
					F1: General Help	
					F2: Previous Values	
					F3: Optimized Default	
					F4: Save & Exit	
					ESC: Exit	

### Console Redirection

Console Redirection Enable/Disable.

### Out-of-Band Mgmt Port

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.

### Terminal Type

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100.

## Sandybridge DTS Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit	
Sadybridge DTS Configuration						→ ← Select Screen
CPU DTS					Enabled	↑ ↓ Select Item
					Enter: Select	
					+ - Change Field	
					F1: General Help	
					F2: Previous Values	
					F3: Optimized Default	
					F4: Save & Exit	
					ESC: Exit	

## CPU DTS

Disabled: ACPI thermal management uses EC reported temperature values.

Enabled: ACPI thermal management uses DTS SMM mechanism to obtain CPU temperature values.

Out of Spec: ACPI Thermal Management uses EC reported temperature values and TS SMM is used to handle Out of Spec.

## Sandybridge PPM Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Sadybridge PPM Configuration					
EIST			Enabled		
Turbo Mode			Enabled		→ ← Select Screen
CPU C3 Report			Enabled		↑ ↓ Select Item
CPU C6 Report			Enabled		Enter: Select
CPU C7 Report			Enabled		+ - Change Field
F1: General Help					
F2: Previous Values					
F3: Optimized Default					
F4: Save & Exit					
ESC: Exit					

### EIST

Enable/Disble Intel SpeedStep.

### Turbo Mode

Turbo Mode.

### CPU C3 Report

Enable/Disable CPU C3(ACPI C2) report to OS.

### CPU C6 Report

Enable/Disable CPU C6(ACPI C3) report to OS.

### CPU C7 Report

Enable/Disable CPU C7(ACPI C3) report to OS.

## Chipset Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
<ul style="list-style-type: none"> <li>▶ System Agent (SA) Configuration</li> <li>▶ PCH-IO Configuration</li> </ul>					

## System Agent (SA) Configuration

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
System Agent RC Version			1.1.0.0		
VT-d Capability			Supported		
VT-d			Enabled		
CHAP Device (B0:D7:F0)			Disabled		→ ← Select Screen
Thermal Device (B0:D4:F0)			Disabled		↑ ↓ Select Item
Enable NB CRID			Disabled		Enter: Select
<ul style="list-style-type: none"> <li>▶ Intel IGFX Configuration</li> <li>▶ DMI Configuration</li> <li>▶ NB PCIe Configuration</li> <li>▶ Memory Configuration</li> <li>▶ GT – Power Management Control</li> </ul>					+- Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

### VT-d

Check to enable VT-d function on MCH.

### Enable NB CRID

Enable or disable NB CRID WorkAround.

## Intel IGFX Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Intel IGFX Configuration					
IGFX VBIOS Version			2102		
IGFX Frequency			650 MHz		
Primary Display			Auto		→ ← Select Screen
Internal Graphics			Auto		↑ ↓ Select Item
GTT Size			2MB		Enter: Select
Aperture Size			256MB		+ - Change Field
DVMT Pre-Allocated			64M		F1: General Help
DVMT Total Gfx Mem			256M		F2: Previous Values
Gfx Low Power Mode			Disabled		F3: Optimized Default
▶ LCD Control					F4: Save & Exit
					ESC: Exit

### Primary Display

Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.

### Internal Graphics

Keep IGD enabled based on the setup options.

### GTT Size

Select the GTT Size: 1MB, 2MB.

### Aperture Size

Select the Aperture Size: 128MB, 256MB, 512MB.

### DVMT Pre-Allocated

Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device: 0M~512M.

### DVMT Total Gfx Mem

Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device: 128M, 256M, MAX.

### Gfx Low Power Mode

This option is applicable for SFF only.

**LCD Control**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
LCD Control					
Primary IGFX Boot Display			VBIOS Default		
Active LFP			No LVDS		
Panel Color Depth			18 Bit		
LCD Panel Type			1024x768 LVDS		
SDVO-LFP Panel Type			VBIOS Default		
Panel Scaling			Auto		
Spread Spectrum clock Chip			Off		
TV1 Standard			VBIOS Default		
TV2 Standard			VBIOS Default		
ALS Support			Enabled		
					→ ← Select Screen
					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

**Primary IGFX Boot Display**

Select the Video Device which will be activated during PoST. This has no effect if external graphics present.

Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.

**Active LFP**

Select the Active LFP Configuration.

No LVDS: VBIOS does not enable LVDS.

Int-LVDS: VBIOS enables LVDS driver by Integrated encoder.

SDVO LVDS: VBIOS enables LVDS driver by SDVO encoder.

eDP Port-A: LFP Driven by Int-DisplayPort encoder from Port-A.

**Panel Color Depth**

Select the LFP Panel Color Depth: 18 Bit, 24 Bit.

**LCD Panel Type**

Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item: 640x480 LVDS ~ 2048x1536 LVDS.

**SDVO-LFP Panel Type**

Select SDVO panel used by Internal Graphics Device by selecting the appropriate setup item: VBIOS Default, 1024x768 ~ 1600x1200.

**Panel Scaling**

Select the LCD panel scaling option used by the Internal Graphics Device: Auto, Off, Force Scaling.

### Spread Spectrum clock Chip

Hardware: Spread is controlled by chip;

Software: Spread is controlled by BIOS.

### TV1 Standard

Select the ability to configure a TV Format.

### TV2 Standard

Select the ability to configure a TV Minor Format.

### ALS Support

Valid only for ACPI.

Legacy = ALS Support though the IGD INT 10 function.

ACI = ALS support through an ACPI ALS driver.

### DMI Configuration

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
DMI Configuration					
DMI			X4 Gen2		
DMI Vc1 Control			Enabled		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit
DMI Vcp Control			Enabled		
DMI Vcm Control			Enabled		
DMI Link ASPM Control			L0sL1		
DMI Extended Synch Control			Disabled		
DMI Gen 2			Enabled		

### NB PCIe Configuration

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
NB PCIe Configuration					
PEG0			Not Present		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit
PEG0 – Gen X			Auto		
PEG0			Not Present		
PEG0 – Gen X			Auto		
PEG0			Not Present		
PEG0 – Gen X			Auto		
PEG0			Not Present		
PEG0 – Gen X			Auto		
Always Enable PEG			Disabled		

## Memory Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Memory Information					
Memory RC Version		1.1.0.0			
Memory Frequency		1333 Mhz			
Total Memory		4096 MB (DDR3)			
DIMM#0		4096 MB (DDR3)			
DIMM#1		Not Present			
DIMM#2		Not Present			
DIMM#3		Not Present			
CAS Latency (tCL)		9			
Minimum delay time					
CAS to RAS (tRCDmin)		9			
Row Precharge (tRPmin)		9			
Active to Precharge (tRASmin)		24			
DIMM profile		Default DIMM profile			→ ← Select Screen
Memory Frequency		Auto			↑ ↓ Select Item
Max TOLUD		Dynamic			Enter: Select
Nmode Support		Auto			+ - Change Field
Memory Scrambler		Disabled			F1: General Help
RMT Crosser Support		Disabled			F2: Previous Values
MRC Fast Boot		Disabled			F3: Optimized Default
DIMM Exit Mode		Auto			F4: Save & Exit
					ESC: Exit

## GT – Power Mangement Control

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
GT – Power Management Control					
GT Info		GT2 (0x116)			→ ← Select Screen
RC6 (Render Standby)		Enabled			↑ ↓ Select Item
GT OverClocking Support		Disabled			Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
					ESC: Exit



## PCI-IO Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
		Intel PCH RC Version	1.1.0.0		
		PCH LAN Controller	Enabled		
		Wake on Lan Enabled	Disabled		
		Azalia	Auto		
		Azalia Docking Support Enable	Disabled		
		Azalia PME Enable	Disabled		
		Azalia Internal HDMI Codec	Enabled		
		Display logic	Enabled		
		CLKRUN# logic	Enabled		
		Enable SB CRID	Disabled		
		High Precision Event Timer Configuration			→ ← Select Screen
		High Precision Timer	Enabled		↑ ↓ Select Item
		SLP_S4 Assertion Width	4-5 Seconds		Enter: Select
		Set NAND Management Override	Enabled		+ - Change Field
		▶ USB Configuration			F1: General Help
		▶ PCI Express Configuration			F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

### Azalia

Control Detectin of the Azalia device.

Disabled = Azalia will be unconditionally disabled.

Enabled = Azalia will be unconditionally enabled. Auto = Azalia will be enabled if present, disabled otherwise.

### Set NAND Management Override

Option to Override NAND Management to allow driver or 3<sup>rd</sup> parties software to configure the NAND module after POST.

## USB Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
		EHCI1	Enabled		
		EHCI2	Enabled		
		USB Ports Per-Port Disable Control	Disabled		

### EHCI1

Control the USB EHCI (USB2.0) functions.

One EHCI controller must always be enabled.

## PCI Express Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
		PCI Express Clock Gating	Enabled		
		DMI Link ASPM Control	L0sL1		
		DMI Link Extended Synch Control	Disabled		
		Subtractive Decode	Disabled		
		▶ PCI Express Root Port1			
		▶ PCI Express Root Port2			
		▶ PCI Express Root Port3			
		▶ PCI Express Root Port4			
		▶ PCI Express Root Port5			
		PCI Port 6 is assigned to LAN			
		▶ PCI Express Root Port7			
		▶ PCI Express Root Port8			
		Low MMIO Align	64M		
		Initiate Graphic Adapter	PEG/IGD		
		Graphics Turbo IMON Current	31		
		VT-d	Disabled		
		PCI Express Port	Auto		
		IGD Memory	32M		
		PAVP Mode	Disabled		
		PEG Force Gen1	Disabled		
					→ ← Select Screen
					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

### DMI Click ASPM Control

The control of Active State Power Management on both NB side and SB side of the DMI Link.

### DMI Link Extended Synch Control

The control of Extended Synch on SB side of the DMI Link.

## Boot Settings

This section allows you to configure the boot settings according to your preference.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Boot Configuration					
Setup Prompt Timeout			1		
Bootup NumLock State			On		
Quiet Boot			Disabled		→ ← Select Screen
CM16 Module Version			07.63		↑ ↓ Select Item
GateA20			Upon Request		Enter: Select
Option ROM Messages			Force BIOS		+ - Change Field
Interrupt 19 Capture			Disabled		F1: General Help
Boot Option Priorities					F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

### Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

### GateA20 Active

UPON REQUEST – GA20 can be disabled using BIOS services.

ALWAYS – do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

### Option ROM Messages

Set display mode for Option ROM. Options are Force BIOS and Keep Current.

### Interrupt 19 Capture

Enable: Allows Option ROMs to trap Int 19.

### Boot Option Priorities

Sets the system boot order.

## Security Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Password Description					
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.					
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights					
Administrator Password					
User Password					
Set User Password					
Set Master Password					
		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit			

### Administrator Password

Set Setup Administrator Password.

### User Password

Set User Password.

## Save & Exit Settings

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset  Save Options Save Changes Discard Changes  Restore Defaults Save as User Defaults Restore User Defaults  Boot Override  Launch EFI Shell from filesystem device					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit

### Save Changes and Exit

Exit system setup after saving the changes.

### Discard Changes and Exit

Exit system setup without saving any changes.

### Save Changes and Reset

Reset the system after saving the changes.

### Discard Changes and Reset

Reset system setup without saving any changes.

### Save Changes

Save Changes done so far to any of the setup options.

### Discard Changes

Discard Changes done so far to any of the setup options.

### Restore Defaults

Restore/Load Defaults values for all the setup options.

**Save as User Defaults**

Save the changes done so far as User Defaults.

**Restore User Defaults**

Restore the User Defaults to all the setup options.

**Boot Override**

Pressing ENTER causes the system to enter the OS.

**Launch EFI Shell from filesystem device**

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

---

## Drivers Installation

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

Intel Chipset Software Installation Utility .....	52
VGA Drivers Installation .....	53
Realtek HD Audio Driver Installation .....	54
LAN Drivers Installation .....	55
Intel® Management Engine Interface .....	57
ASMedia USB 3.0 Drivers .....	59

### **IMPORTANT NOTE:**

After installing your Windows operating system, 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.

1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.



2. Click **Intel(R) Chipset Software Installation Utility**.



3. When the Welcome screen to the Intel® Chipset Device Software appears, click **Next** to continue.

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

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

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



## VGA Drivers Installation

**NOTE:** Before installing the *Intel(R) QM67 Chipset Family Graphics Driver*, the Microsoft .NET Framework 3.5 SPI should be first installed.

To install the VGA drivers, follow the steps below.

1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.
2. Click **Intel(R) QM67 Chipset Family Graphics Driver**.



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



4. Click **Yes** to agree with the license agreement and continue the installation.
5. On the Readme File Information screen, click **Next** to continue the installation of the Intel@ Graphics Media Accelerator Driver.
6. On Setup Progress screen, click **Next** to continue.
7. Setup complete. Click **Finish** to restart the computer and for changes to take effect.

## Realtek HD Audio Driver Installation

Follow the steps below to install the Realtek HD Audio Drivers.

1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.

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



3. On the Welcome to the InstallShield Wizard screen, click **Yes** to proceed with and complete the installation process.

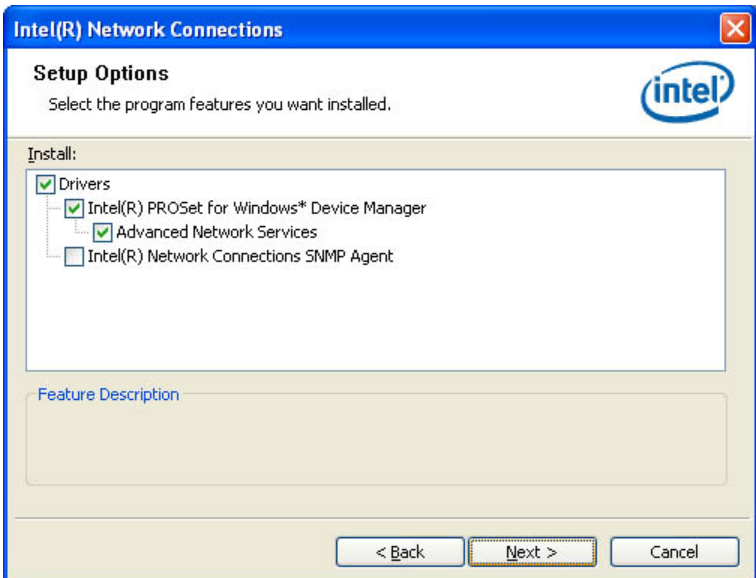


## LAN Drivers Installation

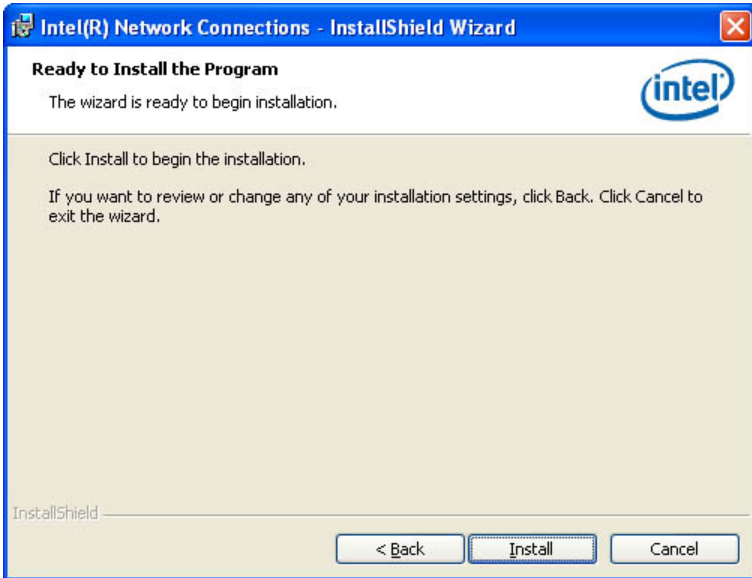
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.
2. Click **Intel(R) PRO LAN Network Driver**.



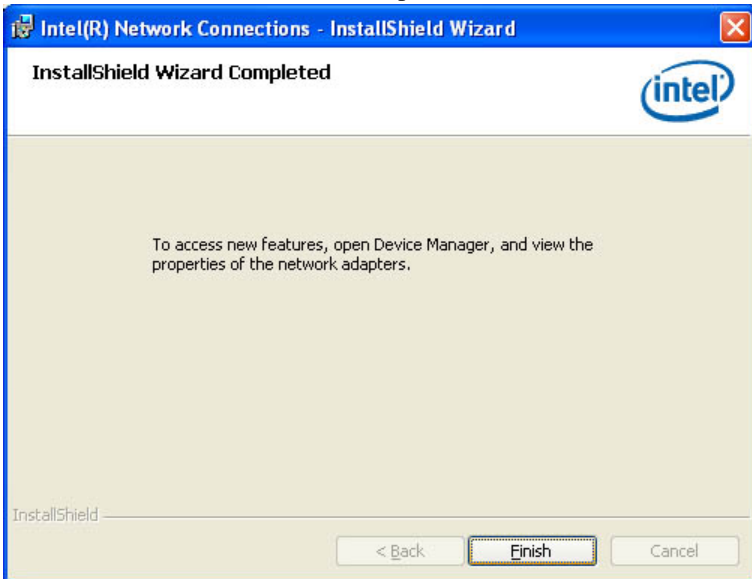
3. When the Welcome screen appears, click **Next**. On the next screen, click **Yes** to agree with the license agreement.
4. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.



5. The wizard is ready to begin installation. Click **Install** to begin the installation.



6. When InstallShield Wizard is complete, click **Finish**.



## Intel® Management Engine Interface

**REMARKS: The Intel iAMT 7.0 Drivers can be installed on MI956AF, not MI956F.**



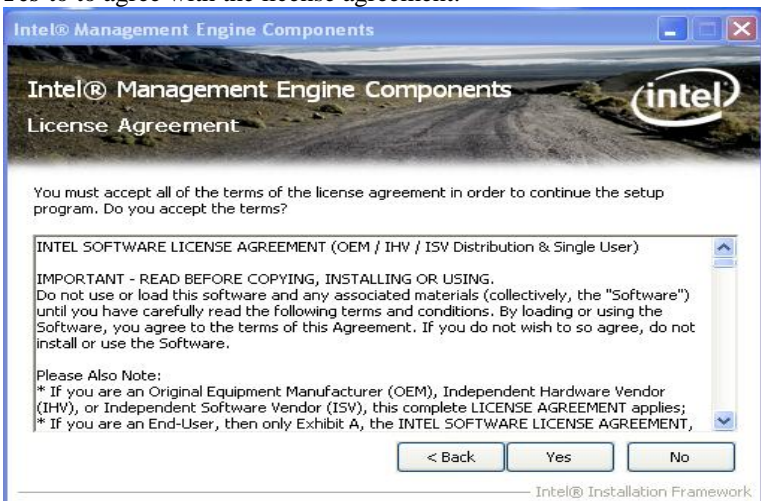
The following application requires Microsoft .NET Framework 3.5 or later: Intel® Management Engine Components. Please install the latest version of Microsoft .NET Framework from Microsoft Download Center to run this application correctly.

Follow the steps below to install the Intel Management Engine.

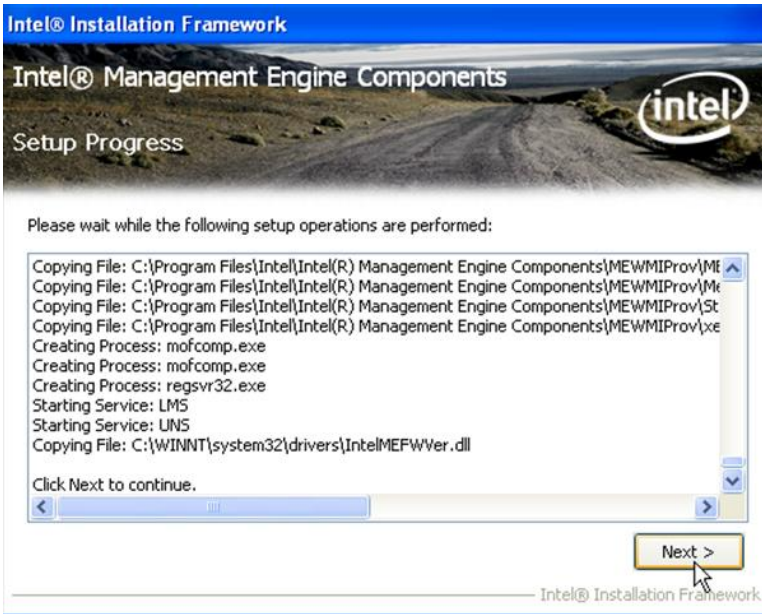
1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) AMT 7.0 Drivers*.



2. When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click *Next*. On the next screen, click *Yes* to agree with the license agreement.



2. When the Setup Progress screen appears, click **Next**. Then, click **Finish** when the setup progress has been successfully installed.



## ASMedia USB 3.0 Drivers

1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.
2. Click **Intel(R) PRO LAN Network Driver**.



2. When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click **Next**.



3. When InstallShield Wizard is complete, click **Finish**.



# 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
278h - 27Fh	Parallel Port #2(LPT2)
2E8h - 2EFh	Serial Port #4(COM4)
2F8h - 2FFh	Serial Port #2(COM2)
2B0h - 2DFh	Graphics adapter Controller
360h - 36Fh	Network Ports
3B0h - 3BFh	Monochrome & Printer adapter
3C0h - 3CFh	EGA adapter
3D0h - 3DFh	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
IRQ4	Serial Port #1
IRQ5	Reserved
IRQ6	Reserved
IRQ7	Reserved
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Serial Port #3
IRQ11	Serial Port #4
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; //count mode is second
    Set_F81865_Reg(0xF5, bBuf);

    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
}
//-----

```

## APPENDIX

```
//-----  
//  
// 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;
    }
//-----

//-----
//
// 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.
//
//-----
#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

```