ASTUT-152-RE1S

Industrial Panel PC

User's Manual

Version 1.0
(Sep. 2017)

iBASE

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Disclaimer

Trademarks

Compliance

$C\epsilon$

In a domestic environment, this product may cause radio interference in which case users may be required to take adequate measures.

FC

This product has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.
Operation is subject to the following two conditions:

• This product may not cause harmful interference
• This product must accept any interference received including interference that may cause undesired operation.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception which can be determined by turning the equipment off and on, you may correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and the receiver.
• Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
• Consult the distributor or an experienced radio/TV technician for help.

WEEE

This product must not be disposed of as normal household waste, in accordance with the EU directive of for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

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Green IBASE

This product is compliant with the current RoHS restrictions and prohibits use of the following substances in concentrations exceeding 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr6+)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

Important Safety Information

Carefully read the precautions before using the device.

Environmental conditions:

- Lay the device horizontally on a stable and solid surface during installation in case the device may fall, causing serious damage.
- Leave plenty of space around the device for ventilation.
- Use this product in environments with ambient temperatures between 0˚C and 50˚C.
- DO NOT LEAVE THIS DEVICE IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY BE BELOW -20° C OR ABOVE 60° C. To prevent from damages, the device must be used in a controlled environment.
- Keep the device away from humidity to avoid fog or condensation from accumulating on the inner surface of the panel.

Care for your IBASE products:

- Before cleaning the device, turn it off and unplug all cables such as power in case a small amount of electrical current may still flow.
- Use neutral cleaning agents or diluted alcohol to clean the device chassis with a cloth. Then wipe the chassis with a dry cloth.
- Vacuum the dust with a computer vacuum cleaner to prevent the air vent or slots from being clogged.

 WARNING

Attention during use:

- Operate with fingers on the panel. Sharp-pointed articles are prohibited.
- Do not use this product near water.
- Do not spill water or any other liquids on your device.
- Do not place heavy objects on the top of the device.
- Operate this device from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your distributor or local power company.
- Do not walk on the power cord or allow anything to rest on it.
- If you use an extension cord, make sure that the total ampere rating of the product plugged into the extension cord does not exceed its limits.

Avoid Disassembly

You are not suggested to disassemble, repair or make any modification to the device. Disassembly, modification, or any attempt at repair could generate hazards and cause damage to the device, even bodily injury or property damage, and will void any warranty.

Warranty Policy

- **IBASE standard products:**

  24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

  12-month (1-year) warranty from delivery for the 3rd-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adapter, panel and touchscreen.

* PRODUCTS, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

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Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information of your product and elaborate upon the problem.

   - Product model name
   - Product serial number
   - Detailed description of the problem
   - The error messages in text or in screenshots if there is any
   - The arrangement of the peripherals
   - Software in use (such as OS and application software, including the version numbers)

3. If repair service is required, you can download the RMA form at http://www.ibase.com.tw/english/Supports/RMAService/. Fill out the form and contact your distributor or sales representative.

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Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Specifications
- Overview
- Dimensions

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1.1 Introduction

ASTUT-152-RE1S is a 15" all-in-one Panel PC with Riser Card Expansion carrying the level of IP65 waterproof ingress protection.

12.1" industrial projected touch panel PC that is railway compliant. With Intel® Atom™ E3845 Quad-Core based processor, the device carries the level of IP65 ingress protection for the panel to provide good quality of water-tight. The readability is especially enhanced for operating on rolling shock on the railway. It is able to be operated at the ambient operating temperature ranging from -25 to 55 °C, and even from -30 to 70 °C for storage.

1.2 Features

- Intel® Core™ i5-4402E Quad-Core processor at 1.6 GHz
- One PCIe 16x expansion slot
- Wide-range 12V ~ 24V DC power input
- IP65 waterproof front panel protection
- Resistive touchscreen

1.3 Packing List

Your ASTUT-152-RE1S package should include the items listed below. If any of the items below is missing, contact the distributor or the dealer from whom you purchased the product.

- ASTUT-152-RE1S   x 1
- Mounting Clamp   x 10
- Disk   x 1
  (including chipset drivers and flash memory utility)

1.4 Optional Accessories

IBASE provides optional accessories as follows. Please contact us or your dealer if you need any.

- Power Adapter (84W, 12V)
- Power Cord (10A, 125V)

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1.5   Specifications

Product Name	ASTUT-152-RE1S
System	
Motherboard	MI980VF
Operating System	• Windows 7 Pro for Embedded • Windows Embedded Standard 7
CPU	Intel® Core™ i5-4402E Quad-Core (1.6 GHz)
Chipset	Intel® QM87
Memory	2 x DDR3 1600 SO-DIMM 8 GB, expandable up to 16 GB (1 x 4 GB by default)
Super I/O	Fintek F81866AD-I
LVDS	Dual channel 24-bit
Audio Codec	Realtek ALC662, two-way audio
Membrane Control	1 x Membrane Control Keypad (Power, Brightness+, Brightness-, Volume+, Volume-, Power LED, HDD LED)
Power Supply	12 ~ 24V DC-in
BIOS	AMI BIOS
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min
iSMART	iSMART 2.0 (auto-scheduler / power resume)
Chassis	Black SGCC front bezel and black steel back cover with aluminum heat-sink
Mounting	VESA 75 x 75 mm (100 x 100 mm)
Dimensions (W x H x D)	410 x 310 x 84 mm (16.14” x 12.2” x 3.3”)
Net Weight	7.9 kg (17.4 lb)
Ingress Protection	IP65 for front panel with panel mount
Certificate	CE, FCC Class B
sPanel	
Display Type	15” TFT-LCD
Touch Type	Resistive touch
Point of Touch	1
Resolution	Max. 1024 x 768
Color	Max. 16.2 M

View Angle (H/V)	160° / 160°
Light Transmission	80 %
Luminance	500 cd/m2
Contrast	800:1
Backlight Lifetime	50000 hrs
Interface	USB
I/O Ports	
Power	• 1 x 3-pin DC power connector • 1 x Power switch
LAN	2 x Gigabit Ethernet (RJ45)
USB	• 4 x USB 3.0 • 2 x USB 2.0
Serial	**2 x COM ports:** • COM1 RS-232/422/485 • COM2 RS-232 only
Storage	1 x 2.5" drive bay for SATA II HDD (320 GB)
SATA	2 x SATA II connector
Display	• 1 x DVI-I • 1 x DVI-D • 1 x Display Port
Audio	Audio jacks for Microphone input, Line-Out, Line-In
Expansion	• 2 x Mini PCIe (x1) slot (half/full-sized, J15 connector with USB 2.0 only, J14 connector with USB 2.0 & mSATA) • 1 x Mini PCIe (x16)
Environment	
Temperature	• **Operating:** 0 ~ 50 °C (32 ~ 122 °F) • **Storage:** --20 ~ 60 °C (-4 ~ 140 °F)
Relative Humidity	10 ~ 90% (non-condensing)

All specifications are subject to change without prior notice.

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1.6   Overview

Oblique View

I/O View
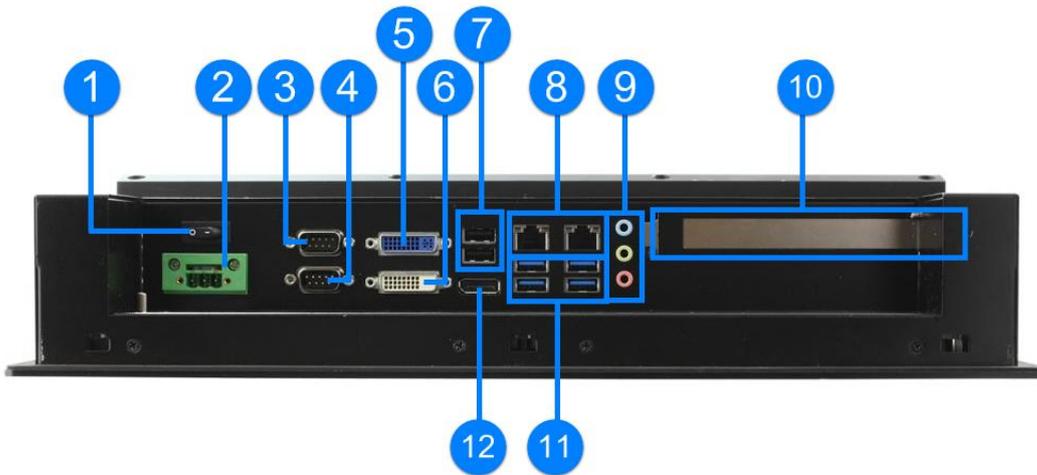
No.	Name	No.	Name
1	Power Switch	7	USB 2.0 Port
2	DC Power Connector	8	GbE LAN Port
3	COM1 RS-232/422/485 Port	9	Audio Jacks (From top to bottom: Line-Out, Line-In, Mic-In)
4	COM2 RS-232 Port	10	2.5" Drive bay
5	DVI-I Port	11	USB 3.0 Port
6	DVI-D Port	12	Display Port

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1.7   Dimensions

Unit: mm
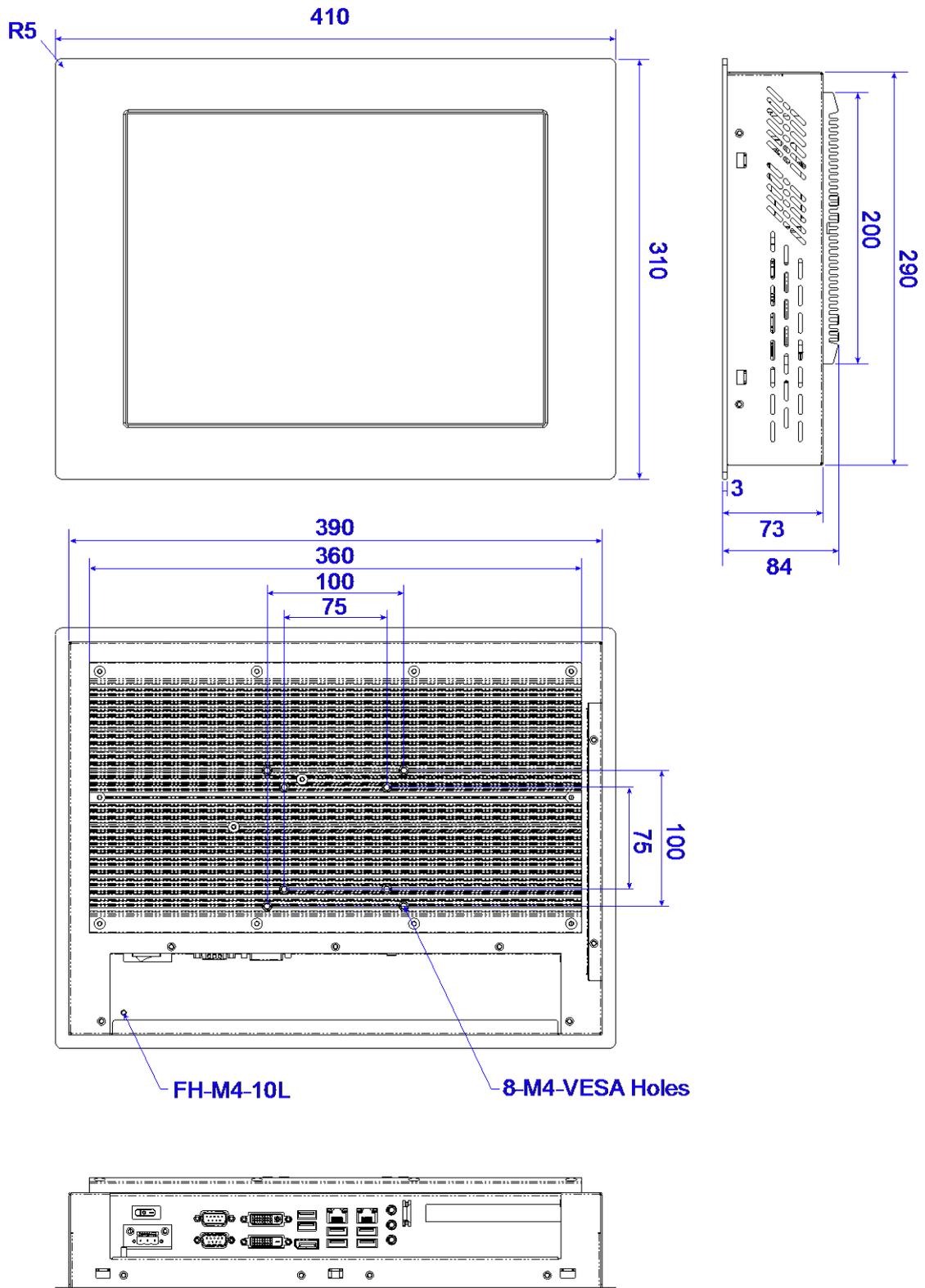
Chapter 2
Hardware Installation & Motherboard Information

The information provided in this chapter includes:

- Memory installation and membrane keypad extension
- Information and locations of connectors

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2.1 Hardware Installation

Avoid Disassembly: You are not suggested to disassemble, repair or make any modification to the device. Disassembly, modification, or any attempt at repair could generate hazards and cause damage to the device, even bodily injury or property damage, and will void any warranty. If you need to make any change to the device, be sure to have qualified engineers or technicians for disassembly or installation.

2.1.1 Memory Installation

There are two SO-DIMM DDR3L memory slots inside ASTUT-152-RE1S and the maximum memory supported is 8 GB.

The ASTUT-152-RE1S supports two SO- DIMM DDR3L memory slots for a maximum total memory of 8GB. To install the modules, locate the memory slot on the board and perform the following steps:
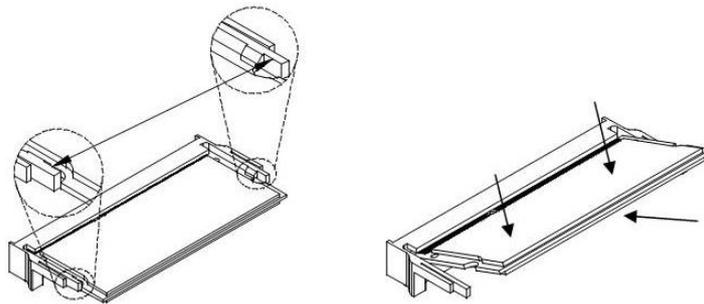
1. Align the key of the memory module with that on the memory slot and insertl the module slantwise.

2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

To remove the module, press the clips outwards with both hands.

2.1.2   Pinout for COM1, COM2, & Power Input

- **Power Input (3-pin terminal block)**
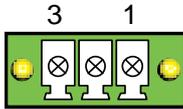
Pin	Assignment	Pin	Assignment
1	12 ~ 24V	3	DC_IN
2	Frame Ground		

- **COM1 RS232/422/485 Port**

COM 1 is jumperless for RS-232/422/485 selection and configurable in BIOS.

Pin	Assignment	Pin	Assignment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

Pin	Assignment		
	RS-232	**RS-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

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- **COM2 RS-232 Port**

Pin	Assignment	Pin	Assignment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

2.2 Setting the Jumpers

Set up and configure your ASTUT-152-RE1S by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.
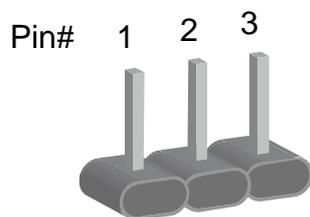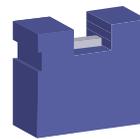
A 3-pin jumper   **A jumper cap**

Refer to the illustration below to set jumpers.

Pin closed	Oblique view	Schematic illustration in the manual
Open		
1-2		
2-3		
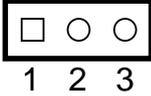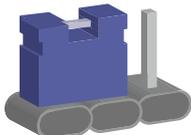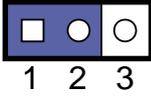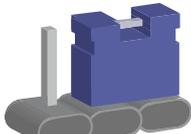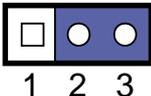
When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

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2.3 Jumper & Connector Locations on Motherboard

Motherboard: MI980VF
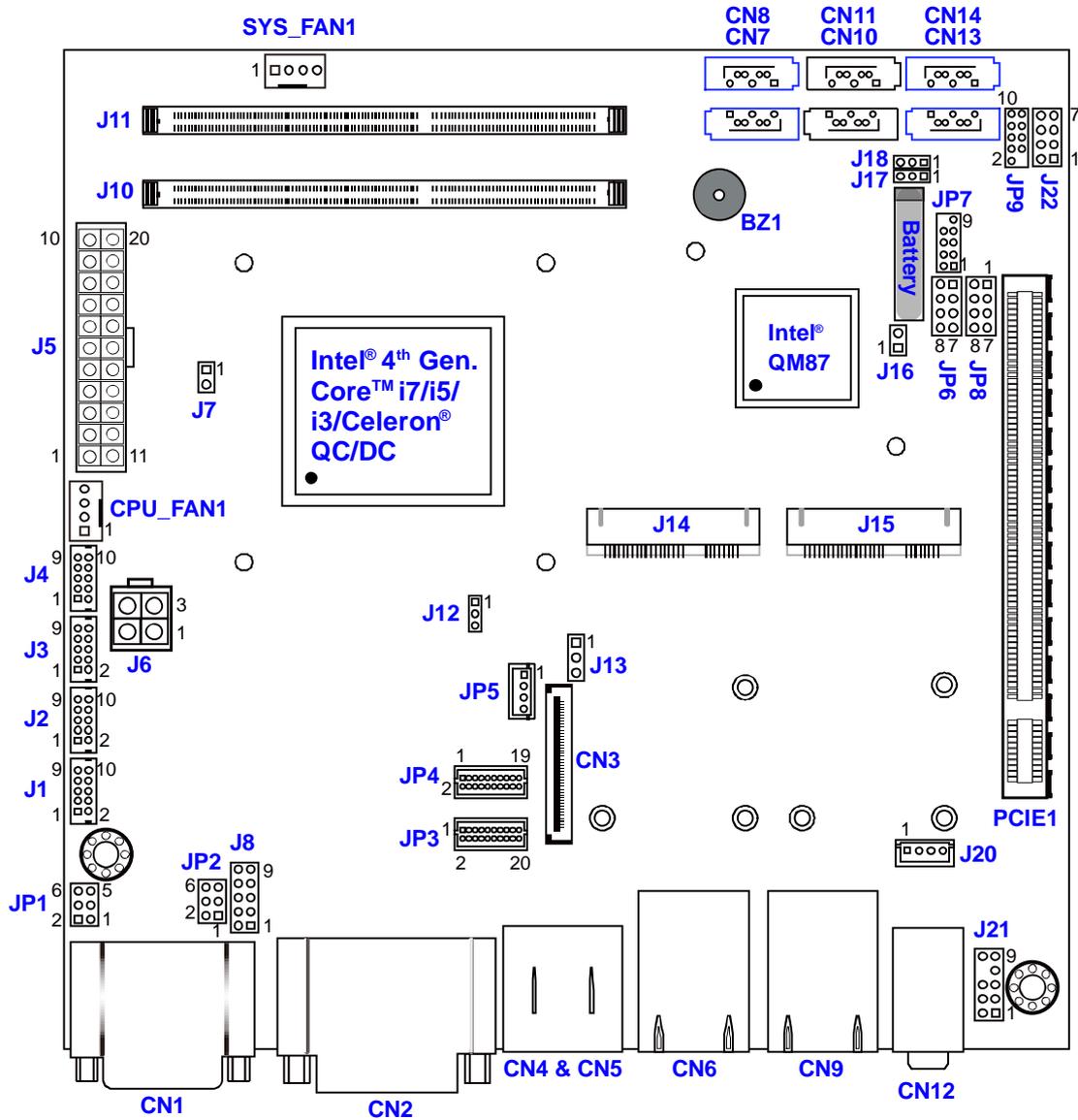
MI980VF - top

2.4   Jumpers Quick Reference

Function	Connector Name	Page
COM2 RS-232 Power Selection	JP1	16
COM1 RS-232/422/485 Power Selection	JP2	17
LCD Panel Power Selection	J13	18
CMOS Data Clearance	J17	19
ME Register Clearance	J18	20
LVDS / eDP Connector Selection	J12	21
PCIe1 Configuration	J7	22
Factory User Only	J16	--

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2.4.1 COM2 RS-232 Power Selection (JP1)
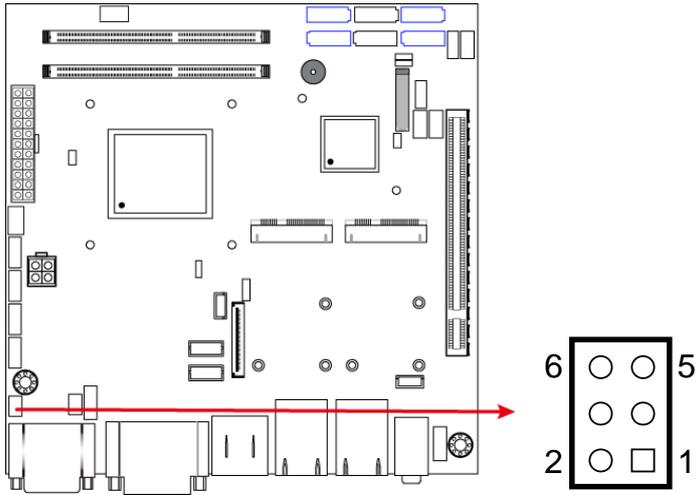
Function	Pin closed	Illustration
12V	1-3	
RI (default)	3-4	
5V	3-5	

2.4.2 COM1 RS-232/422/485 Power Selection (JP2)

Function	Pin closed	Illustration
12V	1-3	
RI (default)	3-4	
5V	3-5	

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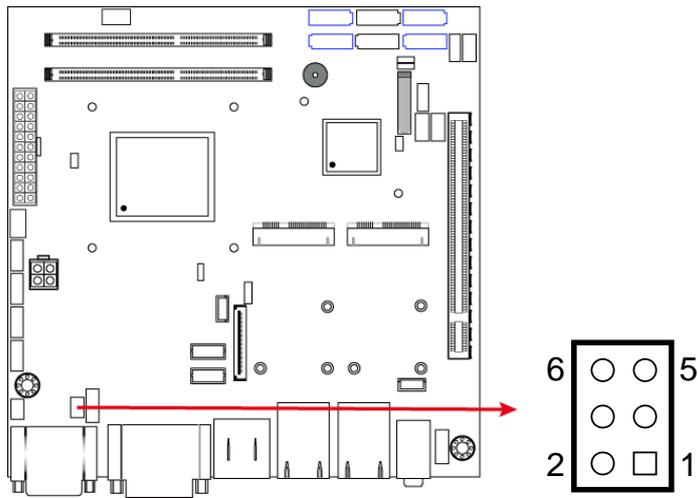
2.4.3 LCD Panel Power Selection (J13)
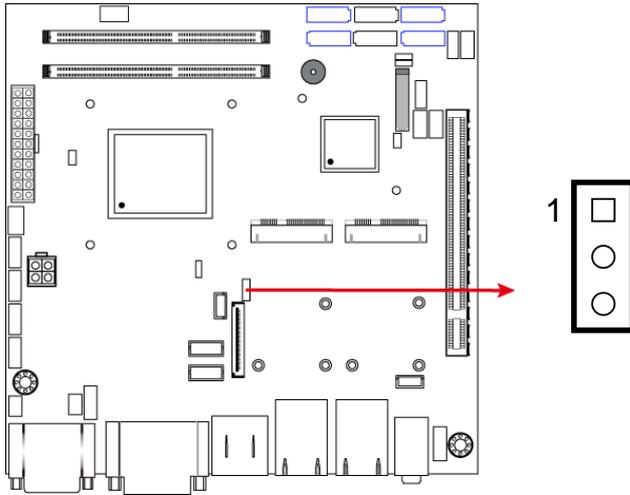
Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

2.4.4   CMOS Data Clearance   (J17)
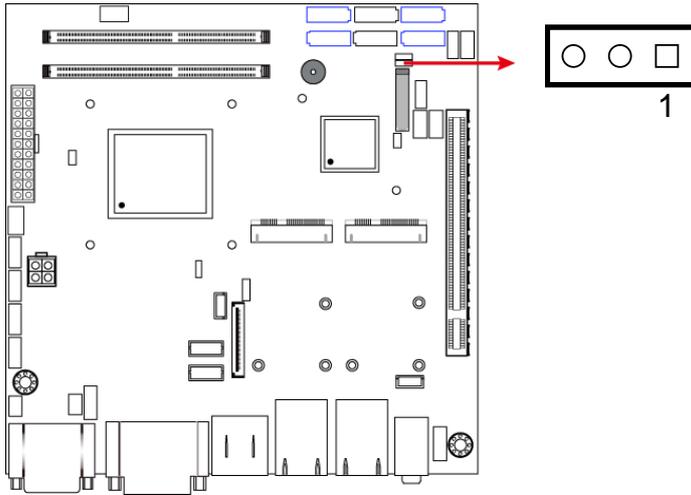
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear CMOS	2-3	

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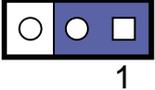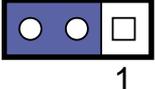
2.4.5 ME Register Clearance (J18)
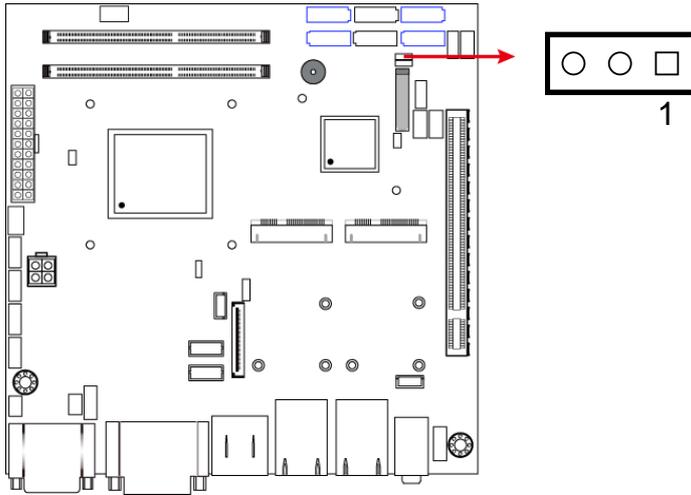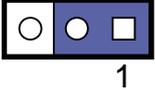
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear ME Register	2-3	
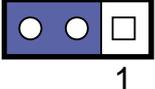
2.4.6 LVDS / eDP Connector Selection   (J12)
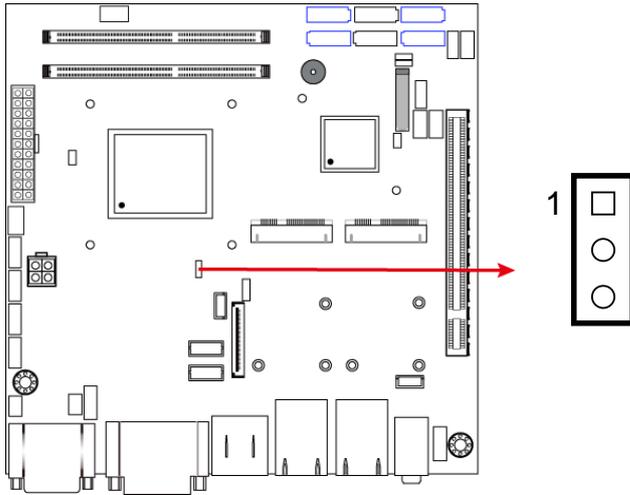
Function	Pin closed	Illustration
eDP Connector	1-2	
LVDS (default)	2-3	

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2.4.7 PCIe1 Configuration (J7)
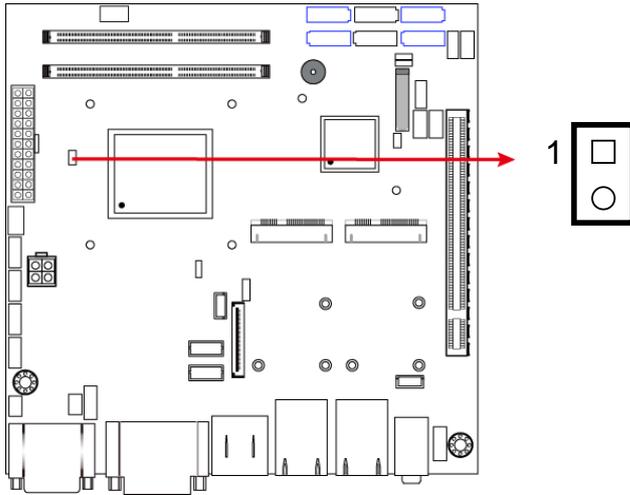
Function	Pin closed	Illustration
PCIe (x16) (default)	Open	1 □ ○
2 x PCIe (x8)	Close	1 ■ ●
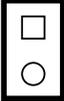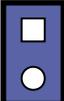
2.5 Connectors Quick Reference

Function	Connector Name	Page
COM Ports	CN1	24
DVI-I & DVI-D Ports	CN2	25
eDP Connector	CN3	26
Display Port & USB 2.0 Ports	CN4 & CN5	27
LAN (GbE) & USB 3.0 Ports	CN6, CN9	27
SATA III Connector	CN7, CN8, CN13, CN14	27
SATA II Connector	CN10, CN11	28
HD Audio Connector	CN12	28
LVDS Connector	JP3, JP4	29
LCD Backlight Connector	JP5	30
USB 2.0 Connector	JP6, JP8	30
COM Connector	J1, J2, J3, J4	31
ATX Power Connector	J5	32
ATX 12V Power Connector	J6	33
DDR3 SO-DIMM Socket	J10, J11	34
Audio Connector for Front Panel	J21	34
Front Panel Settings	J22	35
CPU Fan Power Connector	CPU_FAN1	35
System Fan Power Connector	SYS_FAN1	36
Mini PCIe / mSATA Connector (shared with CN7)	J14	36
Mini PCIe Connector	J15	37
Factory Use Only	JP7, JP9	--

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2.5.1   COM Ports   (CN1)
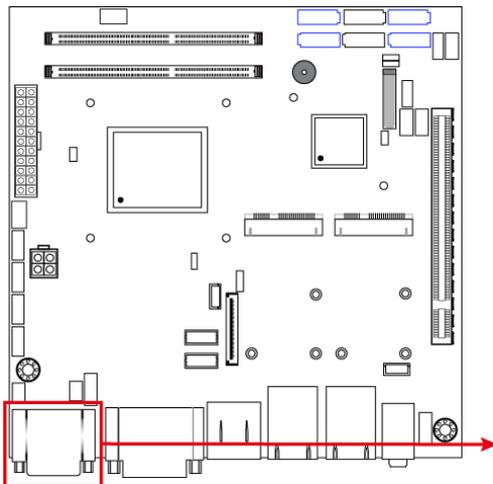
COM1: RS-232/422/485
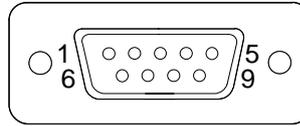
COM2: RS-232 only

COM 1 is jumperless for RS-232/422/485 selection and configurable in BIOS.

Pin	Assignment	Pin	Assignment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

Pin	Assignment		
	RS-232	**RS-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

COM2 is RS-232 only.

Pin	Assignment	Pin	Assignment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

2.5.2 DVI-I & DVI-D Ports (CN2)
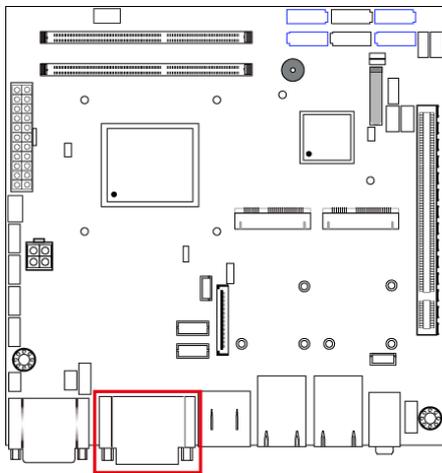
2.5.3   eDP Connector   (CN3)
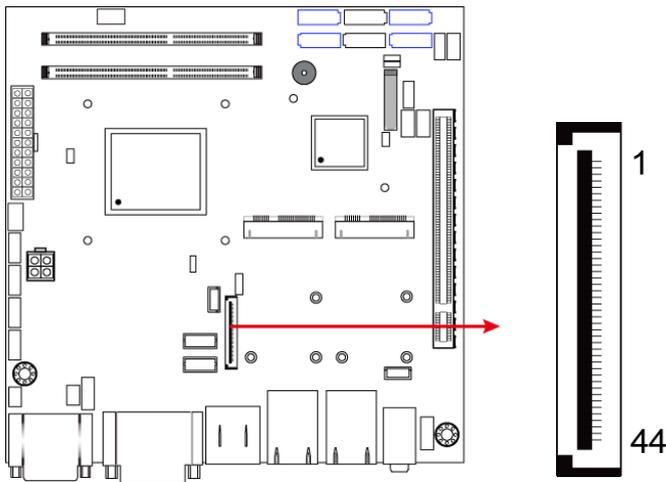
Pin	Assigment	Pin	Assigment
1	3.3V	23	TXN0
2	3.3V	24	TXP0
3	3.3V	25	GND
4	3.3V	26	AUXP
5	3.3V	27	AUXN
6	GND	28	NC
7	GND	29	VCC3
8	GND	30	NC
9	GND	31	VCC12
10	HPD	32	NC
11	NC	33	GND
12	NC	34	VCC5
13	GND	35	NC
14	NC	36	Brightness
15	NC	37	BKLT_EN
16	GND	38	VCC12
17	NC	39	VCC3
18	NC	40	GND
19	GND	41	SMB_THRM_CLK
20	TXN1	42	SMB_THRM_DATA
21	TXP1	43	NC
22	GND	44	NC

2.5.4 Display Port & USB 2.0 Ports (CN4 & CN5)
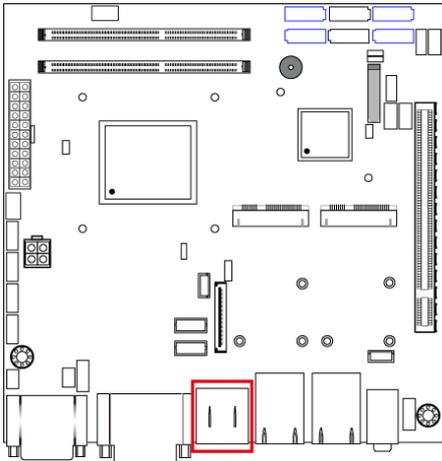
2.5.5 LAN & USB 3.0 Ports (CN6, CN9)
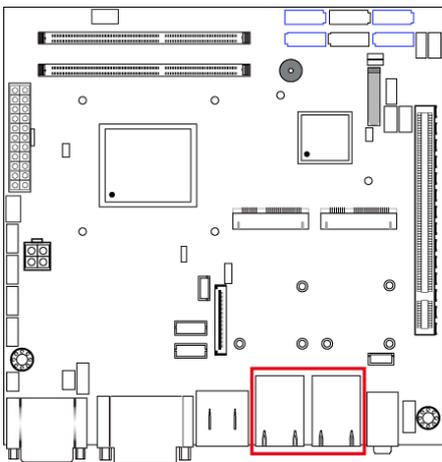
2.5.6 SATA III Connector (CN7, CN8, CN13, CN14)

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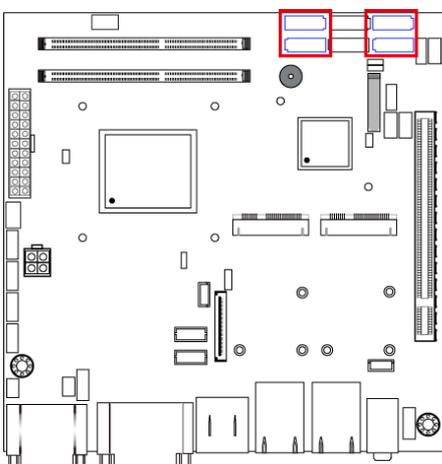
2.5.7 SATA II Connector (CN10, CN11)
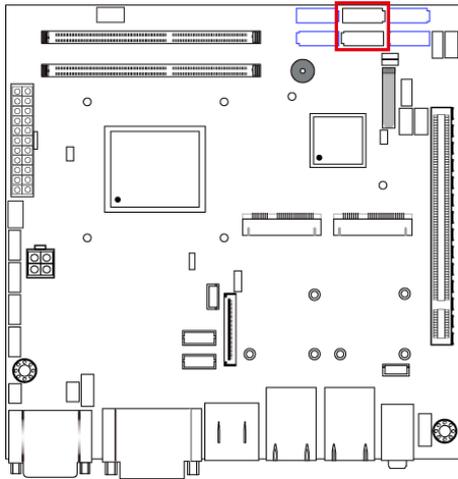
2.5.8 HD Audio Connector (CN12)

2.5.9 LVDS Connector (JP3, JP4)

JP3: 2nd channel

```
  1 □○○○○○○○○○□ 19
  2 ○○○○○○○○○○ 20
```

JP4: 1st channel

```
  1 □○○○○○○○○○□ 19
  2 ○○○○○○○○○○ 20
```
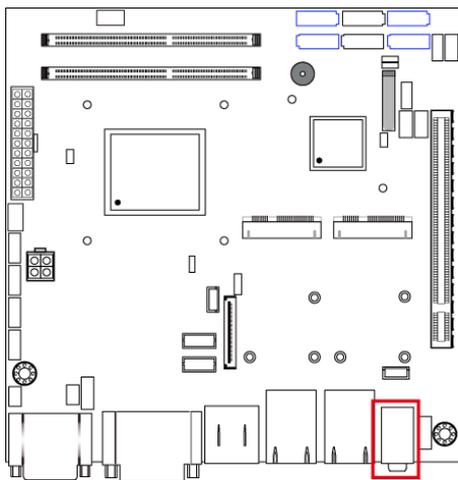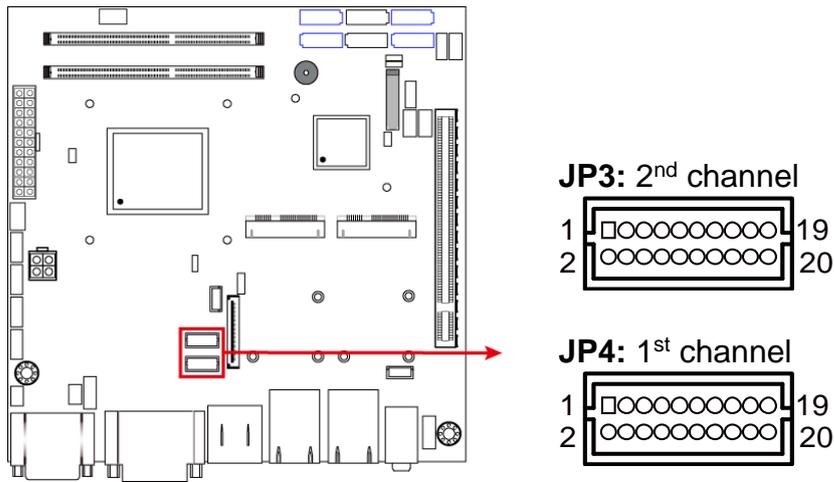
Pin	Assigment	Pin	Assigment
1	TX0P	2	TX0N
3	Ground	4	Ground
5	TX1P	6	TX1N
7	Ground	8	Ground
9	TX2P	10	TX2N
11	Ground	12	Ground
13	CLKP	14	CLKN
15	Ground	16	Ground
17	TX3P	18	TX3N
19	Power	20	Power

2.5.10 LCD Backlight Connector (JP5)
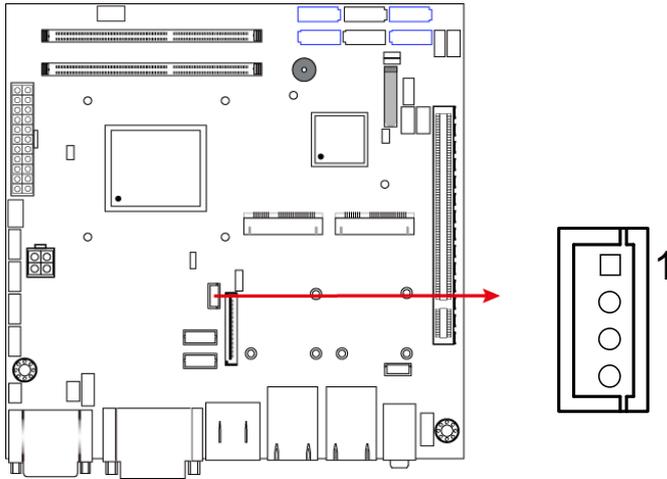
Pin	Assigment	Pin	Assigment
1	+12V	3	Brightness Control
2	Backlight Enable	4	Ground

2.5.11 USB 2.0 Connector (JP6, JP8)
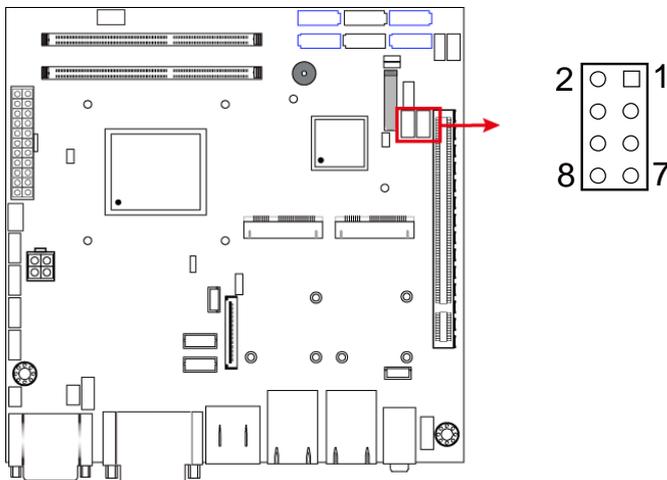
Pin	Assigment	Pin	Assigment
1	Vcc	2	Ground
3	D0-	4	D1+
5	D0+	6	D1-
7	Ground	8	Vcc

2.5.12   COM Connector   (J1, J2, J3, J4)
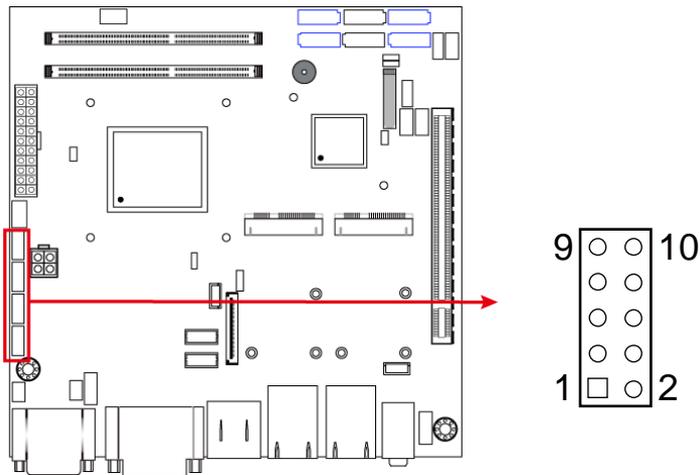
Pin	Assigment	Pin	Assigment
1	DCD#	2	SIN#
3	SOUT	4	DTR#
5	GND	6	DSR#
7	RTS#	8	CTS#
9	RI#	10	KEY

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2.5.13 ATX Power Connector (J5)
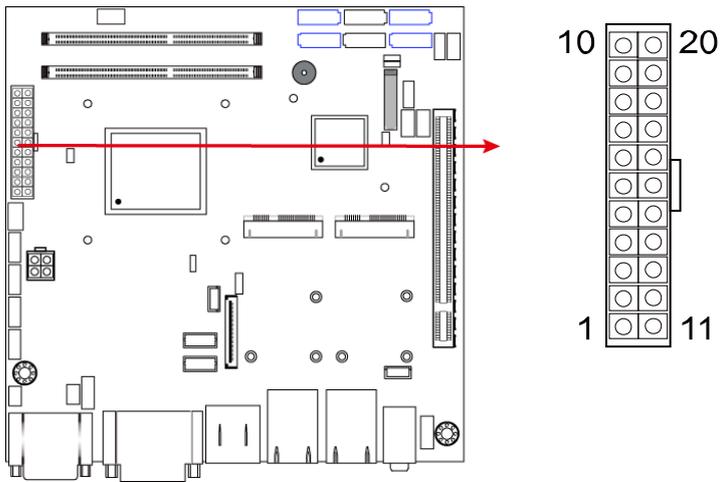
Pin	Assigment	Pin	Assigment
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	Ground	13	Ground
4	+5V	14	PS-ON
5	Ground	15	Ground
6	+5V	16	Ground
7	Ground	17	Ground
8	Power good	18	-5V
9	5VSB	19	+5V
10	+12V	20	+5V

2.5.14 ATX 12V Power Connector (J6)
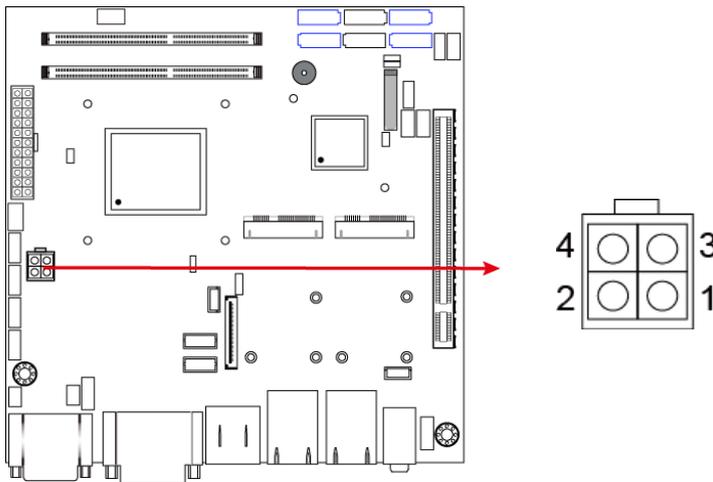
Pin	Assigment	Pin	Assigment
1	Ground	2	Ground
3	+12V	4	+12V

2.5.15 Digital I/O Connector (J8)
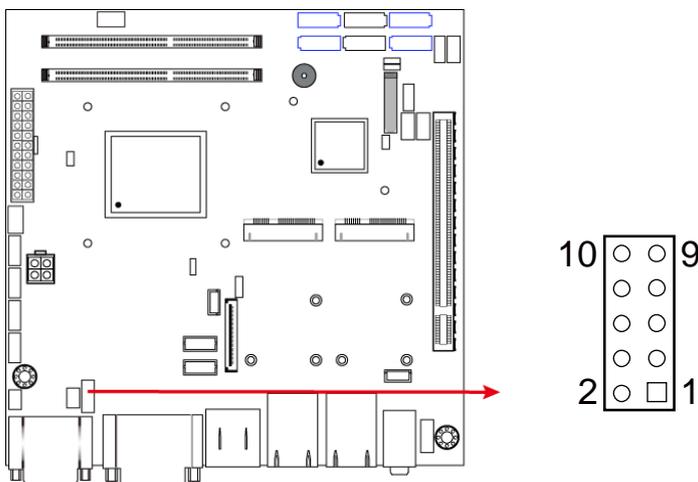
Pin	Assigment	Pin	Assigment
1	Ground	2	+5V
3	Out3	4	Out1
5	Out2	6	Out0
7	IN3	8	IN1
9	IN2	10	IN0

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2.5.16 DDR3 SO-DIMM Socket (J10, J11)
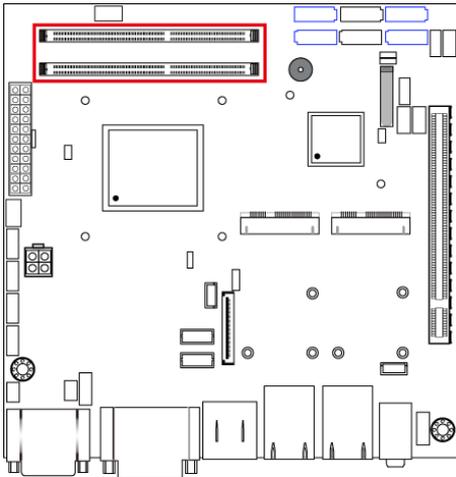
2.5.17 Audio Connector for Front Panel (J21)
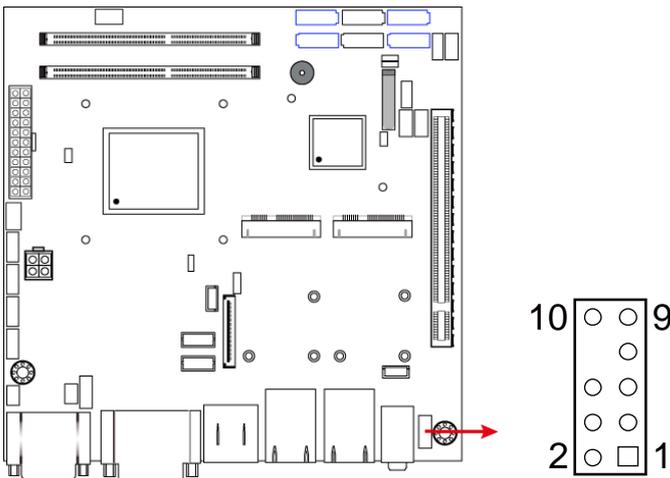
Pin	Assigment	Pin	Assigment
1	MIC IN_L	2	Ground
3	MIC IN_R	4	DET
5	LINE_R	6	Ground
7	Sense	8	KEY
9	LINE_L	10	Ground

2.5.18 Front Panel Settings (J22)
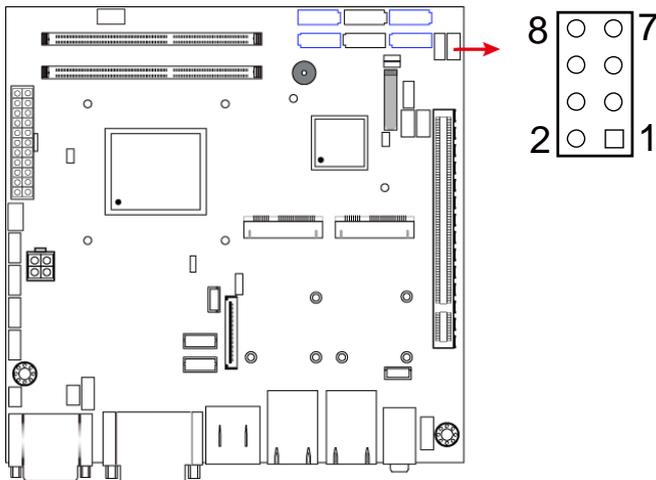
Pin	Assigment	Pin	Assigment
1	Power BTN	2	Power BTN
3	HDD LED+	4	HDD LED-
5	Reset BTN	6	Reset BTN
7	Power LED+	8	Power LED-

2.5.19 CPU Fan Power Connector (CPU_FAN1)
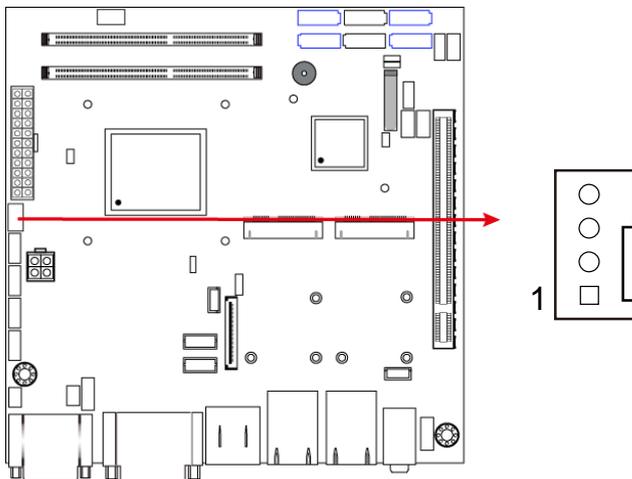
Pin	Assigment	Pin	Assigment
1	Ground	3	Rotation detection
2	+12V	4	Control

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2.5.20　System Fan Power Connector　(SYS_FAN1)
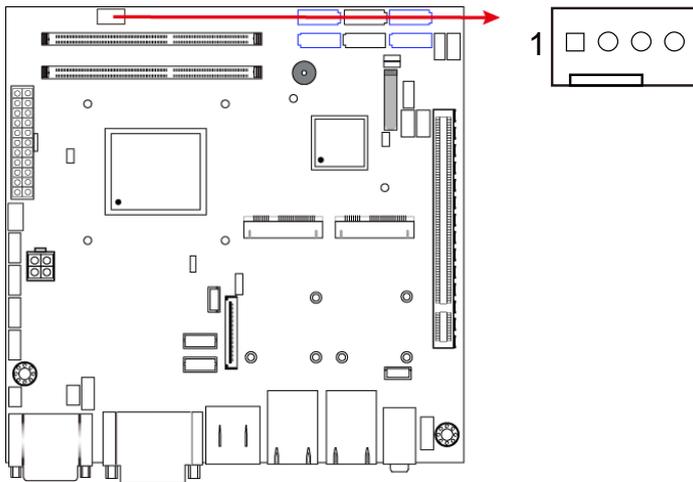
Pin	Assigment	Pin	Assigment
1	Ground	3	Rotation detection
2	+12V	4	Control

2.5.21　Mini PCIe / mSATA Connector　(J14)
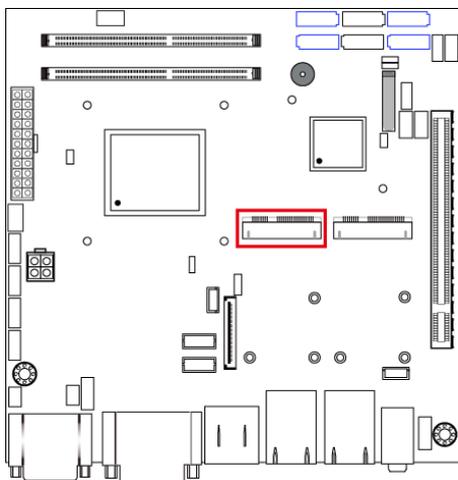
2.5.22   Mini PCIe Connector   (J15)
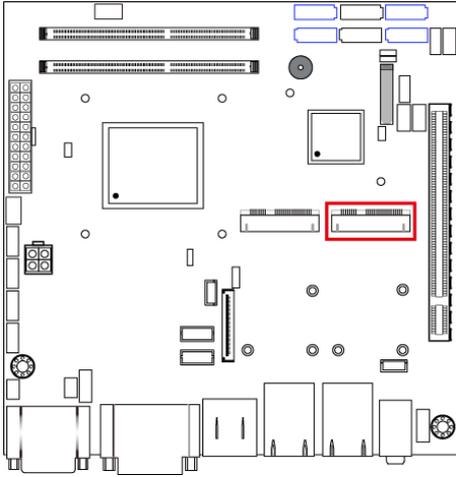
Chapter 3
Driver Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility

- VGA Driver Installation

- HD Audio Driver Installation

- LAN Driver Installation

- Intel® Management Engine (ME) Interface

- Intel® USB 3.0 Driver Installation

3.1 Introduction

This section describes the installation procedures for software drivers. The software drivers are in a disk enclosed with the product package. If you find anything missing, please contact the distributor where you made the purchase.

Note: After installing your Windows operating system, you must install the Intel® Chipset Software Installation Utility first before proceeding with the drivers installation.

3.2 Intel® Chipset Software Installation Utility

The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for the chipset components. Follow the instructions below to complete the installation.

1. Insert the disk enclosed in the package. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.

2. Click **Intel(R) Chipset Software Installation Utility**.
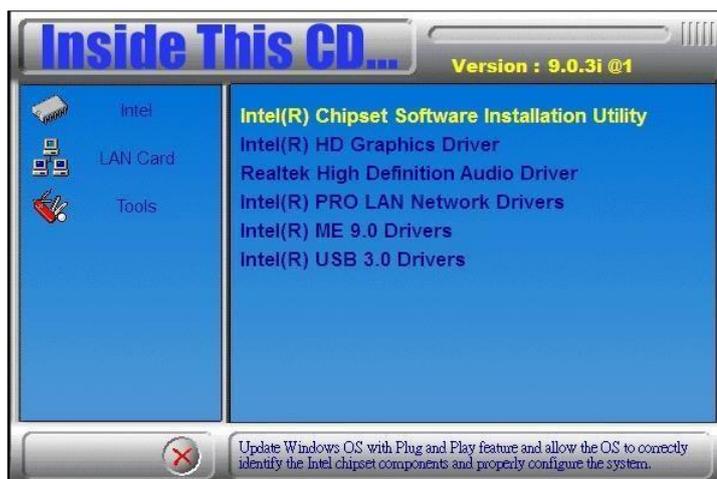
3. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next** to continue.

4. Click **Yes** to accept the software license agreement.

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

6. After the driver is completely installed, click **Finish** and restart the computer for changes to take effect.

3.3 VGA Driver Installation

1. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.

2. Click **Intel(R) Core(TM) i3/i5/i7 Graphics Driver**.
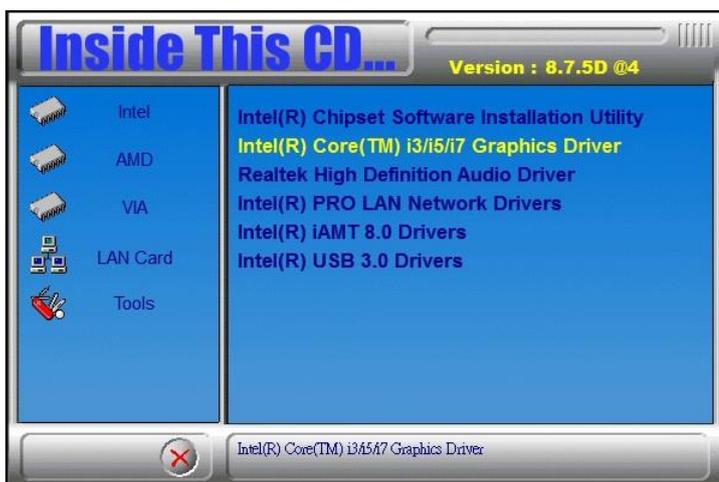
3. When the *Welcome* screen appears, click **Next** to continue.
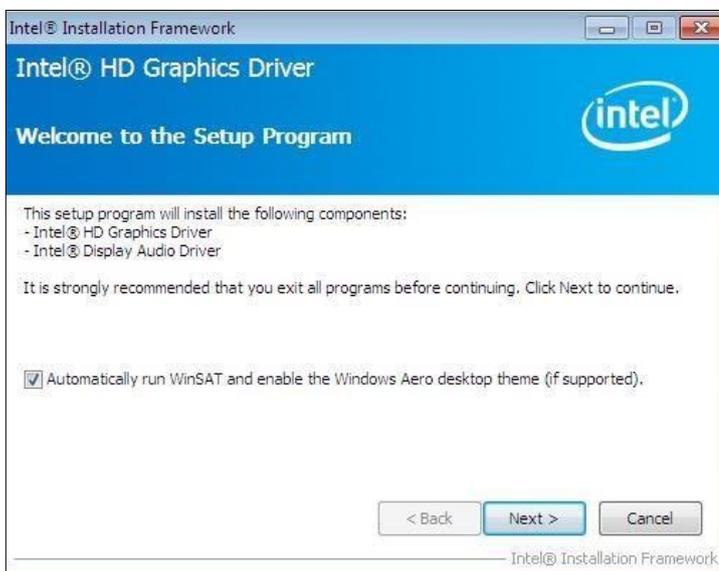
4. Click **Yes** to agree with the license agreement and continue the installation.

5. Click **Install**.

6. After the driver is completely installed, click **Finish** and restart the computer for changes to take effect.

3.4   HD Audio Driver Installation

1. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.
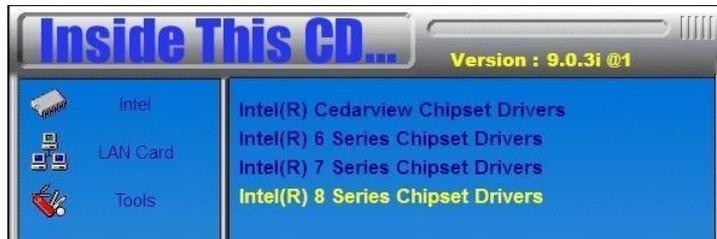
2. Click **Realtek High Definition Audio Driver**.
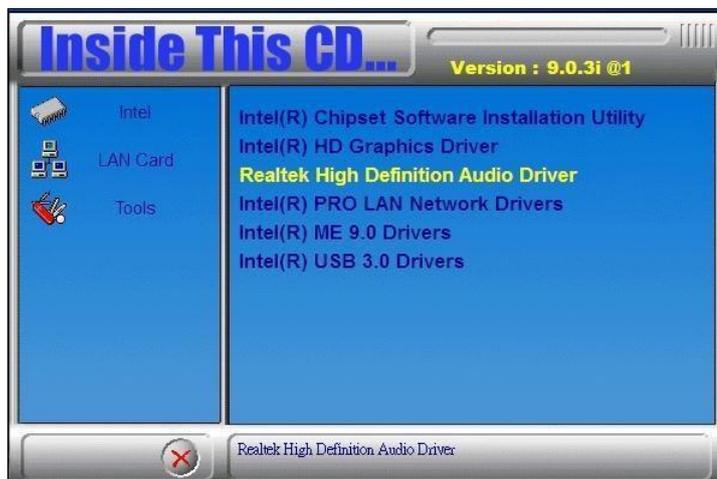
3. On the *Welcome* screen of the InstallShield Wizard, click **Yes** for installation.

4. After the driver is completely installed, click **Finish** and restart the computer for changes to take effect.

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3.5 LAN Driver Installation

1. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.

2. Click **Intel(R) PRO LAN Network Drivers**.
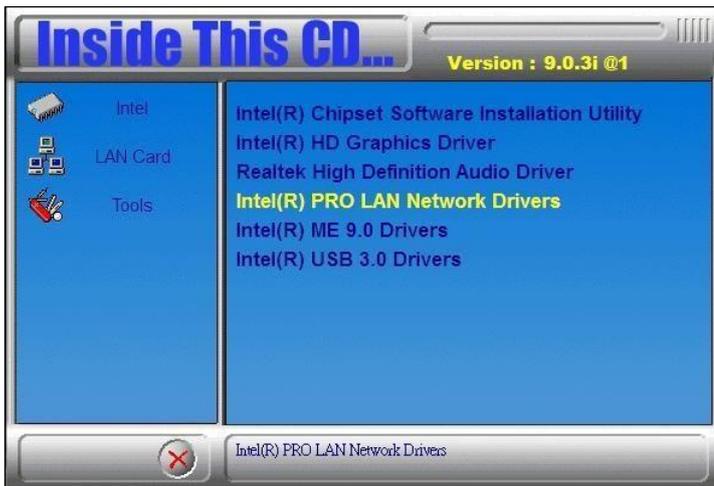
3. Click **Install Drivers and Software**.

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

5. Agree with the license agreement and click **Next**.

6. Tick the checkbox for **Drivers** on the *Setup Options* screen and click **Next** to continue.

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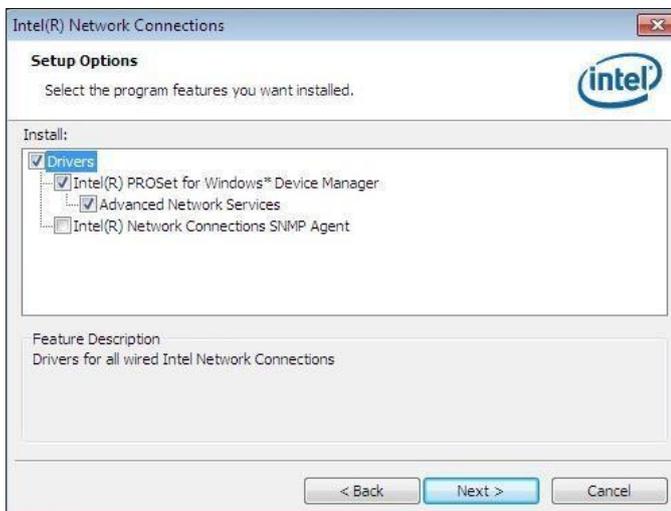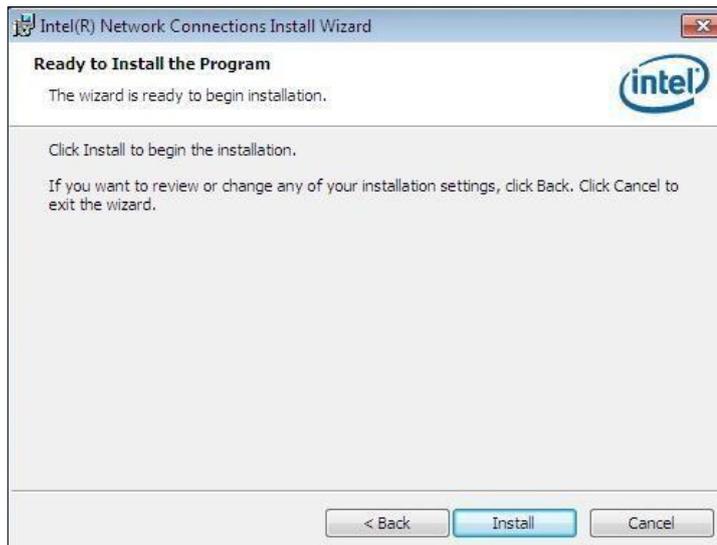
7. Click **Install**.

8. After the driver is completely installed, click **Finish** and restart the computer for changes to take effect.

3.6 Intel® Management Engine (ME) Interface

Note: You are suggested to install the latest version of Microsoft .NET
framework to run this application correctly. This driver requires
Microsoft .NET Framework 3.5 or later.

---

1. Click **Intel,** and then **Intel(R) 8 Series Chipset Drivers.**

2. Click **Intel(R) ME 9.0 Drivers**.

3. When the *Welcome* screen appears, tick the checkbox for **Install Intel®
Control Center** and click **Next..**
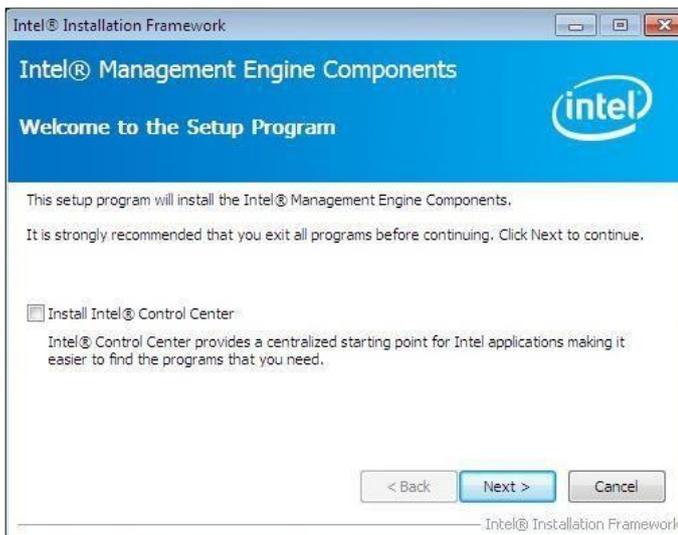
4. Click **Yes** to agree with the license agreement.

5. When the Setup Progress screen appears, click **Next** to continue the installation.
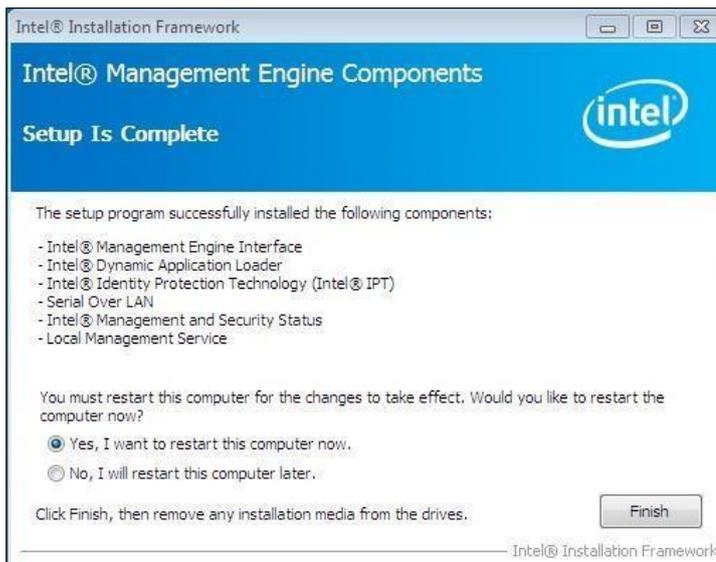
6. After the driver is completely installed, click **Finish** and restart the computer for changes to take effect.

3.7   Intel® USB 3.0 Drivers

1. Insert the disk enclosed in the package. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.

2. Click **Intel(R) USB 3.0 Drivers**.

3. When the *Welcome* screen to the Intel® USB 3.0 eXtensible Host Controller Driver appears, click **Next** to continue.

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4. Click **Yes** to accept the software license agreement.

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

6. After the driver is completely installed, click **Finish** and restart the computer for changes to take effect.

Chapter 4
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:

- Main Settings
- Advanced Settings
- Chipset Settings
- Boot Settings
- Security Settings
- Save & Exit

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4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices 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.

4.2 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. Press 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 need 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, 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 BIOS 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.

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 make the system unstable and crash in some cases.

4.3   Main Settings

```
            Aptio Setup Utility – Copyright © 2013 American Megatrends, Inc.
┌──────────────────────────────────────────────────────────────────────────┐
│  Main    Advanced    Chipset    Boot      Security    Save & Exit          │
├──────────────────────────────────────────────────────────────────────────┤
│  BIOS Information                              Choose the system default    │
│                                               language                      │
│  Total Memory             4096 MB (DDR3)      → ←Select Screen              │
│  Momory Frequency         1333 Mhz                                          │
│                                               ↑ ↓ Select Item               │
│  System Date              [Tue 01/20/2009]    Enter: Select                 │
│  System Time              [21:52:06]          +-   Change Field             │
│                                               F1: General Help              │
│  Access Level             Administrator       F2: Previous Values           │
│                                               F3: Optimized Default         │
│                                               F4: Save   ESC: Exit          │
└──────────────────────────────────────────────────────────────────────────┘
```

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

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

iBASE

4.4 Advanced Settings

This section allows you to configure, 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 |

▶ PCI Subsystem Settings
▶ ACPI Settings
▶ Wake up event setting
▶ Trusted Computing
▶ CPU Configuration
▶ SATA Configuration
▶ Shutdown Temperature Configuration
▶ iSmart Controller
▶ AMT Configuration
▶ USB Configuration
▶ F81866 Super IO Configuration
▶ F81866 H/W Monitor

→ ←Select Screen
↑ ↓ Select Item
Enter: Select
+- Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
F4: Save ESC: Exit

4.4.1   PCI Subsystem Settings

```
                              Aptio Setup Utility

Main    Advanced     Chipset      Boot       Security     Save & Exit

 PCI Bus Driver Version          V 2.0502
                                                  → ←Select Screen

 PCI Common Settings                              ↑↓ Select Item
 PCI Latency Timer               32 PCI Bus Clocks  Enter: Select
 VGA Palette Snoop               Disabled         +-   Change Field
 PERR# Generation                Disabled         F1: General Help
 SERR# Generation                Disabled         F2: Previous Values
                                                  F3: Optimized Default
 ► PCI Express Settings                           F4: Save  ESC: Exit
```

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#.

PCI Express Settings
Change PCI Express devices settings. Value to be programmed into PCI Latency Timer Register.

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4.4.1.1. PCI Express Settings

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit

```
PCI Express Device Register Settings
Relaxed Ordering                      Disabled
Extended Tag                          Disabled
No Snoop                              Enabled
Maximum Payload                       Auto              → ←Select Screen
Maximum Read Request                  Auto
                                                        ↑↓ Select Item
                                                        Enter: Select
PCI Express Link Register Settings                      +-  Change Field
ASPM Support                          Disabled          F1: General Help
WARNING: Enabling ASPM may cause      Disabled          F2: Previous Values
         some PCI-E devices to fail                     F3: Optimized Default
Extended Synch                        Disabled          F4: Save  ESC: Exit

Link Training Retry                   5
Link Training Timeout (uS)            100
Unpopulated Links                     Keep Link ON
Restore PCIE Registers                Disabled
```

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 L0s – Force all links to L0s State: AUTO – BIOS auto configure: DISABLE – Disables ASPM.

Extended Synch

If ENABLED allows generation of Extended Synchronization patterns.

Link Training Retry

Defines number of Retry Attempts software will take to retrain the link if previous training attempt was unsuccessful.

Link Training Timeout (uS)

Defines number of Microseconds software will wait before polling 'Link Training' bit in Link Status register. Value range from 10 to 1000 uS.

Unpopulated Links

In order to save power, software will disable unpopulated PCI Express links, if this option set to 'Disable Link'.

Restore PCIE Registers

On non-PCI Express aware OS's (Pre Windows Vista) some devices may not be correctly reinitialized after S3. Enabling this restore PCI Express device configuration on S3 resume

Warning: Enabling this may cause issues with other hardware after S3 resume.

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4.4.2 ACPI Settings

Aptio Setup Utility

| Main | Advanced | Chipset | Boot | Security | Save & Exit |

ACPI Settings

→ ←Select Screen
↑↓ Select Item

Enable Hibernation	Enabled
ACPI Sleep State	S3 (Suspend to R...)
Lock Legacy Resources	Disabled
S3 Video Repost	Disabled

Enter: Select
+- Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
F4: Save ESC: Exit

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

Lock Legacy Resources
Enabled or Disabled Lock of Legacy Resources.

S3 Video Repost
Enable or disable S3 Video Repost.

4.4.3   Wake up Event Settings

Aptio Setup Utility

| Main | **Advanced** | Chipset | Boot | Security | Save & Exit |

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   ESC: Exit
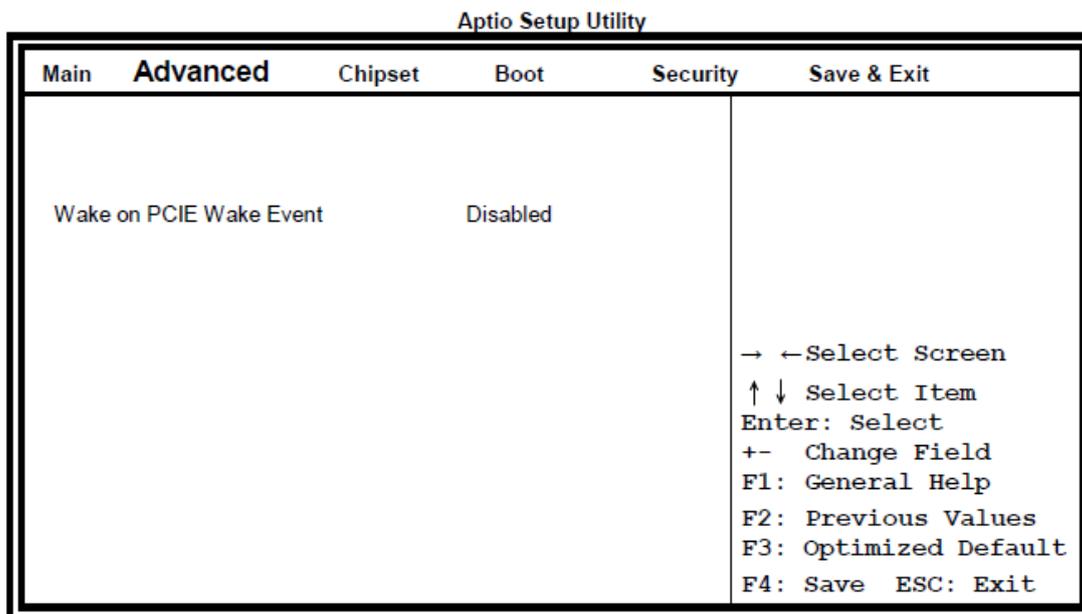
Wake on PCIE PME Wake Event
The options are Disabled and Enabled.

4.4.4   Trusted Computing

Aptio Setup Utility

| Main | **Advanced** | Chipset | Boot | Security | Save & Exit |

TPM Configuration
  TPM SUPPORT   Disabled

Current TPM Status Information
  TPM SUPPORT OFF

→ ←Select Screen
↑ ↓ Select Item
Enter: Select
+-   Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
F4: Save   ESC: Exit
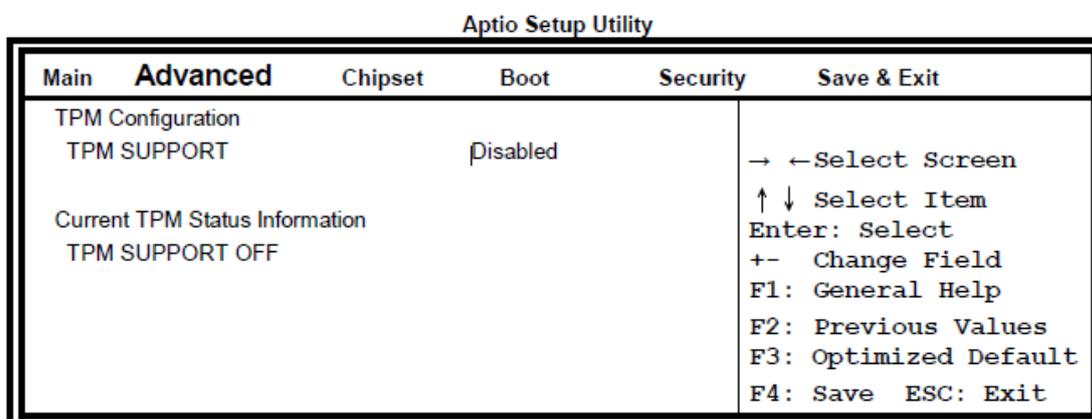
TPM Support
This configuration is supported only with MI980VF. Enables or Disables TPM support. O.S. will not show TPM. Reset of platform is required.

Security Device Support
Enables or disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

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4.4.5 CPU Configuration

This section shows the CPU configuration parameters.

Main	Advanced	Chipset	Boot	Security	Save & Exit

CPU Configuration

Intel(R) CPU Core(TM)i5-4402E @ 1.60GHz

CPU Signature	306c3
Processor Family	6
Microcode Patch	8
FSB Speed	100MHz
Max CPU Speed	1600 MHz
Min CPU Speed	800 MHz
CPU Speed	2600 MHz
Processor Cores	2
Intel HT Technology	Supported
Intel VT-x Technology	Supported
Intel SMX Technology	Supported
64-bit	Supported
EIST	Supported
CPU C3 State	Supported
CPU C6 State	Supported
CPU C7 State	Supported
Active Processor Cores	All
Overclocking lock	Disabled
Limit CPUID Maximum	Disabled
Execute Disable Bit	Enabled
Intel Virtualization Technology	Enabled
Adjacent Cache Line Prefetch	Enabled
Boot performance mode	Turbo performance
EIST	Enabled
Turbo Mode	Enabled

→ ←Select Screen
↑ ↓ Select Item
Enter: Select
+- Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
F4: Save   ESC: Exit

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

Overclocking lock
Flex_RATIO(194)MSR

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

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

Adjacent Cache Line Prefetch
To turn on/off prefetching of adjacent cache lines.

Boot Performance Mode
Select the performance state that the BIOS will set before OS handoff.

EIST
Enabled/Disabled Intel Speedstep.

4.4.6   SATA Configuration

```
                          Aptio Setup Utility

  Main    Advanced      Chipset      Boot      Security     Save & Exit

   SATA Controller(s)          Enabled
   SATA Mode Selection         IDE



   SATA Port0                  Empty
     Software Preserve         Unknown        → ←Select Screen
   SATA Port1                  Empty          ↑ ↓  Select Item
     Software Preserve         Unknown        Enter: Select
   SATA Port2                  Empty          +-   Change Field
     Software Preserve         Unknown        F1: General Help
   SATA Port3                  Empty          F2: Previous Values
     Software Preserve         Unknown        F3: Optimized Default
   SATA Port4                  Empty          F4: Save  ESC: Exit
     Software Preserve         Unknown
   SATA Port5                  Empty
     Software Preserve         Unknown
```

SATA Controller(s)
Enable / Disable Serial ATA Controller.

SATA Mode Selection
(1) IDE Mode
(2) AHCI Mode
(3) RAID Mode. (This configuration is supported only with MI980VF)

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4.4.7 Shutdown Temperature Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit

APCI Shutdown Temperature   Disabled

→ ←Select Screen
↑↓ Select Item
Enter: Select
+-   Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
F4: Save   ESC: Exit

ACPI Shutdown Temperature
The default setting is Disabled.

4.4.8 iSmart Controller

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit

iSmart Controller

Power-On after Power failure   Disable

Schedule Slot 1   None
Schedule Slot 2   None

→ ←Select Screen
↑↓ Select Item
Enter: Select
+-   Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
F4: Save   ESC: Exit

iSmart Controller
Setup the power on time for the system.

Schedule Slot 1 / 2
Setup the hour/minute for system power on.

4.4.9 AMT Controller

```
                         Aptio Setup Utility
 ┌────────────────────────────────────────────────────────────────────────┐
 │ Main   Advanced    Chipset    Boot      Security    Save & Exit         │
 ├────────────────────────────────────────────────────────────────────────┤
 │                                                                         │
 │  Intel AMT                         Enabled                              │
 │  BIOS Hotkey Pressed               Disabled                            │
 │  MEBx Selection Screen             Disabled                            │
 │  Hide Un-Configure ME Confirmation Disabled                            │
 │  Un-Configure ME                   Disabled                            │
 │  Amt Wait Timer                    0                                   │
 │  Activate Remote Assistance Process Disabled                          │
 │  USB Configure                     Enabled        → ←Select Screen     │
 │  PET Progress                      Enabled        ↑↓ Select Item       │
 │  AMT CIRA Timeout                  0              Enter: Select         │
 │  Watchdog                          Disabled      +-  Change Field       │
 │    OS Timer                        0             F1: General Help       │
 │    BIOS Timer                      0             F2: Previous Values    │
 │                                                  F3: Optimized Default  │
 │                                                  F4: Save  ESC: Exit    │
 └────────────────────────────────────────────────────────────────────────┘
```

AMT Configuration
This configuration is supported only with MI980VF (with iAMT function).
Options are Enabled and Disabled.
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.

Unconfigure ME
Perform AMT/ME unconfigure without password operation.

Amt Wait Timer
Set timer to wait before sending ASF_GET_BOOT_OPTIONS.

Activate Remote Assistance Process
Trigger CIRA boot.

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

Watchdog Timer
Enable/Disable Watchdog Timer.

iBASE

4.4.10 USB Configuration

Aptio Setup Utility

Main	**Advanced**	Chipset	Boot	Security	Save & Exit

USB Configuration

USB Devices:
    2 Hubs

Legacy USB Support	Enabled
USB3.0 Support	Enabled
XHCI Hand-off	Enabled
EHCI Hand-off	Enabled
USB Mass Storage Driver Support	Enabled
USB hardware delays and time-outs:	
USB Transfer time-out	20 sec
Device reset tine-out	20 sec
Device power-up delay	Auto

→ ←Select Screen
↑↓ Select Item
Enter: Select
+- Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
F4: Save ESC: Exit

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

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

USB Mass Storage Driver Support

Enable/Disable USB Mass Storage Driver Support.

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 100ms, for a Hub port the delay is taken from Hub descriptor.

4.4.11   F8186 Super IO Configuration

```
                            Aptio Setup Utility
┌──────────────────────────────────────────────────────────────────────┐
│  Main   Advanced   Chipset    Boot      Security    Save & Exit        │
│ ┌──────────────────────────────────────────┬───────────────────────┐  │
│ │ Super IO Configuration                   │                       │  │
│ │                                          │ → ←Select Screen      │  │
│ │ F81866 Super IO Chip        F81866       │ ↑ ↓ Select Item       │  │
│ │                                          │ Enter: Select         │  │
│ │                                          │ +-   Change Field     │  │
│ │                                          │ F1: General Help      │  │
│ │ ► Serial Port 1 Configuration            │ F2: Previous Values   │  │
│ │ ► Serial Port 2 Configuration            │ F3: Optimized Default │  │
│ │ ► Serial Port 3 Configuration            │ F4: Save  ESC: Exit   │  │
│ │ ► Serial Port 4 Configuration            │                       │  │
│ │ ► Serial Port 5 Configuration            │                       │  │
│ │ ► Serial Port 6 Configuration            │                       │  │
│ │                                          │                       │  │
│ └──────────────────────────────────────────┴───────────────────────┘  │
└──────────────────────────────────────────────────────────────────────┘
```

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.

4.4.11.1.   Serial Port Configuration

```
┌──────────────────────────────────────────────────────────────────────┐
│  Main   Advanced   Chipset    Boot      Security    Save & Exit        │
│ ┌──────────────────────────────────────────┬───────────────────────┐  │
│ │ Serial port 0 Configuration              │                       │  │
│ │                                          │ → ←Select Screen      │  │
│ │ Serial port              Enabled         │ ↑ ↓ Select Item       │  │
│ │ Device Settings          IO=3F8h ; IRQ=4 │ Enter: Select         │  │
│ │                                          │ +-   Change Field     │  │
│ │ Change Settings          Auto            │ F1: General Help      │  │
│ │                                          │ F2: Previous Values   │  │
│ │ F81866 SERIAL PORT1 MODE SELECT  RS232 Mode │ F3: Optimized Default │ │
│ │                                          │ F4: Save  ESC: Exit   │  │
│ │                                          │                       │  │
│ └──────────────────────────────────────────┴───────────────────────┘  │
└──────────────────────────────────────────────────────────────────────┘
```
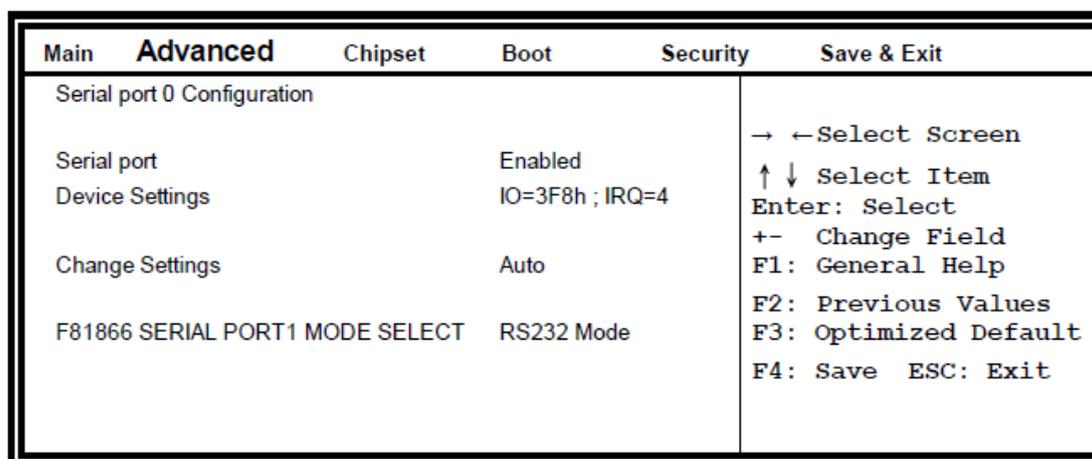
F81866 SERIAL PORT1 MODE SELECT
F81866 SERIAL PORT1 LOOP Back/RS232/RS422/RS485 mode select.

iBASE

4.4.12 F81866 Hardware Monitor

Aptio Setup Utility

| Main | Advanced | Chipset | Boot | Security | Save & Exit |

PC Health Status

Fan 1 smart fan control	Disabled
Fan 2 smart fan control	Disabled
CPU temperature	+33 C
SYS temperature	+34 C
FAN1 Speed	2170 RPM
FAN2 Speed	N/A
Vcore	+1.800 V
+5V	+5.087 V
+12V	+12.408 V
Memory Voltage	+1.392 V
VSB5V	+5.016 V

→ ←Select Screen
↑↓ Select Item
Enter: Select
+- Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
F4: Save 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/Fan2 Smart Fan Control
This field enables 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.

4.5   Chipset Settings

```
                          Aptio Setup Utility

 Main    Advanced    Chipset    Boot    Security    Save & Exit

  ▶ PCH-IO Configuration
  ▶ System Agent (SA) Configuration          → ←Select Screen

                                             ↑↓ Select Item
                                             Enter: Select
                                             +-   Change Field
                                             F1: General Help
                                             F2: Previous Values
                                             F3: Optimized Default
                                             F4: Save  ESC: Exit
```

4.5.1   PCH-IO Configuration

```
                          Aptio Setup Utility

 Main    Advanced    Chipset    Boot    Security    Save & Exit
  Intel PCH RC Version       1.5.0.0
  Intel PCH SKU Name         QM87
  Intel PCH Rev ID           04/C1

  ▶ PCI Express Configuration
  ▶ USB Configuration
  ▶ PCH Azalia Configuration


  PCH LAN Controller         Enabled
  Wake on LAN                Disabled
  SLP_LAN# Low on DC Power   Enabled

                                             → ←      Select Screen

                                             ↑↓ Select Item
                                             Enter: Select
                                             +-   Change Field
                                             F1: General Help
                                             F2: Previous Values
                                             F3: Optimized Default
                                             F4: Save  ESC: Exit
```

PCH LAN Controller
Enable or disable onboard NIC.

Wake on LAN
Enable or disable integrated LAN to wake the system. (The Wake On LAN cannot be disabled if ME is on at Sx state.)

SLP_LAN# Low on DC Power
Enable or Disable SLP_LAN# Low on DC Power.

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4.5.1.1. PCI Express Configuration

```
Main      Advanced    Chipset      Boot       Security      Save & Exit

PCI Express Configuration


PCI Express Clock Gating         Enabled
DMI Link ASPM Control            Enabled
DMI Link Extended Synch Control  Disabled
PCIe-USB Glitch W/A              Disabled
PCIE Root Function Swapping      Disabled
Subtractive Decode               Disabled


▶ PCI Express Root Port 1
▶ PCI Express Root Port 2
▶ PCI Express Root Port 3                  → ←    Select Screen
▶ PCI Express Root Port 4                  ↑ ↓  Select Item
▶ PCI Express Root Port 5               Enter: Select
  PCI-E Port 6 is assigned to LAN       +-   Change Field
▶ PCI Express Root Port 7               F1: General Help
▶ PCI Express Root Port 8               F2: Previous Values
                                        F3: Optimized Default
                                        F4: Save  ESC: Exit
```

PCI Express Clock Gating
Enable or disable PCI Express Clock Gating for each root port.

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

PCIe-USB Glitch W/A
PCIe-USB Glitch W/A for bad USB device(s) connected behind PCIE/PEG port.

4.5.1.2.   USB Configuration

```
Main    Advanced    Chipset      Boot      Security      Save & Exit

 USB Configuration

 USB Precondition             Disabled         → ←    Select Screen
 xHCI Mode                    Auto             ↑ ↓ Select Item
                                               Enter: Select
 USB Ports Per-Port Disable Control  Disabled  +-    Change Field
                                               F1: General Help

                                               F2: Previous Values
                                               F3: Optimized Default
                                               F4: Save  ESC: Exit
```

USB Precondition
Precondition work on USB host controller and root ports for faster enumeration.

xHCI Mode
Mode of operation of xHCI controller.

USB Ports Per-Port Disable Control
Control each of the USB ports (0~13) disabling.

4.5.1.3.   PCH Azalia Configuration

```
Main    Advanced    Chipset      Boot      Security      Save & Exit

 PCH Azalia Configuration                      → ←    Select Screen

                                               ↑ ↓ Select Item
 Azalia                       Auto             Enter: Select
                                               +-    Change Field
                                               F1: General Help
                                               F2: Previous Values
                                               F3: Optimized Default
                                               F4: Save  ESC: Exit
```

Azalia
Control Detection of the Azalia device. Disabled = Azalia will be unconditionally be disabled. Enabled = Azalia will be unconditionally be enabled. Auto = Azalia will be enabled if present, disabled otherwise.

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4.5.2 System Agent (SA) Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit

```
System Agent Bridge Name            Haswell
System Agent RC Version             1.5.0.0
VT-d Capability                     Supported

VT-d                                Enabled
CHAP Device (B0:D7:F0)              Disabled          → ←Select Screen
Thermal Device (B0:D4:F0)           Disabled
CPU SA Audio Device (B0:D3:F0)      Enabled           ↑↓ Select Item
Enable NB CRID                      Disabled          Enter: Select
BDAT ACPI Table Support             Disabled          +-  Change Field
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Default
► Graphics Configuration                              F4: Save  ESC: Exit
► Memory Configuration
```

VT-d
Check to enable VT-d function on MCH.

Enable NB CRID
Enable or disable NB CRID WorkAround.

Graphics Configuration

```
                          Aptio Setup Utility

  Main    Advanced    Chipset      Boot      Security     Save & Exit

  Graphics Configuration
  IGFX VBIOS Version              2166
  IGfx Frequency                  800 MHz

  Primary Display                 Auto
  Primary PEG                     Auto          → ←Select Screen
  Primary PCIE                    Auto          ↑↓ Select Item
  Internal Graphics               Auto        Enter: Select
  Aperture Size                   256MB        +-   Change Field
  DVMT Pre-Allocated              64M          F1: General Help
  DVMT Total Gfx Mem              256MB        F2: Previous Values
  Primary IGFX Boot Display       VBIOS Default F3: Optimized Default
  LVDS/EDP Control                Disabled     F4: Save  ESC: Exit
  Gfx Low Power Mode              Disabled
```

Primary Display
Select which of IGFX/PEG/PCI graphics device should be primary display or select SG for switchable Gfx.

Primary PEG
Select PEGO/PEG1/PEG2/PEG3 Graphics device should be Primary PEG.

Primary PCIE
Select PCIE0/PCIE1/PCIE2/PCIE3/PCIE4/PCIE5/PCIE6PCIE7 Graphics device should be primary PCIE.

Internal Graphics
Keep IGD enabled based on the setup options.

DVMT Pre-Allocated
Select DVMT 5.0 Pre-Allocated (Fixed) graphics memory size used by the internal graphics device.

DVMT Total Gfx Mem
Select DVMT 5.0 total graphics memory size used by the internal graphics device.

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Primary IGFX Boot Display
Select the Video Device that will be activated during POST. This has no effect if external graphics present. Secondary booty display selection will appear based on your selection. VGA modes will be supported only on primary display.

LVDS/EDP Control
LVDS/EDP Control

Gfx Low Power Mode
This option is applicable for SFF only.

Memory Configuration

```
                        Aptio Setup Utility

  Main    Advanced   Chipset    Boot     Security    Save & Exit

  Memory Information

  Memory Frequency        1333 MHz
  Total Memory            4096 MB (DDR3)
  DIMM#0                  2048 MB (DDR3)
  DIMM#1                  2048 MB (DDR3)
  CAS Latency (tCL)        11                    → ←Select Screen
  Minimum delay time
                                                 ↑ ↓ Select Item
     CAS to RAS (tRCDmin)   11                   Enter: Select
     Row Precharge (tRPmin) 11                   +-   Change Field
     Active to Precharge (tRASmin) 28            F1: General Help

                                                 F2: Previous Values
                                                 F3: Optimized Default

                                                 F4: Save  ESC: Exit
```

4.6 Boot Settings

```
                      Aptio Setup Utility

  Main    Advanced    Chipset    Boot    Security    Save & Exit

  Boot Configuration
  Setup Prompt Timeout            1
  Bootup NumLock State            On

  Quiet Boot                      Disabled
  Fast Boot                       Disabled

                                           → ←Select Screen
  Boot Option Priorities                   ↑ ↓ Select Item
  Boot Option #1                           Enter: Select
                                           +-   Change Field
                                           F1: General Help
  Hard Drive BBS Priorities                F2: Previous Values
  ► CSM16 Parameters                       F3: Optimized Default
  CSM Parameters                           F4: Save  ESC: Exit
```

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

Bootup NumLock State
Select the keyboard NumLock state.

Quiet Boot
Enables/Disables Quiet Boot option.

Fast Boot
Enables/Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

Boot Option Priorities
Sets the system boot order.

4.6.1 CSM Parameters

Boot Option Filter
This option controls what devices system can boot to.

Launch PXE OpROM Policy
Controls the execution of UEFI and Legacy PXE OpROM.

Launch Storatge OpROM Policy
Controls the execution of UEFI and Legacy Storage OpROM.

Launch Video OpROM Policy
Controls the execution of UEFI and Legacy Video OpROM.

Other PCI Device ROM Priority
For PCI devices other than Network, Mass storage or Video defines which OpROM to launch.

4.7 Security Settings

```
                          Aptio Setup Utility
┌─────────────────────────────────────────────────────────────────────┐
│ Main    Advanced    Chipset    Boot    Security    Save & Exit        │
├─────────────────────────────────────────────────────────────────────┤
│ Password Description                    │                             │
│                                         │                             │
│ If ONLY the Administrator's password    │                             │
│ is set, then this only limit access     │                             │
│ to Setup and is only asked for          │                             │
│ when entering Setup.                    │ → ←Select Screen            │
│ If ONLY the User's password is set,     │                             │
│ then this is a                          │ ↑ ↓ Select Item            │
│ power on password and must be entered   │ Enter: Select               │
│ to boot or                              │ +-   Change Field           │
│ enter Setup. In Setup the User will have│ F1: General Help            │
│ Administrator rights                    │ F2: Previous Values         │
│ The password length must be             │ F3: Optimized Default       │
│                                         │ F4: Save  ESC: Exit         │
│ in the following range:                 │                             │
│ Minimum length                    3     │                             │
│ Maximum length                    20    │                             │
│                                         │                             │
│ Administrator Password                  │                             │
│ User Password                           │                             │
│                                         │                             │
└─────────────────────────────────────────────────────────────────────┘
```

Administrator Password

Set Setup Administrator Password.

User Password

Set User Password.

iBASE

4.8 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

```
→ ←Select Screen
↑↓ Select Item
Enter: Select
+-  Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
F4: Save  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.

Appendix

This section provides the mapping addresses of peripheral devices and the sample code of watchdog timer configuration.

- I/O Port Address Map
- Interrupt Request Lines (IRQ)
- Digital I/O Sample Code
- Watchdog Timer Configuration

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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
2F8h - 2FFh	Serial Port #2(COM2)
2B0h- 2DFh	Graphics adapter Controller
360h - 36Fh	Network Ports
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
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ8	Real Time Clock
IRQ14	Primary IDE
IRQ15	Secondary IDE

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C. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for the 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, you will need to 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 "F81866.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 81866 watch dog program\n");  SIO = Init_F81866();
if (SIO == 0)
{
printf("Can not detect Fintek 81866, 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_F81866_Reg(0x2B); bBuf &= (~0x20);
Set_F81866_Reg(0x2B, bBuf);  //Enable WDTO

Set_F81866_LD(0x07);      //switch to logic device 7
Set_F81866_Reg(0x30, 0x01); //enable timer

bBuf = Get_F81866_Reg(0xF5); bBuf &= (~0x0F);
bBuf |= 0x52;
Set_F81866_Reg(0xF5, bBuf);          //count mode is second Set_F81866_Reg(0xF6,
interval);    //set timer
bBuf = Get_F81866_Reg(0xFA); bBuf |= 0x01;
Set_F81866_Reg(0xFA, bBuf);  //enable WDTO output

bBuf = Get_F81866_Reg(0xF5); bBuf |= 0x20;
Set_F81866_Reg(0xF5, bBuf);  //start counting
}
//-------------------------------------------------------------------------
void DisableWDT(void)
{
unsigned char bBuf;
Set_F81866_LD(0x07);      //switch to logic device 7  bBuf = Get_F81866_Reg(0xFA);
bBuf &= ~0x01;
Set_F81866_Reg(0xFA, bBuf);  //disable WDTO output

bBuf = Get_F81866_Reg(0xF5); bBuf &= ~0x20;
bBuf |= 0x40;
Set_F81866_Reg(0xF5, bBuf);  //disable WDT
}
//
```

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```
//------------------------------------------------------------------------
//
// 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 "F81866.H"
#include <dos.h>
//------------------------------------------------------------------------
unsigned int F81866_BASE; void Unlock_F81866 (void);  void Lock_F81866 (void);
//------------------------------------------------------------------------
unsigned int Init_F81866(void)
{
unsigned int result;  unsigned char ucDid;

F81866_BASE = 0x4E;
result = F81866_BASE;

ucDid = Get_F81866_Reg(0x20);
if (ucDid == 0x07)      //Fintek 81866
{      goto Init_Finish; }

F81866_BASE = 0x2E;
result = F81866_BASE;

ucDid = Get_F81866_Reg(0x20);
if (ucDid == 0x07)      //Fintek 81866
{      goto Init_Finish; }

F81866_BASE = 0x00;
result = F81866_BASE;

Init_Finish:
return (result);
}
//------------------------------------------------------------------------
void Unlock_F81866 (void)
{
outportb(F81866_INDEX_PORT, F81866_UNLOCK);  outportb(F81866_INDEX_PORT,
F81866_UNLOCK);
}
//------------------------------------------------------------------------
void Lock_F81866 (void)
{
outportb(F81866_INDEX_PORT, F81866_LOCK);
}
//------------------------------------------------------------------------
void Set_F81866_LD( unsigned char LD)
{
Unlock_F81866();
outportb(F81866_INDEX_PORT, F81866_REG_LD);
outportb(F81866_DATA_PORT, LD);  Lock_F81866();
}
```

```
//------------------------------------------------------------------------
void Set_F81866_Reg( unsigned char REG, unsigned char DATA)
{
Unlock_F81866(); outportb(F81866_INDEX_PORT, REG);  outportb(F81866_DATA_PORT,
DATA);  Lock_F81866();
}
//------------------------------------------------------------------------
unsigned char Get_F81866_Reg(unsigned char REG)
{
unsigned char Result;  Unlock_F81866();
outportb(F81866_INDEX_PORT, REG);  Result = inportb(F81866_DATA_PORT);
Lock_F81866();
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        F81866_H
#define        F81866_H       1
//------------------------------------------------------------------------
#define    F81866_INDEX_PORT    (F81866_BASE)
#define    F81866_DATA_PORT     (F81866_BASE+1)
//------------------------------------------------------------------------
#define    F81866_REG_LD      0x07
//------------------------------------------------------------------------
#define F81866_UNLOCK  0x87
#define    F81866_LOCK  0xAA
//------------------------------------------------------------------------
unsigned int Init_F81866(void);
void Set_F81866_LD( unsigned char);
void Set_F81866_Reg( unsigned char, unsigned char);  unsigned char
Get_F81866_Reg( unsigned char);
//------------------------------------------------------------------------
#endif //      F81866_H
```