MI963F

AMD® Embedded G-Series SoC
Mini ITX Motherboard

User's Manual

Version 1.0
(Apr. 2017)

Compliance

CE

This is a class B product. 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.

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.

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 board.

Environmental conditions:

- Use this product in environments with ambient temperatures between 0˚C and 60˚C.
- Do not leave this product in an environment where the storage temperature may be below -20° C or above 80° C. To prevent from damages, the product must be used in a controlled environment.

Care for your IBASE products:

- Before cleaning the PCB, unplug all cables and remove the battery.
- Clean the PCB with a circuit board cleaner or degreaser, or use cotton swabs and alcohol.
- Vacuum the dust with a computer vacuum cleaner to prevent the fan from being clogged.

WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on this product.
- Do not place heavy objects on the top of this product.

Anti-static precautions

- Wear an anti-static wrist strap to avoid electrostatic discharge.
- Place the PCB on an anti-static kit or mat.
- Hold the edges of PCB when handling.
- Touch the edges of non-metallic components of the product instead of the surface of the PCB.
- Ground yourself by touching a grounded conductor or a grounded bit of metal frequently to discharge any static.

CAUTION

Danger of explosion if the internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions or recycle them at a local recycling facility or battery collection point.

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.

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
- Block Diagram
- Board Overview
- Board Dimensions

1.1 Introduction

MI963F is a Mini ITX single board computer based on the platform of AMD® Embedded G-series (SoC) APU. It offers high-definition visual experience and high performance on graphics processing and parallel processing. It can also be well utilized for designs of low power consumption in a board range of markets, including industrial control & automation, digital signage, thin client, electronic gaming machines, and SMB storage appliances.

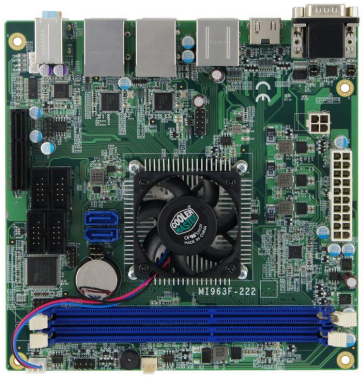


Photo of MI963F

1.2 Features

- Onboard AMD® Embedded G-series SoC
- 2 x DDR3/L-1600/1866 UDIMM slots, expandable up to 8GB, ECC supported per CPU SKUs
- Output through 2 HDMI ports
- Configurable watchdog timer and digital I/O
- 2 x Intel® PCI-E Gigabit LAN
- 2 x GbE LAN, 6 x USB 2.0, 2x USB 3.0, 6 x COM, 2 x SATA III
- 1x PCIe (x4) slot

1.3 Packing List

Your MI963F package should include the items listed below. If any of the items below is missing, contact the distributor or dealer from whom you purchased the product.

- MI963F Motherboard x 1
- I/O Shield x 1
- SATA Cable (SATA-1) x 1
- USB 2.0 Cable (USB2K-9) x 1
- COM Port Cable (PK1-2KA) x 1
- Disk (including chipset drivers) x 1
- This User's Manual x 1

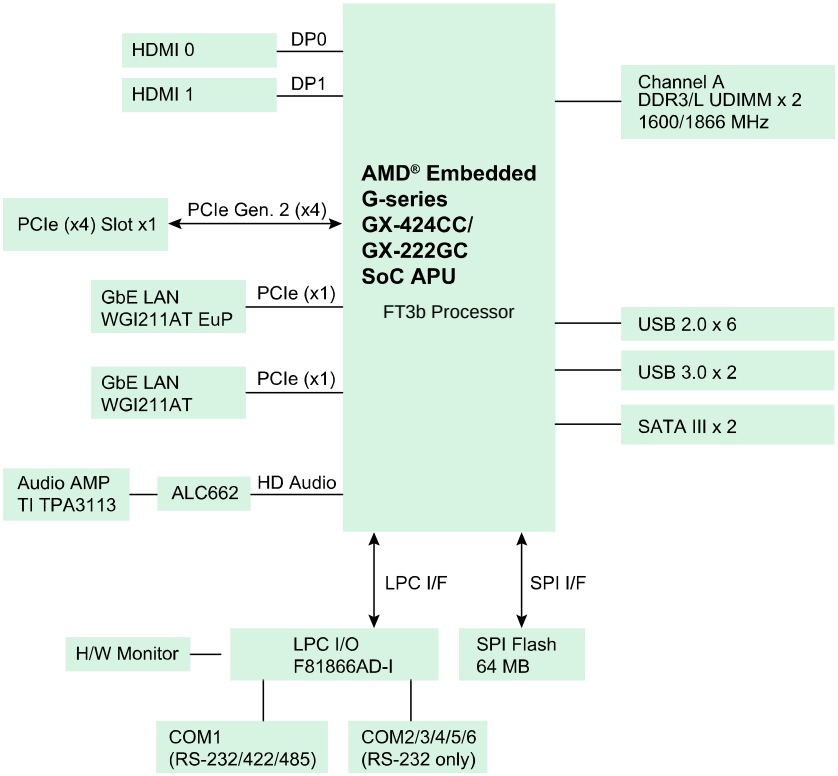
1.4 Specifications

Product Name	MI963F-424 (for GX-424CC)	MI963F-222 (for GX-222GC)
Form Factor	Mini ITX motherboard	
System		
Operating System	• Windows 10 / 8 / 7 • Linux	
CPU Type	AMD® Embedded G-series GX-424CC Quad Core SoC	AMD® Embedded G-series GX-222GC Dual Core SoC
CPU Speed	2.4 GHz	Up to 2.4 GHz
Chipset	Integrated	
Memory	2 x DDR3/L-1600/1866 UDIMM, single channel, expandable up to 8GB * ECC will be supported by identified CPU SKUs.	
Graphics	AMD® Radeon™ HD 8000 Series GPU	
Network	Intel® I211AT PCIe Gigabit Ethernet	
Super I/O	Fintek F81866AD-I	
Audio Codec	Realtek ALC662-VD0-GR with TI TPA3113D2 speaker amplifier	
Power Supply	ATX Power	
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec / min)	
BIOS	AMI BIOS	
Dimensions	170 x 170 mm (6.7” x 6.7”)	
RoHS	Yes	
Certification	CE, FCC Class B	
I/O Ports		
HDMI	2 x HDMI 1.4a Resolution up to 3840 x 2160 at 30Hz	

LAN	2 x RJ45 GbE LAN
USB	• **2 x USB 3.0:** I/O coastline connectors • **6 x USB 2.0:** - 4 ports are I/O coastline connectors. - 2 ports via an on-board pin header
Serial	**6 x COM ports:** • COM1: RS-232/422/485 (I/O coastline connector, jumper-less selection) • COM2: RS-232 only (I/O coastline connector) • COM3 ~ COM6: RS-232 only (via on-board box-headers)
SATA	2 x SATA III (6.0 Gb/s)
Audio Jack	• 1 x Line-In • 1 x Line-Out • 1 x Microphone Input
Digital IO	4 In & 4 Out, ATX power connector
Expansion Slots	1 x PCIe (x4) slot
Environment	
Temperature	• Operation: 0 ~ 60 °C • Storage: -20 ~ 80 °C
Relative Humidity	0 ~ 90 %, non-condensing at 60 °C

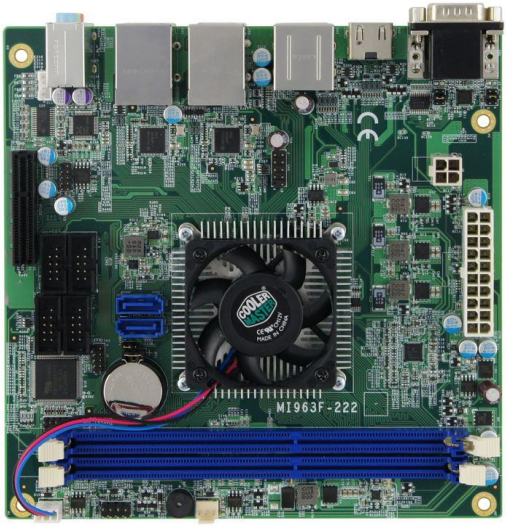
All specifications are subject to change without prior notice.

1.5 Block Diagram

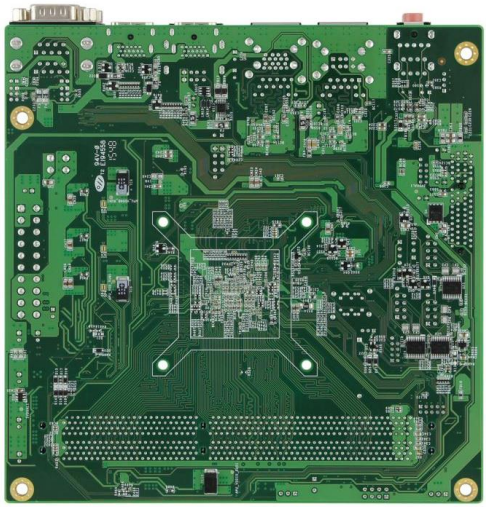


1.6 Overview

Top View

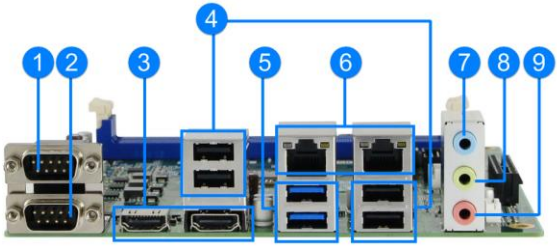


Bottom View



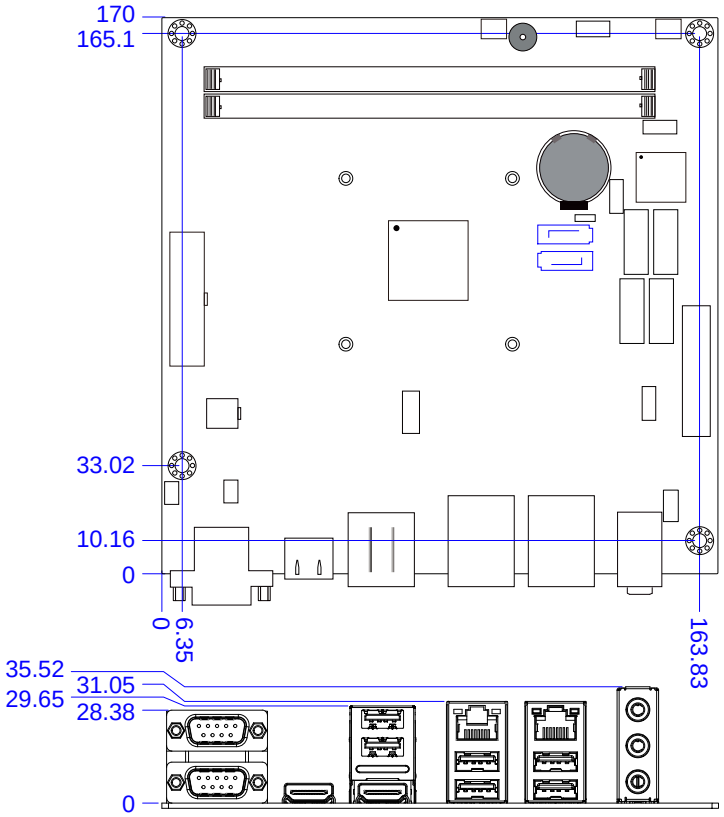
* The photos above are for reference only. Some minor components may differ.

I/O View



No.	Name	No.	Name
1	COM1 Port	6	LAN Port
2	COM2 Port	7	Line-In
3	HDMI Port	8	Line-Out
4	USB 2.0 Port	9	Microphone Input
5	USB 3.0 Port		

1.7 Dimensions



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Chapter 2
Hardware Configuration

This section provides information on jumper settings and connectors on the MI963F in order to set up a workable system. On top of that, you will also need to install crucial pieces such as the CPU and the memory before using the product. The topics covered are:

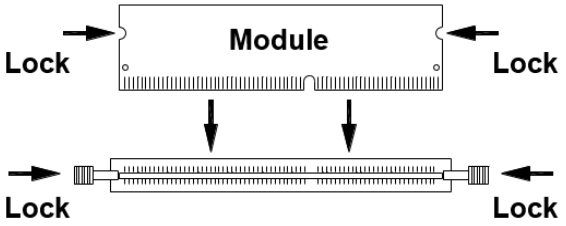
- Essential installations before you begin:
  CPU and the memory
- Jumper and connector locations
- Jumper settings and information of connectors

2.1 Essential Installations Before You Begin

Follow the instructions below to install the memory.

2.1.1 Installing the Memory

The MI963F board supports two DDR3/L memory sockets for a maximum total memory of 8 GB. To install the modules, locate the memory slot on the board and perform the following steps:



1. Hold the module so that the key of the module aligned with that on the memory slot.
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.

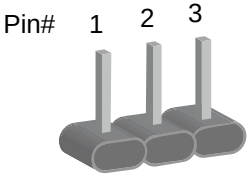
To remove the module, press the clips outwards with both hands

2.2 Setting the Jumpers

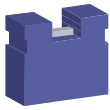
Set up and configure your MI963F by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

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.

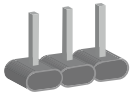
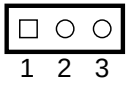
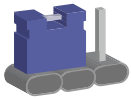
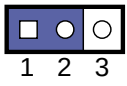
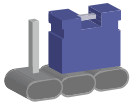
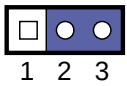


A 3-pin jumper



A jumper cap

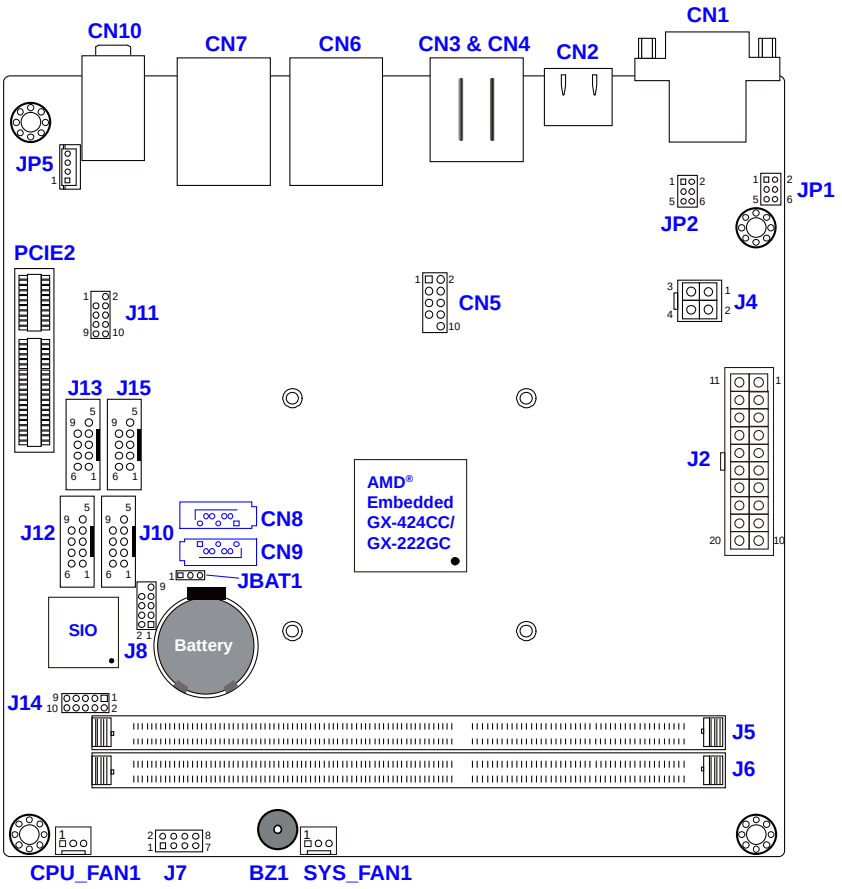
Refer to the illustration below to set jumpers.

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**.

2.3 Jumper & Connector Locations on MI963F

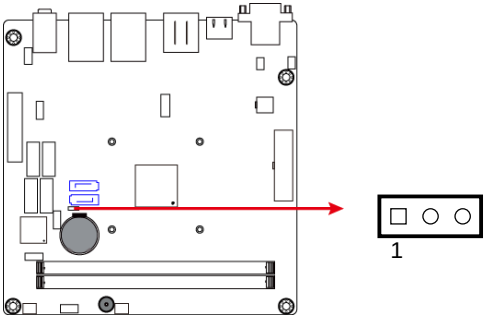


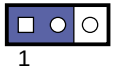
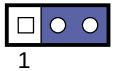
Board diagram of MI963F

2.4 Jumpers Quick Reference

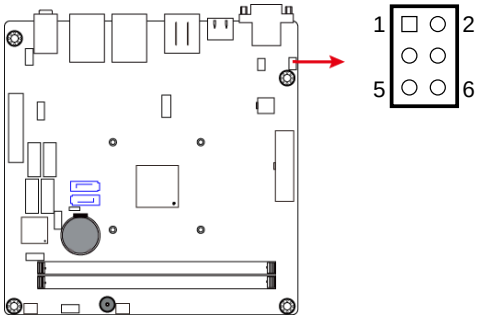
Function	Jumper Name	Page
CMOS Data Clearance	JBAT1	15
COM1 RS-232/422/485 Power Selection	JP1	16
COM2 RS-232 Power Selection	JP2	17

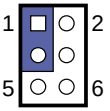
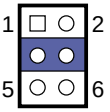
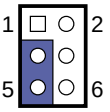
2.4.1 CMOS Data Clearance (JBAT1)



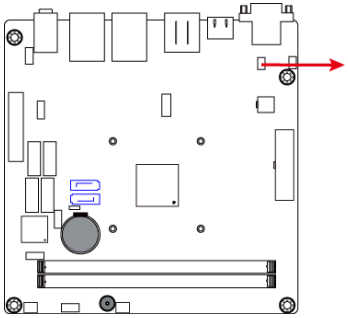
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear CMOS	2-3	

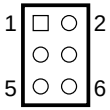
2.4.2 COM1 RS-232/422/485 Power Selection (JP1)

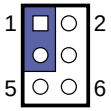
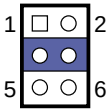
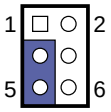


Function	Pin closed	Illustration
12V	1-3	
RI (default)	3-4	
5V	3-5	

2.4.3 COM2 RS-232 Power Selection (JP2)



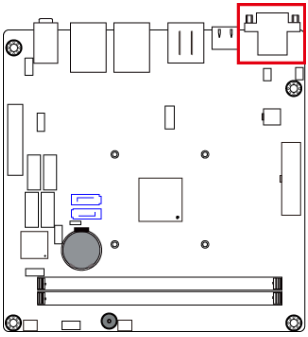


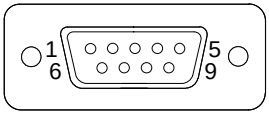
Function	Pin closed	Illustration
12V	1-3	
RI (default)	3-4	
5V	3-5	

2.5 Connectors Quick Reference

Function	Connector Name	Page
COM1 & COM2 Ports	CN1	19
HDMI Port	CN2, CN3	20
USB 2.0 Ports	CN4	20
LAN Port and USB 3.0 Ports	CN6	20
LAN Port and USB 2.0 Ports	CN7	21
HD Audio Jacks	CN10	21
SATA III Port	CN8, CN9	21
USB 2.0 Connector	CN5	22
Amplifier Connector	JP5	22
ATX Power Supply Connector	J2	23
ATX 12V Power Connector	J4	24
DDR3/L UDIMM Socket	J5, J6	24
Front Panel Connector	J7	25
COM3 / COM4 / COM5 / COM6 RS-232 Ports	J10, J13, J12, J15	26
Digital I/O Connector	J14	27
CPU Fan Power Connector	CPU_FAN1	27
System Fan Power Connector	SYS_FAN1	28
PCIe (x4) Slot	PCIE2	28
Factory Use Only	J8, J11	- -

2.5.1 COM1 & COM2 Port (CN1)





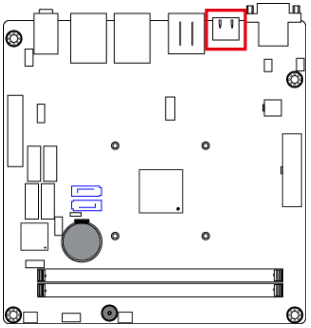
COM1 port is jumper-less and configurable in BIOS.

Pin	Assigment	Pin	Assigment
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	GND, ground		

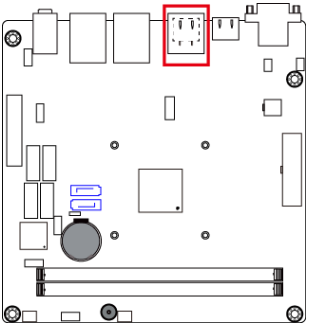
Pin	Assignment		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

2.5.2 HDMI Port (CN2, CN3)

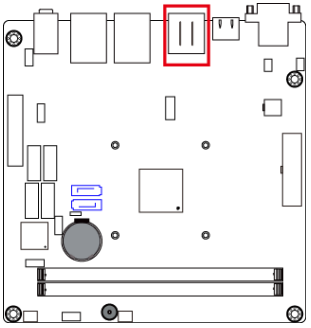
CN2:



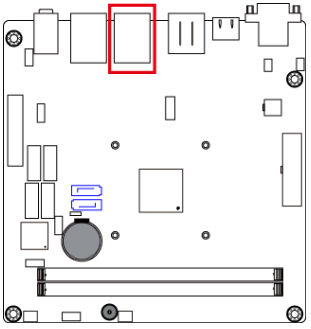
CN3:



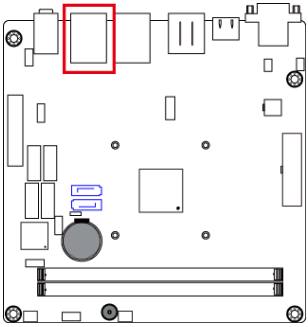
2.5.3 USB 2.0 Ports (CN4)



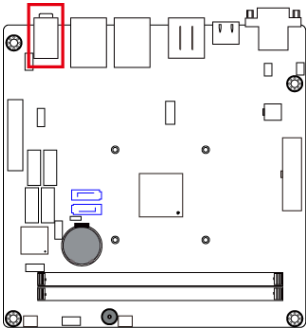
2.5.4 LAN Port & USB 3.0 Ports (CN6)



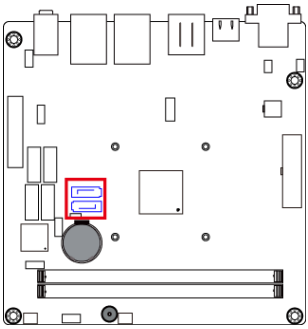
2.5.5 LAN Port & USB 2.0 Ports (CN7)



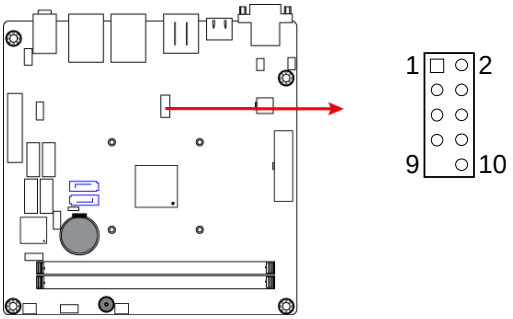
2.5.6 HD Audio Jacks (CN10)



2.5.7 SATA III Port (CN8, CN9)

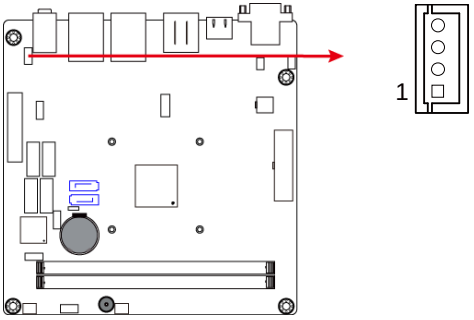


2.5.8 USB2.0 Connectors (CN5)



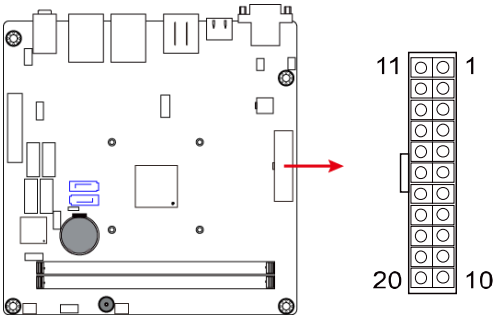
Pin	Assigment	Pin	Assigment
1	VCC	2	VCC
3	D0-	4	D1-
5	D0+	6	D1+
7	Ground	8	Ground
9	- -	10	NC

2.5.9 Amplifier Connector (JP5)



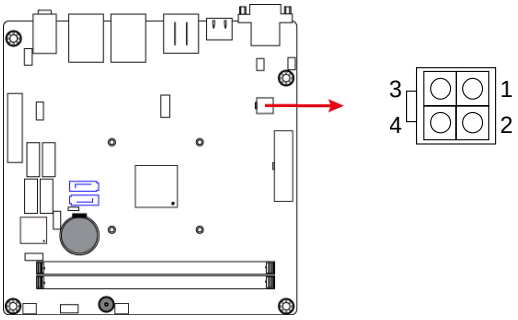
Pin	Assigment	Pin	Assigment
1	OUTR+	3	OUTL-
2	OUTR-	4	OUTL+

2.5.10 ATX Power Supply Connector (J2)



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

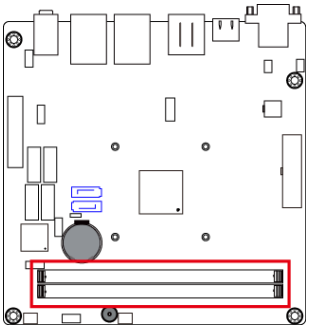
2.5.11 ATX 12V Power Connector (J4)



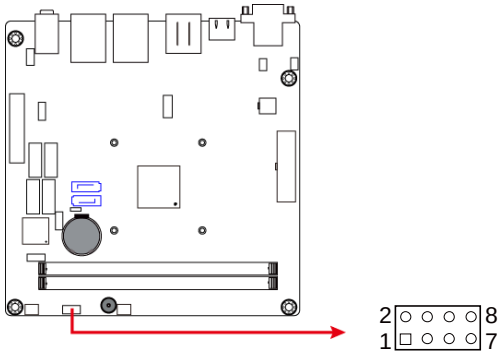
J16 connector supplies the CPU operating voltage.

Pin	Assigment	Pin	Assigment
1	Ground	3	+12V
2	Ground	4	+12V

2.5.12 DDR3/L UDIMM Socket (J5, J6)



2.5.13 Front Panel Function Connector (J7)



Pin	Assigment	Pin	Assigment
1	Ground	2	PWR_SW
3	HDD_LED+	4	HDD_LED-
5	Ground	6	Reset
7	PWR_LED+	8	PWR_LED-

J7 is utilized for system indicators to provide light indication of the computer activities and switches to change the computer status. It provides interfaces for the following functions.

- **ATX Power ON Switch (Pins 1 and 2)**

  The 2 pins makes an “ATX Power Supply On/Off Switch” for the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will power off the system.

- **Hard Disk Drive LED Connector (Pins 3 and 4)**

  This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

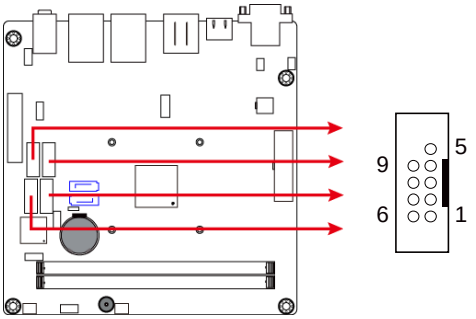
- **Reset Switch (Pins 5 and 6)**

  The reset switch allows you to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

- **Power LED: Pins 7 and 8**

  This connector connects to the system power LED on control panel. This LED will light when the system turns on.

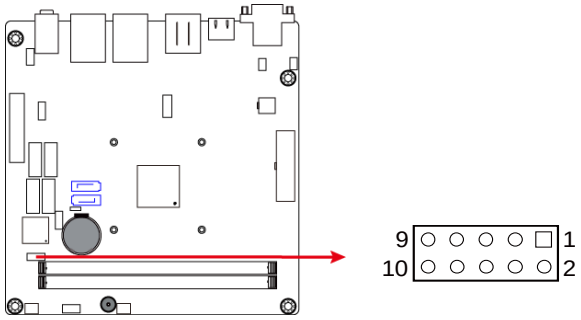
2.5.14 COM3 ~ COM6 RS-232 Ports (J10, J13, J12, J15)



COM3: J10
COM4: J13
COM5: J12
COM6: J15

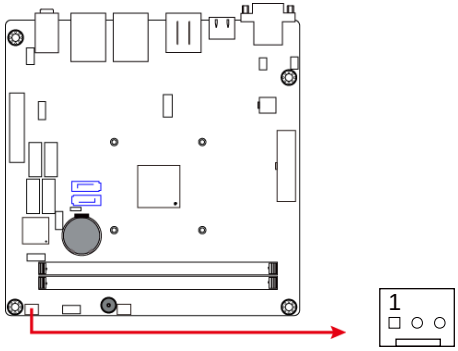
Pin	Assigment	Pin	Assigment
1	DCD#	6	DSR#
2	SIN	7	RTS#
3	SOUT	8	CTS#
4	DTR#	9	RI#
5	GND	10	--

2.5.15 Digital I/O (J14)



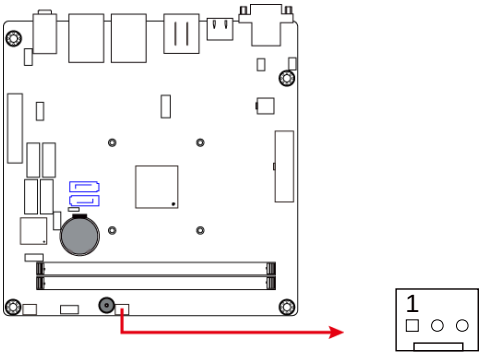
Pin	Assigment	Pin	Assigment
1	GND	2	VCC
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	IN0

2.5.16 CPU Fan Power Connector (CPU_FAN1)



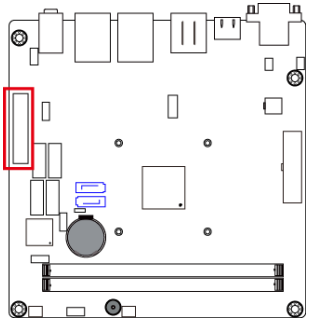
Pin	Assigment	Pin	Assigment
1	Ground	3	Rotation detection
2	+12V		

2.5.17 System Fan1 Power Connector (SYS_FAN1)



Pin	Assigment	Pin	Assigment
1	Ground	3	Rotation detection
2	+12V		

2.5.18 PCIe (x4) Slot (PCIE2)



Chapter 3
Drivers Installation

This chapter introduces installation of the following drivers:

- VGA Driver
- HD Audio Driver
- LAN Driver

3.1 Introduction

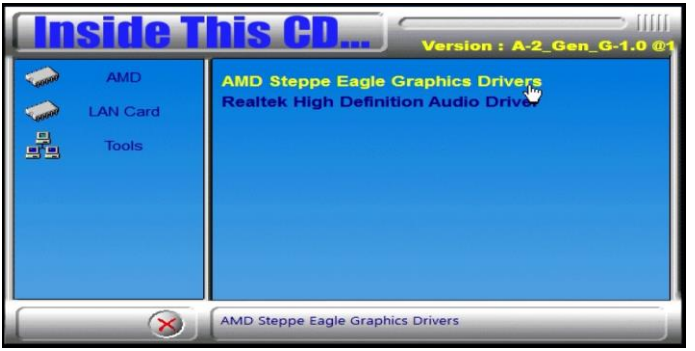
This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find anything missing, please contact the distributor where you made the purchase. The contents of this section include the following:

Note: You must install your Windows operating system before proceeding with the AMD drivers installation.

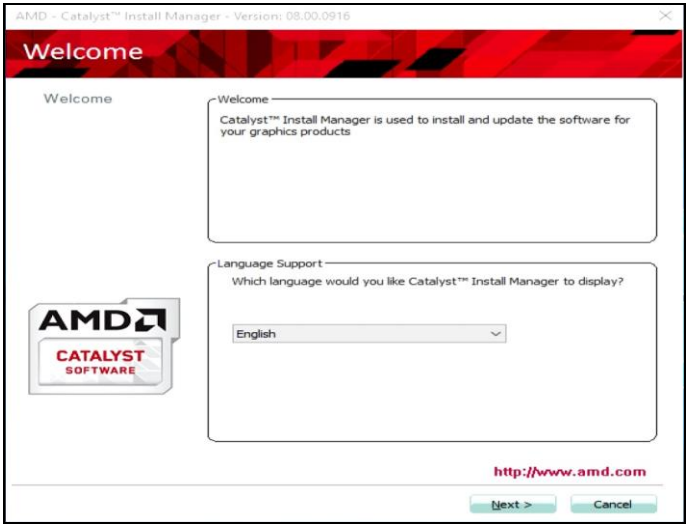
3.2 VGA Driver Installation

1. Insert the disk enclosed in the package with the board. Click **AMD** on the left pane and then **AMD Steppe Eagle Drivers** on the right pane.

2. Click **AMD Steppe Eagle Graphics Drivers**.

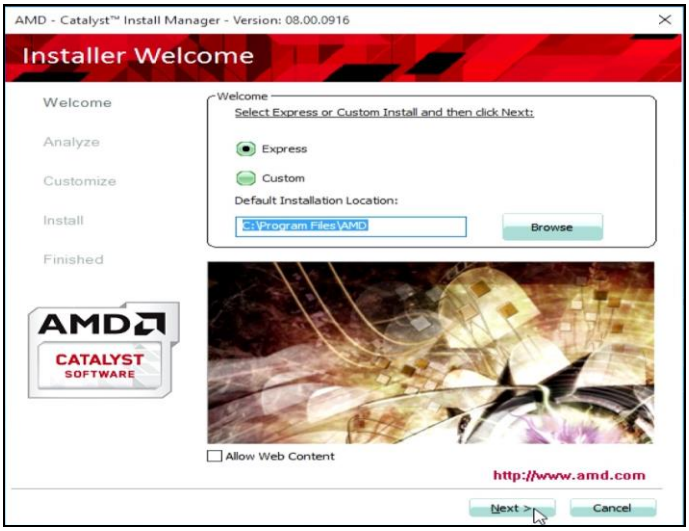


3. When the *Welcome* screen appears, click **Next** to continue.



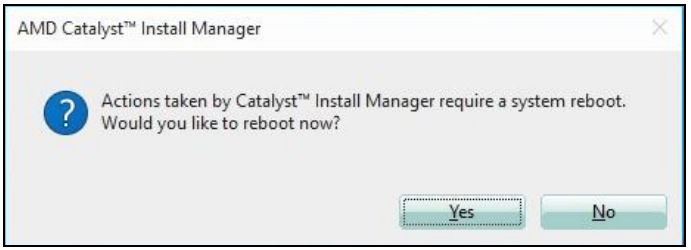
4. Select your language and click **Next**.

5. Select **Express** and assign a default installation location. Click **Next**.



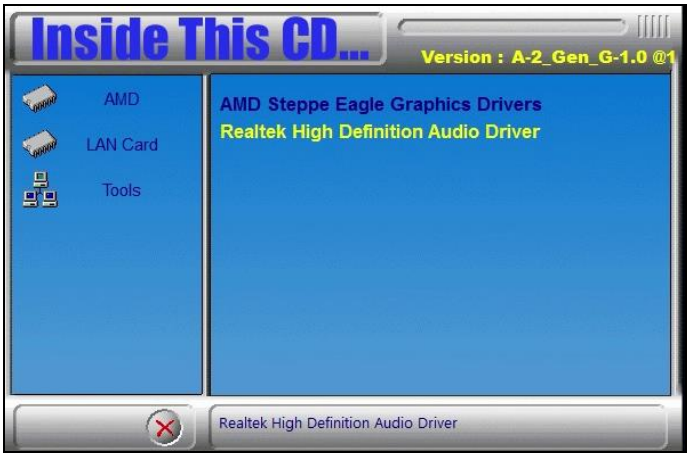
6. Accept the end user license agreement.

7. The AMD Catalyst™ will require a system reboot. Click **Yes**.

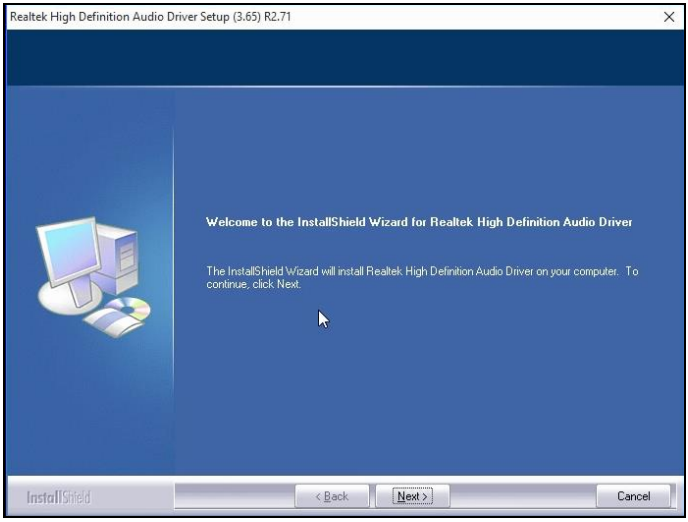


3.3 HD Audio Driver Installation

1. Insert the disk enclosed in the package with the board. Click **AMD** on the left pane and then **Realtek High Definition Audio Driver** on the right pane.



2. On the *Welcome* screen of the InstallShield Wizard, click **Next** for installation.

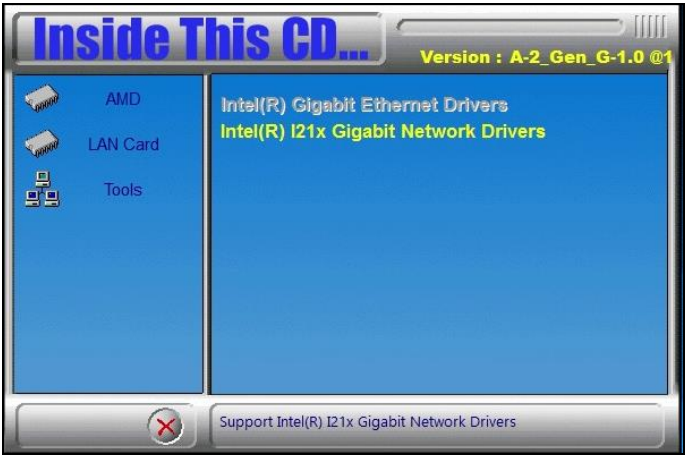


3. The installation is complete. Click **Finish** to restart the computer and for changes to take effect.

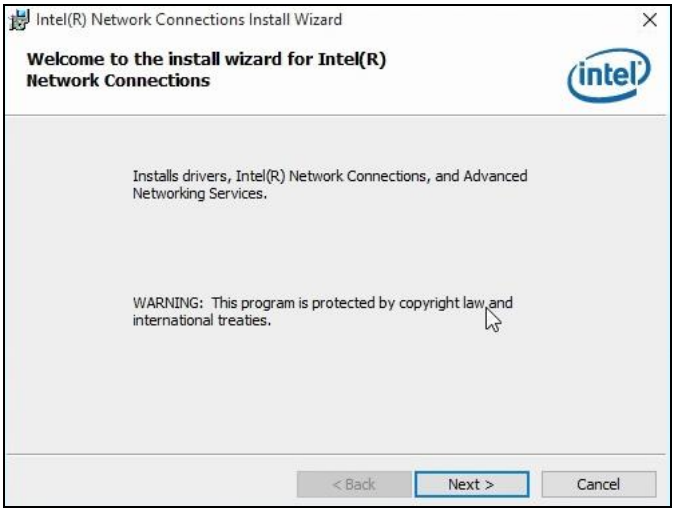
3.4 LAN Driver Installation

1. Insert the disk enclosed in the package with the board. Click **LAN Card** on the left pane and then **Intel LAN Controller Drivers** on the right pane.

2. Click **Intel(R) I21x Gigabit Network Drivers.**.

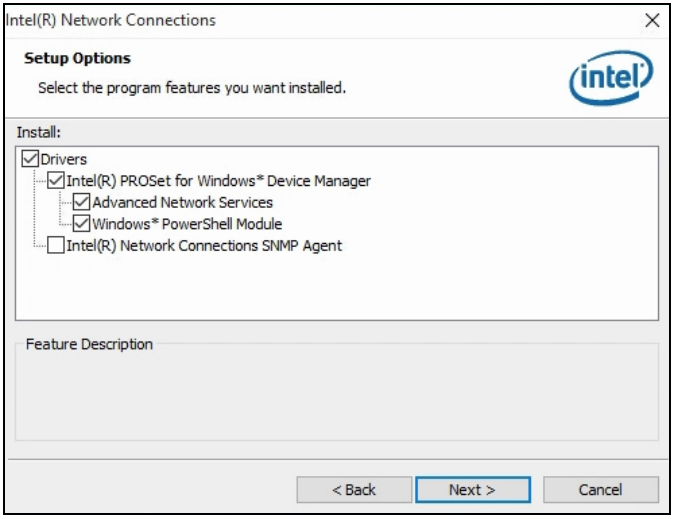


3. When the *Welcome* screen appears, click **Next**.



4. Accept the license agreement and click **Next**.

5. On the *Setup Options* screen, click the checkbox to select the desired driver(s) for installation. Then click **Next** to continue.



6. The wizard is ready for installation. Click **Install**.

7. As the installation is complete, click **Finish** and restart the computer for changes to take effect.

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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

4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports AMD® 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
```

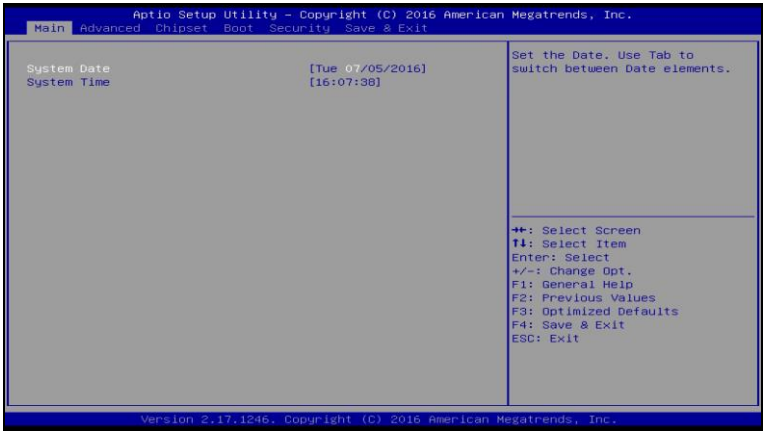
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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.

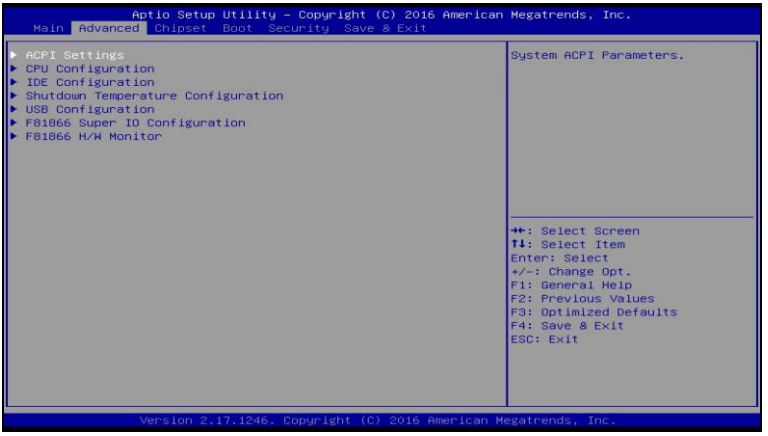
4.3 Main Settings



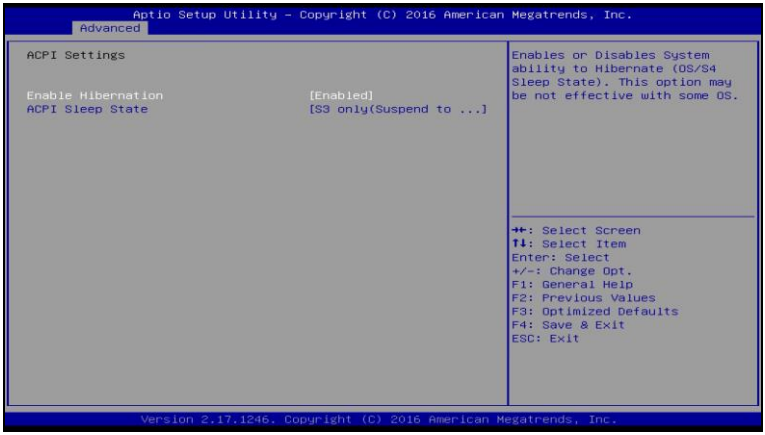
BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the data elements.
System Time	Set the time. Use the <Tab> key to switch between the data elements.

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.

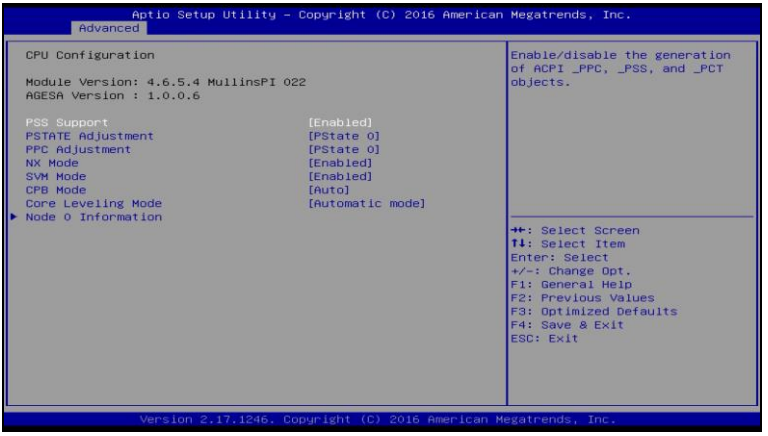


4.4.1 ACPI Computing



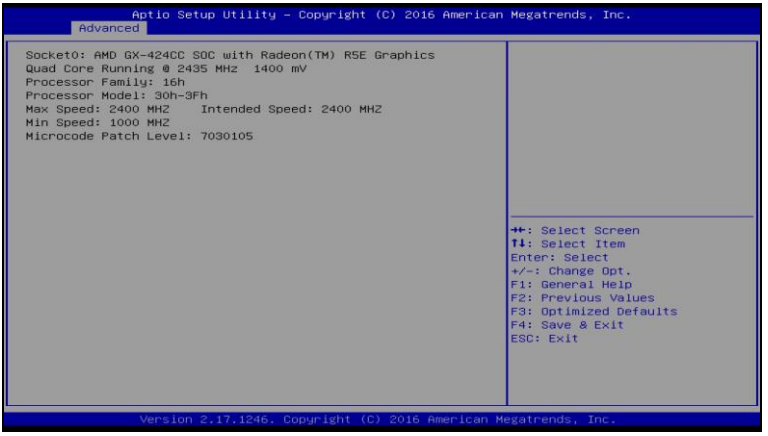
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Selects an ACPI sleep state where the system will enter when the Suspend button is pressed.

4.4.2 CPU Configuration

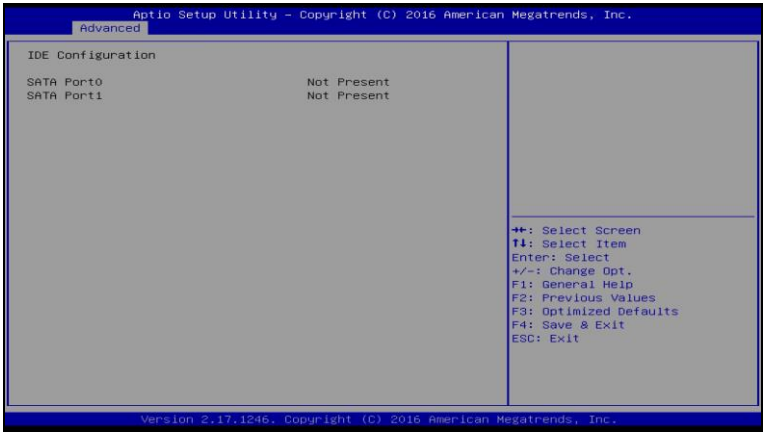


BIOS Setting	Description
PSS Support	Enables / Disables the generation of ACPI _PPC, _PSS, and _PCT objects.

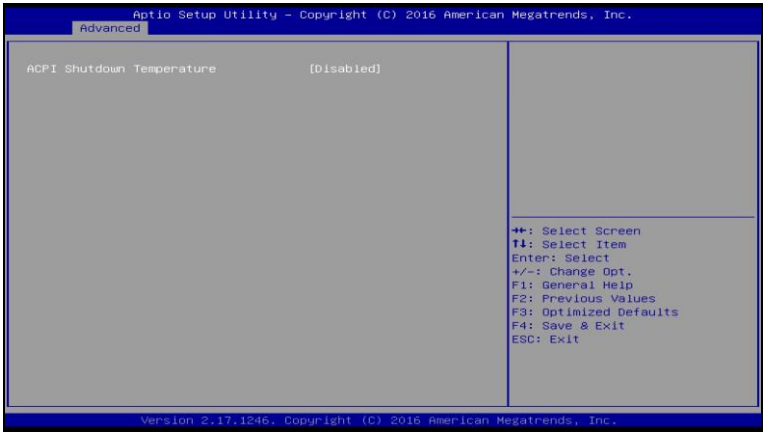
4.4.2.1. Node 0 Information



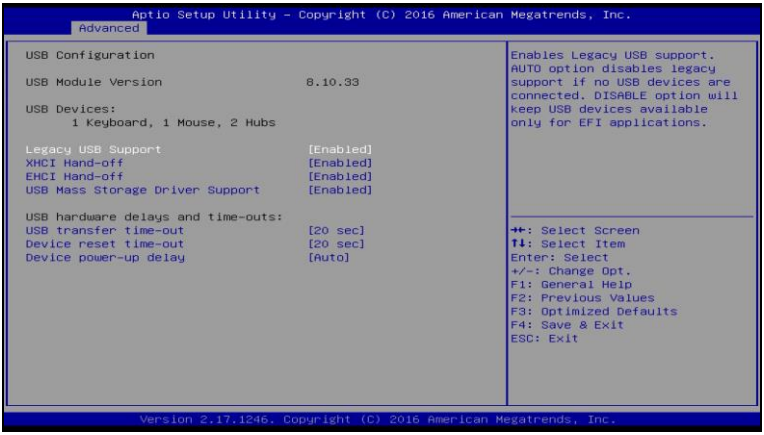
4.4.3 IDE Configuration



4.4.4 Shutdown Temperature Configuration

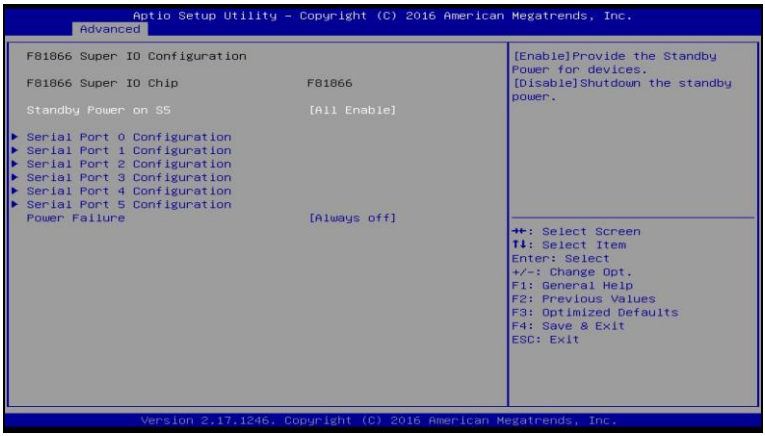


4.4.5 USB Configuration



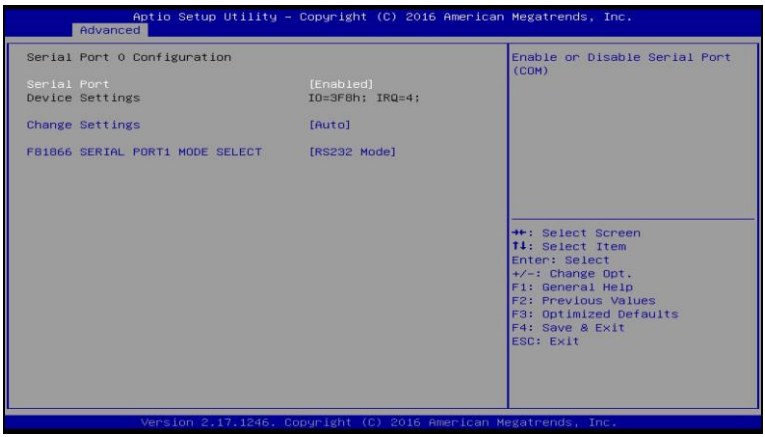
BIOS Setting	Description
Legacy USB Support	Enables Legacy USB support. "Auto" disables legacy support if there is no USB device connected. "Disable" keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change 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 Mass Storage Driver Support	Enables / Disables the support for USB mass storage driver.
USB Transfer time-out	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	Seconds of delaying execution of start unit command to USB mass storage device.
Device power-up delay	The 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. But for a Hub port, the delay is taken from Hub descriptor.

4.4.6 F81866 Super IO Configuration

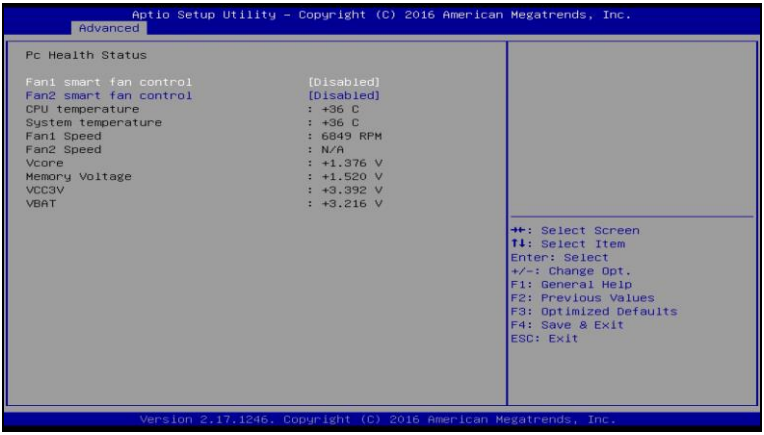


BIOS Setting	Description
Serial Port Configuration	Sets parameters of Serial Ports. Enables / Disables the serial port and select an optimal setting for the Super IO device.

4.4.6.1. Serial Port 0 Configuration

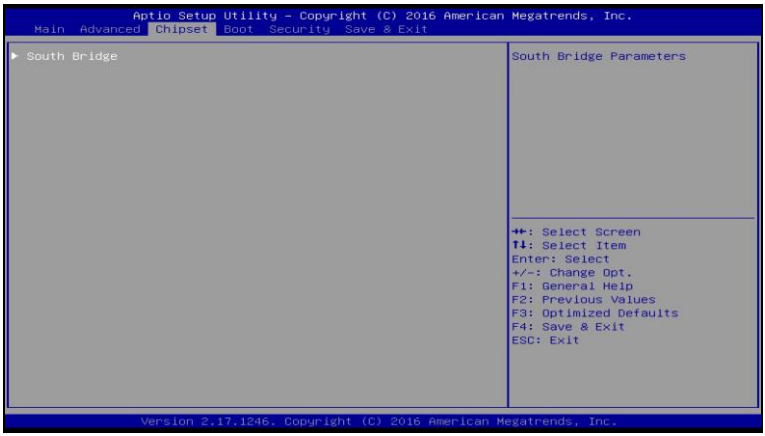


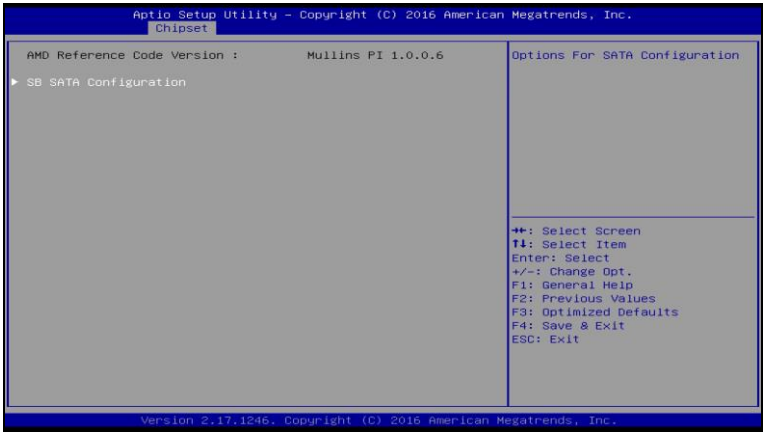
4.4.7 F81866 Hardware Monitor

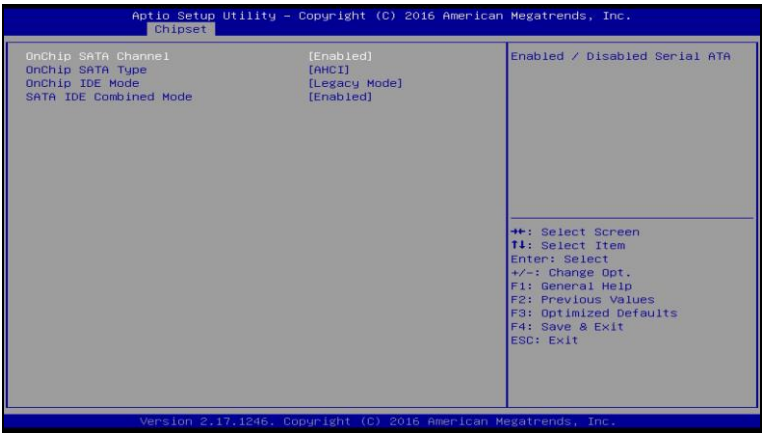


BIOS Setting	Description
Smart fan control	Enables / Disables the smart fan feature.
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.5 Chipset Settings

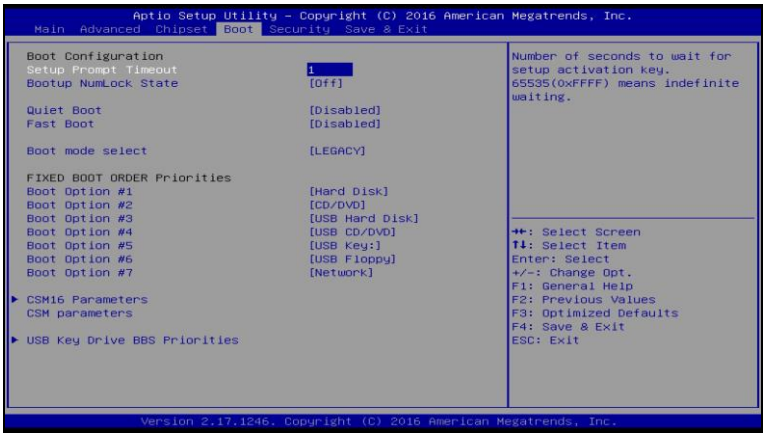


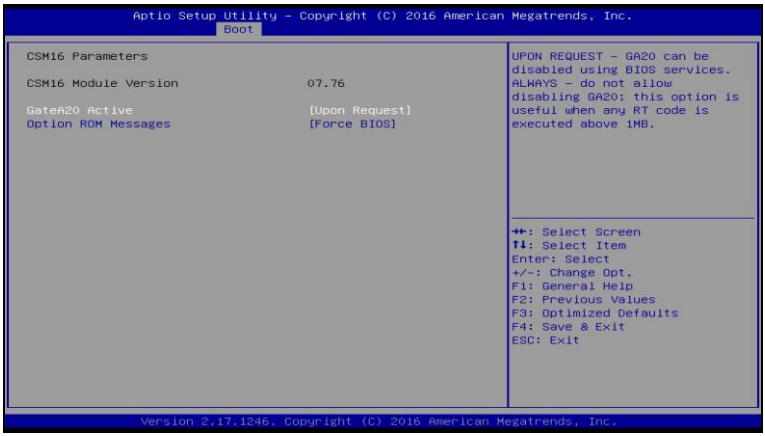


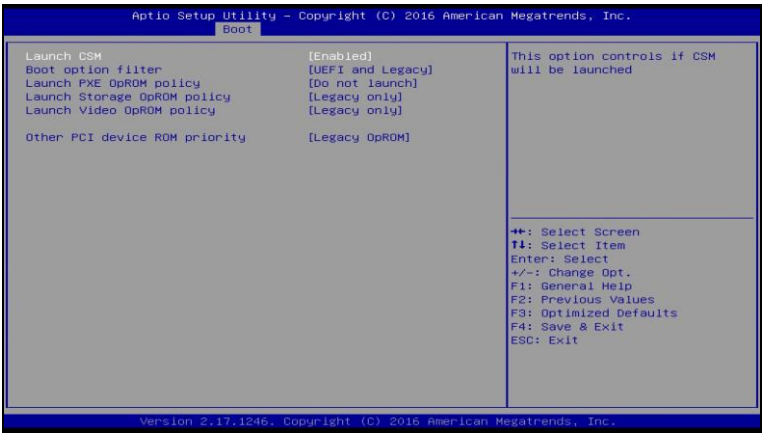


BIOS Setting	Description
OnChip SATA Channel	Enables / Disables Serial ATA.

4.6 Boot Settings

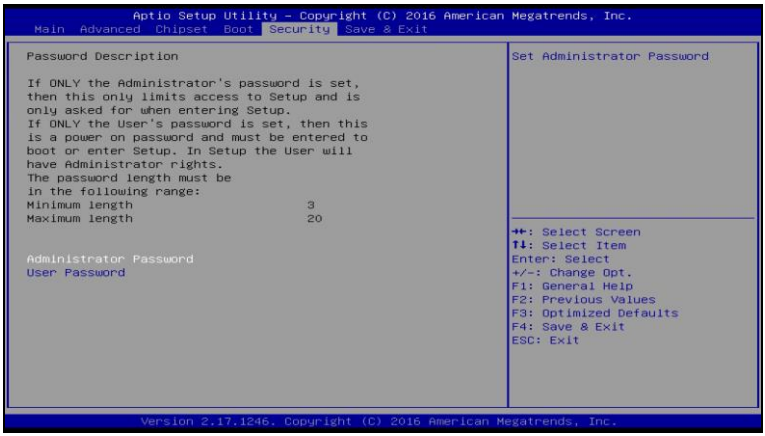






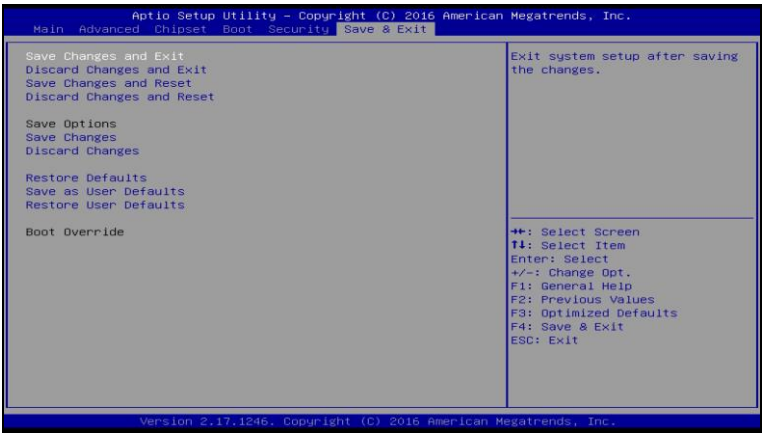
BIOS Setting	Description
Launch CSM	Enables / Disables the launch of CSM.

4.7 Security Settings



BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.

4.8 Save & Exit Settings



BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Discard Changes and Exit	Exits system setup without saving any changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Save Changes	Saves changes done so far to any of the setup options.
Discard Changes	Discards changes done so far to any of the setup options.
Restore Defaults	Restores / Loads defaults values for all the setup options.
Save as User Defaults	Saves the changes done so far as User Defaults.
Restore User Defaults	Restores 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.

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
0000h-0000h	Direct memory access controller
0010h-001Fh	Motherboard resources
0020h-0021h	Programmable interrupt controller
0022h-003Fh	Motherboard resources
0040h-0043h	System timer
0044h-005Fh	Motherboard resources
0061h-0061h	System speaker
0063h-0063h	Motherboard resources
0065h-0065h	Motherboard resources
0070h-0071h	System CMOS/real time clock
0072h-007Fh	Motherboard resources
0081h-0083h	Direct memory access controller
00F0h-00FFh	Numeric data processor
03B0h-03BBh	AMD Radeon™ R5E Graphic
0238H-023Fh	Communications Port (COM5)
02E8H-02EFh	Communications Port (COM4)
02F8H-02FFh	Communications Port (COM2)
0338H-033Fh	Communications Port (COM6)
03E8H-03EFh	Communications Port (COM3)
03F8H-03FFh	Communications Port (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
IRQ 0	System timer
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM3)
IRQ 7	Communications Port (COM4)
IRQ 10	Communications Port (COM5)
IRQ 11	Communications Port (COM6)
IRQ 13	Numeric data processor
IRQ 16	High Definition Audio Controller
IRQ 18	Standard Enhanced PCI to USB Host Controller
IRQ 18	Standard Enhanced PCI to USB Host Controller
IRQ 19	AMD SATA Controller

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

```
//---------------------------------------------------------------------------
//
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// 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
```

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