FWA5104 Series

Networking Appliance

User's Manual

Version: 1.1

Table of Content

Foreword

Every effort has been made to ensure that the contents of this manual are correct and up to date. However, the manufacturer makes no guarantee regarding the accuracy of its contents, and reserves the right to make changes without prior notice.

Safety Information

FWA5104 is designed and tested to meet the latest standards of safety for information technology equipment. However, to ensure your safety, it is important that you read the following safety instructions.

Setting up your system

- Read and follow all instructions in the documentation before you operate your system.
- Do not use this product near water.
- Set up the system on a stable surface or secure on wall with the provided rail. Do not secure the system on any unstable plane or without the rail.
- Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
- Slots and openings on the chassis are for ventilation. Do not block or cover these openings. Make sure you leave plenty of space around the system for ventilation. Never insert objects of any kind into the ventilation openings.
- This system should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
- Use this product in environments with ambient temperatures between 0˚C and 45˚C.
- If you use an extension cord, make sure that the total ampere rating of the devices plugged into the extension cord does not exceed its ampere rating.

Care during use

- Do not walk on the power cable or allow anything to rest on it.
- Do not spill water or any other liquids on your system.
- When the system is turned off, a small amount of electrical current still flows.
- Always unplug all power, and network cables from the power outlets before cleaning the system.
- If you encounter the following technical problems with the product, unplug the power cord and contact a qualified service technician or your retailer.
  - The power cable or plug is damaged.
  - Liquid has been spilled into the system.
  - The system does not function properly even if you follow the operating instructions.
  - The system was dropped or the cabinet is damaged.

Lithium-Ion Battery Warning

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

NO DISASSEMBLY

The warranty does not apply to the products that have been disassembled by users

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

CAUTION: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

CE Mark Warning

This is a Class B product, in a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Chapter 1 Introduction

The FWA5104 series are specifically designed for the networking appliance market.

Network Security Applications:
• Firewall
• Virtual Private Network
• Proxy Server
• Caching Server

Network Management Applications:
• Load balancing
• Quality of Service
• Remote Access Service

The FWA network appliance product line covers the spectrum from offering platforms designed for :

• SOHO
• SMB
• Enterprise

Each product is designed to address the distinctive requirements of its respective market segment from cost effective entry-level solutions to high throughput and performance-bound systems for the Enterprise level.

Chapter 2 System Specification

Product Description

FWA5104 incorporates AMD G-Series SoC. Currently, it is available in the following model:

Model	AMD SoC		Fanless	Mini DP	2.5” HDD Support
FWA5104-4CG	GX-412HC	Quad Core 1.2 GHz	Yes	Yes	Yes
FWA5104-4C	GX-412TC	Dual Core 1.0 GHz	Yes	No	Yes

FWA5104 Features

- Supports AMD G-Series SoC
- 1 x DDR3L SO-DIMM, up to 8GB
- 4 GbE ports with one bypass segment
- Half-sized Mini PCI-e slot and Cfast socket
- Fanless design for easier maintenance

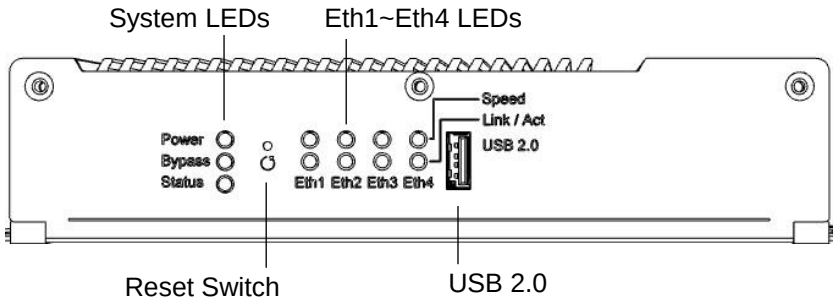
FWA5104 Specifications

Product Name	FWA5104-4CG or FWA5104-4C
Form Factor	Desktop
CPU Type Operating Frequency	AMD G-Series Crowned Eagle SoC, 28nm process technology MBN500-4CG: AMD GX-412HC Quad Core 1.2GHz [TPD = 7W] MBN500-4C: AMD GX-412TC Dual Core 1.0GHz [TDP = 6W]
BIOS	AMI BIOS 64Mb
Memory	One DDR3L SO-DIMM socket, Non-ECC, unbuffered
Display	N/A
Ethernet controller	Intel I211-AT PCI Express Gigabit ethernet controller x4
LAN	Eth1, 2, 3 & 4: Intel I211-AT @ RJ45 with LED
Network Bypass	One Bypass segment (Eth3/4) Control by GPIO / Watchdog
Storage	● Onboard Cfast Socket x 1 ● 2.5” HDD Bay x 1
Front Edge	● System LED: Power (Green) / Bypass (Green/Red) / Status (Yellow/Red) ● LAN LED: Link/Active (Green) x 4; LAN Speed (Yellow/Green) x 4 ● 1 x Mini DP (FWA5104-4CG only) ● Factory Mode Restore Reset Switch (GPIO control) ● 1 x USB 2.0 receptacle
Rear Edge	● 1 x RJ45 Console ● 2 x USB 3.0 receptacle ● 4 x RJ45 GbE port with status LED ● 1 x Power on/off switch ● 2 USB 2.0 ● Cylindrical (Tip) Connector DC +12V inlet with screw lock
Internal I/O Headers	● 1 x DC Fan 3-pin Connector ● 1 x DC-in 2-pin header (12V) ● 2 x USB 2.0 by DF11 8-pin connector ● 1 x COM2 by DF11 8-pin connector ● 1 x SATA 3.0 data 7-pin connector ● 1 x SATA power (5V) 4-pin JST connector ● 1 x Cfast socket ● 1 x mini PCIe half-size socket
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec/min)
Expansion Slot	Mini PCIe half-size socket x 1
Power Supply	● Full range 40W Adapter / 12V (Optional)
Dimensions	187.5 (W) x 116 (D) x 42 (H) mm
Operation Temperature	HDD: 0 ~ 40 ˚C (32 ~ 104 ˚F) SSD: 0 ~ 45 ˚C (32 ~ 113 ˚F)

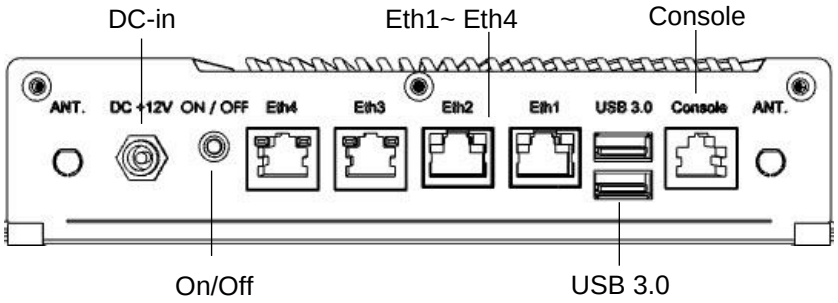
Storage Temperature	-20 ~ 80 ˚C (-4 ~ 176 ˚F)
Operation Humidity	10 ~ 90% @ 45°C, (non-condensing)
Certifications	CE, FCC, LVD

Chapter 3 Hardware Configuration

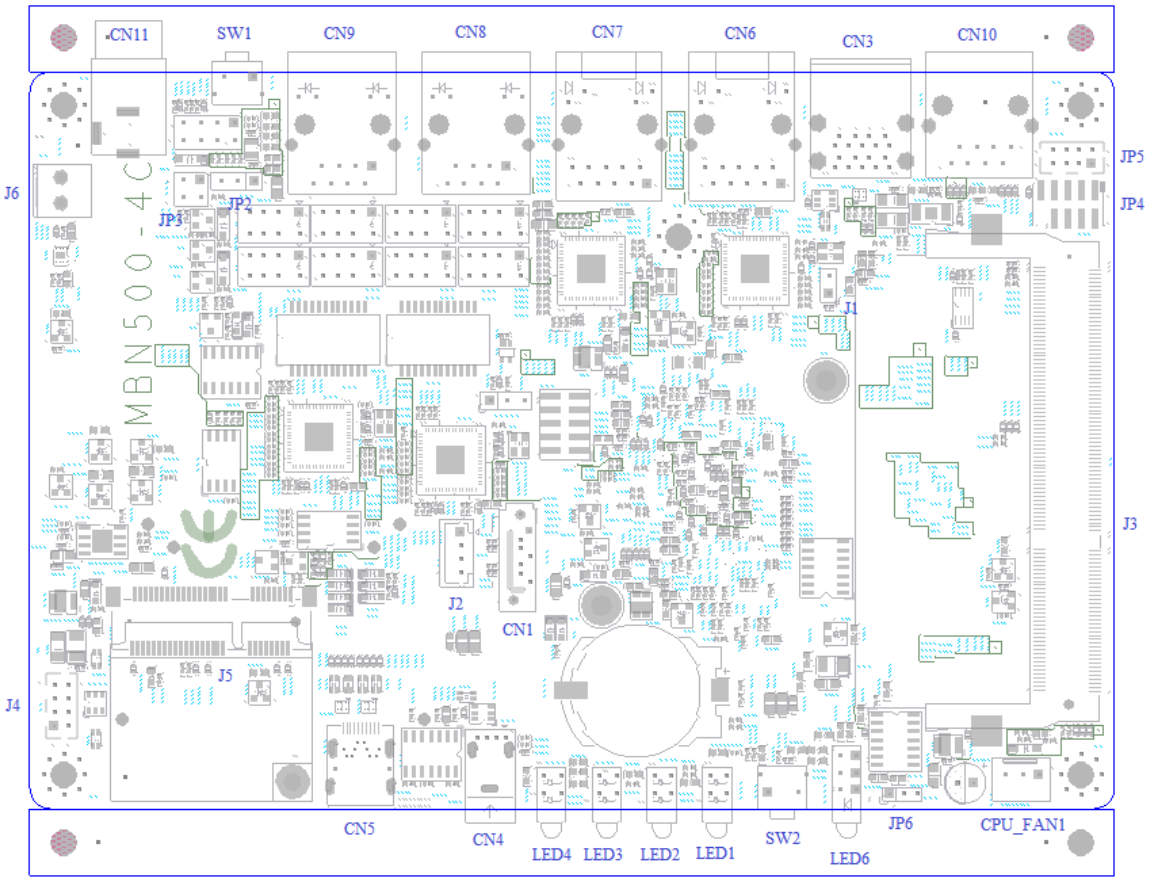
Front Panel Features



Rear Panel Features



Jumper and Connector Locations on MBN500



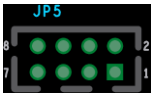
J1: SPEAKER (Reserved)

Pin #	Signal Name
1	VCC5
2	SPKR#

JBAT1: Clear CMOS Setting

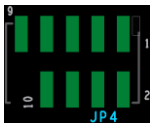
JP2	Setting
	Normal
	Clear CMOS

JP5: LCM COM2



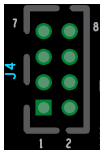
Signal Name	Pin #	Pin #	Signal Name
VCC5	1	2	VCC5
SOUT2	3	4	RTS#2
SIN2	5	6	CTS#2
GND	7	8	GND

JP4: LPC Debug Port



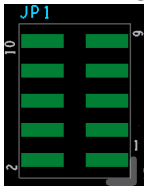
Signal Name	Pin #	Pin #	Signal Name
LPC_AD0	1	2	SIO_PLTRST#
LPC_AD1	3	4	LPC_FRAME#
LPC_AD2	5	6	+3.3V
LPC_AD3	7	8	Ground
LPC_CLK	9		

J4 : USB2.0 Ports



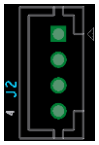
Signal Name	Pin #	Pin #	Signal Name
+5V	1	2	GND
P4-	3	4	P5+
P4+	5	6	P5-
GND	7	8	+5V

JP1: SPI Debug Port



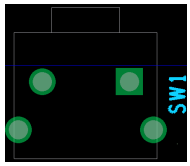
Signal Name	Pin #	Pin #	Signal Name
NC	1	2	NC
SPI_CS#0	3	4	3VDUAL
SPI_SO	5	6	SPI0_HOLD#
SPI0_WP#	7	8	SPI_CLK
GND	9	10	SPI_SI

J2: External SATA Power Connector (only for 2.5" SATA)



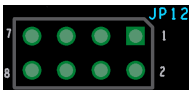
Pin #	Signal Name
1	+5V
2	Ground
3	Ground
4	NA

SW1: ATX On/Off



JP7: System Function Connector

JP12 provides connectors for system indicators that provide light indication of the computer activities and switches to change the computer status. JP7 is an 8-pin header that provides interfaces for the following functions



Power LED: Pin 1,2

The power LED indicates the status of the main power switch.

Pin #	Signal Name
1	+5V
2	GND

ATX Power ON Switch: Pin 3,4

This 2-pin connector is an “ATX Power Supply On/Off Switch” on 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 force the system to power off.

Pin #	Signal Name
3	Power_ON
4	GND

Hard Disk Drive LED Connector: Pin 5, 6

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

Pin #	Signal Name
5	+3.3V
6	-HDD_LED

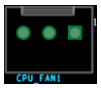
Reset Switch: Pin 7, 8

The reset switch allows the user 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.

Pin #	Signal Name
7	PM_SYSRST#
8	GND

CPU_FAN1: System Fan Power Connector

FAN1 is a 3-pin header for system fans. The fan must be 12V (Max. 1A).



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

LED6: Status LED

A1 & C1 : Status LED
A2 & C2 : Bypass LED
A3 & C3 : Power LED

SIGNAL NAME	Pin #	Pin #	Signal Name
SIO_GP27	A1	C1	SIO_GP26
ALARM_R	A2	C2	SIO_GP25
PWR_R	A3	C3	GND

Remark: It is controlled by Logical Device 7, Index port is 0x2E, Data port is 0x2F, GPIO24-27 Data Register: 0xE9 BIT4-7

CN11: DC power Jack (+12V only)

Remarks: CN11 and J6 cannot be connected at the same time.

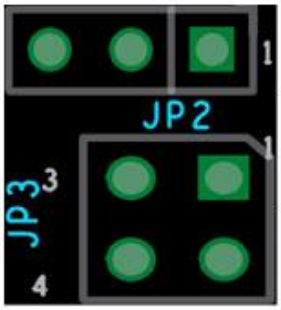
SW2: Software reset button

SIGNAL NAME	Pin #	Pin #	Signal Name
GND	1	2	GPIO_S5_7

JP6: SODIMM Power select

Pin #	Signal Name
1	MEM_1V5
2	GND
3	MEM_1V35

JP2 & JP3: Bypass Function select

JP2,JP3	Setting	Function	Power OFF	Power ON,OS run software
	JP2 Pin 2-3 Closed JP3Pin 1-2 Open & 3-4 Closed < Default >	System LAN bypass function is controlled by Super I/O GP23	LAN Bypass	GP23 Active: Low: Bypass High: Normal
		System will reboot upon the time out of watchdog timer.		WDT Reboot System
	JP2 Pin 1-2 Closed JP3 Pin 1-2 & 3-4 Open	System will Normal LAN upon the time out of watchdog timer.		Relay Mode Change
	JP2 Pin 2-3 Closed JP3 Pin 1-2 & 3-4 Open	System LAN bypass function is controlled by Super I/O GP23.		GP23 Active: Low: Bypass High: Normal
	JP2 Pin 1-2 Closed JP3 Pin 1-2 & 3-4 Closed	System LAN is at normal		LAN Always Normal
		System will reboot upon the time out of watchdog timer.		WDT Reboot System

CN10:Console Port

CN1: SATA3.0 Port

CN3:USB3.0 Port(x2)

CN4: USB2.0 Port(x1)

CN2: CFAST Connector

J5: Mini PCI- E(x1) W/USB Connector

CN6,CN7,CN8,CN9: Intel I211 LAN

J3:SODIMM Socket

CN5: MINI DP (only MBN500-4CG)

LED1, LED2, LED3, LED4: LAN Port Link, Active LED

Chapter 4 Console Mode Information

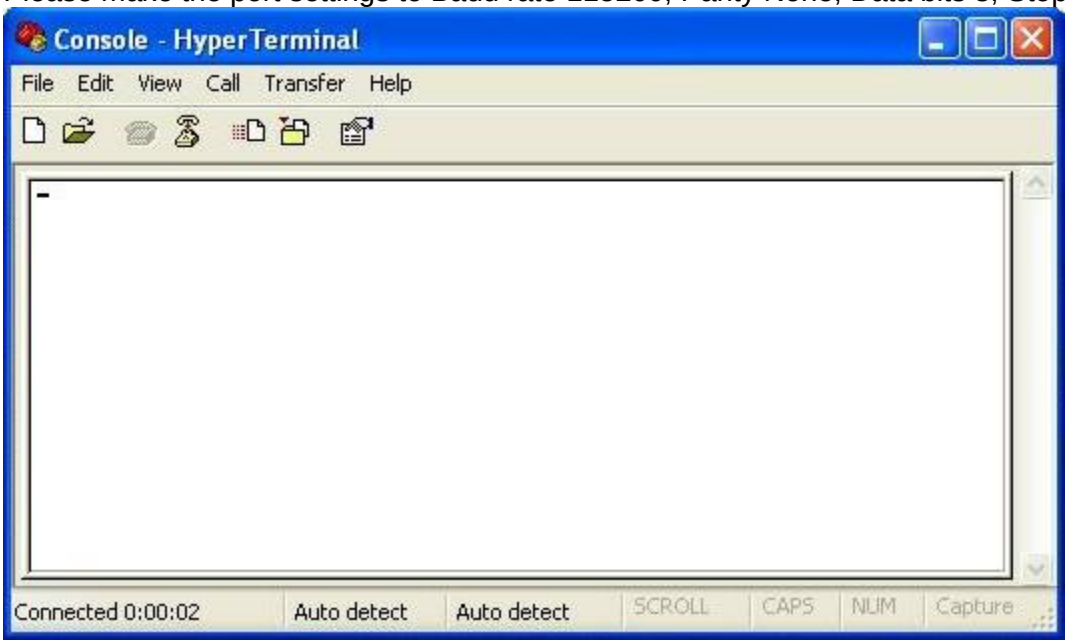
FWA5104 supports output information via Console in BIOS level.

Prepare a computer as client loaded with an existing OS such as Windows 7.
Connect client computer and FWA5104 with NULL Modem cable.
Follow the steps below to configure the Windows Hyper Terminal application setting:

1. For executing the Hyper Terminal, issue command “hypertrm”.
2. Customize your name for the new connection.

3. Choose the COM port on the client computer for the connection.

4. Please make the port settings to Baud rate 115200, Parity None, Data bits 8, Stop bits 1



5. Power on FWA5104 and the screen will display the BIOS information.
   Press <**Tab**> key to enter BIOS setup screen in **Console mode**.
   Press <**Del**> key to enter BIOS setup screen in **VGA mode**.

Open the Chassis

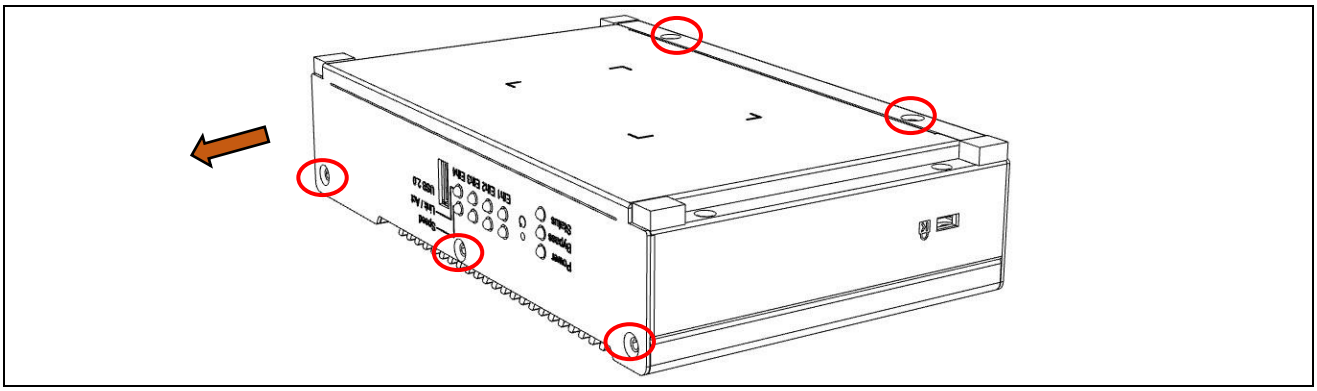


Fig. 5-1 Loosen screws and remove the cover

Installing DDR3 Memory

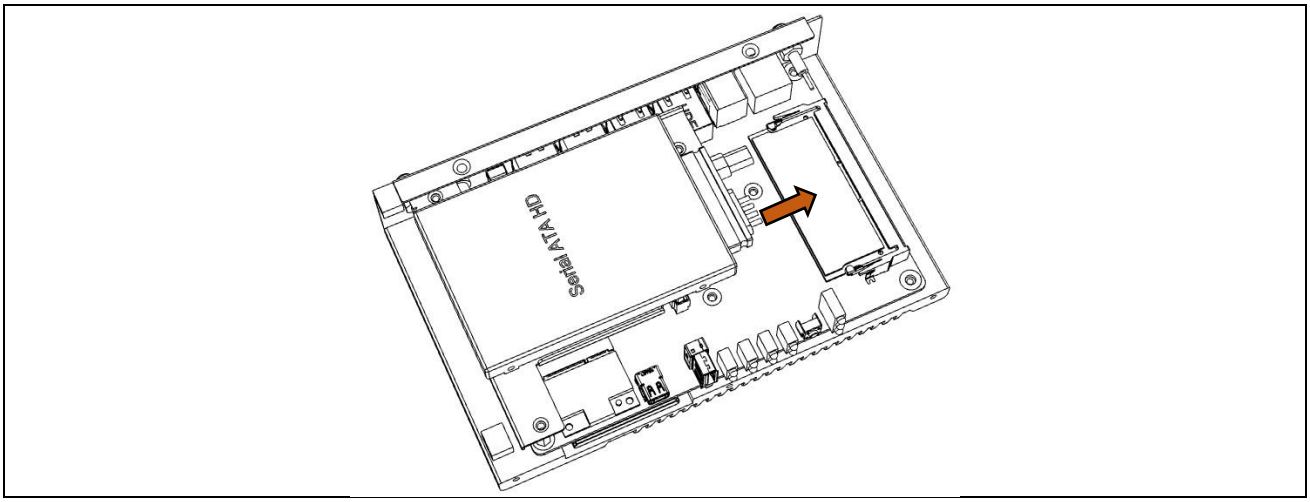


Fig. 5-2 Insert and press down DDR3L SO-DIMM memory module

Installing Cfast Card

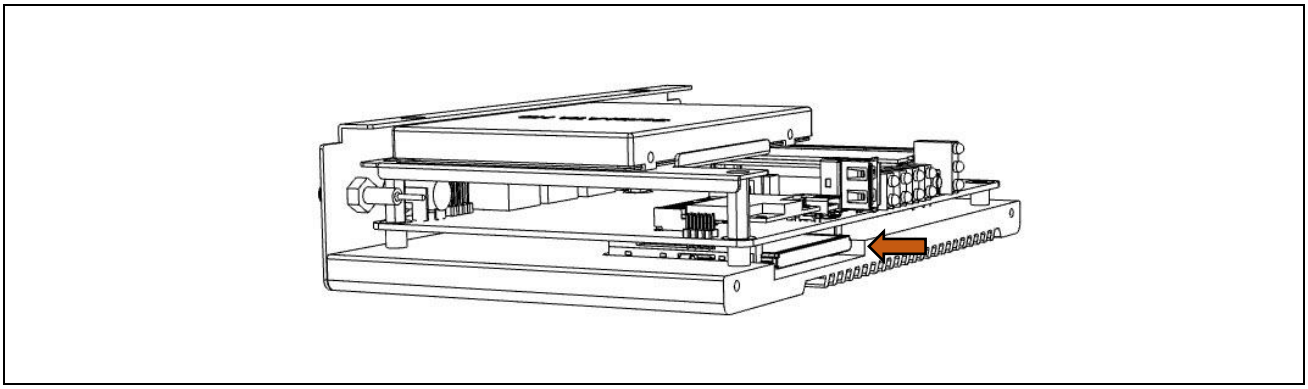


Fig. 5-3 *Insert and push Compact Flash Card*

Installing Mini PCIe Module

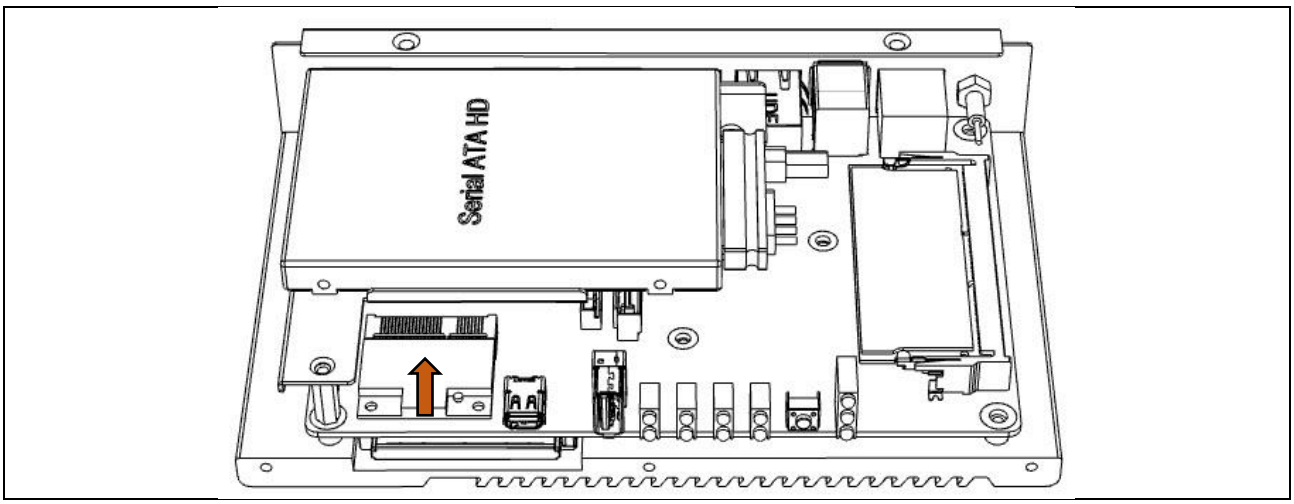


Fig. 5-4 Insert and push down Half-sized Mini PCI-e module

Installing 2.5” HDD/SSD

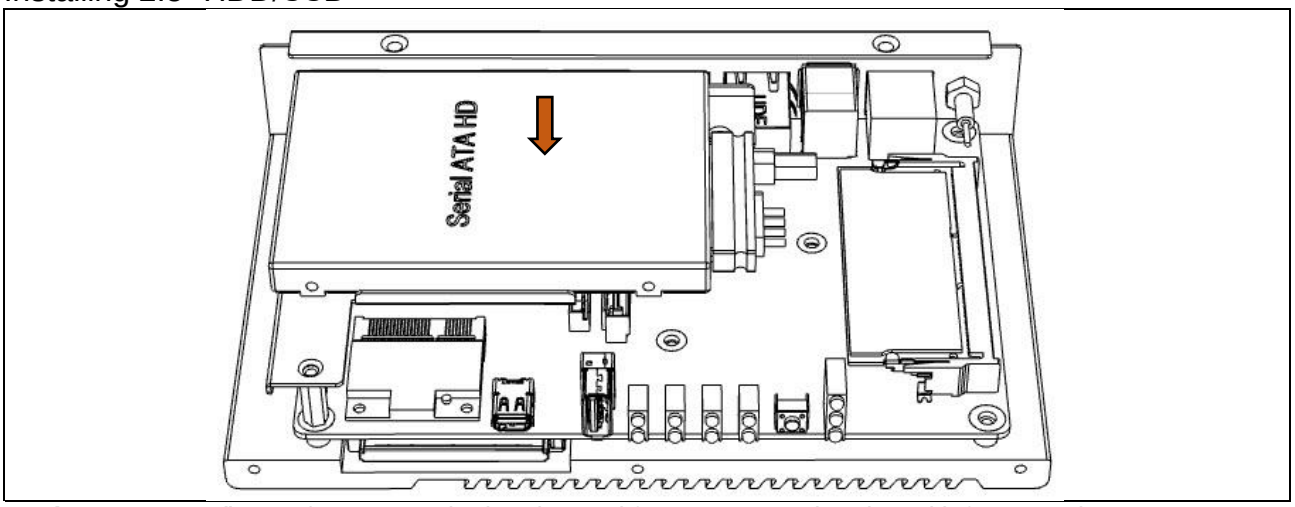


Fig. 5-5 *Put 2.5” HDD / SSD onto the bracket and fasten HDD on bracket with four M3 Flat screws*

Chapter 6 BIOS Information

BIOS Introduction

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

BIOS Setup

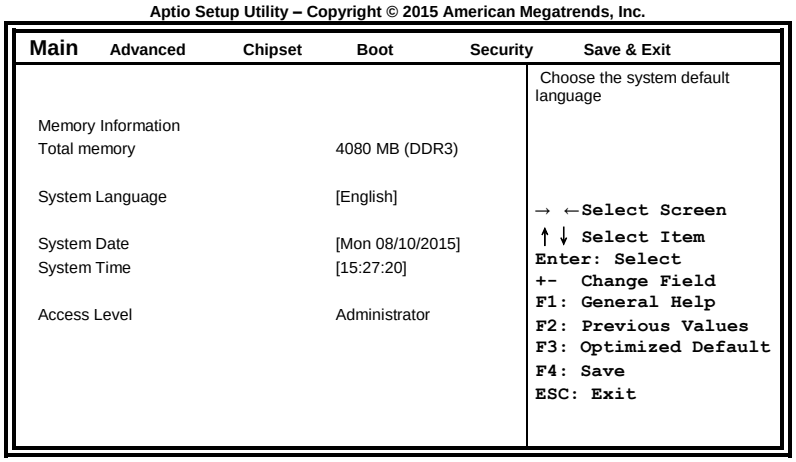
The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are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

Press <DEL> or <F2> to Enter Setup

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

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

Main Settings



System Date

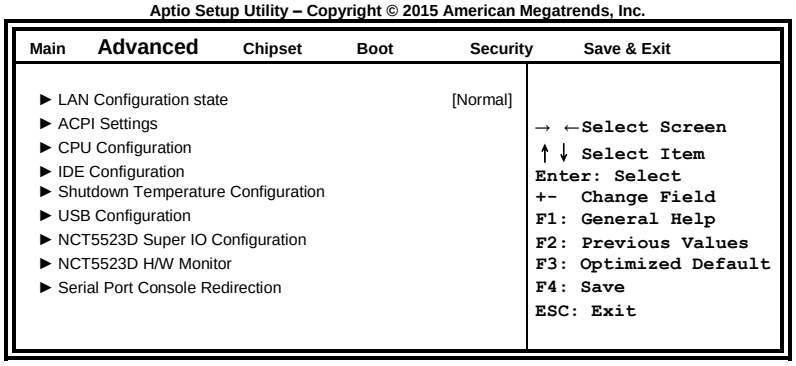
Set the Date. Use Tab to switch between Data elements.

System Time

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

Advanced Settings

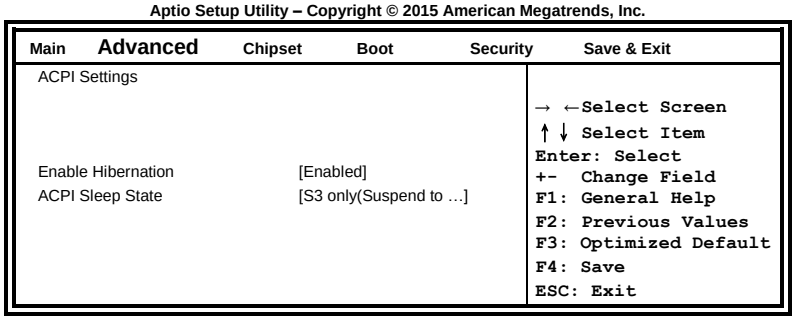
This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



LAN Configuration state

LAN Bypass Function Setting [Bypass] or [Normal]

ACPI Settings



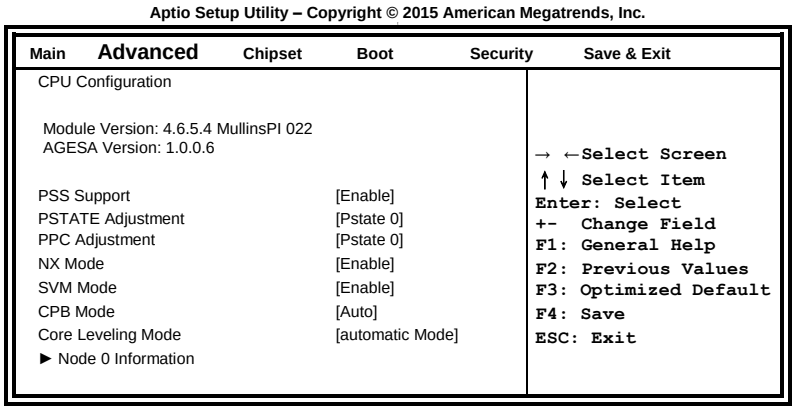
Enable Hibernation

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.

CPU Configuration
This section shows the CPU configuration parameters.



PSS Support
Enable/disable the generation of ACPI _PPC, _PPC, _PSS, and _PCT objects.

PSTATE Adjustment
Provide to adjust startup P-state level.

PPC Adjustment
Provide to adjust _PPC object.

NX Mode
Enable/disable No-execute page protection function.

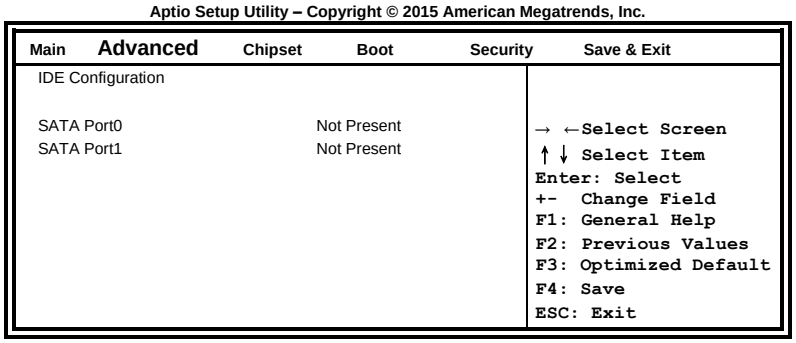
SVM Mode
Enable/disable CPU Virtualization.

CPB Mode
Enable/disable CPB.

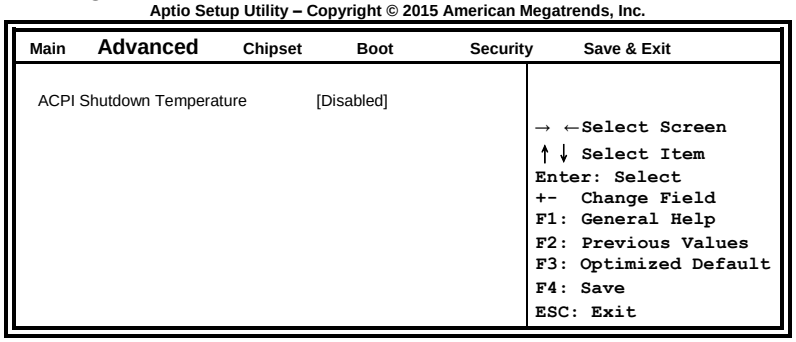
Core Leveling Mode
Change the number of cores in the system.

Node 0 Information
View memory information related to Node 0.

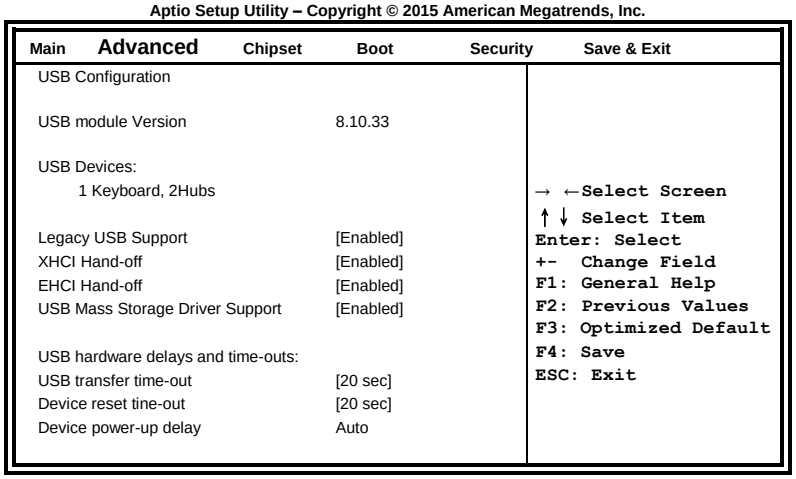
IDE Configuration



Shutdown Temperature Configuration



USB Configuration



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.

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.

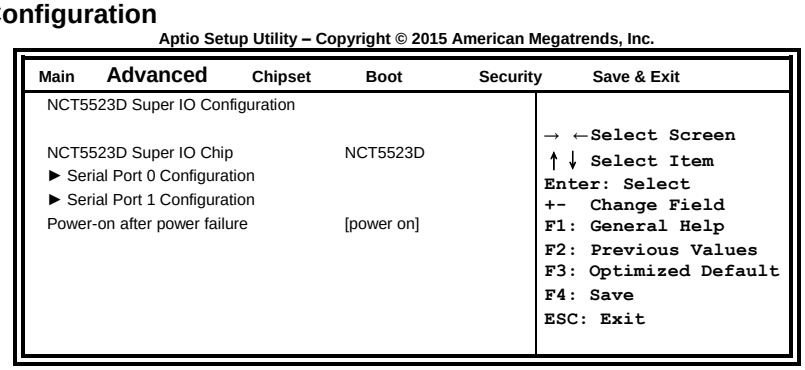
USB MASS Storage Driver Support
Enable/Disable USB Mass Storage Driver Support.

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 delays
Maximum time the device will take before it properly
Reports itself to the host controller.
'Auto' uses default value: for a Root port it is 100 ms,
For a Hub port the delay is taken form Hub descriptor.

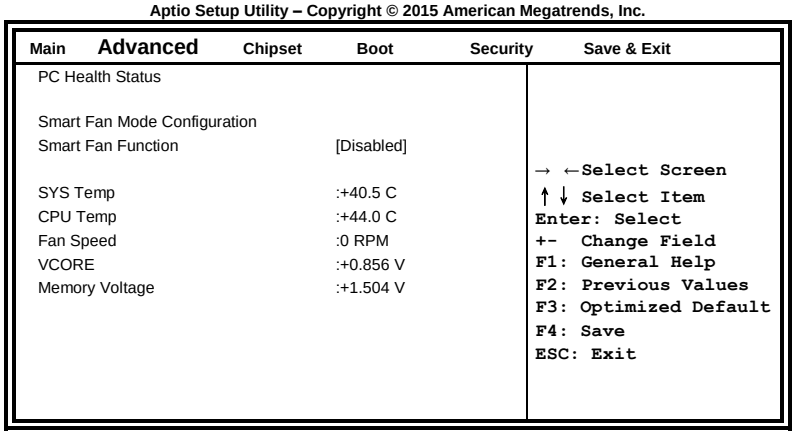
NCT5523D Super IO Configuration



Serial Port 0 Configuration
Set parameters of Serial Port 0 (COMA)

Serial Port 1 Configuration
Set parameters of Serial Port 1 (COMB)

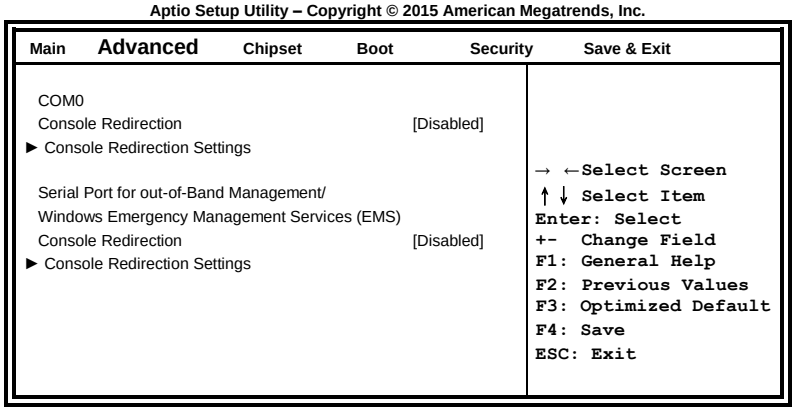
NCT5523D H/W Monitor



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

Smart Fan Function
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.

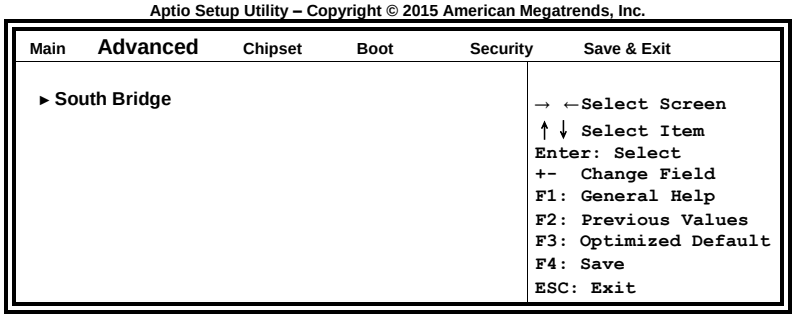
Serial Port Console Redirection

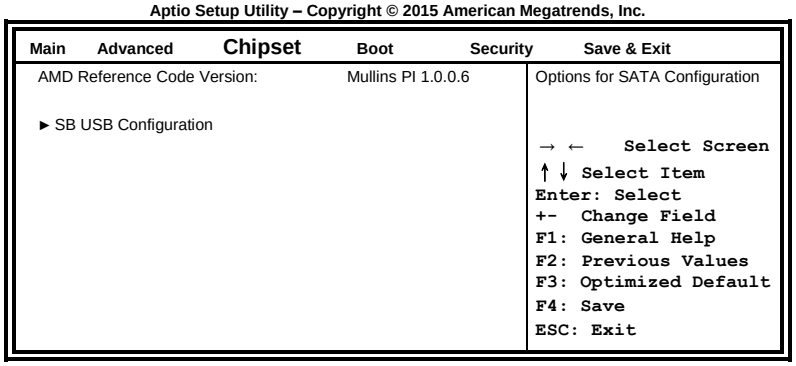


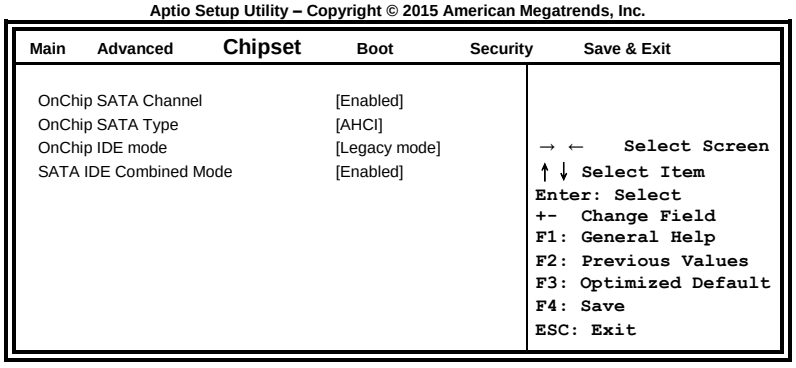
Console Redirection
Console Redirection Enable or Disable

Chipset Settings

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







OnChip SATA Channel

Enabled / Disabled Serial ATA.

OnChip SATA Type

Select OnChip SATA Type.

OnChip IDE mode

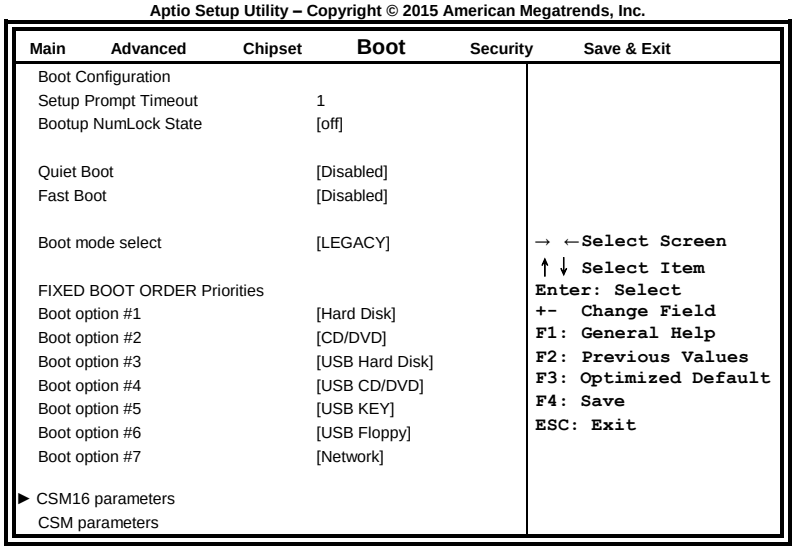
Sata IDE Controller Mode.

SATA IDE Combined Mode

SATA IDE Controller Combined Mode

Boot Settings

This section allows you to configure the boot settings.



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 or Disables Quiet Boot option.

Fast Boot

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

Boot mode select

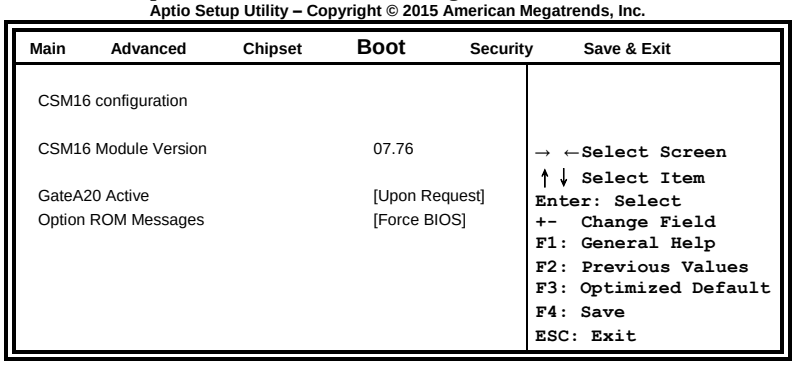
Select boot mode LEGACY/UEFI

Boot Option Priorities

Sets the system boot order.

CSM16 parameters

CSM16 configuration Enable/Disable, Option ROM execution settings,etc.



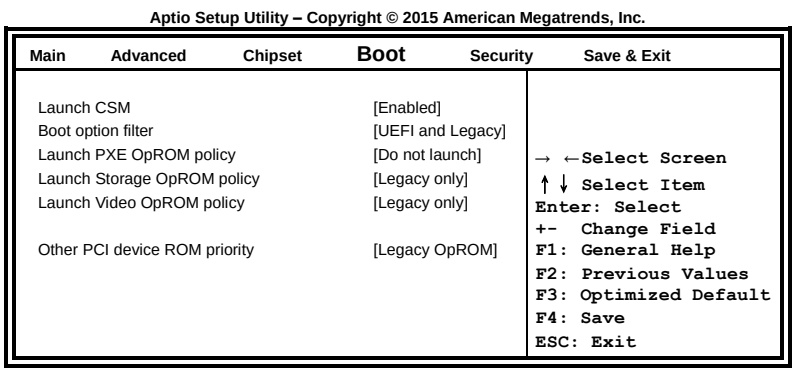
GateA20 Active

UPON REQUEST – GA20 can be disabled using BIOS services.
ALWAYS – do not allow disabling GA20 ; this option is useful when
any RT code is executed above 1MB

Option ROM Messages

Set display mode for Option ROM

CSM parameters
OpROM execution, boot options filter,etc.



Launch CSM
This option controls if CSM will be launched.

Boot option filter
This option controls what devices system can boot to.

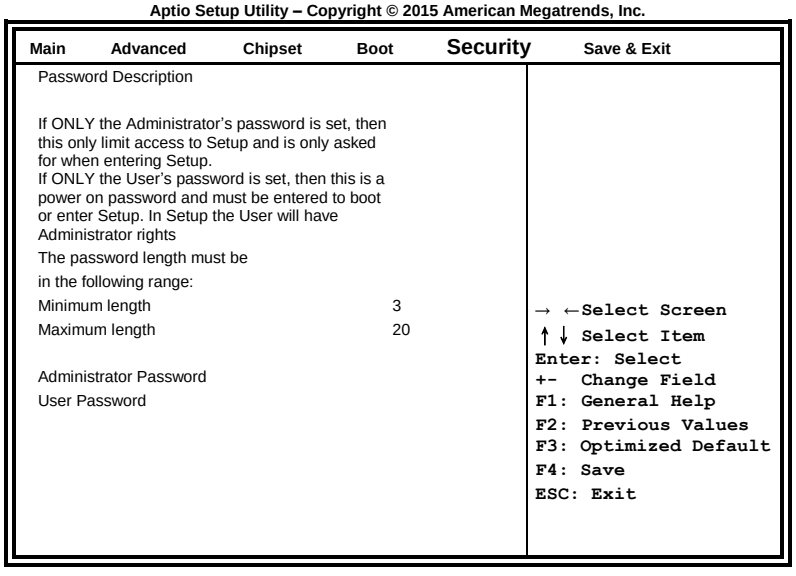
Launch PXE OpROM policy
Controls the execution of UEFI and Legacy PXE OpROM.

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.

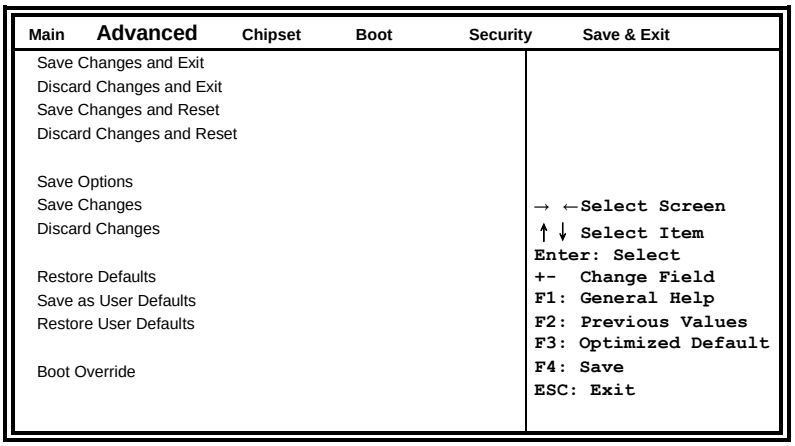
Security Settings
This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



Administrator Password
Set Setup Administrator Password.

User Password
Set User Password.

Save & Exit Settings



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.

Chapter 7 Drivers Installation

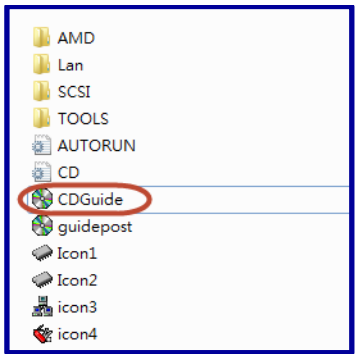
This section describes the installation procedures for software and drivers. The software and drivers are included with the board. If you find the items missing, please contact the vendor where you made the purchase.

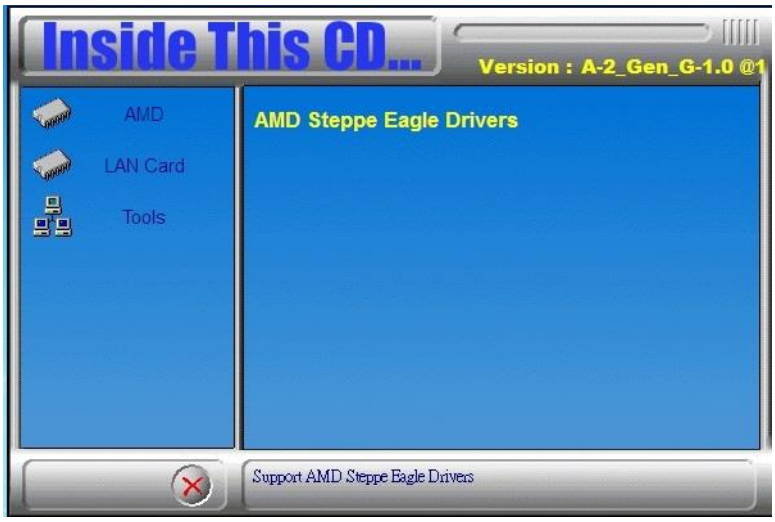
IMPORTANT NOTE:

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

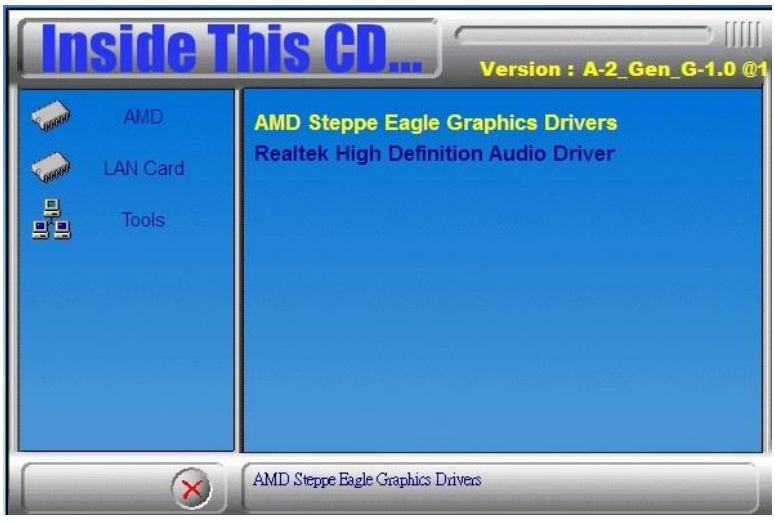
Chipset Software Installation Utility

1. In the Driver folder, execute the CDGuide file. Click ***AMD***, then ***AMD Steppe Eagle Drivers***.

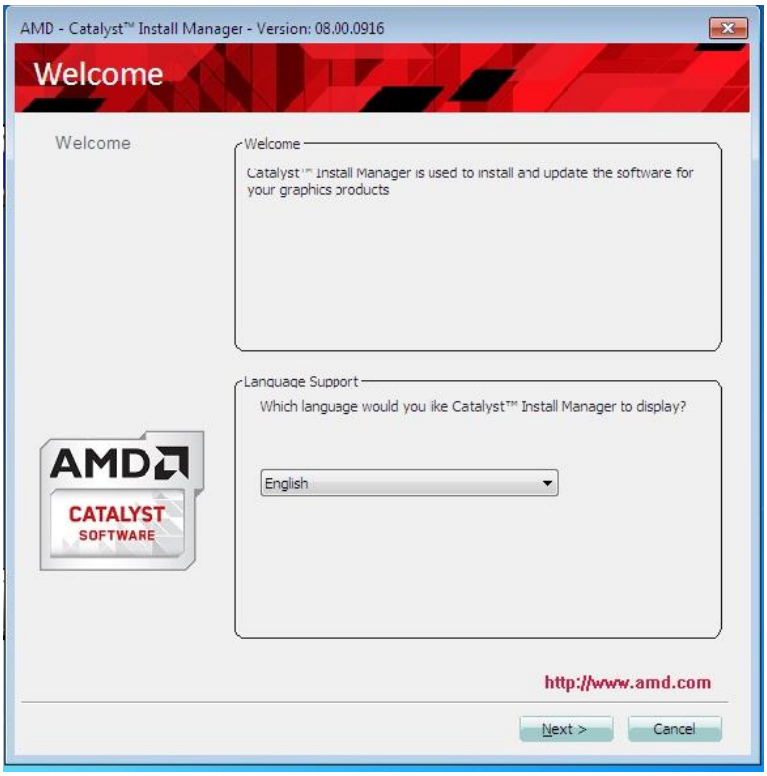




2. Click ***AMD Steppe Eagle Graphics Drivers***.

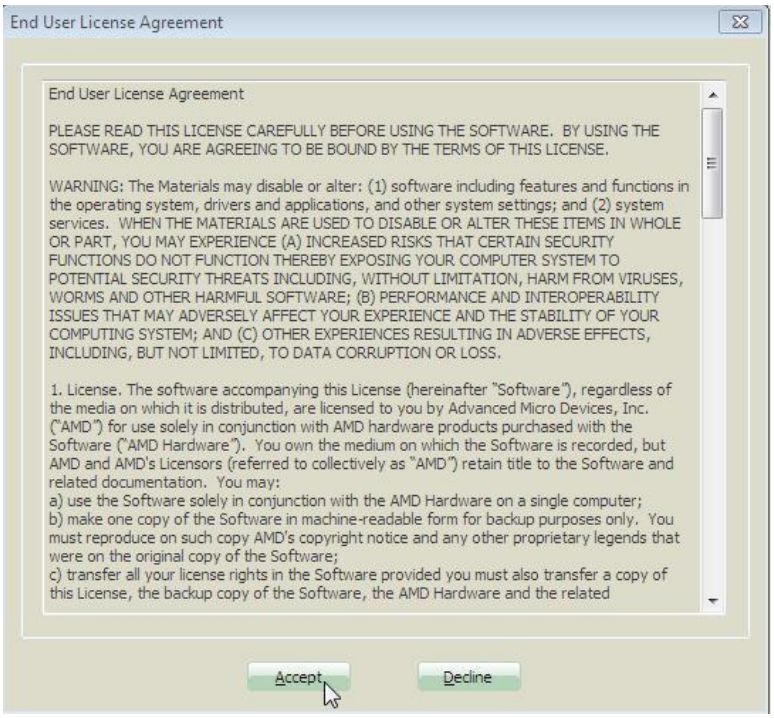


3. Select the language you would like to be displayed and click ***Next***.

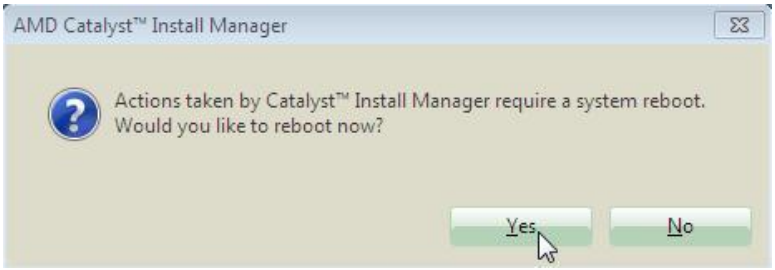


4. Select **Express** and the **installation location** and click ***Next***.

5. Click ***Accept*** to accept the End User License Agreement.



6. To reboot the system, click ***Yes***.



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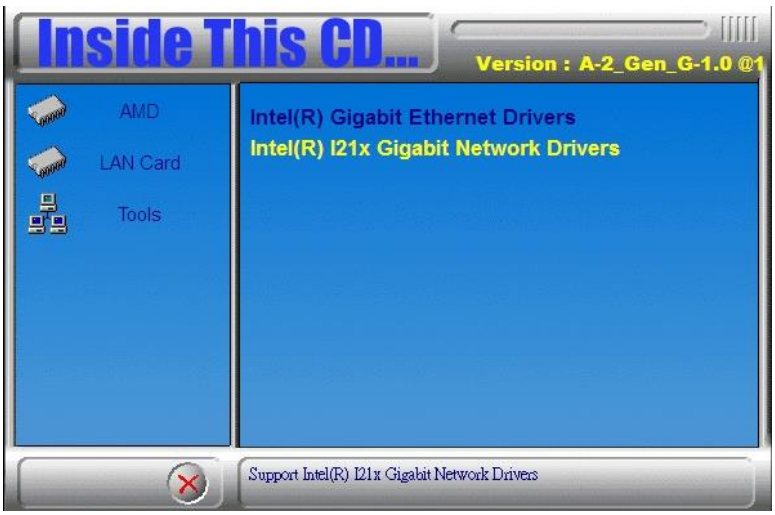
1. In the Driver folder, execute the CDGuide file.

2. Click ***LAN Card*** and then ***Intel LAN Controller Drivers***.

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



4. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.

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

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

Chapter 8 Appendix

A. I/O Port Address Map

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

Address	Device Description
0000h-03AFh	PCI bus
0000h-000Fh	Direct memory access controller
0010h-001Fh	Motherboard resources
0020h-0021h	Programmable interrupt controller
0040h-0043h	System timer
0061h-0061h	System speaker
0070h-0071h	System CMOS/real time clock
0072h-007Fh	Motherboard resources
0081h-0083h	Direct memory access controller
0084h-0086h	Motherboard resources
0087h-0087h	Direct memory access controller
00A0h-00A1h	Programmable interrupt controller
00A2h-00BFh	Motherboard resources
00C0h-000Dh	Direct memory access controller
00F0h-00FFh	Numeric data processor
02F8h-02FFh	Communications Port (COM2)
03B0h-03BBh	PCI Express standard Root Port
03B8h-03DFh	PCI bus
03F8h-03FFh	Communications Port (COM1)
0CD8h-0CDFh	Motherboard resources
F000h-F00Fh	AMD SATA Controller

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 8	High precision event timer
IRQ 13	Numeric data processor
IRQ 18	Standard Enhanced PCI to USB Host Controller
IRQ 18	Standard Enhanced PCI to USB Host Controller
IRQ 19	AMD SATA Controller
IRQ81	Microsoft ACPI-Compliant System
IRQ82	Microsoft ACPI-Compliant System
IRQ83	Microsoft ACPI-Compliant System
IRQ84	Microsoft ACPI-Compliant System

C. Watchdog Timer Configuration (WDT)

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

SAMPLE CODE:

File of the NCT5523D.H

```
//-----------------------------------------------------------------------------
//
// 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 __NCT5523D_H
#define __NCT5523D_H 1
//-----------------------------------------------------------------------------
#define NCT5523D_INDEX_PORT (NCT5523D_BASE)
#define NCT5523D_DATA_PORT (NCT5523D_BASE+1)
//-----------------------------------------------------------------------------
#define NCT5523D_REG_LD 0x07
//-----------------------------------------------------------------------------
#define NCT5523D_UNLOCK 0x87
#define NCT5523D_LOCK 0xAA
//-----------------------------------------------------------------------------
unsigned int Init_NCT5523D(void);
void Set_NCT5523D_LD( unsigned char);
void Set_NCT5523D_Reg( unsigned char, unsigned char);
unsigned char Get_NCT5523D_Reg( unsigned char);
//-----------------------------------------------------------------------------
#endif //__NCT5523D_H
```

File of the MAIN.CPP.

```
//---------------------------------------------------------------------------
//
// 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 "NCT5523D.H"
//---------------------------------------------------------------------------
int main (void);
void WDTInitial(void);
void WDTEnable(unsigned char);
void WDTDisable(void);
//---------------------------------------------------------------------------
int main (void)
{
char SIO;
SIO = Init_NCT5523D();
if (SIO == 0)
{
printf("Can not detect Nuvoton NCT5523D, program abort.\n");
return(1);
}
WDTInitial();
WDTEnable(10);
WDTDisable();
return 0;
}
//---------------------------------------------------------------------------
void WDTInitial(void)
{
unsigned char bBuf;
Set_NCT5523D_LD(0x08); //switch to logic device 8
bBuf = Get_NCT5523D_Reg(0x30);
bBuf &= (~0x01);
Set_NCT5523D_Reg(0x30, bBuf); //Enable WDTO
}
//---------------------------------------------------------------------------
```

```
void WDTEnable(unsigned char NewInterval)
{
unsigned char bBuf;
Set_NCT5523D_LD(0x08); //switch to logic device 8
Set_NCT5523D_Reg(0x30, 0x01); //enable timer
bBuf = Get_NCT5523D_Reg(0xF0);
bBuf &= (~0x08);
Set_NCT5523D_Reg(0xF0, bBuf); //count mode is second
Set_NCT5523D_Reg(0xF1, NewInterval); //set timer
}
//------------------------------------------------------------------------
void WDTDisable(void)
{
Set_NCT5523D_LD(0x08); //switch to logic device 8
Set_NCT5523D_Reg(0xF1, 0x00); //clear watchdog timer
Set_NCT5523D_Reg(0x30, 0x00); //watchdog disabled
}
//------------------------------------------------------------------------
```