USER'S MANUAL

MD-591X

Fanless Kiosk Motherboard powered by Intel® Atom™ N2600 features VGA/LAN/2USB

MD-591X M1

MD-591X Kiosk Motherboard with Intel® Atom ™N2600

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DISCLAIMER

This operation manual is meant to assist both Embedded Computer manufacturers and end users in installing and setting up the system. The information contained in this document is subject to change without any notice.

CE NOTICE

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any change or modifications to the equipment not expressly approve by the party responsible for compliance could void your authority to operate such equipment.

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.

TABLE OF CONTENTS

INTRODUCTION

CHAPTER

1

This chapter gives you the information for MD-591X. It also outlines the system specifications.

Sections included:

- About This Manual
- System Specifications
- Safety Precautions

Experienced users can jump to chapter 2 on page 2-1 for a quick start.

1-1. ABOUT THIS MANUAL

Thank you for purchasing our MD-591X Kiosk Motherboard with Intel® Atom™ N2600 processor and enhanced with VGA, LAN, & two USB ports, which is fully PC/AT compatible. MD-591X provides faster processing speed, greater expandability and can handle more tasks than before. This manual is designed to assist you how to install and set up the system. It contains four chapters. The user can apply this manual for configuration according to the following chapters:

Chapter 1 Introduction

This chapter introduces you to the background of this manual, and the specifications for this system. The final page of this chapter will indicate how to avoid damaging this board.

Chapter 2 Hardware Configuration

This chapter outlines the component locations and their functions. In the end of this chapter, you will learn how to set jumper and how to configure this card to meet your own needs.

Chapter 3 Software Utilities

This chapter contains helpful information for proper installations of the VGA utility, LAN utility, Sound utility, and Flash BIOS Update. It also describes the Watchdog-timer configuration.

Chapter 4 BIOS Setup

This chapter indicates you how to set up the BIOS configurations.

Appendix A Expansion Bus

This appendix introduces you the expansion bus for PCIe connectors.

Appendix B Technical Summary

This appendix gives you the information about the Technical maps.

1-2. SYSTEM SPECIFICATIONS

System

CPU	Intel® Atom™ N2600 Processor
OS Support	▪ Microsoft WES 7 (32 bit) ▪ Microsoft Windows 7 (32 bit)
Chipset	Intel® NM10
Memory	1 x DDR3 SO-DIMM, up to 2GB
BIOS	AMI
Power Supply	DC-in 16V (from CRADEL connector)
Power Switch	Power Switch on Keysheet or CRADEL connector
Power LED	1 x power status
Speaker	Monaural speaker
Dimension	226 x 151 mm (8.89” x 5.94”)
Certificate	CE/FCC

I/O Ports

USB Port	2 x USB 2.0
LAN	1 x 10/100/1000 Base-T
SATA II	1x 2.5” SATA II HDD
CFast Slot	1 x ADATA ISC3E-032GM 32GB
Expansion Bus	1 x Mini-PCIe, reserved for WLAN

Display

LCD Type	10.4” XGA
Resolution	1024 x 768
Touch Panel	4-wire resistive touch (Glass = 0.7mm)
Brightness	150 cd/m^2
Backlight	LED
Viewing Angle	-45 ~ 45˚ (H) -20 ~ 40˚ (V)

Environment

Temperature	Operating: 0 ~ 60°C (32 ~ 140°F) Non-operating: 10 ~ 60°C (14 ~ 140°F)
Humidity	Operating: 20 ~ 90% RH Non-operating: 10~90% RH

1-3. SAFETY PRECAUTIONS

Follow the messages below to avoid your systems from damage:

1. Keep your system away from static electricity on all occasions.

2. Prevent electric shock. Don‘t touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.

3. Disconnect power when you change any hardware devices.
   For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

CHAPTER

2

HARDWARE CONFIGURATION

*** QUICK START ***

Helpful information describes the jumper & connector settings, and component locations.

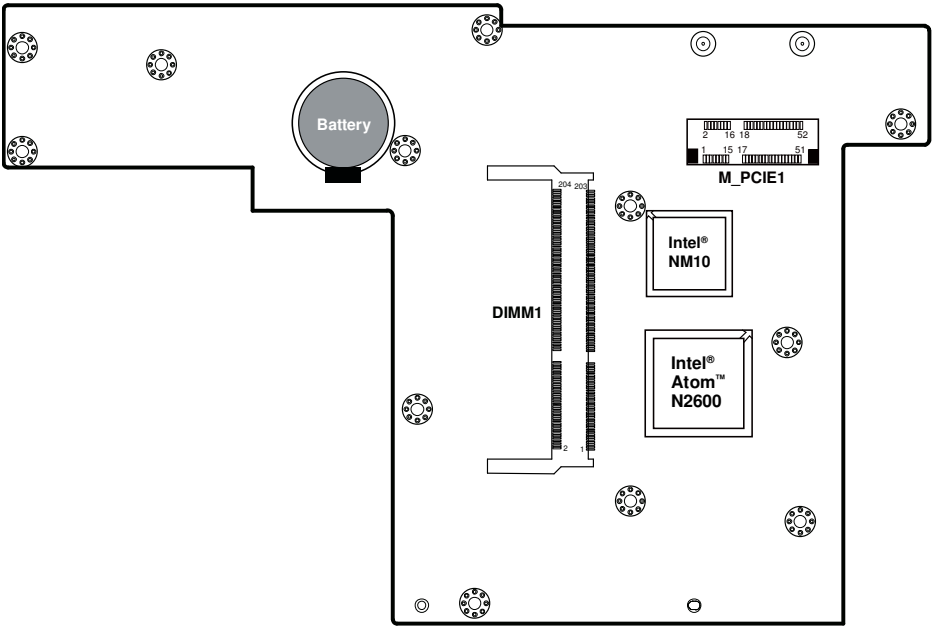
Sections included:

- Jumper & Connector Quick Reference Table
- Component Locations
- Configuration and Jumper settings
- Connector's Pin Assignments

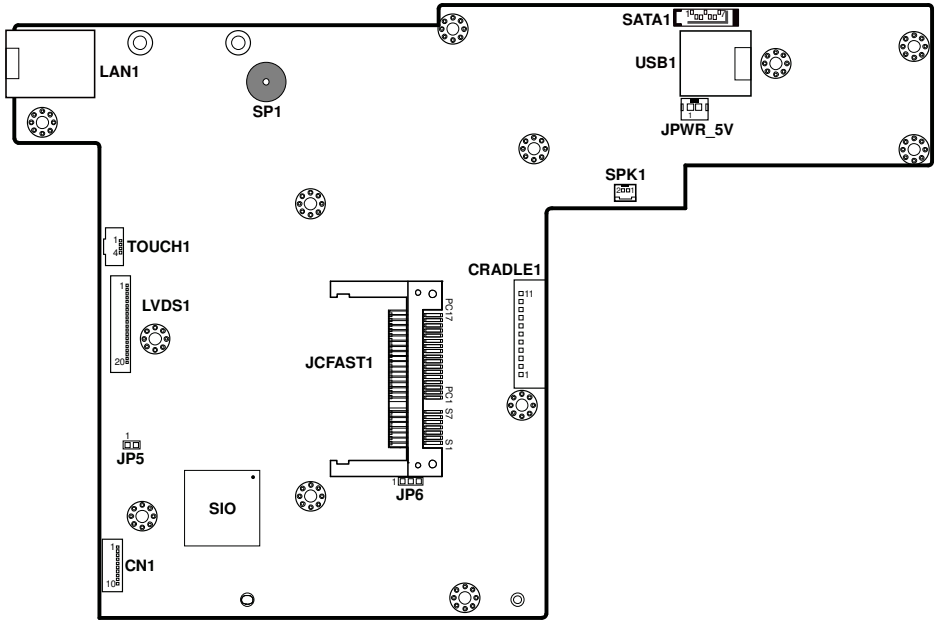
2-1. JUMPER & CONNECTOR QUICK REFERENCE TABLE

JUMPER/CONNECTOR	NAME
Touch Panel Connector	TOUCH1
LAN Port	LAN1
USB Port	USB1
Speaker Connector	SPK1
LVDS Connector	LVDS1
LVDS Backlight Connector	CN1
Power Supply Connector	CRADLE1
SATA & SATA Power Connector	SATA1, JPWR_5V

2-2. COMPONENT LOCATIONS



MD-591X Connector and Component locations - Top



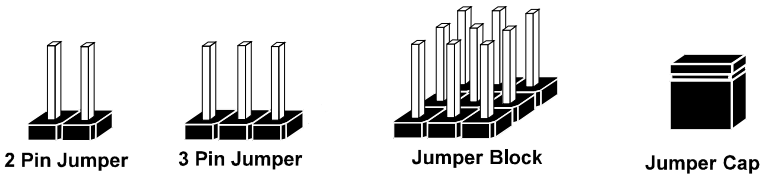
MD-591X Connector, Jumper and Component locations - Bottom

2-3. HOW TO SET JUMPERS

You can configure your board by setting jumpers. Jumper is consists of two or three metal pins with a plastic base mounted on the card, and by using a small plastic "cap", Also known as the jumper cap (with a metal contact inside), you are able to connect the pins. So you can set-up your hardware configuration by "open" or "close" pins.

The jumper can be combined into sets that called jumper blocks. When the jumpers are all in the block, you have to put them together to set up the hardware configuration. The figure below shows how this looks like.

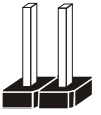
JUMPERS AND CAPS



If a jumper has three pins (for examples, labelled PIN1, PIN2, and PIN3), You can connect PIN1 & PIN2 to create one setting by shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams look and what they represent.

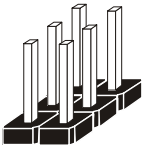
JUMPER DIAGRAMS

Jumper Cap looks like this

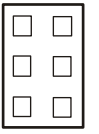


2 pin Jumper looks like this

3 pin Jumper looks like this

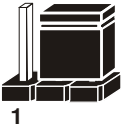


Jumper Block looks like this

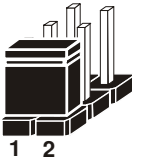


JUMPER SETTINGS

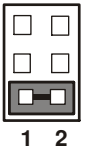
2 pin Jumper close(enabled) Looks like this



3 pin Jumper 2-3 pin close(enabled) Looks like this



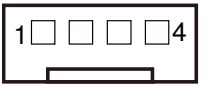
Jumper Block 1-2 pin close(enabled) Looks like this



2-4. TOUCH PANEL CONNECTOR

TOUCH1: Touch Panel Connector

PIN	ASSIGNMENT
1	X+
2	Y+
3	X-
4	Y-



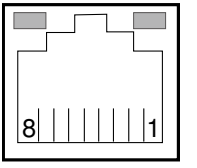
TOUCH1

2-5. LAN PORT

LAN1: RJ45 LAN Port

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MDI_P0	5	MDI_P2
2	MDI_N0	6	MDI_N2
3	MDI_P1	7	MDI_P3
4	MDI_N1	8	MDI_N3

Yellow Green



LAN1

LAN LED Indicator:

Right Side LED

Green Color On	10/100 LAN Speed Indicator
Orange Color On	Giga LAN Speed Indicator
OFF	No LAN Switch/Hub Connected

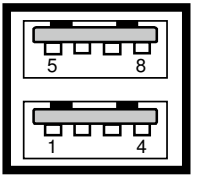
Left Side LED

Yellow Color Blinking	LAN Message Active
OFF	No LAN Message Active

2-6. USB PORT

USB1: Stacked USB Ports

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	X	5	USBV0
2	X	6	USBC0N
3	X	7	USBC0P
4	GND	8	GND

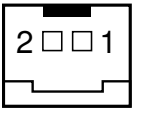


USB1

2-7. SPEAKER CONNECTOR

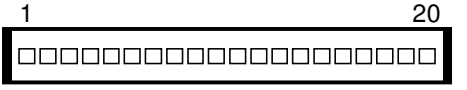
SPK1: Speaker Connector

PIN	ASSIGNMENT
1	VO1_SPK
2	VO2_SPK



SPK1

2-8. LVDS CONNECTOR



LVDS1

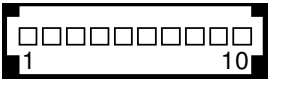
LVDS1: LVDS Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LVDS_VCC	11	LVDS_TX2_DP_C
2	LVDS_VCC	12	GND
3	GND	13	LVDS_CLK_DN
4	LVDS_TX0_DN_C	14	LVDS_CLK_DP
5	LVDS_TX0_DP_C	15	GND
6	GND	16	GND
7	LVDS_TX1_DN_C	17	GND
8	LVDS_TX1_DP_C	18	GND
9	GND	19	DPS
10	LVDS_TX2_DN_C	20	GND

2-9. LVDS BACKLIGHT CONNECTOR

CN1: LVDS Backlight Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	K5	6	A3
2	A5	7	K2
3	K4	8	A2
4	A4	9	K1
5	K3	10	A1



CN1

2-10. POWER SUPPLY CONNECTOR

CRADLE1: 16V Power Supply Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CRADLE1_PIN1	7	MATEJ
2	GND	8	S3
3	DETJ	9	GND
4	GND	10	AD+
5	USBN3_L	11	AD+
6	USBP3_L		

CRADLE1

2-11. SATA & SATA POWER CONNECTOR

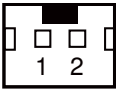
SATA1: SATA Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	SATA0_RX_N_C
2	SATA0_TX_P_C	6	SATA0_RX_P_C
3	SATA0_TX_N_C	7	GND
4	GND		

SATA1

JPWR_5V: SATA Power Connector

PIN	ASSIGNMENT
1	VCC5
2	GND



JPWR_5V

SOFTWARE UTILITIES

CHAPTER

3

This chapter comprises the detailed information of VGA driver, LAN driver, and Sound driver.

Sections included:

- Introduction.
- Intel® Chipset Software Installation Utility
- VGA Driver Utility
- LAN Driver Utility
- Sound Driver Utility
- Touch Driver Utility
- Wireless LAN Driver Utility

3-1. INTRODUCTION

Enclosed with our MD-591X package are our driver utilities, which come in a format of CD ROM. Refer to the following table for driver locations:

FILENAME (Assume that CD ROM drive is D:)	PURPOSE
D:\DRIVER\Platform\Win7(32-bit)\ UTILITY	Intel® chipset device software installation utility
D:\DRIVER\Platform\Win7(32-bit)\ VGA	Intel® Graphics Media Accelerator 3600 series for VGA driver installation
D:\DRIVER\Platform\Win7(32-bit)\LAN	Intel® 82583V for LAN driver installation
D:\DRIVER\Platform\Win7(32-bit)\SOUND	Realtek ALC888S for sound driver installation
D:\ Driver\Devices\Touch	eGalax Touch for touch driver installation
D:\ Driver\Devices\WLAN	Silex wireless mini-PCIe LAN card for driver installation
D:\DRIVER\Flash BIOS	Aptio (EFI) BIOS update utility

Note: Be sure to install the Utility right after the OS fully installed.

3-2. INTEL® CHIPSET SOFTWARE INSTALLATION UTILITY

3-2-1. Introduction

The Intel® Chipset Device Software installs Windows INF files to the target system. These files outline to the operating system how to configure the Intel® chipset components in order to ensure that the following features function properly:

- Core PCI and ISAPNP Services
- PCIe Support
- IDE/ATA33/ATA66/ATA100 Storage Support
- SATA Storage Support
- USB Support
- Identification of Intel® Chipset Components in the Device Manager

3-2-2. Installation of the Utility

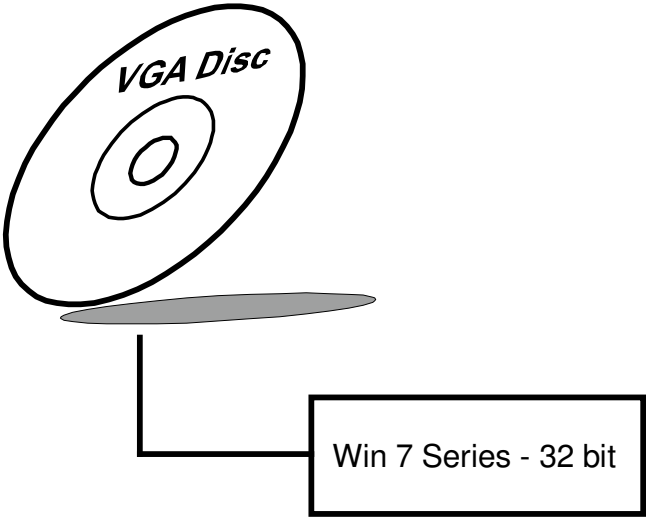
The Utility Pack is to be installed only for Windows 7, and it should be installed right after the OS installation. Please follow the steps below:

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the Utility driver is located.
3. Run the application with administrative privileges.

3-3. VGA DRIVER UTILITY

3-3-1. Introduction

The VGA interface embedded with our MD-591X can support a wide range of display. You can display DVI simultaneously with the same mode.



3-3-2. Installation of VGA Driver

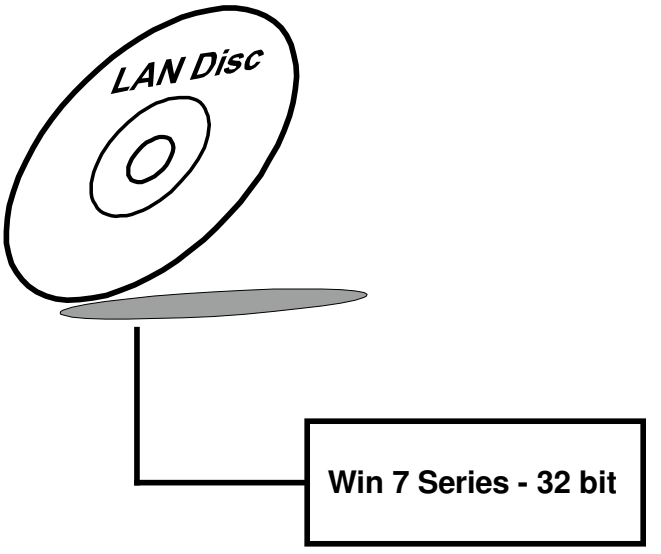
To install the VGA driver, simply follow the following steps:

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the VGA driver is located.
3. Run the application with administrative privileges..

3-4. LAN DRIVER UTILITY

3-4-1. Introduction

MD-591X is enhanced with LAN function that can support various network adapters. Installation programs for LAN drivers are listed as follows:

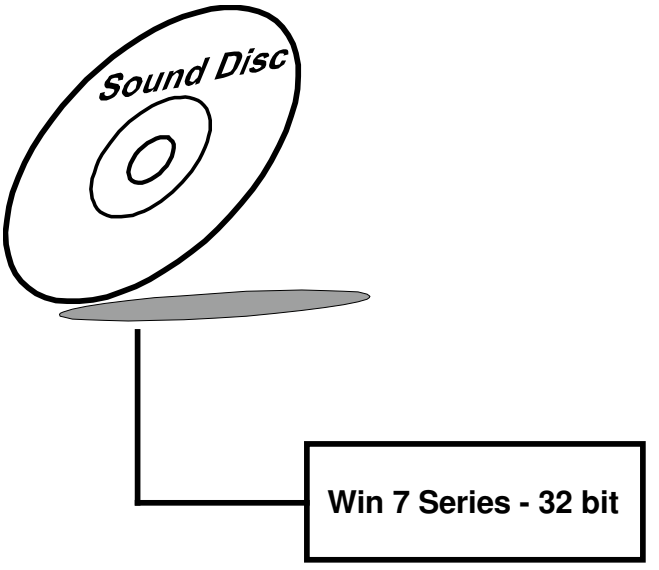


For more details on Installation procedure, please refer to Readme.txt file found on LAN Driver Utility.

3-5. SOUND DRIVER UTILITY

3-5-1. Introduction

The Realtek sound function enhanced in this system is fully compatible with Windows 7 & WES 7. Below, you will find the content of the Sound driver:



3-5-2. Installation of Sound Driver

To install the sound driver, follow the steps below:

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the Sound driver is located.
3. Run the application with administrative privileges..
4. Follow the instructions on the screen to complete the installation.
5. Once the installation is completed, shut down the system and restart in order for the changes to take effect.

3-6. TOUCH DRIVER UTILITY

The touch screen driver utility can only be installed on Windows 7, and it should be installed right after the OS installation.

3-6-1. Installation of Touch Driver

To install the touch driver, follow the steps below:

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the Touch driver is located.
3. Run the application with administrative privileges..
4. Follow the instructions on the screen to complete the installation.
5. Once the installation is completed, shut down the system and restart in order for the changes to take effect.

3-7. WIRELESS DRIVER UTILITY

The wireless driver utility can only be installed on Windows 7, and it should be installed right after the OS installation.

3-7-1. Installation of Wireless Driver

To install the wireless driver, follow the steps below:

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the Wireless driver is located.
3. Run the application with administrative privileges..
4. Follow the instructions on the screen to complete the installation.
5. Once the installation is completed, shut down the system and restart in order for the changes to take effect.

CHAPTER

4

BIOS SETUP

This chapter shows how to set up the BIOS.

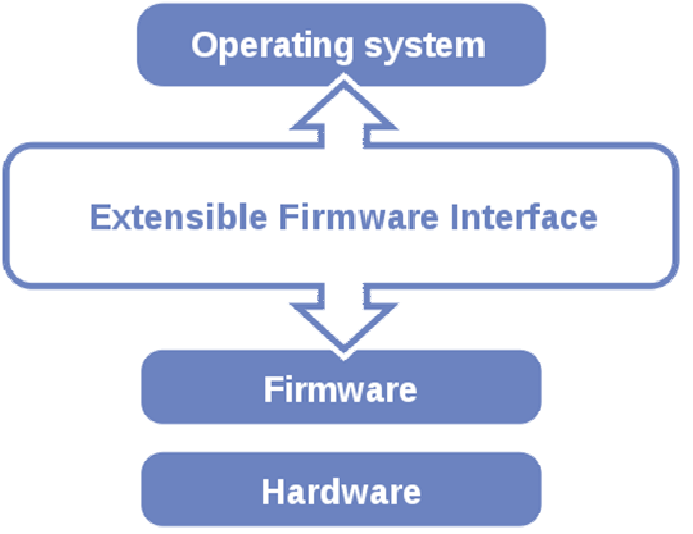
Sections included:

- Introduction
- Entering Setup
- Main
- Advanced
- Chipset
- Boot
- Security
- Save & Exit

4-1. INTRODUCTION

The board MD-591X uses an AMI Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated. The SPI Flash contains the BIOS Setup program, Power-on Self-Test (POST), the PCI auto-configuration utility, LAN EEPROM information, and Plug and Play support.

Aptio is AMI's BIOS firmware based on the UEFI (Unified Extensible Firmware Interface) Specifications and the Intel Platform Innovation Framework for EFI. The UEFI specification defines an interface between an operating system and platform firmware. The interface consists of data tables that contain platform-related information, boot service calls, and runtime service calls that are available to the operating system and its loader. These provide standard environment for booting an operating system and running pre-boot applications. Following illustration shows Extensible Firmware Interface's position in the software stack.



EFI BIOS provides an user interface allow users the ability to modify hardware configuration, e.g. change system date and time, enable or disable a system component, decide bootable device priorities, setup personal password, etc., which is convenient for modifications and customization of the computer system and allows technicians another method for finding solutions if hardware has any problems.

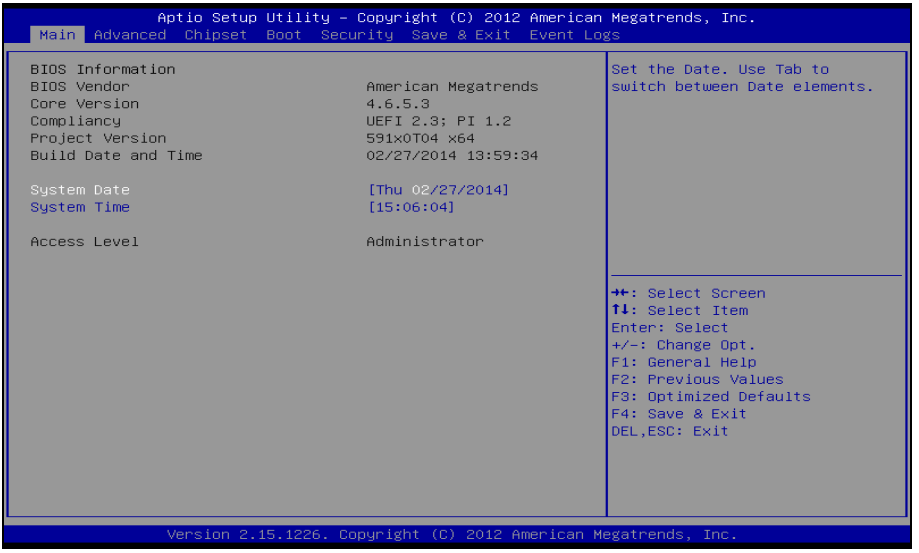
The BIOS Setup program can be used to view and change the BIOS settings for the computer. The BIOS Setup program is accessed by pressing the <Del> or <ESC> key after the POST memory test begins and before the operating system boot begins. The settings are shown below.

4-2. ENTERING SETUP

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines and the following message will appear on the lower screen:

POST screen

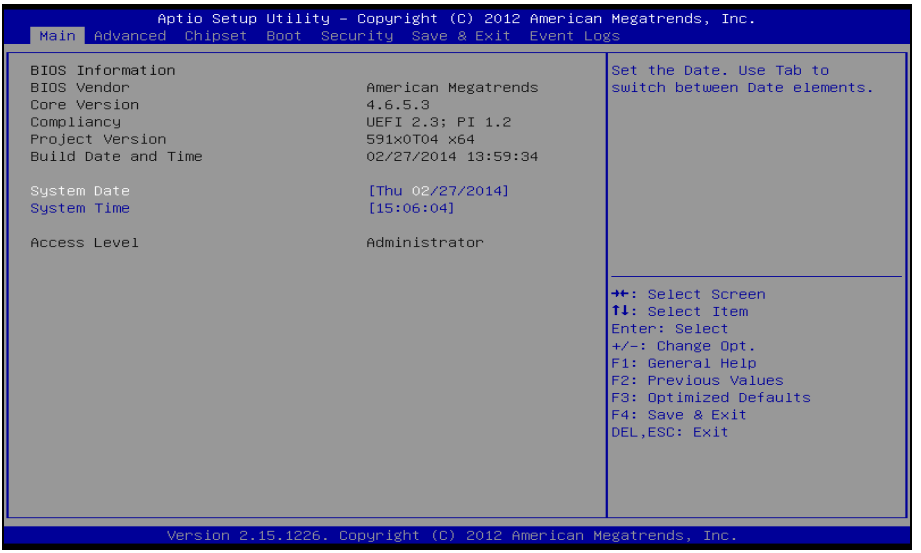
As long as this message is present on the screen you may press the <Del> key (the one that shares the decimal point at the bottom of the number keypad) to access the Setup program. In a moment, the main menu of the Aptio Setup Utility will appear on the screen:



BIOS setup program initial screen

You may move the cursor by up/down keys to highlight the individual menu items. As you highlight each item, a brief description of the highlighted selection will appear at the bottom of the screen.

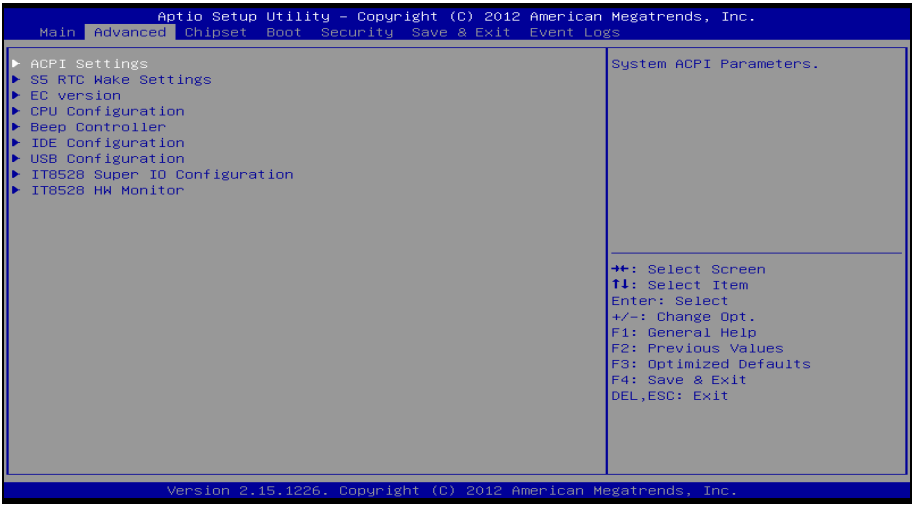
4-3. MAIN



Main screen

BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Project Version	No changeable options	Displays the version of the BIOS currently installed on the platform.
Build Date	No changeable options	Displays the date of current BIOS version.
Total Memory	No changeable options	Displays the current memory installed amount and type.
System Date	Month, day, year	Specifies the current date.
System Time	Hour, minute, second	Specifies the current time.
Access Level	Administrator	Access level status

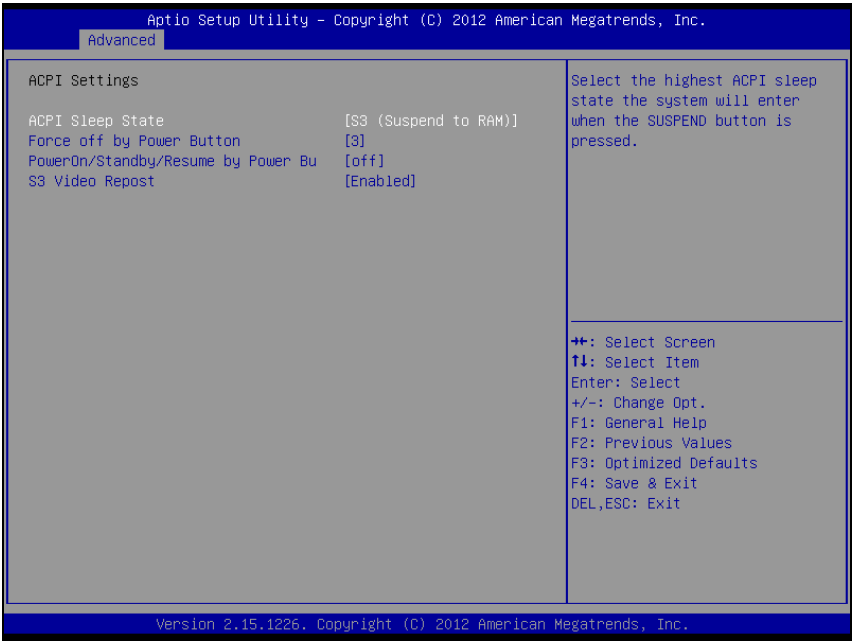
4-4. ADVANCED



Advanced screen

BIOS Setting	Options	Description/Purpose
ACPI Settings	Enter	System ACPI Parameters
S5 RTC Wake Settings	Enter	Enable system to wake from S5 using RTC alarm
EC version	Enter	Display EC version
CPU Configuration	Enter	CPU Configuration Parameters
Beep Controller	Enter	Enable or Disable Beep
IDE Configuration	Enter	IDE Device Configuration
USB Configuration	Enter	USB Configuration Parameters
IT8528 Super IO Configuration	Enter	System Super IO Chip Parameters.
IT8528 HW Monitor	Enter	Monitor hardware status.

4-4-1. ACPI Settings



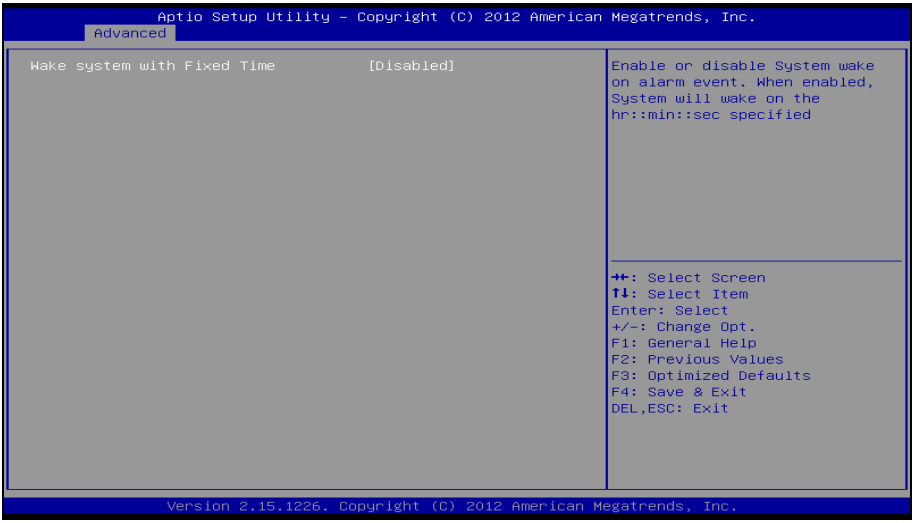
ACPI settings screen

BIOS Setting	Options	Description/Purpose
ACPI Sleep State	-Suspend Disabled -S1 (CPU Stop Clock) -S3 (Suspend to RAM)	Specifies the ACPI sleep state. ▪ **Disabled** disables ACPI sleep feature. ▪ **S1** mode allows the CPU stop executing instructions. ▪ **S3** allows the platform to enter Sleep (also known as Standby or Suspend to RAM) mode.
Force off by Power Button	3,5,10	Delay N seconds: Shutdown after you press button for N seconds.

BIOS Setting	Options	Description/Purpose
PowerOn/Standby/Resume By Power Button	Off, 1,2	Delay N seconds: Power ON after press button continue N seconds.
S3 Video Repost	-Disabled -Enabled	Enable or Disable S3 Video Repost.

Note: Options marked in blue are set by default.

4-4-2. S5 RTC Wake Settings



S5 RTC Wake Settings screen

BIOS Setting	Options	Description/Purpose
Wake system with Fixed Time	- Disabled - Enabled	Enable or disable system wake on alarm event. When enabled, the system will wake on the hr:min:sec specified.
Wake Up Mode	- Daily - Monthly	▪ **Daily:** The system wakes up every day at the specified time ▪ **Monthly:** The system wakes up at each month on the specified day at the specified time.
Wake up hour	0~23	Select 0-23 for example enter 3 for 3am and 15 for 3pm
Wake up minute	0~59	0-59 minute
Wake up second	0~59	0-59 second

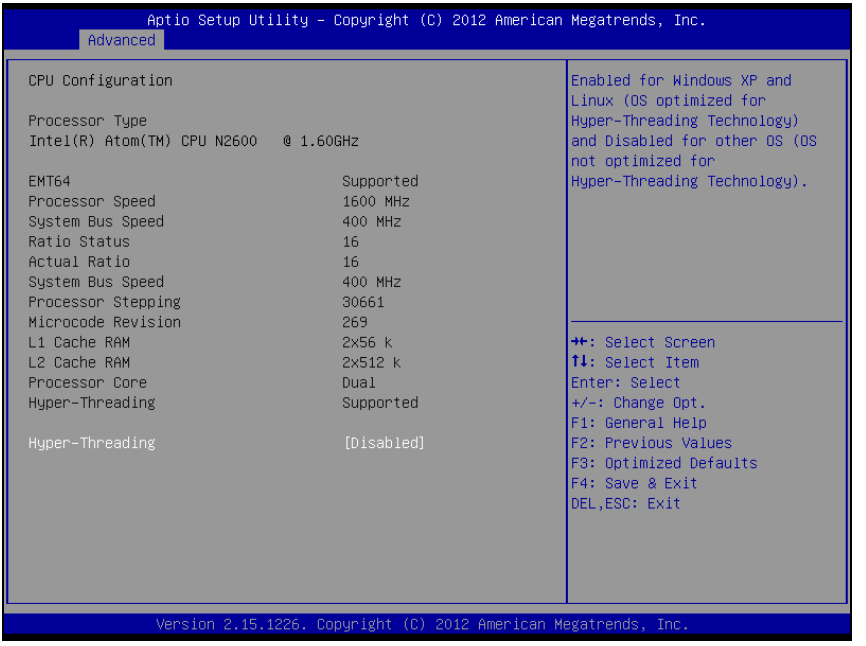
Note: Options marked in blue are set by default.

4-4-3. EC Version

EC version screen

BIOS Setting	Options	Description/Purpose
EC version	Display only	EC version

4-4-4. CPU Configuration



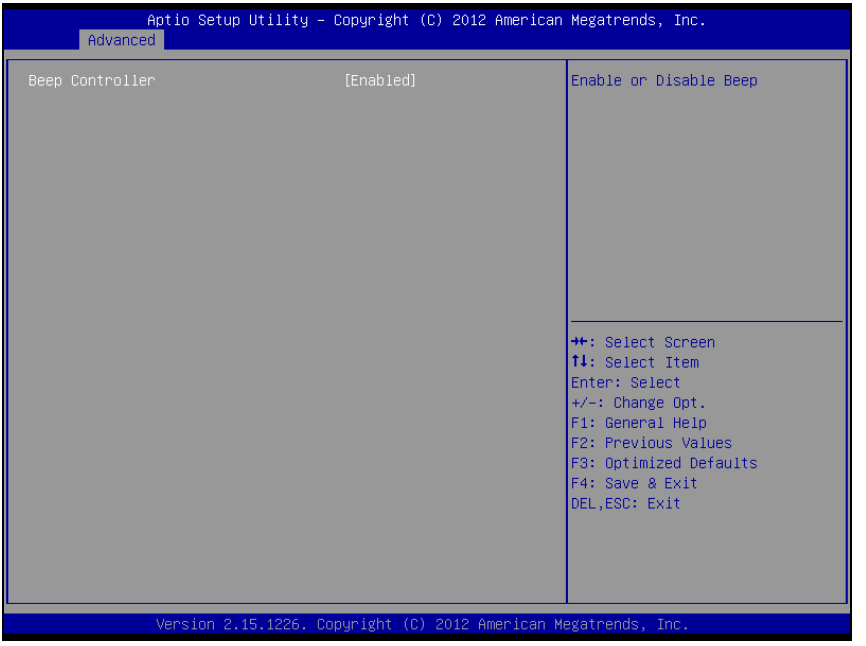
CPU configuration screen

BIOS Setting	Options	Description/Purpose
Processor Type	No changeable options	Displays the current processor model number.
EMT64	No changeable options	Reports if processor supports Intel x86-64 (amd64) implementation.
Processor Speed	No changeable options	Displays the current processor frequencys.
System Bus Speed	No changeable options	Displays System Bus speed
Ratio Status	No changeable options	Displays ratio status
Actual Ratio	No changeable options	Displays actual ratio
Processor Stepping	No changeable options	Displays Processor Stepping

BIOS Setting	Options	Description/Purpose
Microcode Revision	No changeable options	Displays processor's microcode update revision.
L1 Cache RAM	No changeable options	Displays L1 Cache ram size
L2 Cache RAM	No changeable options	Displays L2 Cache ram size
Processor Cores	No changeable options	Displays number of physical cores in processor.
Hyper-Threading	No changeable options	Reports if Intel Hyper-Threading Technology is supported by processor.
Hyper-threading	-Disabled -Enabled	When disabled, only one thread per active core will operate.

Note: Options marked in blue are set by default.

4-4-5. Beep Controller

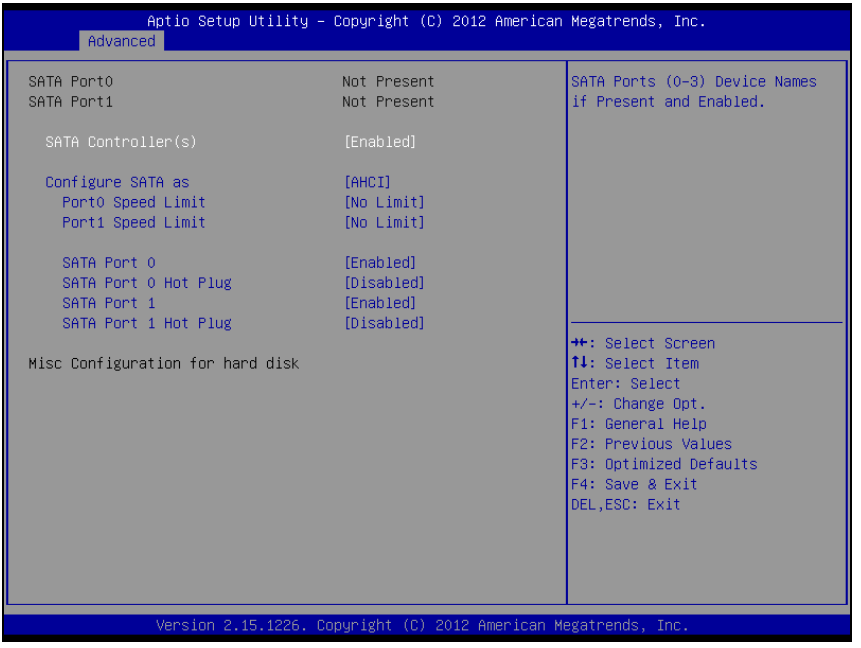


Beep Controller screen

BIOS Setting	Options	Description/Purpose
Beep Controller	- Disabled - Enabled	Enable or Disable Beep

Note: Options marked in blue are set by default.

4-4-6. IDE Configuration



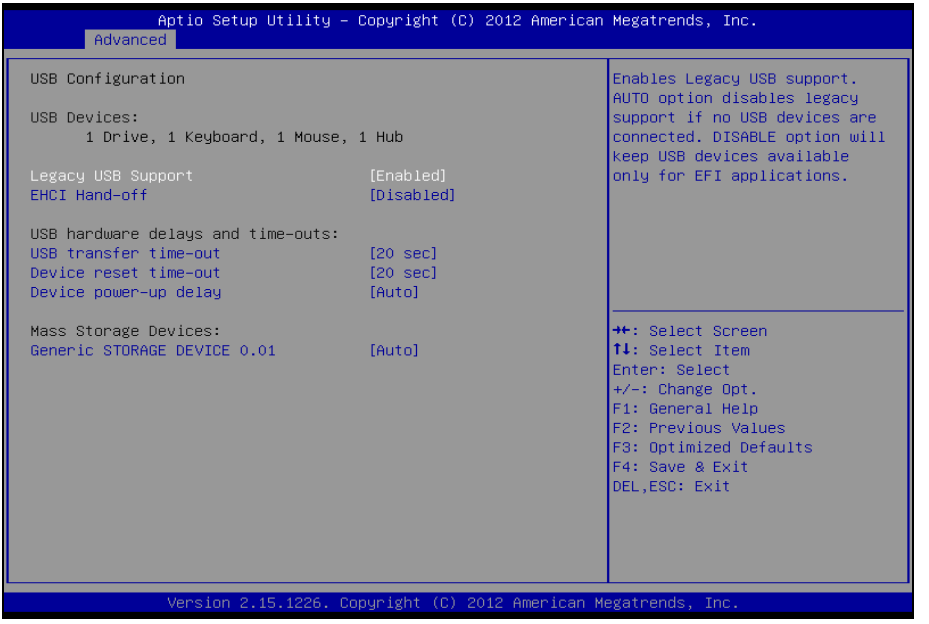
IDE Configuration screen

BIOS Setting	Options	Description/Purpose
Port0 Speed Limit	-No Limit -Gen1 Rate -Gen2 Rate	Select Port0 AHCI Speed Limit
Port1 Speed Limit	-No Limit -Gen1 Rate -Gen2 Rate	Select Port1 AHCI Speed Limit
SATA Port 0	-Disabled -Enabled	Enable or Disable SATA Port
SATA Port 0 Hot Plug	-Disabled -Enabled	Designates this port as Hot Pluggable.

BIOS Setting	Options	Description/Purpose
SATA Port 1	-Disabled -Enabled	Enable or Disable SATA Port
SATA Port 1 Hot Plug	-Disabled -Enabled	Designates this port as Hot Pluggable.

Note: Options marked in blue are set by default.

4-4-7. USB Configuration



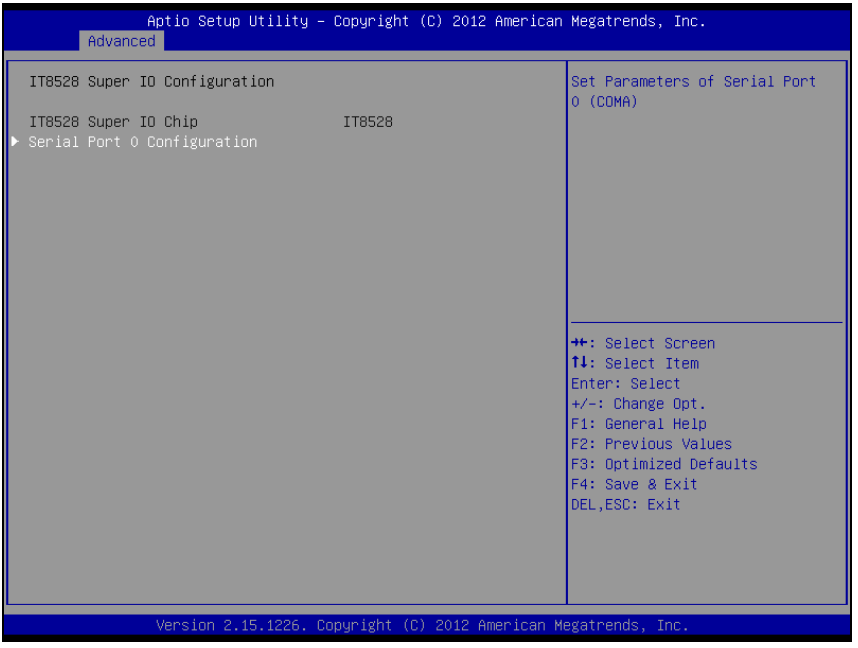
USB configuration screen

BIOS Setting	Options	Description/Purpose
USB Devices	No changeable options	Displays number of available USB devices.
Legacy USB Support	- Disabled - Enabled - Auto	Enables support for legacy USB.
EHCI Hand-off	- Disabled - Enabled	When enabled it allows BIOS support control of the EHCI controller and the OS handoff synchronization capatability.

BIOS Setting	Options	Description/Purpose
USB Transfer time-out	-1 sec -5 sec -10 sec -20 sec	The time-out value for Control, Bulk, and Interrupt transfers.
Device Reset timeout	-10 sec -20 sec -30 sec -40 sec	Specifies the value for device reset timeout.
Device power-up delay	-Auto -Manual	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.
Mass Storage Devices Type	-Auto -Floppy -Forced FDD -Hard Disk -CD-ROM	Mass storage device emulation type. 'Auto' enumerates devices less than 530MB as floppies. Forced FDD option can be used to force HDD formatted drive to boot as FDD(e.g. ZIP drive).

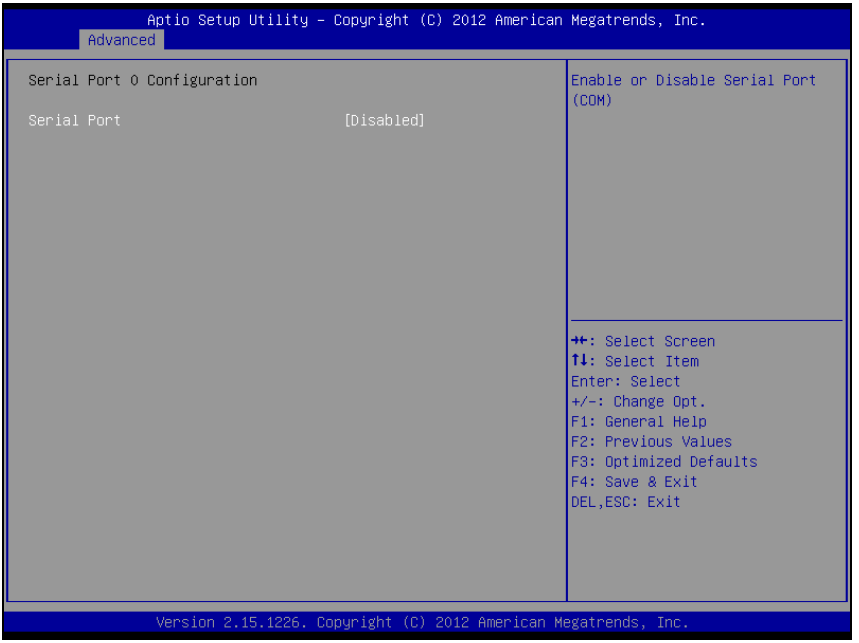
Note: Options marked in blue are set by default.

4-4-8. IT8528 Super IO Configuration



IT8528 Super IO Configuration screen

BIOS Setting	Options	Description/Purpose
Super IO Chip	No changeable options	Displays the super IO chip model and its manufacturer.
Serial Port 0 Configuration	Enter	Enter Serial Port 0 settings

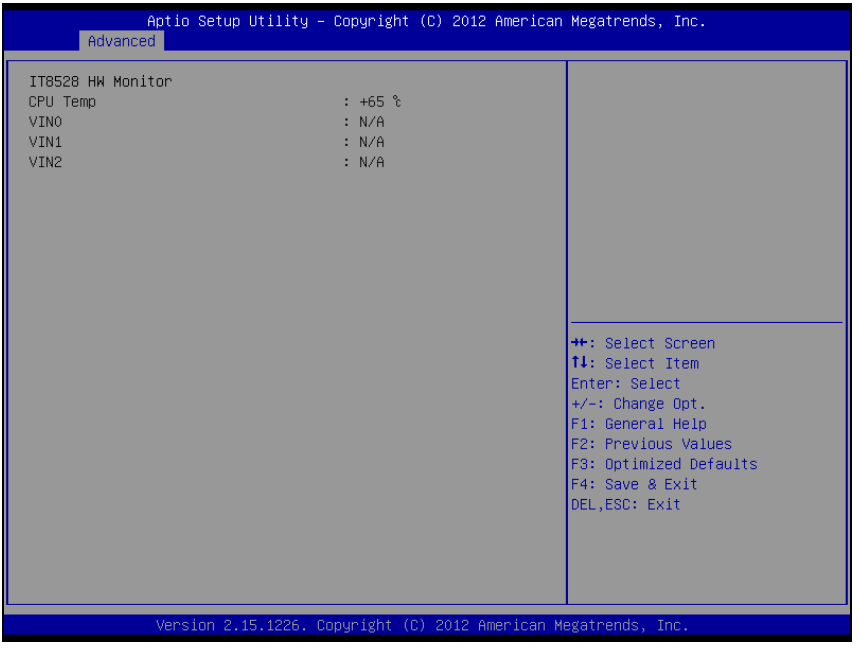


Serial Port 0 Configuration screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Configures the serial port 0.
Device Settings	No changeable options	Reports the current serial port 0 setting.
Change Settings	- Auto - IO=3F8h; IRQ=4 - IO=3F8h; IRQ=3,4,5,6,7,10,11,12 - IO=2F8h; IRQ=3,4,5,6,7,10,11,12 - IO=3E8h; IRQ=3,4,5,6,7,10,11,12 - IO=2E8h; IRQ=3,4,5,6,7,10,11,12	Specifies the base I/O address and interrupt request for the serial port 0 if enabled.

Note: Options marked in blue are set by default.

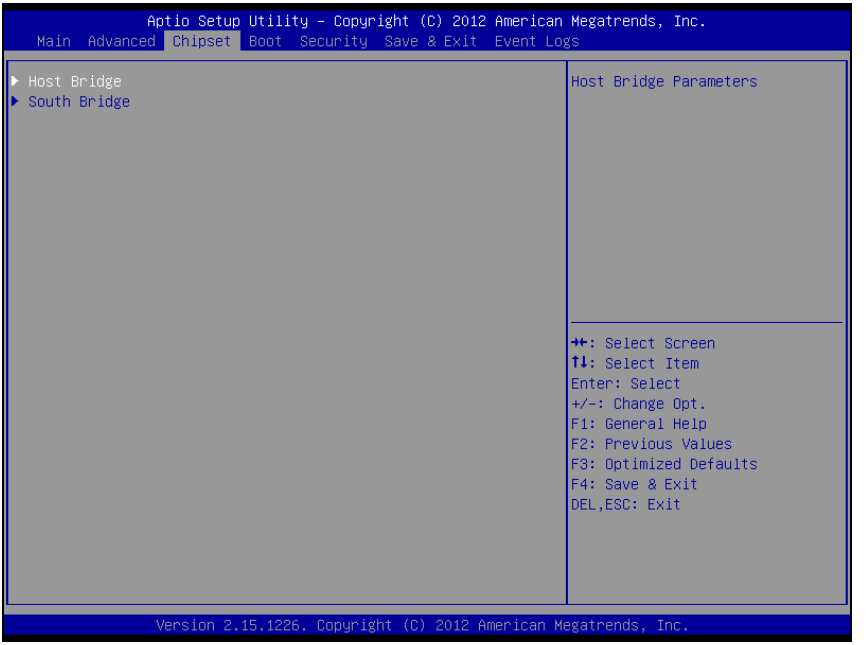
4-4-9. IT8528 Hardware Monitor



IT8528 Hardware Monitor screen

BIOS Setting	Options	Description/Purpose
CPU Temp	No changeable options	Displays CPU temperature.
VIN0	No changeable options	Displays voltage level of the VINx in supply.
VIN1	No changeable options	Displays voltage level of the VINx in supply.
VIN2	No changeable options	Displays voltage level of the VINx in supply.

4-5. CHIPSET



Chipset screen

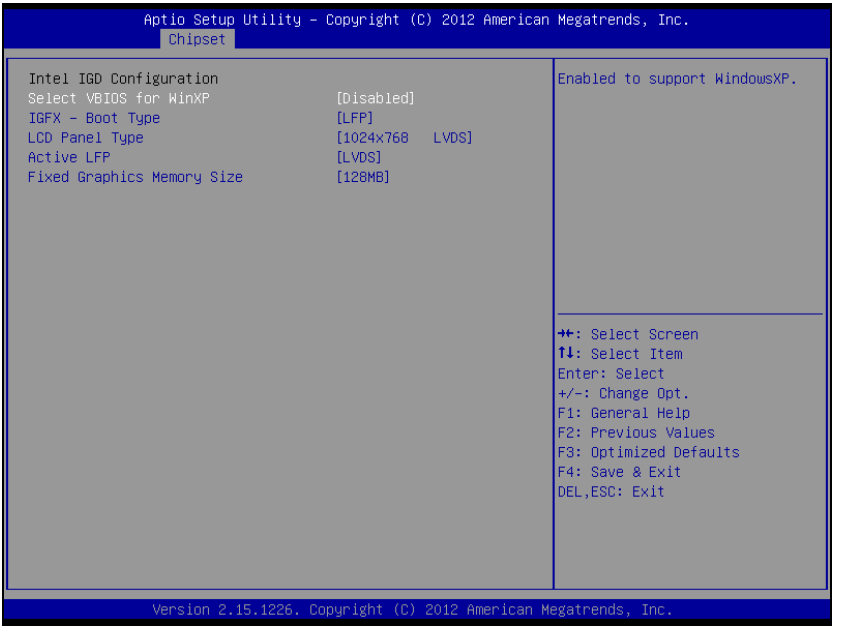
BIOS Setting	Options	Description/Purpose
Host Bridge		Host Bridge Parameters
South Bridge		South Bridge Parameters

4-5-1. North Bridge

North Bridge screen

BIOS Setting	Options	Description/Purpose
Intel IGD Configuration	Enter	Config Intel IGD Settings.
Memory Frequency	Show only	Displays memory frequency
Total Memory	Show only	Displays Dimm total size.
DIMM#1	Show only	Displays DIMM#1 size

4-5-1-1. North Bridge – Intel IGD Configuration



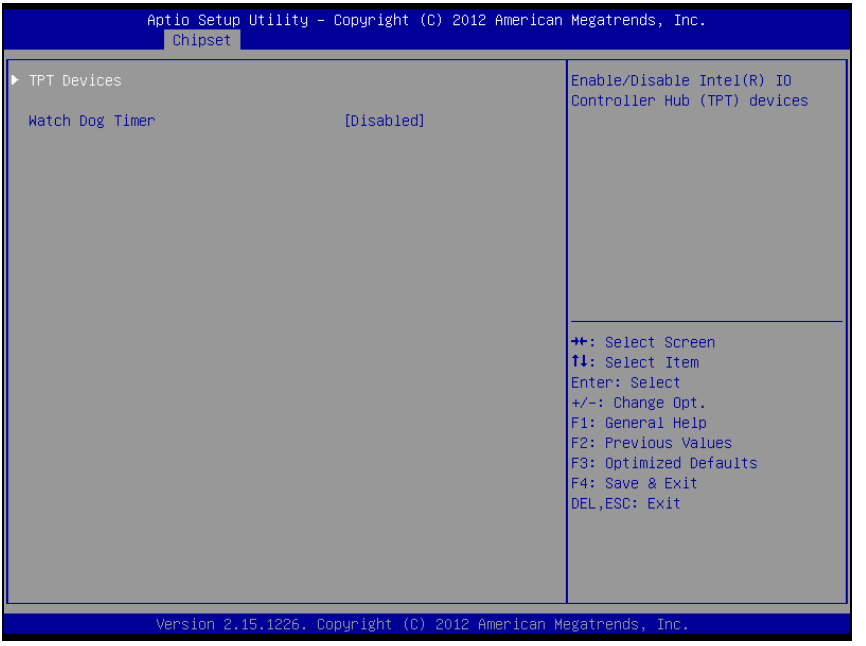
Intel IGD Configuration screen

BIOS Setting	Options	Description/Purpose
Select vbios for WinXP	- Disabled - Enabled	
IGFX- Boot Type	- VBIOS Default - CRT - LFP - CRT+LFP	Select the Video Device which will be activated during POST, This has no effect if external graphics pesent.
LCD Panel Type	- VBIOS Default - 640x480 LVDS - 800x600 LVDS - 1024x768 LVDS - 1280x1024 LVDS - 1366x768 LVDS - 1224x600 LVDS - 1280x800 LVDS	Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item.

BIOS Setting	Options	Description/Purpose
Active LFP	- No LVDS - LVDS	Select the Active LFP configuration. ▪ **No LVDS:** VBIOS does not enable LVDS. ▪ **LVDS:** VBIOS enables LVDS driver by integrated encoder.
Fixed Graphics Memory size	- 128MB - 256MB	Configure Fixed Graphics Memory size

Note: Options marked in blue are set by default.

4-5-2. South Bridge

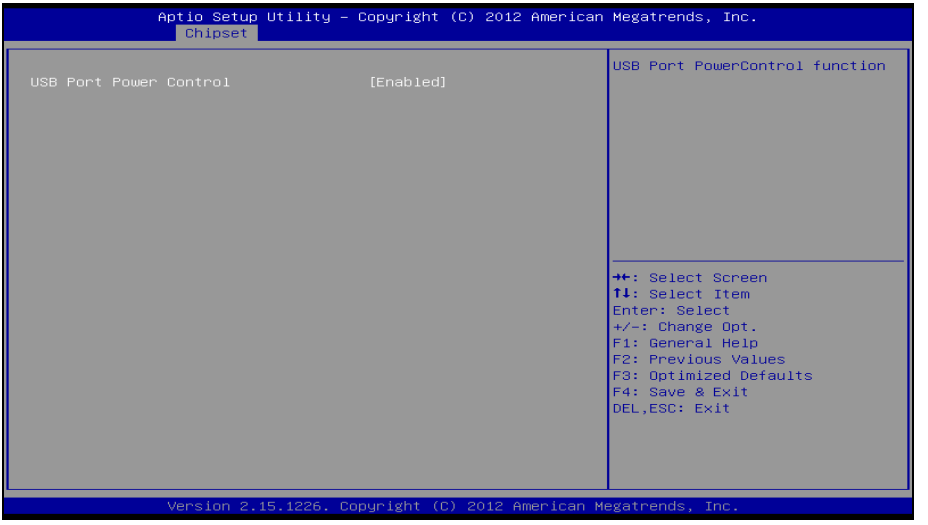


South Bridge screen

BIOS Setting	Options	Description/Purpose
TPT Devices	Enter	Enable/Disable Intel® IO Controller Hub (TPT) Devices
Watch Dog Timer	-Disabled -30sec -60sec -90sec -120sec -150sec -180sec -210sec -240sec	Select 30sec,60 sec, … 240sec to set watchdog timer.

Note: Options marked in blue are set by default.

4-5-2-1. TPT Devices

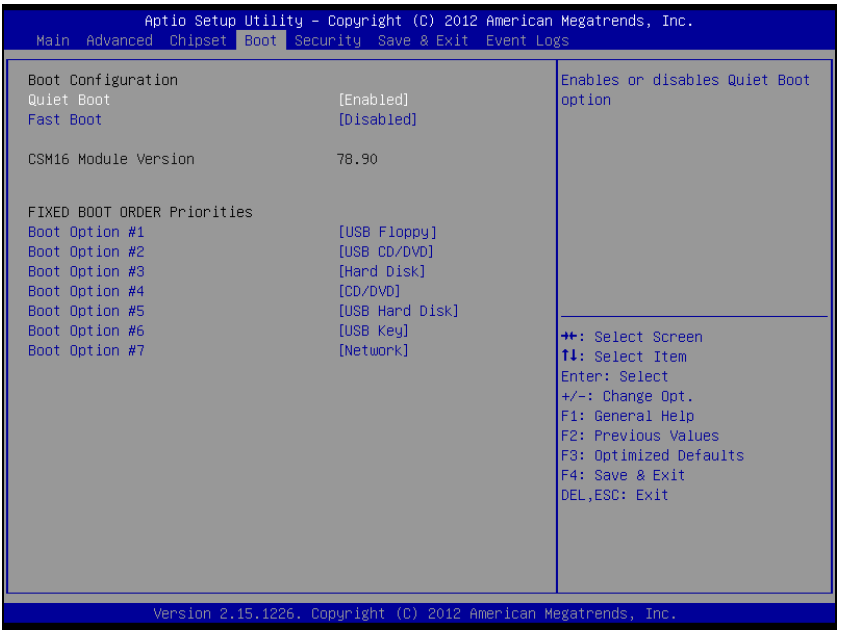


TPT Devices screen

BIOS Setting	Options	Description/Purpose
USB Port Power Control	- Disabled - Enabled	USB port power control function

Note: Options marked in blue are set by default.

4-6. BOOT

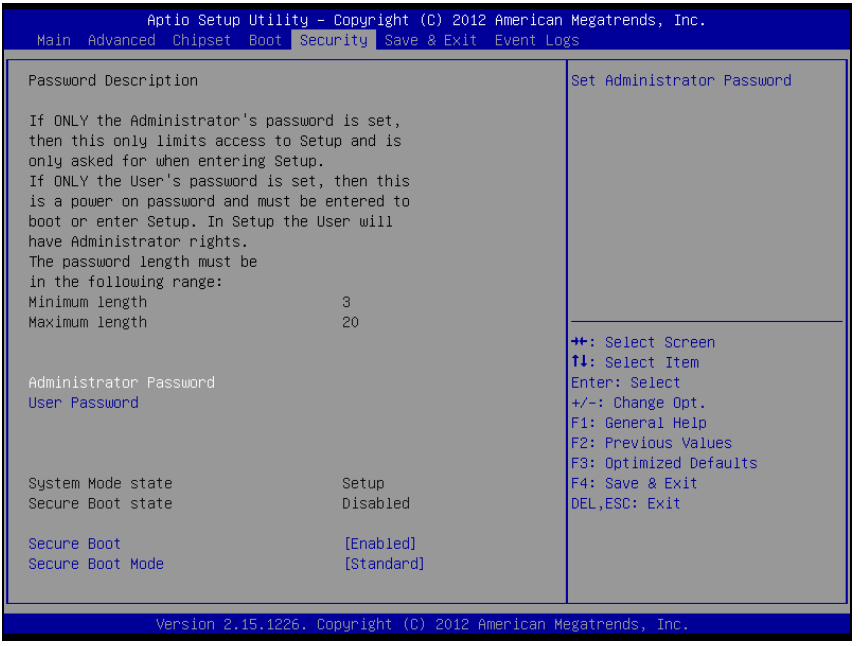


Boot screen

BIOS Setting	Options	Description/Purpose
Quiet Boot	-Disabled -Enabled	When quiet boot is enabled, it displays OEM logo instead of POST messages during boot.
Fast Boot	-Disabled -Enabled	When fast boot is enabled, it boots with minimal set of devices required to launch active boot option.
Boot Option #1	USB Floopy	
Boot Option #2	USB CD/DVD	
Boot Option #3	Hard Disk	
Boot Option #4	CD/DVD	
Boot Option #5	USB Hard Disk	
Boot Option #6	USB Key	
Boot Option #7	Network	

Note: Options marked in blue are set by default.

4-7. SECURITY



Security screen

BIOS Setting	Options	Description/Purpose
Administrator Password	Password can be up to 20 alphanumeric characters.	Specifies the administrator password.
User Password	Password can be up to 20 alphanumeric characters.	Specifies the user password.
Secure Boot	-Disabled -Enabled	Secure Boot flow control. Secure Boot is possible only if system runs in User Mode.
Secure Boot Mode	-Standard -Custom	Secure Boot Mode selector.” Standard’- fixed secure boot policy, ‘Custom’ – changeable Image Execution policy and Secure Boot Key databases.

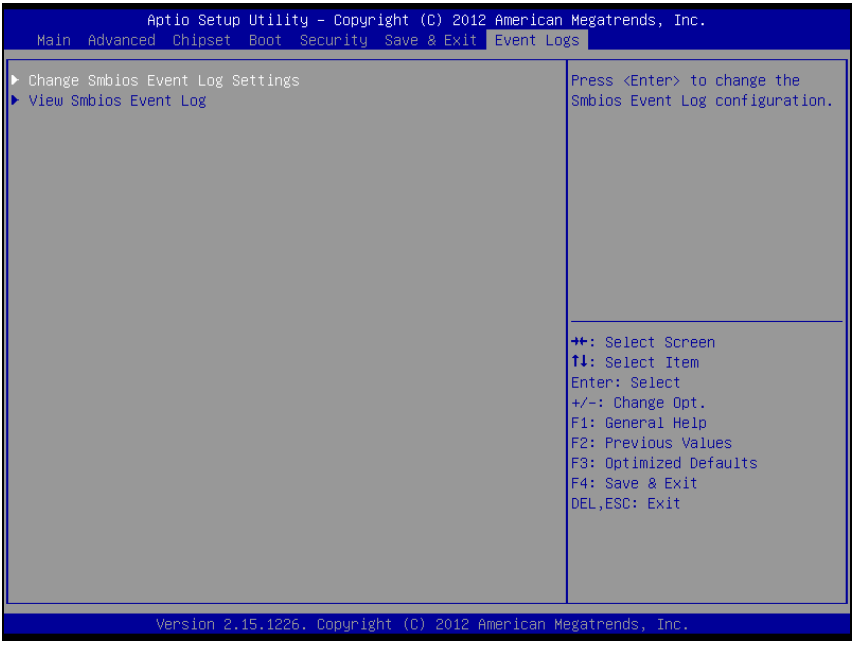
4-8. SAVE & EXIT

Save & Exit screen

BIOS Setting	Options	Description/Purpose
Save Changes and Exit	No changeable options	Exits and saves the changes in CMOS SRAM.
Discard Changes and Exit	No changeable options	Exits without saving any changes made in BIOS settings.
Save Changes and Reset	No changeable options	Saves the changes in CMOS SRAM and resets.
Discard Changes and Reset	No changeable options	Resets without saving any changes made in BIOS settings.
Save Changes	No changeable options	Saves the changes done in BIOS settings so far.
Discard Changes	No changeable options	Discards the changes done in BIOS settings so far.

BIOS Setting	Options	Description/Purpose
Restore Defaults	No changeable options	Loads the optimized defaults for BIOS settings.
Save as User Defaults	No changeable options	Saves the current values as user defaults.
Restore User Defaults	No changeable options	Loads the user defaults for BIOS settings.
Boot Override	-[drive(s)]	Forces to boot from selected [drive(s)].

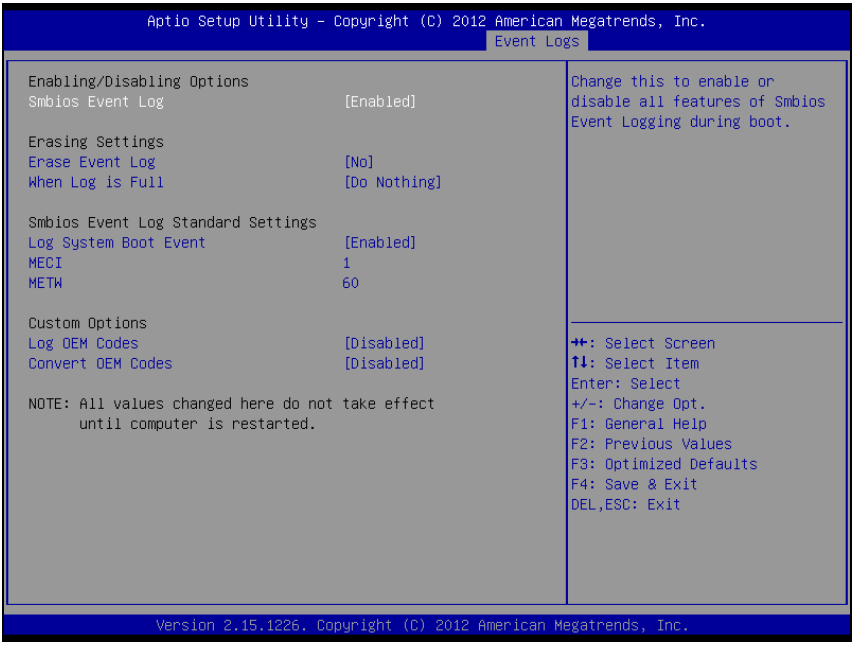
4-9. EVENT LOGS



Event Logs screen

BIOS Setting	Options	Description/Purpose
Change Smbios Event Log Settings	Enter	Press <Enter> to change the Smbios Event Log configuration.
View Smbios Event Log	Enter	Press <Enter> to view the Smbios Event Log records.

4-9-1. Change Smbios Event Log Settings

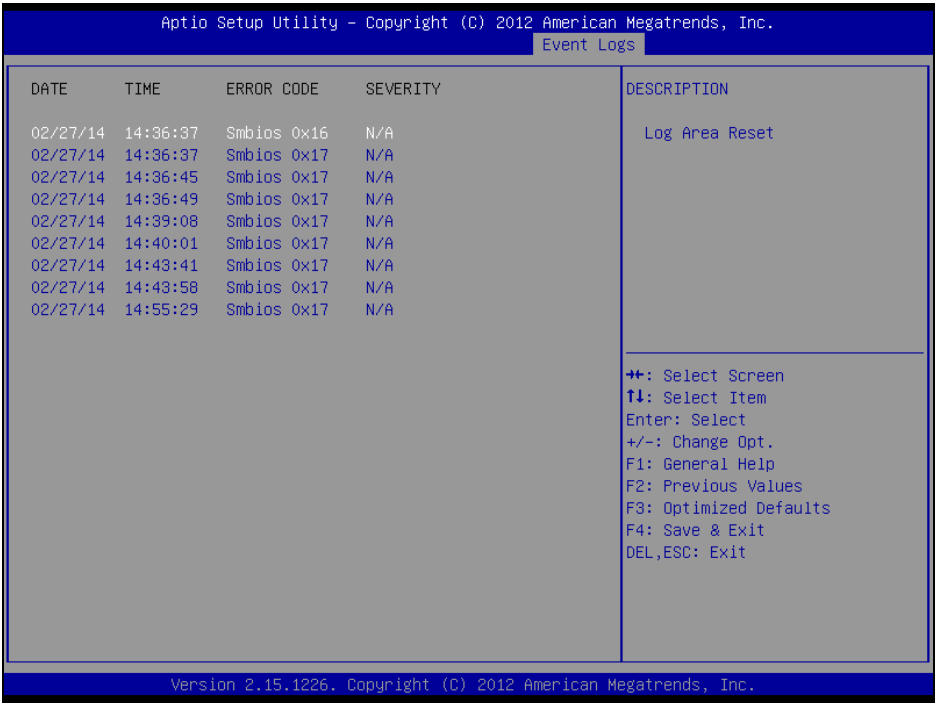


Change Smbios Event Log Settings screen

BIOS Setting	Options	Description/Purpose
Smbios Event Log	- Disabled - Enabled	Change this to enable or disable all features of smbios event logging during boot.
Erase event log	- No - Yes, Next reset - Yes, Every reset	Choose options for erasing Smbios Event log. Erasing is done prior to any logging activation during reset.
When Log is Full	- Do Nothing - Erase Immediately	Choose options for reactions to a full Smbios event log.
Log System Boot Event	- Disabled - Enabled	Choose option to enable/disable logging of System boot event.

BIOS Setting	Options	Description/Purpose
MECI	1~33	Multiple Event Count Increment: The number of occurrences of a duplicate event that must pass before the multiple-event counter associated with the log entry is updated, specified as a numeric value in the range 1 to 33.
METW	0~60~99	Multiple event time window: The number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.
Log OEM Codes	- Disabled - Enabled	Enable or disable the logging of EFI Status Codes as OEM Codes (if not already converted to legacy).
Covert OEM Codes	- Disabled - Enabled	Enable or Disable the converting of EFI Status Codes to Standard Smbios Types (Not all may be translated).

4-9-2. View Smbios Event Log



View Smbios Event Log screen

CHAPTER

5

EC FIRMWARE SPECIFICATIONS

This chapter gives you the information for EC firmware. It also outlines the system specifications.

Sections included:

- Standards
- Introduction
- Requested Items
- ACPI Embedded Controller
- SMBus and System Management
- LCD Backlight Brightness Controller
- GPIO Control
- AD Converted Features

5-1. EC FIRMWARE STANDARDS

1.) Advanced Configuration and Power Interface Specification

- About Smart Battery:

Smart Battery Charger Specification, version 1.1 (15-Dec-98)
Smart Battery Data Specification, version 1.1 (15-Dec-98)
Smart Battery Selector Specification, version 1.1 (15-Dec-98)
Smart Battery System Manager Specification, version 1.0 (Release B): (15-Dec-98)

- About SMBus:

System Management Bus (SMBus) Specification, version 1.1.

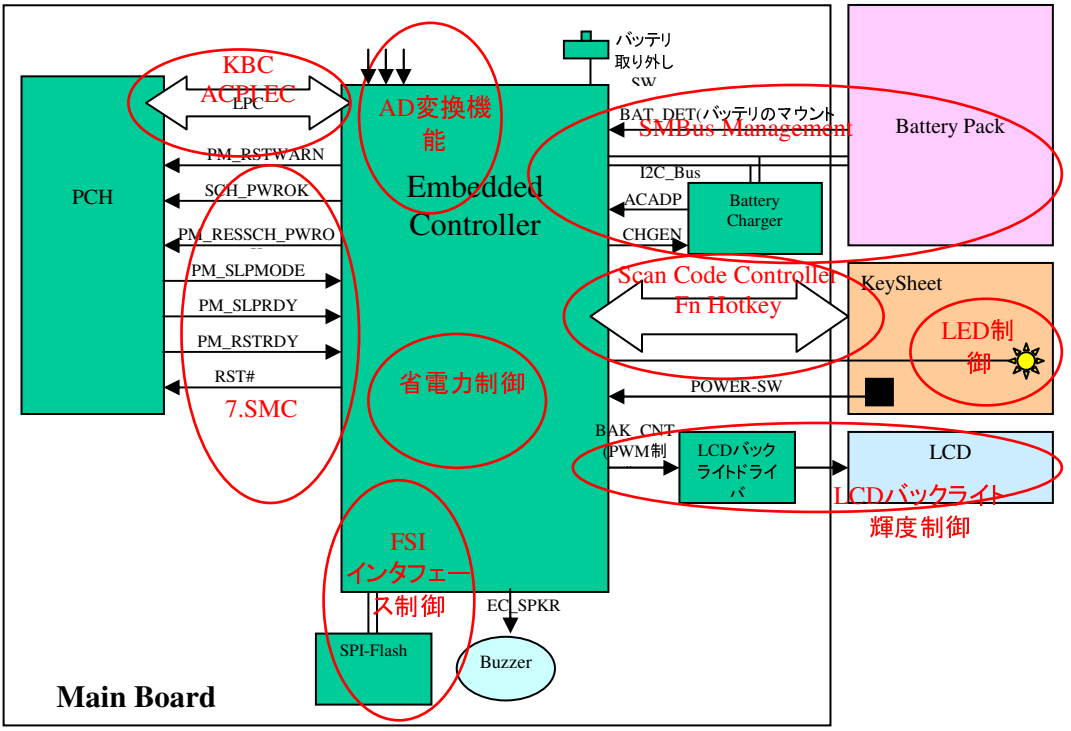
2.) Glossary

NAME	DESCRIPTION
ACPI	Advanced Configuration and Power Interface
EC	Embedded Controller
KBC	Keyboard Controller
SMC	System Management Controller
SCI	System Control Interrupt
SMI	System Management Interrupt
LPC	Low Pin Count
FSI	SPI Flash Memory Serial Interface
PWM	Pulse Width Modulation
RSOC	Relative State Of Charge
BMU	Battery Management Unit

5-2. INTRODUCTION

EC Firmware is the microcomputer firmware for controlling the key sheet, the battery, LEDs and so on as following figure.

It communicates to HOST CPU by KBC and ACPI EC interface, connecting via LPC bus.



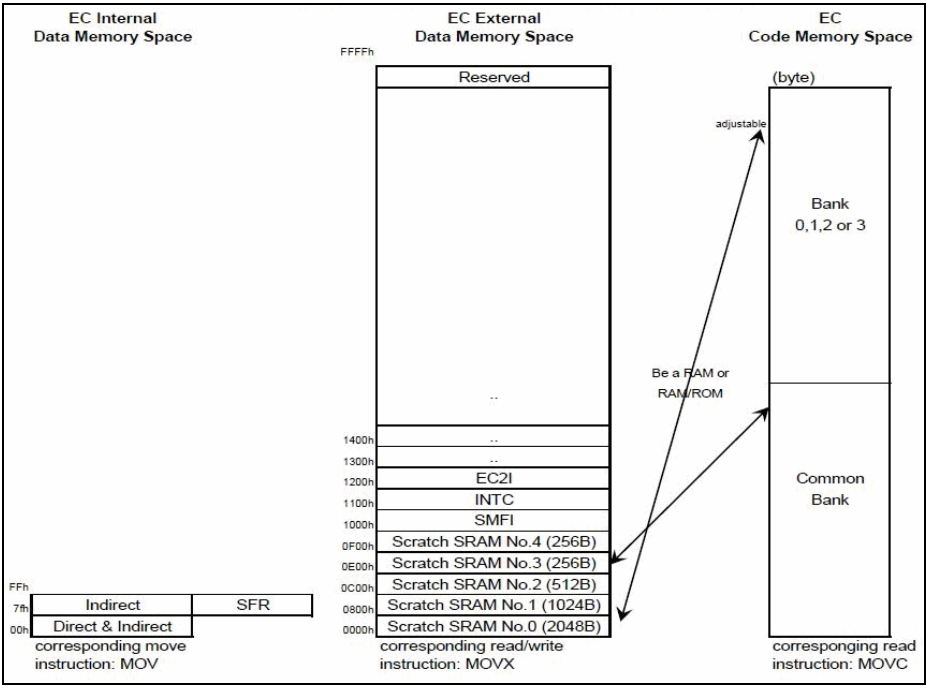
5-3. REQUESTED ITEMS

The following items are requested in the EC firmware specifications.

- Design and test of EC firmware based on the EC firmware specifications.
- Accommodate for these request items.

NO.	REQUEST ITEM
1	Memory map for EC firmware
2	Initializing process
3	Electrical power saving function of EC controller

1.) EC Mapped Memory Space



EC 8032 Data/Code Memory Map

External SRAM Memory Map:

0x0000-0x00FF	Kernel use resources	256 bytes
0x0100-0x03FF	OEM-RAM	768 bytes
0x0400-0x04FF	ECRAM	256 bytes
0x0500-0x05FF	OEM-RAM	256 bytes
0x0600-0x06FF	For ITE_Flash_Utility & SPI ROM Read/Wirte	256 bytes
0x0700-0x07FF	RamProgram using	256 bytes
0x0800-0x0EFF	OEM-RAM	1792 bytes
0x0E00-0x0FFF	For HSPI ram code function	256 bytes

2.) Initializing Process

When initialization rises, EC firmware runs the following processes

No.	Initial item
1	GPIO
2	SMBus
3	PWM
4	ADC
5	Scanner Keyboard
6	Host LPC I/O

5-4. ACPI EMBEDDED CONTROLLER (EC)

1.) ACPI Embedded Controller Interface

Host uses the following resisters for accessing this chip.

ACPI Embedded Controller Interface Register:

I/O Offset	Description	Read/Write
66h	Status	R
66h	Command In Buffer	W
62h	Data In Buffer	W/R

ACPI Embedded Controller Status Register:

Bit	Description
7	Reserved
6	SMI_EVT
5	SCI_EVT
4	BURST
3	Command/Data
2	Ignored
1	Input Buffer Full (IBF)
0	Output Buffer Full (OBF)

Follow the EC interface command below.

Embedded Controller Command Set:

Embedded Controller Command	Command Byte Encoding
Read Embedded Controller (RD_EC)	0x80
Write Embedded Controller (WR_EC)	0x81
Burst Enable Controller (BE_EC)	0x82
Burst Disable Controller (BD_EC)	0x83
Query Embedded Controller (QR_EC)	0x84

For more information, refer to the section *Advanced Configuration and Power Interface Specification*.

2.) EC RAM

This chip has an EC RAM area of 256 bytes.

The host CPU can access the EC RAM area by the following EC interface command.
- Read Embedded Controller (RD_EC)
- Write Embedded Controller (WR_EC)

The content of EC RAM area (256 bytes) is as below.
CAUTION) About the 2 bytes area, data is saved as Big endian.

EC RAM Area:

Offset	Byte	R/W	Name	Description	Note
00h	1	R	BAT1_STATUS	Battery#1 Data Status 0x01 – BAT1 DATA OK!	
01h	1	R	BAT1_BP	Battery#1 Battery Percentage	0x0d
02h	2	R	BAT1_BS	Battery#1 Battery Status	0x16
04h	2	R	BAT1_FCC	Battery#1, Last Full Charge Capacity [mAh]	0x10
06h	2	R	BAT1_BRC	Battery#1, Remaining Capacity [mAh]	0x0f
08h	2	R	BAT1_BT	Battery#1, Battery Temperature [0.1K]	0x08
0Ah	2	R	BAT1_BV	Battery#1, Battery Voltage [mV]	0x09
0Ch	2	R	BAT1_BAC	Battery#1, Battery Average Current [mA]	0x0b
0Eh	2	R	BAT1_DC	Battery#1 Design Capacity [mAh]	0x18
10h	2	R	BAT1_DV	Battery#1 Design Voltage [mV]	0x19
12h	2	R	Reserved	Reserved	
14h	2	R	Reserved	Reserved	
16h	2	R	BAT1_SN	Battery#1 Serial Number	0x1c
18h	2	R	BAT1_MANU_ACC	Battery#1 Manufacture Access Status	0x00
1Ah	2	R	BAT1_CC	Battery#1 Cycle Count	0x17
1Ch	2	R	BAT1_MANU_DATE	Battery#1 Manufacture Date Date. (year-1980)*512+month*32+day	0x1b
1Eh	2	R	BAT1_CURRENT	Battery#1 Battery Current [mA]	0x0a

Offset	Byte	R/W	Name	Description	Note
20h	12	R	BAT1_MANU_NAME	Battery#1 Manufacture Name (String)	0x20
2Ch	8	R	BAT1_DN	Battery#1 Device Name (String)	0x21
34h	4	R	BAT1_DCH	Battery#1 Device Chemistry (String)	0x22
38h	8	R	BAT1_MANU_DATA	Battery#1 Manufacture Data	0x23
40h	2	R	BAT1_CellVoltage4	Battery#1 CellVoltage4	0x3c
42h	2	R	BAT1_CellVoltage3	Battery#1 CellVoltage3	0x3d
44h	2	R	BAT1_CellVoltage2	Battery#1 CellVoltage2	0x3e
46h	2	R	BAT1_CellVoltage1	Battery#1 CellVoltage1	0x3f
48h	1	R	PS_STATE	POWER SOURCE STATUS BIT0 // =1 BAT1 IN BIT1 .. BIT4 RESERVED BIT5 // =1 CRA_DET BIT6 // =1 AC ADP BIT7 // =1 AC CRA	
49h	1	R	BAT_SW	BATTERY SWITCH	
4Ah	1	R	BAT_CHG_STATE	BATTERY CHARGING STATE	
4Bh-BFh	117		Reserved	Reserved	
C0h	1	R/W	OEM_LCD_BACK_LIGHT	OEM LCD Brightness Level	
C1h	1	R/W	OEM_EX_CMD	OEM Extended Command BIT0 // =1 Battery Refresh Mode BIT1 .. BIT7 :RESERVED	
C2h	1	R/W	OEM_WIfI_LED	OEM Wifi LED	
C3-CFh	13		Reserved	Reserved	
D0h	1	R	ADC_CPU_CORE_VOLT	VCC_CPU voltage value	

Offset	Byte	R/W	Name	Description	Note
D1h	1	R	ADC_1_35_VOLT	1.35V voltage value	
D2h	1	R	ADC_3_3_VOLT	3.3V voltage value	
D3h	1	R	ADC_GFX_VOLT	GFX voltage value	
D4-EFh	28		Reserved	Reserved	
F0	1	R	MAIN_REV	EC Firmware Main Version	
F1	1	R	SUB_REV	EC Firmware Sub Version	
F2	1	R	TEST_REV	EC Firmware Test Version	
F3-FFh	13		Reserved	Reserved	

3.) SCI Event

This chip supports SCI event to notify the state AC or battery to the host. When SCI event occurs, generates a SCI interrupt to the host, and return the Query Notification Byte by request from the host.

SCI interrupt

Type	Timing
RUNTIME-SCI	Operating (S0)

Query Notification Byte can be accessed by the following EC interface command.

- Query Embedded Controller

The following table is the contents of SCI event (Notification Byte):

Event No.	Event Name	Description	Note
90h-9Fh	reserved	Reserved for Wake-up Event	
A0h	AC_PLUG_EVT	AC adapter is inserted or removed.	ACADP
A1h	BAT_SW_EVT	Main battery lock switch is released.	BATSW
A2h	BAT_DET_EVT	Main battery pack is inserted or removed. RSOC had been 100%. (FCC re-read request)	BAT_DET
A4h-Afh	reserved		
B0h	BAT_LOW_EVT	Battery low alarm event (in S0 state) 8%	
B1h-FFh	reserved		

There are 8 SCI event queue of the EC firm (FIFO), and retention of 8 events is possible at the same time. The 9th event or more will be discarded. If received SCI interrupt, send QR_EC(0x84) command and confirm the event that had occurred.

For details, refer to the section *System Management (SMC).*

4.) Mail Box

Index port:1200h, data port:1201h port

Register	Bit	function	Notes
0x81~84	32	Recognized string(fixed value)*read only/8bitx4/ASCII code	Read only
0x85~87	24	Wake up time(h/m/s) *BCD value setting /8bit x3	
0x88	8	Wake up date (d) * BCD value setting / 8bit	
0x89	bit0	Function Enable /Disable *1=Enable,0=Disable / 0bit bit1~ 7 : reserved	
0x8A~8F		Reserved	
0x91	8	USB bus Power on control.USB0~USBx==> 1:Power off, 0: power on	
0x92		Reserved	
0x93	8	CPU core voltage	
0x94	8	1.35v voltage	
0x95	8	3.3v voltage	
0x96	8	GFX voltage	
0x97		Reserved	
0x98	8	<Forced off by power button> You can choose the following [Delay 10 seconds] or [Delay 5 seconds]=>default value bit0~ 4 , 0~ 31 sec <Power on/Standby/Resume by power button> You can choose the following. [Delay 2 seconds] or [Delay 1 sec]=>default value bit 5~7=> 0~ 7 sec	
0x99		Reserved	
0x9A	8	EC Firmware main- version number.	
0x9B	8	EC Firmware sub- version number.	
0x9C	8	EC Firmware test- version number.	
0x9D~9F		Reserved	

Register	Bit	function	Notes
0xB1	8	Wifi LED	
0xB2	8	OEM Extended Command bit0 : Battery Refresh Mode	1:Enable 0:Eisable
0xB3	8	LCD_BACK_LIGHT brightness bit 7~6 (4 Level)	
0xB4	8	bit0: Buzzer Muting enable/Disable	1:Enable 0:Eisable
0xB5	8	xMBX_OemPwrFail_CTRL	//BIT1 BIT0 // 0 0 :do nothing // 0 1 :Auto boot
0xB6		Reserved	
0xB7	8	bit0: System Watch Dog Timer Enable/Disable	1:Enable 0:Eisable
0xB8	8	System Watch Dog Time (sec)	
0xB9		Reserved	
0xBA	8	bit0: xMBX_OEM_TEST_MODE	1:Enable 0:Eisable
0xBB~FF		Reserved	

5-5. SMBUS MANAGEMENT

Standard EC SMBus Command

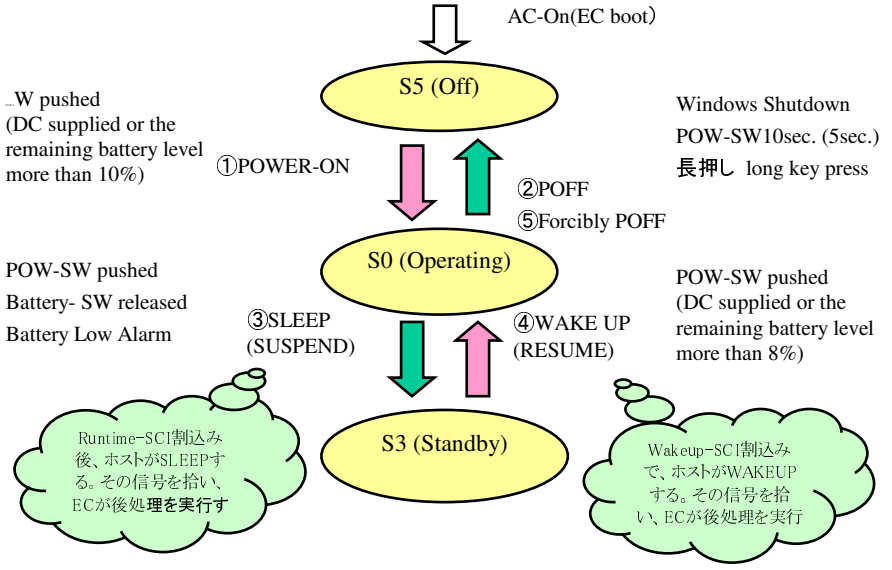
Supports standard SMBus access command that defined by Advanced Configuration and Power Interface Specification.

As for the interface to host CPU, use from 80h onward in EC RAM area.

5-6 SYSTEM MANAGEMENT (SMC)

Standby and resume controlling S0→S3→S0 (ON→SaveToRAM→ON)

Monitor the remaining battery level, prohibit returning from S3 to S0 by Power switch pushed and indicate user by the battery LED controlling.



1.) Power On

If EC firmware detects the Power button pushed in S5 (off) state, it transits to S0 (operating).

The following shows the sequence of the current model.

Power-on（S5→S0）sequence:
Signal name and control sequence is of current model

1. WLAN_LED setting 1→0
2. EN_3V3_SYS setting 0→1
3. 50ms wait
4. PWR_LED setting 0→1
5. SIO_PWRBTNJ setting 0→1
6. 200ms wait
7. SIO_RSMRSTJ setting 0→1
8. 40ms wait
9. SIO_PWRBTNJ setting 1→0
10. Wait until becoming SLP_S4J == 1
11. 20ms wait
12. Wait until becoming SLP_S3J == 1
13. 20ms wait
14. SIO_PSONJ setting 1→0
15. ECSCI setting 0→1
16. ECSMI setting 0→1
17. A20GATE_IO setting 0→1
18. KBRSTJ_IO setting 0→1
19. CLKRUNJ setting 0→1

If any problems occurs, power on operation (S5 to S0) cannot run, and the state keep in S5. (inhibited powered on)

2.) Power Off

If Windows Shutdown is executed in S0 state, the following signals that is input to EC change, and the state transit from S0 to S5 by EC firmware detecting signal changing. The following shows the sequence of the current model.

In S0 state, when EC detect that Power button is in long key press for 10seconds (5seconds), EC execute forcibly power off sequence. The following shows the sequence of the current model. EC transits from S0 to S5.

Power-on（S5→S0）sequence:

Signal name and control sequence is of current model

1. CLKRUNJ setting 1→0
2. WLAN_LED setting 1→0
3. A20GATE_IO setting 1→0
4. KBRSTJ_IO setting 1→0
5. ECSCI setting 1→0
6. ECSMI setting 1→0
7. PWR_LED setting 1→0
8. SIO_PSONJ setting 0→1
9. 50ms wait

3.) Sleep

In S0 state, if EC detects Power switch pushed or Battery Low Alarm, notices the Runtime-SCI interrupt to host. Host confirms the occurred event by sending EC QR command to EC, and operates Sleep operation (Suspend to RAM). Therefore, signals changes as following table. EC detects these changing, and transits from S0 to S3. The following shows the sequence of the current model.

Suspend（S0→S3）sequence:

Signal name and control sequence is of current model

1. CLKRUNJ setting 1→0
2. WLAN_LED setting 1→0
3. A20GATE_IO setting 1→0
4. KBRSTJ_IO setting 1→0
5. ECSCI setting 1→0
6. ECSMI setting 1→0
7. PWR_LED setting 1→0
8. SIO_PSONJ setting 0→1
9. 50ms wait

4.) Wakeup

In S3 (standby) state, when AC adapter connected, or when the remaining battery level is enough (RSOC more than 8%) in battery operating, if EC detects Power button pushed, EC notices the Wakeup-SCI interrupt to host. Host operates Wakeup operation. Therefore, signals changes as following table. EC detects these changing, and transits from S3 to S0. The following shows the sequence of the current model.

Resume (S3→S0) sequence:
Signal name and control sequence is of current model

1. PWR_LED setting 0→1
2. SIO_PSONJ setting 1→0
3. ECSCI setting 0→1
4. ECSMI setting 0→1
5. A20GATE_IO setting 0→1
6. KBRSTJ_IO setting 0→1
7. CLKRUNJ setting 0→1

If any problem occurs, Wakeup operation (S3 to S0) cannot run, so the state keeps in S3. (inhibited wakeup)

- SMBus communication error with the main battery

5-7. LCD BACKLIGHT BRIGHTNESS CONTROL

By PWM controlling, EC control LCD backlight brightness. The default value of brightness is “brightness 1”.

Brightness control button.
Pushing it on the key sheet enables the brightness to change in 4 steps.

The default value is “brightness 1”, and if brightness control button is pushed 1 time, the brightness increases
every 1 step.

In “brightness 4” state, if pushed, the brightness level returns to “brightness 1”.
This value is memorized even if after power off, when power on, set the previous value.

Brightness control by button pushed on the key sheet

	Percentage[%]	**Note**
Brightnes 1 (darkest)	32%	Default
Brightness 2	48%	
Brightness 3	55%	
Brightness 4 (brightest)	63%	

Signal name	**Input/output**	**Terminal name**
BCLT_PWM	OUT	PWM0/GPA0

5-8. GPIO CONTROL

Input Signal:

PWRBTNJ

The Power switch signal is from the key sheet. By this signal, tablet can power on or power off or transit to standby, when key pressed for 2 second, or for 1 second (and beep 1 time). When key pressed for 10 seconds, or for 5 seconds (and beep 2times), the tablet can be forcibly powered off.

5-9. AD CONVERTED FEATURES

Internal power voltage value that is converted from analog to digital is expanded to EC RAM. So, we can check the internal voltage value by some test tool.

Description	Note (Name in EC RAM area)
CPU core voltage value	ADC_CPU_CORE_VOLT
1.35V voltage value	ADC_1_35_VOLT
3.3V voltage value	ADC_3_3_VOLT
GFX voltage value	ADC_GFX_VOLT

EXPANSION BUS

APPENDIX

A

This appendix indicates the pin assignments.

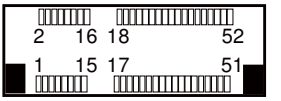
Sections included:

- Mini-PCIe Bus

MINI-PCIE BUS

You will find a **M_PCIE1** on MD-591X.
The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	WAKE#	27	GND
2	+3.3V	28	+1.5V
3	Reserved	29	GND
4	GND	30	SMB_CLK
5	Reserved	31	PETn0
6	+1.5V	32	SMB_DATA
7	CLKREQ#	33	PETp0
8	Reserved	34	GND
9	GND	35	GND
10	Reserved	36	USB_D-
11	REFCLK-	37	GND
12	Reserved	38	USB_D+
13	REFCLK+	39	+3.3V
14	Reserved	40	GND
15	GND	41	+3.3V
16	Reserved	42	Reserved
17	Reserved	43	GND
18	GND	44	Reserved
19	Reserved	45	CLINK_CLK
20	Reserved	46	Reserved
21	GND	47	CLINK_DATA
22	PERST#	48	+1.5V
23	PERn0	49	CLINK_RST_N
24	+3.3Vaux	50	GND
25	PERp0	51	Reserved
26	GND	52	+3.3V



M_PCIE1

TECHNICAL SUMMARY

APPENDIX

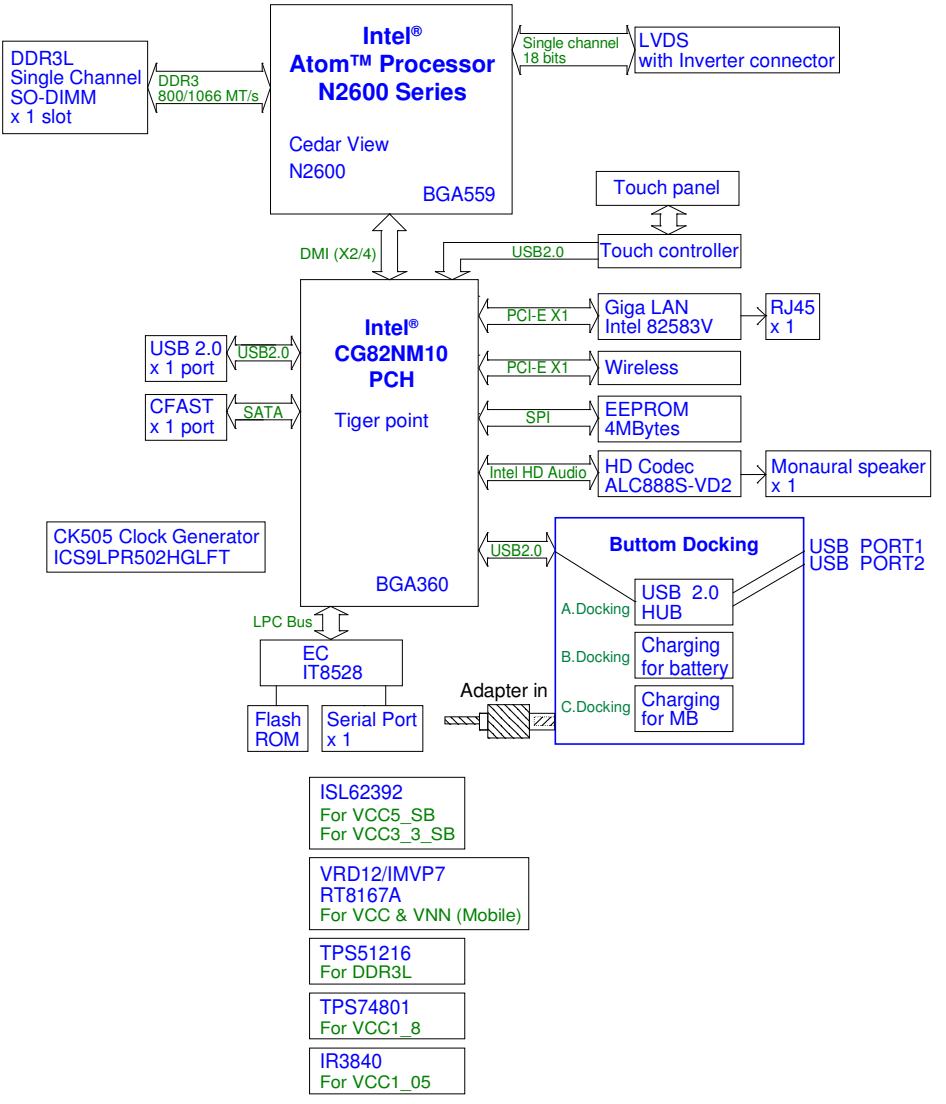
B

This section introduce you the maps concisely.

Sections included:

- Block Diagram
- Interrupt Map
- DMA Channel Map
- I/O Map
- Memory Map
- Post Codes
- S3 Resume Codes
- ACPI Checkpoints
- Event Log Codes
- Flash BIOS Update

BLOCK DIAGRAM



INTERRUPT MAP

IRQ	ASSIGNMENT
0	Intel® Graphics Media Accelerator 3600 Series
0	System timer
7	Intel® N10/ICH7 Family SMBus Controller - 27DA
8	System CMOS/real time clock
13	Numeric data processor
16	Intel® N10/ICH7 Family USB Universal Host Controller - 27CB
16	Intel® N10/ICH7 Family PCI Express Root Port - 27D0
18	Intel® N10/ICH7 Family PCI Express Root Port - 27D4
18	Intel® N10/ICH7 Family USB Universal Host Controller - 27CA
19	Standard AHCI 1.0 Serial ATA Controller
19	Intel® N10/ICH7 Family PCI Express Root Port - 27D6
19	Intel® N10/ICH7 Family USB Universal Host Controller - 27C9
22	High Definition Audio Controller
23	Intel® N10/ICH7 Family USB Universal Host Controller - 27C8
23	Intel® N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
81	Microsoft ACPI-Compliant System
82	Microsoft ACPI-Compliant System
83	Microsoft ACPI-Compliant System
84	Microsoft ACPI-Compliant System
85	Microsoft ACPI-Compliant System
86	Microsoft ACPI-Compliant System
87	Microsoft ACPI-Compliant System
88	Microsoft ACPI-Compliant System
89	Microsoft ACPI-Compliant System
90	Microsoft ACPI-Compliant System
91	Microsoft ACPI-Compliant System
92	Microsoft ACPI-Compliant System
93	Microsoft ACPI-Compliant System
94	Microsoft ACPI-Compliant System
95	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
96	Microsoft ACPI-Compliant System
97	Microsoft ACPI-Compliant System
98	Microsoft ACPI-Compliant System
99	Microsoft ACPI-Compliant System
100	Microsoft ACPI-Compliant System
101	Microsoft ACPI-Compliant System
102	Microsoft ACPI-Compliant System
103	Microsoft ACPI-Compliant System
104	Microsoft ACPI-Compliant System
105	Microsoft ACPI-Compliant System
106	Microsoft ACPI-Compliant System
107	Microsoft ACPI-Compliant System
108	Microsoft ACPI-Compliant System
109	Microsoft ACPI-Compliant System
110	Microsoft ACPI-Compliant System
111	Microsoft ACPI-Compliant System
112	Microsoft ACPI-Compliant System
113	Microsoft ACPI-Compliant System
114	Microsoft ACPI-Compliant System
115	Microsoft ACPI-Compliant System
116	Microsoft ACPI-Compliant System
117	Microsoft ACPI-Compliant System
118	Microsoft ACPI-Compliant System
119	Microsoft ACPI-Compliant System
120	Microsoft ACPI-Compliant System
121	Microsoft ACPI-Compliant System
122	Microsoft ACPI-Compliant System
123	Microsoft ACPI-Compliant System
124	Microsoft ACPI-Compliant System
125	Microsoft ACPI-Compliant System
126	Microsoft ACPI-Compliant System
127	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
128	Microsoft ACPI-Compliant System
129	Microsoft ACPI-Compliant System
130	Microsoft ACPI-Compliant System
131	Microsoft ACPI-Compliant System
132	Microsoft ACPI-Compliant System
133	Microsoft ACPI-Compliant System
134	Microsoft ACPI-Compliant System
135	Microsoft ACPI-Compliant System
136	Microsoft ACPI-Compliant System
137	Microsoft ACPI-Compliant System
138	Microsoft ACPI-Compliant System
139	Microsoft ACPI-Compliant System
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142	Microsoft ACPI-Compliant System
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149	Microsoft ACPI-Compliant System
150	Microsoft ACPI-Compliant System
151	Microsoft ACPI-Compliant System
152	Microsoft ACPI-Compliant System
153	Microsoft ACPI-Compliant System
154	Microsoft ACPI-Compliant System
155	Microsoft ACPI-Compliant System
156	Microsoft ACPI-Compliant System
157	Microsoft ACPI-Compliant System
158	Microsoft ACPI-Compliant System
159	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
160	Microsoft ACPI-Compliant System
161	Microsoft ACPI-Compliant System
162	Microsoft ACPI-Compliant System
163	Microsoft ACPI-Compliant System
164	Microsoft ACPI-Compliant System
165	Microsoft ACPI-Compliant System
166	Microsoft ACPI-Compliant System
167	Microsoft ACPI-Compliant System
168	Microsoft ACPI-Compliant System
169	Microsoft ACPI-Compliant System
170	Microsoft ACPI-Compliant System
171	Microsoft ACPI-Compliant System
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173	Microsoft ACPI-Compliant System
174	Microsoft ACPI-Compliant System
175	Microsoft ACPI-Compliant System
176	Microsoft ACPI-Compliant System
177	Microsoft ACPI-Compliant System
178	Microsoft ACPI-Compliant System
179	Microsoft ACPI-Compliant System
180	Microsoft ACPI-Compliant System
181	Microsoft ACPI-Compliant System
182	Microsoft ACPI-Compliant System
183	Microsoft ACPI-Compliant System
184	Microsoft ACPI-Compliant System
185	Microsoft ACPI-Compliant System
186	Microsoft ACPI-Compliant System
187	Microsoft ACPI-Compliant System
188	Microsoft ACPI-Compliant System
189	Microsoft ACPI-Compliant System
190	Microsoft ACPI-Compliant System
4294967293	Intel® 82583V Gigabit Network Connection #2

IRQ	ASSIGNMENT
4294967294	Intel® 82583V Gigabit Network Connection

DMA CHANNELS MAP

TIMER CHANNEL	ASSIGNMENT
Channel 4	Direct memory access controller

I/O MAP

I/O MAP	ASSIGNMENT
0x00000000-0x0000001F	Direct memory access controller
0x00000000-0x0000001F	PCI bus
0x00000010-0x0000001F	Motherboard resources
0x00000020-0x00000021	Programmable interrupt controller
0x00000022-0x0000003F	Motherboard resources
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x0000002E-0x0000002F	Motherboard resources
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x00000040-0x00000043	System timer
0x00000044-0x0000005F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000050-0x00000053	System timer
0x00000061-0x00000061	Motherboard resources
0x00000062-0x00000063	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x0000006F	Motherboard resources
0x00000065-0x0000006F	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000077	System CMOS/real time clock
0x00000070-0x00000077	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000081-0x00000091	Direct memory access controller
0x00000084-0x00000086	Motherboard resources

I/O MAP	ASSIGNMENT
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x00000093-0x0000009F	Direct memory access controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A2-0x000000BF	Motherboard resources
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B2-0x000000B3	Motherboard resources
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000000C0-0x000000DF	Direct memory access controller
0x000000E0-0x000000EF	Motherboard resources
0x000000F0-0x000000F0	Numeric data processor
0x000001CE-0x000001CF	VgaSave
0x00000290-0x0000029F	Motherboard resources
0x000002A0-0x000002AF	Motherboard resources
0x000002E8-0x000002EF	VgaSave
0x000003B0-0x000003BB	VgaSave
0x000003C0-0x000003DF	VgaSave
0x00000400-0x0000047F	Motherboard resources
0x00000400-0x0000047F	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000500-0x0000057F	Motherboard resources
0x00000500-0x0000057F	Motherboard resources
0x00000600-0x0000061F	Motherboard resources
0x00000680-0x0000069F	Motherboard resources

I/O MAP	ASSIGNMENT
0x000006A0-0x000006AF	Motherboard resources
0x000006B0-0x000006EF	Motherboard resources
0x00000D00-0x0000FFFF	PCI bus
0x00001000-0x0000100F	Motherboard resources
0x0000D000-0x0000DFFF	Intel® N10/ICH7 Family PCI Express Root Port - 27D6
0x0000E000-0x0000EFFF	Intel® N10/ICH7 Family PCI Express Root Port - 27D4
0x0000F000-0x0000F01F	Intel® N10/ICH7 Family SMBus Controller - 27DA
0x0000F020-0x0000F02F	Standard AHCI 1.0 Serial ATA Controller
0x0000F040-0x0000F05F	Intel® N10/ICH7 Family USB Universal Host Controller - 27CB
0x0000F060-0x0000F07F	Intel® N10/ICH7 Family USB Universal Host Controller - 27CA
0x0000F080-0x0000F09F	Intel® N10/ICH7 Family USB Universal Host Controller - 27C9
0x0000F0A0-0x0000F0BF	Intel® N10/ICH7 Family USB Universal Host Controller - 27C8
0x0000F0C0-0x0000F0C3	Standard AHCI 1.0 Serial ATA Controller
0x0000F0D0-0x0000F0D7	Standard AHCI 1.0 Serial ATA Controller
0x0000F0E0-0x0000F0E3	Standard AHCI 1.0 Serial ATA Controller
0x0000F0F0-0x0000F0F7	Standard AHCI 1.0 Serial ATA Controller
0x0000F100-0x0000F107	Intel® Graphics Media Accelerator 3600 Series
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources

MEMORY MAP

MEMORY MAP	ASSIGNMENT
0xFED00000-0xFED003FF	High precision event timer
0xDFF04000-0xDFF043FF	Standard AHCI 1.0 Serial ATA Controller
0xDFE00000-0xDFEFFFFF	Intel® N10/ICH7 Family PCI Express Root Port - 27D4
0xDFE00000-0xDFEFFFFF	Intel® 82583V Gigabit Network Connection
0xDFD00000-0xDFDFFFFF	Intel® N10/ICH7 Family PCI Express Root Port - 27D6
0xDFD00000-0xDFDFFFFF	Intel® 82583V Gigabit Network Connection #2
0xDFF00000-0xDFF03FFF	High Definition Audio Controller
0xDFC00000-0xDFCFFFFF	Intel® Graphics Media Accelerator 3600 Series
0xDFD20000-0xDFD23FFF	Intel® 82583V Gigabit Network Connection #2
0xFF000000-0xFFFFFFFF	Intel® 82802 Firmware Hub Device
0xFF000000-0xFFFFFFFF	Intel® 82802 Firmware Hub Device
0xFED14000-0xFED19FFF	System board
0xE0000000-0xEFFFFFFF	System board
0xFED1C000-0xFED1FFFF	Motherboard resources
0xFED1C000-0xFED1FFFF	Motherboard resources
0x0000-0x3FFF	Motherboard resources
0x0000-0x3FFF	Motherboard resources
0x0000-0x3FFF	Motherboard resources
0xFED45000-0xFED8FFFF	Motherboard resources
0xDFE20000-0xDFE23FFF	Intel® 82583V Gigabit Network Connection
0xFEC00000-0xFEC00FFF	Motherboard resources
0xFEE00000-0xFEE00FFF	Motherboard resources
0xFED20000-0xFED8FFFF	Motherboard resources
0xFFC00000-0xFFFFFFFF	Motherboard resources
0xDFF05000-0xDFF053FF	Intel® N10/ICH7 Family USB2 Enhanced Host Controller - 27CC

MEMORY MAP	ASSIGNMENT
0xA0000-0xBFFFF	PCI bus
0xA0000-0xBFFFF	VgaSave
0xC0000-0xDFFFF	PCI bus
0xE0000-0xEFFFF	PCI bus
0xF0000-0xFFFFF	PCI bus
0x3F800000-0x3FFFFFFF	PCI bus
0x40000000-0xFEBFFFFF	PCI bus

POST CODES

Progress codes:

STATUS CODE	DESCRIPTION
0x01	Power on. Reset type detection (soft/hard).
0x02	AP initialization before microcode loading
0x03	North Bridge initialization before microcode loading
0x04	South Bridge initialization before microcode loading
0x05	OEM initialization before microcode loading
0x06	Microcode loading
0x07	AP initialization after microcode loading
0x08	North Bridge initialization after microcode loading
0x09	South Bridge initialization after microcode loading
0x0A	OEM initialization after microcode loading
0x0B	Cache initialization
0x10	PEI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-Memory North Bridge initialization (North Bridge module specific)
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-memory South Bridge initialization (South Bridge module specific)
0x1B	Pre-memory South Bridge initialization (South Bridge module specific)

STATUS CODE	DESCRIPTION
0x1C	Pre-memory South Bridge initialization (South Bridge module specific)
0x1D – 0x2A	OEM pre-memory initialization codes
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection
0x2D	Memory initialization. Programming memory timing information
0x2E	Memory initialization. Configuring memory
0x2F	Memory initialization (other).
0x30	Reserved for ASL (see ASL Status Codes section below)
0x31	Memory Installed
0x32	CPU post-memory initialization is started
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode (SMM) initialization
0x37	Post-Memory North Bridge initialization is started
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)
0x3A	Post-Memory North Bridge initialization (North Bridge module specific)
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module specific)

STATUS CODE	DESCRIPTION
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F-0x4E	OEM post memory initialization codes
0x4F	DXE IPL is started

Error codes:

STATUS CODE	DESCRIPTION
0x0C – 0x0D	Reserved for future AMI SEC error codes
0x0E	Microcode not found
0x0F	Microcode not loaded
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error.
0x55	Memory not installed
0x56	Invalid CPU type or Speed
0x57	CPU mismatch
0x58	CPU self test failed or possible CPU cache error
0x59	CPU micro-code is not found or micro-code update is failed
0x5A	Internal CPU error
0x5B	reset PPI is not available
0x5C-0x5F	Reserved for future AMI error codes

S3 RESUME CODES

Progress codes:

STATUS CODE	DESCRIPTION
0xE0	S3 Resume is stared (S3 Resume PPI is called by the DXE IPL)
0xE1	S3 Boot Script execution
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE4-0xE7	Reserved for future AMI progress codes

Error codes:

STATUS CODE	DESCRIPTION
0xE8	S3 Resume Failed
0xE9	S3 Resume PPI not Found
0xEA	S3 Resume Boot Script Error
0xEB	S3 OS Wake Error
0x60	DXE Core is started
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started
0x6A	North Bridge DXE SMM initialization is started
0x6B	North Bridge DXE initialization (North Bridge module specific)

STATUS CODE	DESCRIPTION
0x6C	North Bridge DXE initialization (North Bridge module specific)
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)
0x6F	North Bridge DXE initialization (North Bridge module specific)
0x70	South Bridge DXE initialization is started
0x71	South Bridge DXE SMM initialization is started
0x72	South Bridge devices initialization
0x73	South Bridge DXE Initialization (South Bridge module specific)
0x74	South Bridge DXE Initialization (South Bridge module specific)
0x75	South Bridge DXE Initialization (South Bridge module specific)
0x76	South Bridge DXE Initialization (South Bridge module specific)
0x77	South Bridge DXE Initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x7A – 0x7F	Reserved for future AMI DXE codes
0x80 – 0x8F	OEM DXE initialization codes
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller Initialization
0x94	PCI Bus Enumeration

STATUS CODE	DESCRIPTION
0x95	PCI Bus Request Resources
0x96	PCI Bus Assign Resources
0x97	Console Output devices connect
0x98	Console input devices connect
0x99	Super IO Initialization
0x9A	USB initialization is started
0x9B	USB Reset
0x9C	USB Detect
0x9D	USB Enable
0x9E – 0x9F	Reserved for future AMI codes
0xA0	IDE initialization is started
0xA1	IDE Reset
0xA2	IDE Detect
0xA3	IDE Enable
0xA4	SCSI initialization is started
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL (see ASL Status Codes section below)
0xAB	Setup Input Wait
0xAC	Reserved for ASL (see ASL Status Codes section below)
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin

STATUS CODE	DESCRIPTION
0xB1	Runtime Set Virtual Address MAP End
0xB2	Legacy Option ROM Initialization
0xB3	System Reset
0xB4	USB hot plug
0xB5	PCI bus hot plug
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xB8 – 0xBF	Reserved for future AMI codes
0xC0 – 0xCF	OEM BDS initialization codes
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found
0xD7	No Console Input Devices are found
0xD8	Invalid password
0xD9	Error loading Boot Option (LoadImage returned error)
0xDA	Boot Option is failed (StartImage returned error)
0xDB	Flash update is failed
0xDC	Reset protocol is not available

ACPI CHECKPOINTS

STATUS CODE	DESCRIPTION
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state
0x03	System is entering S3 sleep state
0x04	System is entering S4 sleep state
0x05	System is entering S5 sleep state
0x10	System is waking up from the S1 sleep state
0x20	System is waking up from the S2 sleep state
0x30	System is waking up from the S3 sleep state
0x40	System is waking up from the S4 sleep state
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

EVENT LOG CODES

Error codes:

STATUS CODE	DESCRIPTION
0x01	Single Bit ECC Memory Error
0x02	Multi Bit ECC Memory Error
0x03	Parity Memory Error
0x04	Bus Time Out
0x05	I/O Channel Check
0x06	Software NMI
0x07	POST Memory Resize
0x08	POST Errors:
0x09	PCI Parity Error
0x0A	PCI System Error
0x0B	CPU Failure
0x0C	EISA Failsafe Timer Timeout
0x0D	Correctable Memory Log Disabled
0x0E	Logging Disabled for Event Type
0x10	System Limit Exceeded
0x11	Asyn HW Timer Expired
0x12	System Configuration Information
0x13	Hard Disk Information
0x14	System Reconfigured
0x15	Uncorrectable CPU Complex Error
0x16	Log Area Reset
0x18-0x7F	Unused
0x80-0xFE	OEM Assigned
0xFF	End of Log

Flash BIOS Update

I. Before System BIOS update

1. Prepare a bootable media (ex. USB storage device) which can boot system to DOS prompt.
2. Download and save the BIOS file (ex. M5910Pxx.rom) to the bootable device.
3. Copy AMI flash utility – AFUDOS.exe into bootable device.

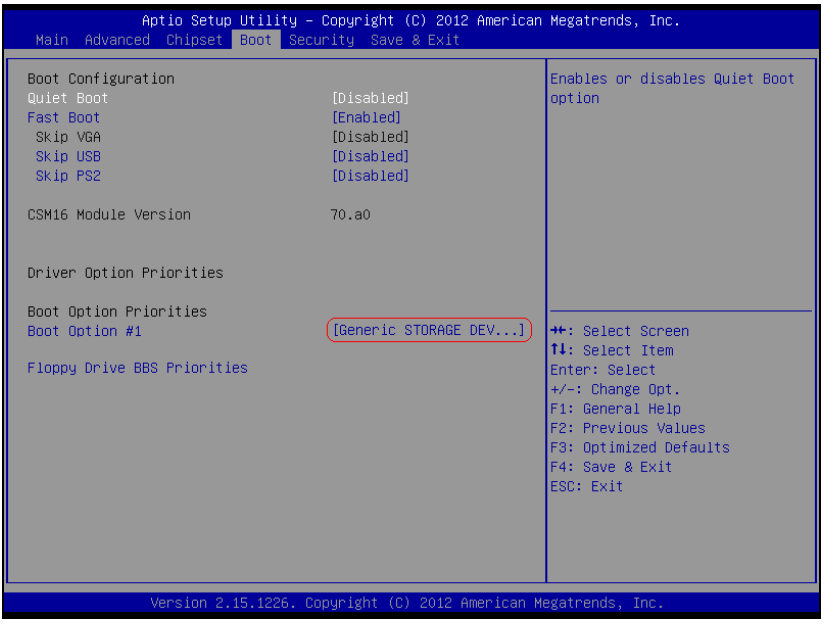
```
C:\>dir


 Volume in drive C is PROTECH
 Volume Serial Number is 3CCE-a150
 Directory of C:\

                     <DIR>        12-14-12   5.50P
                     <DIR>        12-14-12   5.50P
AFUDOS    EXE       159,008        03-04-10   4.16p
README    TXT         2,684        03-04-10   2.33p
AFUDOS    TXT         2,906        03-04-10   3.02p
58520P01  ROM     4,194,304        09-20-13   2.20p
          4 file(d)          4,353,206 bytes
          2 dir(s)        787,197,952 bytes free

C:\>
```

4. Make sure the target system can first boot to the bootable device.
   a. Connect the bootable USB device.
   b. Turn on the computer and press <Del> or <ESC> key during boot to enter BIOS Setup.
   c. System will go into the BIOS setup menu.
   d. Select [Boot] menu.
   e. Select [Hard Drive BBS Priorities], set the USB bootable device to be the 1st boot device.
   f. Press <F4> key to save configuration and exit the BIOS setup menu.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Quiet Boot [Disabled]
Fast Boot [Enabled]
Skip VGA [Disabled]
Skip USB [Disabled]
Skip PS2 [Disabled]
CSM16 Module Version 70.a0
Driver Option Priorities
Boot Option Priorities
Boot Option #1 [Generic STORAGE DEV...]
Floppy Drive BBS Priorities
Enables or disables Quiet Boot option
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

II. AFUDOS Command for System BIOS Update

AFUDOS.exe is the AMI firmware update utility; the command line is shown as below:

AFUDOS <ROM File Name> [option1] [option2]…

You can type AFUDOS /? to see all the definition of each control options. The recommended options for BIOS ROM update consist of following parameters:

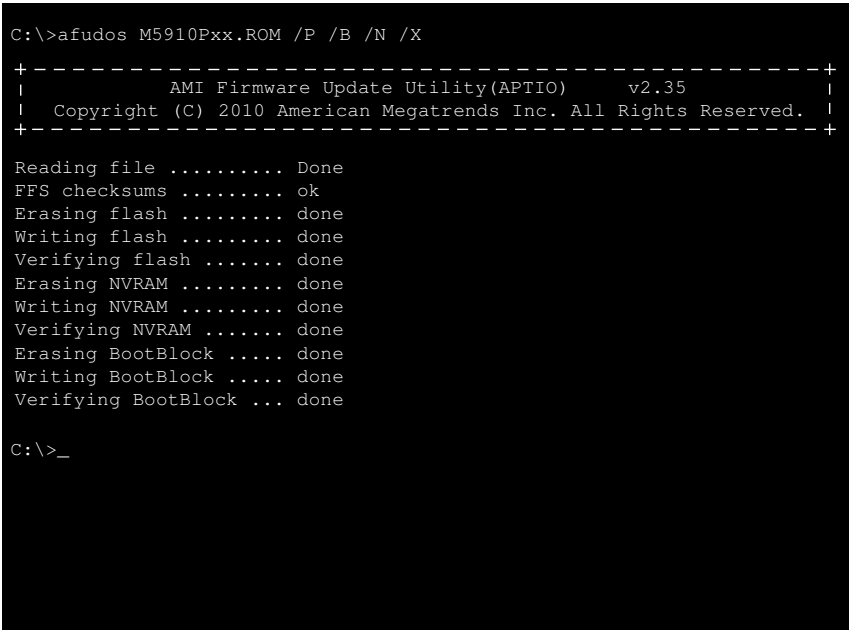
/P: program main BIOS image
/B: program Boot Block
/N: program NVRAM
/X: don't check ROM ID

III. BIOS update procedure

1. Use the bootable USB device to boot up system into the MS-DOS command prompt.
2. Type in AFUDOS M591xxxx.ROM /p /b /n /x and press enter to start the flash procedure.

   Note: xxxx means the BIOS revision part, ex. 0P01…

3. During the update procedure, you will see the BIOS update process status and its percentage. Beware! Do not turn off system power or reset your computer if the whole procedure are not complete yet, or it may crash the BIOS ROM and make system unable to boot up next time.
4. After BIOS update procedures is complete, the messages should be like the figure shown below:



5. You can restart the system and boot up with new BIOS now.
6. Update is complete after restart.

7. Verify during following boot that the BIOS version displayed at initialization screen has changed.