Chapter 4

Overview of AMI Aptio BIOS Features

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4.1 Introduction

The board **BD-C028** 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 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:



BIOS POST Screen

As long as this message is present on the screen you may press the or <ESC> key to access the Setup program. In a moment, the main menu of the Aptio Setup Utility will appear on the screen:

| Aptio Setup Utility - Main Advanced Chipset Security | · Copyright (C) 2016 American Boot Save & Exit | Megatrends, Inc. |
|---|--|---|
| BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time BayTrail SoC | American Megatrends 5.010 UEFI 2.4; PI 1.3 C0280PI1 x64 09/21/2016 16:50:02 D0 Stepping | Choose the system default language |
| TXE Information Sec RC Version TXE FW Version | 00.05.00.00 01.01.04.1148 | |
| System Language System Date System Time | [Fri 09/30/2016] [23:19:07] | <pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Ont</pre> |
| Access Level | Administrator | F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit |
| Version 2.17.1249. C | opyright (C) 2016 American M | egatrends, Inc. |

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

| BIOS Information Choose the | s sustem default |
|---|--|
| BIOS VendorAmerican MegatrendslanguageCore Version5.010CompliancyUEFI 2.4; PI 1.3Project VersionC0280PI1 x64Build Date and Time09/21/2016 16:50:02BayTrail SoCD0 SteppingTXE InformationTABLE AND | s system der durt |
| Sec RC Version 00.05.00.00 | |
| TXE FW Version 01.01.04.1148 | |
| System Language [English] | Screen |
| Sustem Date [Eni 09/30/2016] [L: Select | : Item |
| System Time [23:19:07] Enter: Se +/-: Chan | lect (e Opt. |
| Access Level Administrator F1: General F2: Previo F3: Optim F4: Save & ESC: Exit | al Help nus Values ized Defaults & Exit |

Main Screen

| BIOS Setting | Options | Description/Purpose |
|---------------------|-----------------------|--|
| BIOS Vendor | No changeable options | Displays BIOS vendor name. |
| Core Version | No changeable options | Displays BIOS core version. |
| Compliancy | No changeable options | Displays UEFI version. |
| Project Version | No changeable options | Displays the version of the BIOS currently |
| | | installed on the platform. |
| Build Date and Time | No changeable options | Displays the date of current BIOS version. |
| BayTrail SOC | No changeable options | Displays BayTrail SOC stepping on this |
| | | main board. |
| Sec RC Version | No changeable options | Displays current RC version. |
| TXE FW Version | No changeable options | Displays current TXE version. |
| System Language | English | BIOS Setup language. |
| System Date | month, day, year | Specifies current date. |
| System Time | hour, minute, second | Specifies current time. |
| Access Level | No changeable options | Displays current user level. |

4.4 Advanced

| Aptio Setup Utility – Copyright (C) 2016 American Main Advanced Chipset Security Boot Save & Exit | Megatrends, Inc. |
|--|---|
| CPU Configuration IDE Configuration CSM Configuration SDIO Configuration USB Configuration | CPU Configuration Parameters |
| | <pre>++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |

Advanced Screen

| BIOS Setting | Options | Description/Purpose |
|--------------------|----------|--------------------------------|
| CPU Configuration | Sub-Menu | CPU configuration parameters. |
| IDE Configuration | Sub-Menu | IDE device options settings. |
| CSM Configuration | Sub-Menu | CSM configuration parameters. |
| SDIO Configuration | Sub-Menu | SDIO configuration parameters. |
| USB Configuration | Sub-Menu | USB configuration parameters. |

4.4.1 Advanced – CPU Configuration

| Aptio Setup Utility Advanced |) – Copyright (C) 2016 Americar | n Megatrends, Inc. |
|---------------------------------|---------------------------------|---|
| CPU Configuration | | Socket specific CPU Information |
| ▶ Socket 0 CPU Information | | |
| CPU Speed 64-bit | 1467 MHz Supported | |
| | | <pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| Version 2.17.1249. | Copyright (C) 2016 American M | legatrends, Inc. |

CPU Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------------------|-----------------------|--|
| Socket 0 CPU Information | Sub-Menu | Report CPU Information |
| CPU Speed | No changeable options | Reports current CPU Speed |
| 64-bit | No changeable options | Reports if 64-bit is supported by processor. |

| Aptio Setup Utility – Advanced | Copyright (C) 2016 Americar | Megatrends, Inc. |
|---|--|--|
| Socket 0 CPU Information | | |
| Intel(R) Atom(TM) CPU E3815 @ 1.46G CPU Signature Microcode Patch Max CPU Speed Processor Cores Intel HT Technology Intel VT-x Technology L1 Data Cache L1 Code Cache L2 Cache L3 Cache | Hz 30679 907 1460 MHz 533 MHz 1 Not Supported 24 kB × 1 32 kB × 1 512 kB × 1 Not Present | ++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit |
| Version 2.17.1249. Co | opyright (C) 2016American M | legatrends, Inc. |

4.4.1.1 Advanced – CPU Configuration- Socket 0 CPU Information

Socket 0 CPU Information Screen

| BIOS Setting | Options | Description/Purpose |
|---------------------|-----------------------|--|
| CPU Signature | No changeable options | Reports the CPU Signature |
| Microcode Patch | No changeable options | Reports the CPU Microcode Patch Version. |
| Max CPU Speed | No changeable options | Reports the maximum CPU Speed. |
| Min CPU Speed | No changeable options | Reports the minimum CPU Speed |
| Processor Cores | No changeable options | Displays number of physical cores in processor. |
| Intel HT Technology | No changeable options | Reports if Intel Hyper-Threading Technology is supported by processor |

| Intel VT-x | No changeable options | Reports if Intel VT-x |
|---------------|-----------------------|----------------------------|
| Technology | | Technology is supported by |
| | | processor. |
| L1 Data Cache | No changeable options | Displays size of L1 Data |
| | | Cache |
| L1 Code Cache | No changeable options | Displays size of L1 Code |
| | | Cache |
| L2 Cache | No changeable options | Displays size of L2 Cache. |
| L3 Cache | No changeable options | Displays size of L3 Cache. |

4.4.2 Advanced –IDE Configuration

| Aptio Setup Advanced | Utility – Copyright (C) 2016 | American Megatrends, Inc. |
|---------------------------------------|-------------------------------|---|
| IDE Configuration | | Enable ∕ Disable Serial ATA |
| Serial—ATA (SATA) SATA Test Mode | [Enabled] [Disabled] | |
| SATA Speed Support SATA Mode | [Gen2] [AHCI Mode] | |
| SATA PortO MRCAJCAO32GTTC (32.0GB) | | |
| | | <pre>++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| Version 2. | 17.1249. Copyright (C) 2016 A | merican Megatrends, Inc. |

IDE Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|--------------------|-------------|---|
| Serial-ATA | - Disabled | Enable or disable SATA Device. |
| Controller(s) | - Enabled | |
| SATA Speed Support | - Gen1 | • Gen1 mode sets device to 1.5 Gbit/s |
| | - Gen2 | speed. |
| | | • Gen2 mode sets the device to 3 Gbit/s |
| | | speed (in case it is compatible). |
| SATA Mode | - IDE mode | Configures SATA as following: |
| | - AHCI mode | • IDE: Set SATA operation mode to |
| | | IDE. |
| | | • AHCI: SATA works as AHCI |
| | | (Advanced Host Controller Interface) |
| | | mode for getting better performance. |
| SATA Port 0 | [drive] | Displays the drive installed on this |
| | | SATA port 0. Shows [Empty] if no drive |
| | | is installed. |

4.4.3 Advanced –CSM Configuration

| Compatibility Support Module ConfigurationEnable/Disable CSM SupportCSM Support[Enabled]CSM16 Module Version07.76Boot option filter[UEFI and Legacy]Option ROM execution | Aptio Setup L Advanced | Jtility – Copyright (C) 2016 Americ | an Megatrends, Inc. |
|--|---------------------------------------|-------------------------------------|---|
| CSM Support[Enabled]CSM16 Module Version07.76Boot option filter[UEFI and Legacy]Option ROM execution | Compatibility Support Modu | le Configuration | Enable/Disable CSM Support. |
| CSM16 Module Version07.76Boot option filter[UEFI and Legacy]Option ROM execution | CSM Support | [Enabled] | |
| Boot option filter[UEFI and Legacy]Option ROM execution | CSM16 Module Version | 07.76 | |
| Option ROM execution Legacy] Storage [Legacy] Video [Legacy] Other PCI devices [Legacy] ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit | Boot option filter | [UEFI and Legacy] | |
| Storage [Legacy] Video [Legacy] Other PCI devices [Legacy] ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit | Option ROM execution | | |
| | Storage Video Other PCI devices | [Legacy] [Legacy] [Legacy] | <pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |

CSM Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|--------------------|-------------------|---|
| CSM Support | - Disabled | Disable or Enable CSM support |
| | - Enabled | |
| CSM16 Module | No changeable | Displays the current CSM (Compatibility |
| Version | options | Support Module) version. |
| Boot option filter | - UEFI and Legacy | This option controls what kind of devices |
| | - Legacy only | system can boot. |
| | - UEFI only | |
| Storage | - Do not launch | Controls the execution of UEFI or |
| | - UEFI | Legacy Storage |
| | - Legacy | |
| Video | - Do not launch | Controls the execution of UEFI and |
| | - UEFI | Legacy Video. |
| | - Legacy | |
| Other PCI devices | - Do not launch | Select launch method for other PCI |
| | - UEFI | devices, such as NIC, mass storage or |
| | - Legacy | video card. |

4.4.4 Advanced –SDIO Configuration

| Aptio Advanced | Setup Utility – Copyright (C | :) 2016 American Megatrends, Inc. |
|--------------------|------------------------------|---|
| SDIO Configuration | | Auto Option: Access SD device |
| SDIO Access Mode | [Auto] | supports it,otherwise in PIO mode.DMA Option: Access SD device in DMA mode.PIO Option: Access SD device in PIO mode. |
| | | <pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| Versi | ion 2.17.1249. Copyright (C) | 2016 American Megatrends, Inc. |

SDIO Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|------------------|---------|--|
| SDIO Access Mode | - Auto | Auto: Access SD device in DMA mode |
| | - ADMA | if controller supports it, otherwise in |
| | - SDMA | PIO mode. |
| | - PIO | DMA : Access SD device in DMA |
| | | mode. |
| | | PIO : Access SD device in PIO mode. |

4.4.5 Advanced –USB Configuration

| Aptio Setup Utility - Advanced | Copyright (C) 2016 American | Megatrends, Inc. |
|--|---|---|
| USB Configuration | | Enables Legacy USB support. |
| USB Module Version | 10 | support if no USB devices are connected. DISABLE option will |
| USB Devices: 1 Drive, 1 Keyboard, 1 Mouse, | 3 Hubs | keep USB devices available only for EFI applications. |
| Legacy USB Support EHCI Hand-off USB Mass Storage Driver Support Port 60/64 Emulation | [Enabled] [Disabled] [Enabled] [Enabled] | |
| USB hardware delays and time-outs: | | |
| USB transfer time-out | [20 sec] | ++: Select Screen |
| Device power-up delay | [Auto] | Enter: Select |
| Mass Storade Devices: | | +/-: Change Opt. |
| SanDisk USB Flash Drive 6.51 | [Auto] | F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit |
| | | |
| Version 2.17.1249. C | opyright (C) 2016 American M | egatrends, Inc. |

USB Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|----------------------|---------------|-------------------------------------|
| USB Devices | No changeable | Displays number of available USB |
| | options | devices. |
| Legacy USB Support | - Disabled | Enables support for legacy USB. |
| | - Enabled | |
| | - Auto | |
| EHCI Hand-of | - Disabled | This is a workaround for OSes w/o |
| | - Enabled | EHCI hand-off support. |
| USB Mass Storage | - Disabled | Enable/Disable USB mass storage |
| Driver Support. | - Enabled | driver support. |
| | | |
| Port 60/64 Emulation | - Disabled | Enables I/O port 60h/64h emulation |
| | - Enabled | support. This should be enabled for |
| | | the complete USB keyboard legacy |
| | | support for non-USB aware OSes. |

| USB transfer time-out | 1 / 5 / 10 /20 sec | The time-out value for Control, Bulk, and Interrupt transfers. |
|-----------------------|-----------------------|---|
| | | |
| Device reset time-out | 10 / 20 / 30 / 40 sec | USB mass storage device Start Unit |
| | | command time-out. |
| Device power-up delay | - Auto | Maximum time the device will take |
| | - Manual | 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 from Hub descriptor. |
| Mass Storage Devices: | - Auto | Display the device name and choose |
| | - Floppy | the device emulation type. |
| | - Force FDD | |
| | - Hard Disk | |
| | - CD-ROM | |

4.5 Chipset

| Aptio Setup Utility – Copyright (C) 2016 Main Advanced <mark>Chipset</mark> Security Boot Save & Exit | American Megatrends, Inc. |
|--|---|
| ▶ North Bridge ▶ South Bridge | North Bridge Parameters |
| | <pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| Version 2.17.1249. Copyright (C) 2016 A | merican Megatrends, Inc. |

Chipset Screen

| BIOS Setting | Options | Description/Purpose |
|--------------|----------|--|
| North Bridge | Sub-menu | Sets Parameter for (North Bridge) configuration. |
| South Bridge | Sub-menu | Sets Parameter for (South Bridge) configuration. |

4.5.1 Chipset - North Bridge

| | Aptio Setup Utility – Copy Chipset | right (C) | 2016 American | Megatrends, Inc. |
|--------------------------------|---------------------------------------|------------|-----------------|---|
| ▶ LCD Control | | | | LCD Control |
| Memory Informa Total Memory | tion 204 | 8 MB (DDR3 | IL) | |
| Max TOLUD | [2 | GB] | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | ↔: Select Screen t↓: Select Item |
| | | | | Enter: Select +/–: Change Opt. |
| | | | | F1: General Help F2: Previous Values |
| | | | | F3: Optimized Defaults |
| | | | | ESC: Exit |
| | | | | |
| | | | | |
| | Version 2.17.1249. Copyri | ght (C) 20 |)16 American Me | egatrends, Inc. |

North Bridge Screen

| BIOS Setting | Options | Description/Purpose |
|--------------------|---|--|
| LCD Control | Sub-menu | Configure Graphic Settings. |
| Memory Information | No changeable options | Displays the DRAM information on platform. |
| Total Memory | No changeable options | Displays the DRAM size |
| Max TOLUD | - 2GB - 2.25GB - 2.5GB - 2.75GB - 3GB | Maximum Value of TOLUD (Top Of Low Usable DRAM) |

| 4.5.1.1 Chipset - North Druge-LCD Contro | 4.5.1.1 | Chipset - | North | Bridge-L | CD | Contro |
|--|---------|-----------|-------|-----------------|----|--------|
|--|---------|-----------|-------|-----------------|----|--------|

| Aptio Setup Utilit Chipset | y – Copyright (C) 2016: | 6 American Megatrends, Inc. |
|---|-------------------------|---|
| LCD Control Primary IGFX Boot Display Secondary IGFX Boot Display | [LVDS2] [LVDS1] | Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. |
| | | VGA modes will be supported only on primary display |
| | | 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit |
| Version 2.17.1249 | Э. Copyright (C) 2016 (| ESC: Exit American Megatrends, Inc. |

LCD Control Screen

| BIOS Setting | Options | Description/Purpose |
|-------------------|---------|-----------------------------|
| Primary IGFX Boot | - LVDS1 | Primary Display Settings. |
| Display | - LVDS2 | |
| Secondary IGFX | - LVDS1 | Secondary Display Settings. |
| Boot Display | - LVDS2 | |

4.5.2 Chipset - South Bridge

| Aptio Setup Chipset | Utility – Copyright (C) 2016 Americ | an Megatrends, Inc. |
|--|--------------------------------------|---|
| Azalia HD Audio USB Configuration Restore AC Power Loss | [Power Off] | Azalia HD Audio Options |
| | | <pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| Version 2. | 17.1249. Copyright (C) 2016 American | Megatrends, Inc. |

South Bridge Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------------|--------------|--|
| Azalia HD Audio | Sub-menu | Azalia HD Audio Options. |
| USB Configuration | Sub-menu | USB Configuration Options. |
| Restore AC Power Loss | - Power Off | Select AC power state when power |
| | - Power On | is re-applied after a power failure. |
| | - Last State | • Power Off keeps the power off |
| | | till the power button is pressed. |
| | | • Power On makes system power |
| | | on after restores AC power to |
| | | the board. |
| | | • Last State brings system back |
| | | to the last power state before AC |
| | | remove. |

| Aptio Setup Chipset | Utility – Copyright (C) 2016 A | American Megatrends, Inc. |
|---|---------------------------------|---|
| Audio Configuration Audio Controller | [Enabled] | Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled. Enabled = Azalia will be unconditionally Enabled. Auto = Azalia will be enabled if present disabled otherwise. |
| | | <pre> ++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| Version 2.3 | 17.1249. Copyright (C) 2016 Ame | erican Megatrends, Inc. |

4.5.2.1 Chipset - South Bridge- Azalia HD Audio

Azalia HD Audio Screen

| BIOS Setting | Options | Description/Purpose |
|------------------|------------|---------------------------------|
| Audio Controller | - Disabled | Control Detection of the Azalia |
| | - Enabled | device. |
| | | Disabled: Azalia will be |
| | | unconditionally disabled. |
| | | Enabled: Azalia will be |
| | | unconditionally Enabled. |
| | | Auto: Azalia will be enabled if |
| | | present disabled otherwise |

| Aptio Setup Chipset | Utility – Copyright (C) 2016 America | an Megatrends, Inc. |
|--|--|---|
| USB Configuration USB 2.0(EHCI) Support USB Per Port Control USB Port 0 USB Port 1 USB Port 2 USB Port 3 | [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] | Control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled |
| | | <pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| Version 2. | 17.1249. Copyright (C) 2016 American | Megatrends, Inc. |

4.5.2.2 Chipset - South Bridge – USB Configuration

USB Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------------|------------|--|
| USB 2.0(EHCI) Support | - Enabled | Control the USB EHCI (USB 2.0) |
| | - Disabled | functions. One EHCI controller |
| | | must always be enabled |
| USB Per Port Control | - Enabled | Control each of the USB ports |
| | - Disabled | (0~3). |
| | | Enable: Enable USB per port |
| | | Disable : Use USB port X settings |
| USB Port 0 | - Enabled | Enable / Disable USB Port 0 |
| | - Disabled | |
| USB Port 1 | - Enabled | Enable / Disable USB Port 1 |
| | - Disabled | |
| USB Port 2 | - Enabled | Enable / Disable USB Port 2 |
| | - Disabled | |
| USB Port 3 | - Enabled | Enable / Disable USB Port 3 |
| | - Disabled | |

4.6 Security

| Aptio Setup Main Advanced Chipset | Utility – Copyright (C) 20: Security Boot Save & Exi | 16 American Megatrends, Inc. t |
|---|---|---|
| Password Description | | Set Administrator Password |
| If ONLY the Administrator' then this only limits acce only asked for when enteri If ONLY the User's passwor is a power on password and boot or enter Setup. In Se have Administrator rights. The password length must b in the following range: Minimum length | s password is set, ss to Setup and is ng Setup. d is set, then this must be entered to tup the User will e 3 | |
| Maximum length | 20 | ++: Select Screen |
| Administrator Password User Password | | <pre>fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| Version 2.1 | 7.1249. Copyright (C) 2016 | American Megatrends, Inc. |

Security Screen

| BIOS Setting | Options | Description/Purpose |
|---------------|--------------------------|---------------------------------------|
| Administrator | Password can be 3-20 | Specifies the administrator password. |
| Password | alphanumeric characters. | |
| User Password | Password can be 3-20 | Specifies the user password. |
| | alphanumeric characters. | |

4.7 Boot

| Aptio Setup Utility – Main Advanced Chipset Security | Copyright (C) 2016 American Boot Save & Exit | Megatrends, Inc. |
|---|---|---|
| Boot Configuration Setup Prompt Timeout Bootup NumLock State | 3 [0n] | Select boot mode LEGACY/UEFI |
| Quiet Boot | [Disabled] | |
| Boot mode select | [LEGACY] | |
| FIXED BOOT ORDER Priorities Boot Option #1 Boot Option #2 Boot Option #3 Boot Option #4 • Hard Disk Drive BBS Priorities • USB Key Drive BBS Priorities | [USB Key:SanDisk USB] [USB Hard Disk] [USB CD/DVD] [Hard Disk: MRCAJCAO] | <pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| Version 2.17.1249. Co | pyright (C) 2016 American M | egatrends, Inc. |

Boot Screen

| BIOS Setting | Options | Description/Purpose |
|------------------|--------------|--|
| Setup Prompt | Numeric | Number of seconds to wait for setup activation |
| Timeout | | key. |
| Bootup NumLock | - On | Specifies the power-on state of the NumLock |
| State | - Off | Key. |
| Quiet Boot | - Disabled | Enable/Disable Quiet Boot Options |
| | - Enabled | |
| Boot Mode Select | - Legacy | Select boot mode LEGACY/UEFI |
| | - UEFI | |
| Boot Option #1 | - [Drive(s)] | Select 1 st boot option from available Hard Disks |
| | - Disabled | |
| Boot Option #2 | - [Drive(s)] | Select 2 nd boot option from available USB Hard |
| | - Disabled | Disks |
| Boot Option #3 | - [Drive(s)] | Select 3 rd boot option from available USB |
| | - Disabled | CD/DVD |
| Boot Option #4 | - [Drive(s)] | Select 4 th boot option from available USB Keys |
| | - Disabled | |

| Hard Drive BBS | Sub-Menu | Allow user to select boot order of available |
|----------------|----------|--|
| Priorities | | drive(s) |
| USB Key Drive | Sub-Menu | Allow user to select boot order of available |
| BBS Priorities | | drive(s) |

4.8 Save & Exit

| Aptio Setup Utility – Copyright (C) 2016 Ameri Main Advanced Chipset Security Boot Save & Exit | ican Megatrends, Inc. |
|---|---|
| Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Options Save Changes Discard Changes Restore Defaults Save as User Defaults Restore User Defaults | Exit system setup after saving the changes. |
| Boot Override UEFI: Built-in EFI Shell UEFI: SanDisk USB Flash Drive 6.51, Partition 1 | <pre> ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |

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| | 54 | |
|------------------|---------------|---|
| Save & Exit | | |
| BIOS Setting | Options | Description/Purpose |
| Save Changes and | No changeable | Exits and saves the changes in CMOS SRAM. |
| Exit | options | |
| Discard Changes | No changeable | Exits without saving any changes made in |
| and Exit | options | BIOS settings. |
| Save Changes and | No changeable | Saves the changes in CMOS SRAM and resets. |
| Reset | options | |
| Discard Changes | No changeable | Resets without saving any changes made in |
| and Reset | options | BIOS settings. |
| Save Changes | No changeable | Saves the changes done in BIOS settings so |
| | options | far. |
| Discard Changes | No changeable | Discards the changes done in BIOS settings so |
| | options | far. |
| Restore Defaults | No changeable | Loads the optimized defaults for BIOS |
| | options | settings. |
| Save as User | No changeable | Saves the current values as user defaults. |
| Defaults | options | |

Save & Exit Screen

| Restore User | No changeable | Loads the user defaults for BIOS settings. |
|---------------|---------------|--|
| Defaults | options | |
| Boot Override | -[drive(s)] | Forces to boot from selected [drive(s)]. |

Appendix

ΙΟ

Resource

Device

| 0x0000E070-0x0000E077 | Standard AHCI 1.0 Serial ATA Controller |
|-----------------------|---|
| 0x0000E060-0x0000E063 | Standard AHCI 1.0 Serial ATA Controller |
| 0x0000E050-0x0000E057 | Standard AHCI 1.0 Serial ATA Controller |
| 0x0000E040-0x0000E043 | Standard AHCI 1.0 Serial ATA Controller |
| 0x0000E020-0x0000E03F | Standard AHCI 1.0 Serial ATA Controller |
| 0x0000E080-0x0000E087 | Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900 |
| 0x000003B0-0x000003BB | Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900 |
| 0x000003C0-0x000003DF | Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900 |
| 0x0000E000-0x0000E01F | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12 |

Programmable interrupt controller

Programmable interrupt controller

0x0000020-0x00000021 0x00000024-0x00000025 0x0000028-0x0000029 0x0000002C-0x0000002D 0x00000030-0x00000031 0x0000034-0x0000035 0x00000038-0x00000039 0x000003C-0x000003D 0x000000A0-0x000000A1 0x000000A4-0x000000A5 0x000000A8-0x000000A9 0x000000AC-0x000000AD 0x000000B0-0x000000B1 0x000000B4-0x000000B5 0x000000B8-0x000000B9 0x000000BC-0x000000BD 0x000004D0-0x000004D1 0x0000D000-0x0000DFFF 0x00000040-0x00000043 0x0000050-0x00000053 0x0000000-0x0000006F 0x0000078-0x00000CF7 0x00000D00-0x0000FFFF 0x0000070-0x00000077

Programmable interrupt controller Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C System timer System timer PCI bus PCI bus PCI bus System CMOS/real time clock

| 0x00000070-0x00000077 | Motherboard resources |
|-----------------------|-----------------------|
| 0x0000002E-0x0000002F | Motherboard resources |
| 0x0000004E-0x0000004F | Motherboard resources |
| 0x00000061-0x00000061 | Motherboard resources |
| 0x00000063-0x00000063 | Motherboard resources |
| 0x00000065-0x00000065 | Motherboard resources |
| 0x00000067-0x00000067 | Motherboard resources |
| 0x00000080-0x0000008F | Motherboard resources |
| 0x00000092-0x00000092 | Motherboard resources |
| 0x000000B2-0x000000B3 | Motherboard resources |
| 0x00000680-0x0000069F | Motherboard resources |
| 0x00000400-0x0000047F | Motherboard resources |
| 0x00000500-0x000005FE | Motherboard resources |
| 0x00000600-0x0000061F | Motherboard resources |

IRQ

Note: These resource information were gathered using Windows 7 (the IRQ could be assigned differently depending on OS)

| Resource | <u>Device</u> |
|-----------------|---------------------------------|
| IRQ 81 | Microsoft ACPI-Compliant System |
| IRQ 82 | Microsoft ACPI-Compliant System |
| IRQ 83 | Microsoft ACPI-Compliant System |
| IRQ 84 | Microsoft ACPI-Compliant System |
| IRQ 85 | Microsoft ACPI-Compliant System |
| IRQ 86 | Microsoft ACPI-Compliant System |
| IRQ 87 | Microsoft ACPI-Compliant System |
| IRQ 88 | Microsoft ACPI-Compliant System |
| IRQ 89 | Microsoft ACPI-Compliant System |
| IRQ 90 | Microsoft ACPI-Compliant System |
| IRQ 91 | Microsoft ACPI-Compliant System |
| IRQ 92 | Microsoft ACPI-Compliant System |
| IRQ 93 | Microsoft ACPI-Compliant System |
| IRQ 94 | Microsoft ACPI-Compliant System |
| IRQ 95 | Microsoft ACPI-Compliant System |
| IRQ 96 | Microsoft ACPI-Compliant System |
| IRQ 97 | Microsoft ACPI-Compliant System |
| IRQ 98 | Microsoft ACPI-Compliant System |
| IRQ 99 | Microsoft ACPI-Compliant System |
| | |

| IRQ 100 | Microsoft ACPI-Compliant System |
|---------|---------------------------------|
| IRQ 101 | Microsoft ACPI-Compliant System |
| IRQ 102 | Microsoft ACPI-Compliant System |
| IRQ 103 | Microsoft ACPI-Compliant System |
| IRQ 104 | Microsoft ACPI-Compliant System |
| IRQ 105 | Microsoft ACPI-Compliant System |
| IRQ 106 | Microsoft ACPI-Compliant System |
| IRQ 107 | Microsoft ACPI-Compliant System |
| IRQ 108 | Microsoft ACPI-Compliant System |
| IRQ 109 | Microsoft ACPI-Compliant System |
| IRQ 110 | Microsoft ACPI-Compliant System |
| IRQ 111 | Microsoft ACPI-Compliant System |
| IRQ 112 | Microsoft ACPI-Compliant System |
| IRQ 113 | Microsoft ACPI-Compliant System |
| IRQ 114 | Microsoft ACPI-Compliant System |
| IRQ 115 | Microsoft ACPI-Compliant System |
| IRQ 116 | Microsoft ACPI-Compliant System |
| IRQ 117 | Microsoft ACPI-Compliant System |
| IRQ 118 | Microsoft ACPI-Compliant System |
| IRQ 119 | Microsoft ACPI-Compliant System |
| IRQ 120 | Microsoft ACPI-Compliant System |
| IRQ 121 | Microsoft ACPI-Compliant System |
| IRQ 122 | Microsoft ACPI-Compliant System |
| IRQ 123 | Microsoft ACPI-Compliant System |
| IRQ 124 | Microsoft ACPI-Compliant System |
| IRQ 125 | Microsoft ACPI-Compliant System |
| IRQ 126 | Microsoft ACPI-Compliant System |
| IRQ 127 | Microsoft ACPI-Compliant System |
| IRQ 128 | Microsoft ACPI-Compliant System |
| IRQ 129 | Microsoft ACPI-Compliant System |
| IRQ 130 | Microsoft ACPI-Compliant System |
| IRQ 131 | Microsoft ACPI-Compliant System |
| IRQ 132 | Microsoft ACPI-Compliant System |
| IRQ 133 | Microsoft ACPI-Compliant System |
| IRQ 134 | Microsoft ACPI-Compliant System |
| IRQ 135 | Microsoft ACPI-Compliant System |
| IRQ 136 | Microsoft ACPI-Compliant System |
| IRQ 137 | Microsoft ACPI-Compliant System |
| IRQ 138 | Microsoft ACPI-Compliant System |

| IRQ 139 | Microsoft ACPI-Compliant System |
|---------|---------------------------------|
| IRQ 140 | Microsoft ACPI-Compliant System |
| IRQ 141 | Microsoft ACPI-Compliant System |
| IRQ 142 | Microsoft ACPI-Compliant System |
| IRQ 143 | Microsoft ACPI-Compliant System |
| IRQ 144 | Microsoft ACPI-Compliant System |
| IRQ 145 | Microsoft ACPI-Compliant System |
| IRQ 146 | Microsoft ACPI-Compliant System |
| IRQ 147 | Microsoft ACPI-Compliant System |
| IRQ 148 | Microsoft ACPI-Compliant System |
| IRQ 149 | Microsoft ACPI-Compliant System |
| IRQ 150 | Microsoft ACPI-Compliant System |
| IRQ 151 | Microsoft ACPI-Compliant System |
| IRQ 152 | Microsoft ACPI-Compliant System |
| IRQ 153 | Microsoft ACPI-Compliant System |
| IRQ 154 | Microsoft ACPI-Compliant System |
| IRQ 155 | Microsoft ACPI-Compliant System |
| IRQ 156 | Microsoft ACPI-Compliant System |
| IRQ 157 | Microsoft ACPI-Compliant System |
| IRQ 158 | Microsoft ACPI-Compliant System |
| IRQ 159 | Microsoft ACPI-Compliant System |
| IRQ 160 | Microsoft ACPI-Compliant System |
| IRQ 161 | Microsoft ACPI-Compliant System |
| IRQ 162 | Microsoft ACPI-Compliant System |
| IRQ 163 | Microsoft ACPI-Compliant System |
| IRQ 164 | Microsoft ACPI-Compliant System |
| IRQ 165 | Microsoft ACPI-Compliant System |
| IRQ 166 | Microsoft ACPI-Compliant System |
| IRQ 167 | Microsoft ACPI-Compliant System |
| IRQ 168 | Microsoft ACPI-Compliant System |
| IRQ 169 | Microsoft ACPI-Compliant System |
| IRQ 170 | Microsoft ACPI-Compliant System |
| IRQ 171 | Microsoft ACPI-Compliant System |
| IRQ 172 | Microsoft ACPI-Compliant System |
| IRQ 173 | Microsoft ACPI-Compliant System |
| IRQ 174 | Microsoft ACPI-Compliant System |
| IRQ 175 | Microsoft ACPI-Compliant System |
| IRQ 176 | Microsoft ACPI-Compliant System |
| IRQ 177 | Microsoft ACPI-Compliant System |

| IRQ 178 | Microsoft ACPI-Compliant System | | |
|---|--|--|--|
| IRQ 179 | Microsoft ACPI-Compliant System | | |
| IRQ 180 | Microsoft ACPI-Compliant System | | |
| IRQ 181 | Microsoft ACPI-Compliant System | | |
| IRQ 182 | Microsoft ACPI-Compliant System | | |
| IRQ 183 | Microsoft ACPI-Compliant System | | |
| IRQ 184 | Microsoft ACPI-Compliant System | | |
| IRQ 185 | Microsoft ACPI-Compliant System | | |
| IRQ 186 | Microsoft ACPI-Compliant System | | |
| IRQ 187 | Microsoft ACPI-Compliant System | | |
| IRQ 188 | Microsoft ACPI-Compliant System | | |
| IRQ 189 | Microsoft ACPI-Compliant System | | |
| IRQ 190 | Microsoft ACPI-Compliant System | | |
| IRQ 19 | Standard AHCI 1.0 Serial ATA Controller | | |
| IRQ 19 | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 4 - 0F4E | | |
| IRQ 22 | High Definition Audio Controller | | |
| IRQ 23 | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor EHCI USB - 0F34 | | |
| IRQ 5 | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12 | | |
| IRQ 16 | $Intel(R) \ Atom(TM)/Celeron(R)/Pentium(R) \ Processor \ PCI \ Express \ - \ Root \ Port \ 1 \ - \ 0F48$ | | |
| IRQ 17 | SDA Standard Compliant SD Host Controller | | |
| IRQ 17 | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A | | |
| IRQ 18 | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor SD Host Controller | | |
| IRQ 18 | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C | | |
| IRQ 0 | System timer | | |
| IRQ 8 | High precision event timer | | |
| IRQ 42949672 | 293 Intel(R) Trusted Execution Engine Interface | | |
| IRQ 4294967294 Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900 | | | |
| IRQ 42949672 | Intel(R) I210 Gigabit Network Connection | | |
| IRQ 42949672 | 291 Intel(R) I210 Gigabit Network Connection | | |
| IRQ 42949672 | 290 Intel(R) I210 Gigabit Network Connection | | |
| IRQ 42949672 | 289 Intel(R) I210 Gigabit Network Connection | | |
| IRQ 42949672 | 288 Intel(R) I210 Gigabit Network Connection | | |
| IRQ 42949672 | 287 Intel(R) I210 Gigabit Network Connection | | |

Memory

| <u>Resource</u> | Device |
|-----------------------|--|
| 0x90806000-0x908067FF | Standard AHCI 1.0 Serial ATA Controller |
| 0x90000000-0x903FFFFF | Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900 |
| 0x80000000-0x8FFFFFFF | Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900 |

| 0x80000000-0x8FFFFFFF | PCI bus |
|-----------------------|--|
| 0xA0000-0xBFFFF | Intel(R) Atom(TM) Processor E3800 Series/Intel(R) Celeron(R) Processor N2920/J1900 |
| 0xA0000-0xBFFFF | PCI bus |
| 0x90800000-0x90803FFF | High Definition Audio Controller |
| 0x90805000-0x908053FF | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor EHCI USB - 0F34. |
| 0x90804000-0x9080401F | $Intel(R)\ Atom(TM)/Celeron(R)/Pentium(R)\ Processor\ Platform\ Control\ Unit\ -\ SMBus\ Port\ -\ 0F12.$ |
| | |
| 0xFF000000-0xFFFFFFFF | Intel(R) 82802 Firmware Hub Device |
| 0x90809000-0x90809FFF | SDA Standard Compliant SD Host Controller |
| 0xFF000-0xFFFFF | SDA Standard Compliant SD Host Controller |
| 0xE00000D0-0xE00000DB | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor MBI Device - 33BD |
| 0x90808000-0x90808FFF | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor SD Host Controller |
| 0x90807000-0x90807FFF | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor SD Host Controller |
| 0x90600000-0x907FFFFF | Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C |
| 0x90600000-0x907FFFFF | Intel(R) I210 Gigabit Network Connection |
| 0xFED00000-0xFED003FF | High precision event timer |
| 0xC0000-0xDFFFF | PCI bus |
| 0xE0000-0xFFFFF | PCI bus |
| 0x90500000-0x905FFFFF | Intel(R) Trusted Execution Engine Interface |
| 0x90400000-0x904FFFFF | Intel(R) Trusted Execution Engine Interface |
| 0xE0000000-0xEFFFFFFF | Motherboard resources |
| 0xFED01000-0xFED01FFF | Motherboard resources |
| 0xFED03000-0xFED03FFF | Motherboard resources |
| 0xFED04000-0xFED04FFF | Motherboard resources |
| 0xFED0C000-0xFED0FFFF | Motherboard resources |
| 0xFED08000-0xFED08FFF | Motherboard resources |
| 0xFED1C000-0xFED1CFFF | Motherboard resources |
| 0xFEE00000-0xFEEFFFFF | Motherboard resources |
| 0xFEF00000-0xFEFFFFFF | Motherboard resources |
| 0x90700000-0x90703FFF | Intel(R) I210 Gigabit Network Connection |

System BIOS Update Procedure

A. 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. C0280PI1.bin) to the bootable device.
- 3. Copy AMI flash utility AFUDOS.exe (v5.07.01) into bootable device.

C:\AFUDOS>dir

| Volume ir Volume se Director <u>u</u> | n drive v erial Nui y of C:\i | C has no 18 mber is 08 AFUDOS | abel 46-7844 | |
|---|-------------------------------------|-------------------------------------|-----------------|--------|
| | < D. | IR> | 02-04-15 | 11:20a |
| | < D. | IR> | 02-04-15 | 11:20a |
| AFUDOS E | EXE | 169,120 | 02-02-15 | 2:43p |
| AFUDOS 1 | ГХТ | 5,686 | 02-02-15 | 2:17p |
| README 1 | ГХТ | 5,052 | 01-30-15 | 5:57p |
| AMI_AP~1 F | PDF | 1,088,978 | 02-02-15 | 3:03p |
| C0280PI1 H | BIN | 8,388,608 | 09-13-16 | 2:33p |
| | 5 file(s |) 9,6 | 57,444 byt | .es |
| 2 | 2 dir(s) | 5,3 | 242.82 MB | free |

C:\AFUDOS>

4. Make sure the target system can first boot to the bootable device.

- (1) Connect the bootable USB device.
- (2) Turn on the computer and press <Esc> or key during boot to enter BIOS Setup.
- (3) System will go into the BIOS setup menu.
- (4) Select [Boot] menu.
- (5) Select Boot Option #1 from [Hark Disk] to [USB Key]
- (6) Select [USB Key Drive BBS Priorities], set the USB bootable device to be the 1st boot device.
- (7) Press <F4> key to save configuration and exit the BIOS setup menu.

| | Aptio Setup Utility – | Copyright Boot | (C) (| 2016 American | Megatrends, Inc. |
|----------------|-----------------------|-------------------|--------|----------------|---|
| Boot Option #1 | l | [SanDisk | USB f | Flash D] | Sets the system boot order |
| | | | | | <pre>++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre> |
| | Version 2.17.1249. C | opyright ((| 0) 20: | 16 American Me | egatrends, Inc. |

B. Using AFUDOS.exe utility for system BIOS update

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

AFUDOS <BIN File Name> [option1] [option2]....

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

- **/P**: Program main BIOS image.
- /B: Program Boot Block.
- /N: Program NVRAM.
- **/X**: Don't check ROM ID.

C. BIOS update procedure

- 1. Use the bootable USB storage to boot up system into the DOS command prompt.
- Type "AFUDOSC028xxxx.bin /p /b /n /x" and press enter to start the flash procedure. (Note that xxxx means the BIOS revision part, ex. 0PI1...)
- 3. During the update procedure, you will see the BIOS update processing status and the percentage it has been done.
 - **<u>Beware:</u>** 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.

| Reading flash done - ME Data Size checking . ok - FFS checksums ok Erasing Boot Block done Updating Boot Block done Verifying Boot Block done Frasing Main Block |
|--|
| Updating Main Block done Verifying Main Block done Erasing NVRAM Block done Updating NVRAM Block done Verifying NVRAM Block done |

- 5. User can restart the system and boot up with new BIOS now.
- 6. Update is complete after restart.
- 7. The way to verify the BIOS version.
 - (1) After system restart user should able to see the new BIOS version when AMI logo pops up.



(2) User can also check the BIOS version by pressing or <ESC> key to access BIOS setup page during POST procedure. The current BIOS version will be shown at "Project Version" item of the BIOS main screen.

