» User Guide «

AM4022
uEFI BIOS

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Kontron Europe GmbH may be contacted via the following:

MAILING ADDRESS

Kontron Europe GmbH
Sudetenstraße 7
D - 87600 Kaufbeuren Germany

TELEPHONE AND E-MAIL

+49 (0) 800-SALESKONTRON
sales@kontron.com

For further information about other Kontron products, please visit our Internet web site: www.kontron.com.

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Chapter 1

Starting uEFI BIOS Setup

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1. Starting uEFI BIOS Setup

The AM4022 is provided with a Kontron-customized, pre-installed and configured version of Aptio® (referred to as uEFI BIOS in this manual), AMI's next generation BIOS firmware based on the Unified Extensible Firmware Interface (uEFI) specification and the Intel® Platform Innovation Framework for EFI. This uEFI BIOS provides a variety of new and enhanced functions specifically tailored to the hardware features of the AM4022. This user guide reflects the uEFI BIOS version R12.

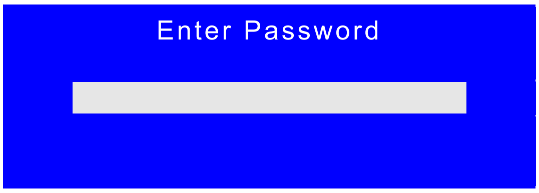
To take advantage of these functions, the uEFI BIOS comes with a Setup program which provides quick and easy access to the individual function settings for control or modification of the uEFI BIOS configuration.

The Setup program allows the accessing of various menus which provide functions or access to sub-menus with more specific functions of their own. The individual menus and the configurable functions are described in this guide.

On board versions with a COM port on the front panel, both the uEFI BIOS Setup and the EFI Shell are accessible via the serial port.

To start the uEFI BIOS Setup program, follow the steps below:

1. Power on the board.
2. Wait until the first characters appear on the screen (POST messages or splash screen).
3. Press the <F2> key.
4. If the uEFI BIOS is password-protected, a window such as the one below will appear:



   Enter either the User password or the Administrator password (refer to Chapter 4, Security Setup, for further information), press <RETURN>, and proceed with step 5.

5. A Setup menu with the following token attributes will appear.
   The currently active menu and the currently active uEFI BIOS Setup item are highlighted in white.

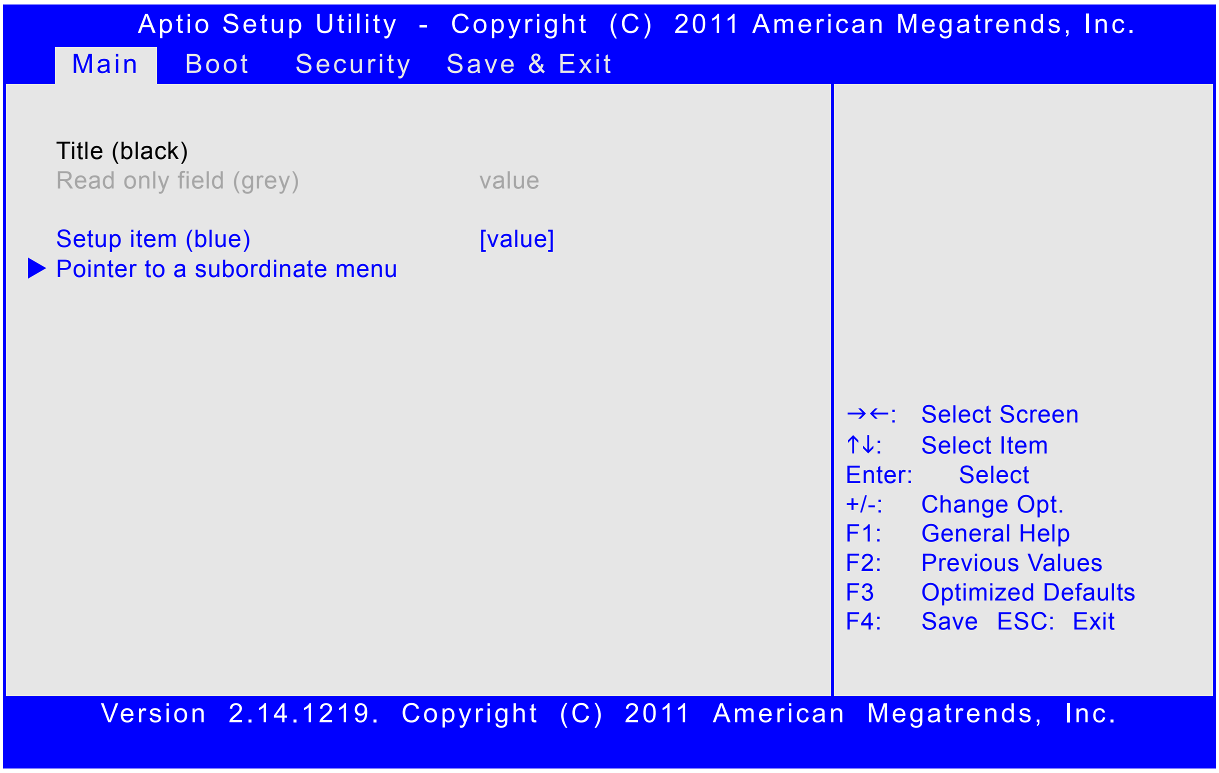
1.1 Main Setup Menu

The Main setup menu is the first screen that appears after starting the Setup program.

At the top of this screen and all of the other major screens, there is a setup menu selection bar, which permits access to all of the other major setup menus. These menus are selected via the left-right arrow keys.

All setup menu screens have two main frames. The left frame displays all the functions that can be configured. They are displayed in blue. Functions displayed in gray provide information about the status or the operational configuration.

The right frame displays the key legend. Above the key legend there is an area reserved for a text message. When a function is selected in the left frame, it is displayed in white. Often a text message will accompany it.



```
        Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
    Main    Boot    Security    Save & Exit

    Title (black)
    Read only field (grey)              value

    Setup item (blue)                   [value]
  ▶ Pointer to a subordinate menu

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

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```

1.2 Navigation

The AM4022 uEFI BIOS setup program uses a hot key-based navigation system. A hot key legend is located in the right frame on most setup screens.The following table provides information concerning the usage of these hot keys.

HOT KEY	DESCRIPTION
<F1>	The <F1> key is used to invoke the General Help window.
<F2>	The <F2> key is used to restore the previous values.
<F3>	The <F3> key is used to load the defaults.
<F4>	The <F4> key is used to save the current settings and exit the uEFI BIOS Setup.
→ ← Left/Right	The *Left and Right* <Arrow> keys are used to select a major Setup screen. For example: Main Screen, Advanced Screen, Chipset Screen, etc.
↑ ↓ Up/Down	The *Up and Down* <Arrow> keys are used to select a Setup function or a sub-screen.
+ - Plus/Minus	The *Plus and Minus* <Arrow> keys are used to change the field value of a particular Setup function, for example, system date and time.
<ESC>	The <ESC> key is used to exit a menu or the uEFI BIOS Setup. Pressing the <ESC> key in a sub-menu causes the next higher menu level to be displayed. When the <ESC> key is pressed in a major Setup menu, the uEFI BIOS Setup is terminated without saving any changes made.
<Enter>	The <Enter> key is used to execute a command or select a menu.

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Chapter 2

Main Setup

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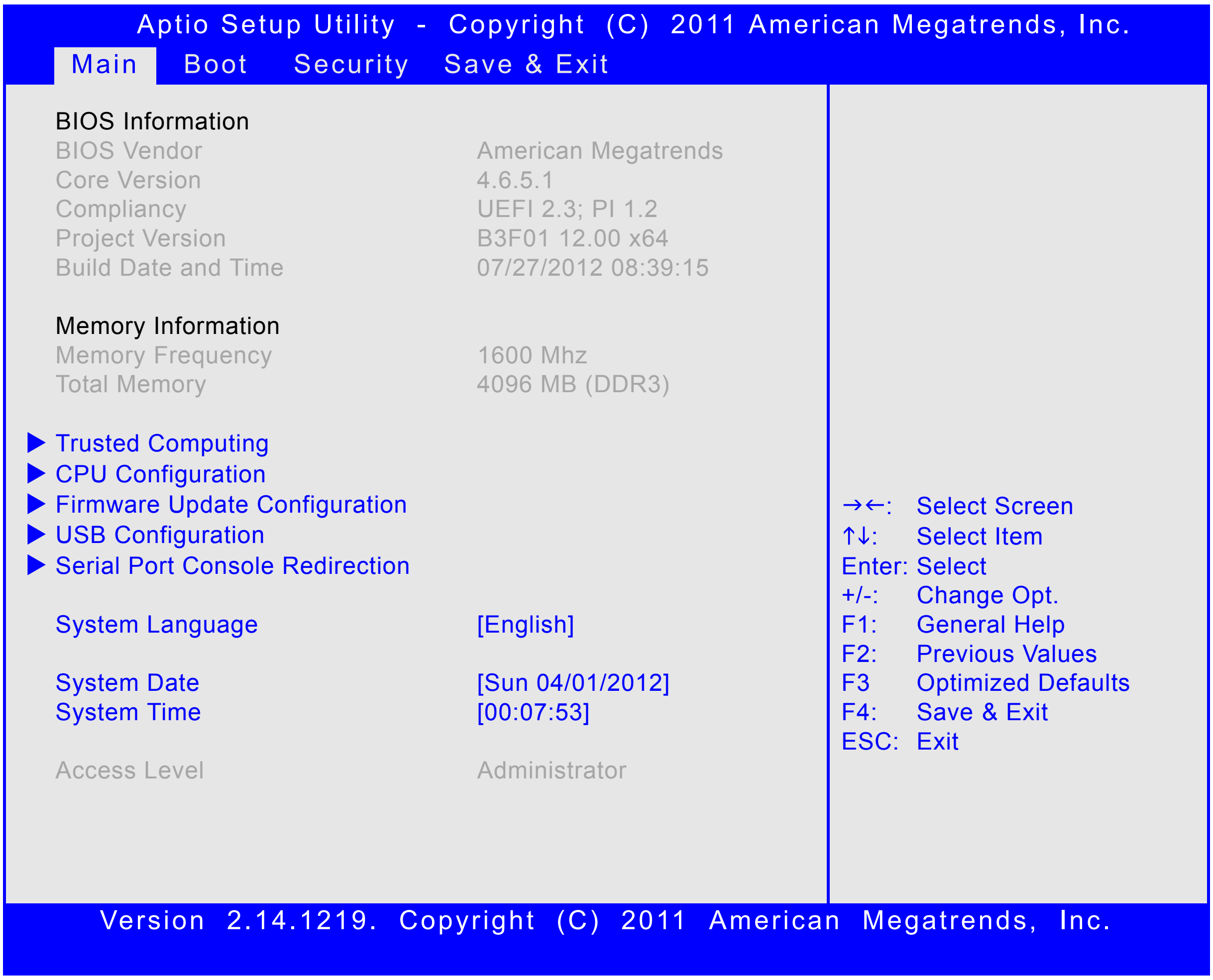
2. Main Setup

Upon entering the uEFI BIOS Setup program, the Main setup screen is displayed. This screen lists the main setup sub-screens and provides very basic system information as well as functions for setting the system time and date. In addition, the remaining major setup menus can be accessed from this screen. This screen can also be selected from any other major setup screen by using the Main tab.



```
          Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main    Boot    Security    Save & Exit

   BIOS Information
   BIOS Vendor                   American Megatrends
   Core Version                  4.6.5.1
   Compliancy                    UEFI 2.3; PI 1.2
   Project Version               B3F01 12.00 x64
   Build Date and Time           07/27/2012 08:39:15

   Memory Information
   Memory Frequency              1600 Mhz
   Total Memory                  4096 MB (DDR3)

 ▶ Trusted Computing
 ▶ CPU Configuration
 ▶ Firmware Update Configuration                        →←:   Select Screen
 ▶ USB Configuration                                    ↑↓:   Select Item
 ▶ Serial Port Console Redirection                      Enter: Select
                                                        +/-:  Change Opt.
   System Language               [English]              F1:   General Help
                                                        F2:   Previous Values
   System Date                   [Sun 04/01/2012]       F3    Optimized Defaults
   System Time                   [00:07:53]             F4:   Save & Exit
                                                        ESC:  Exit
   Access Level                  Administrator

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```

2.1 BIOS Information

This function provides display-only information concerning the uEFI BIOS.

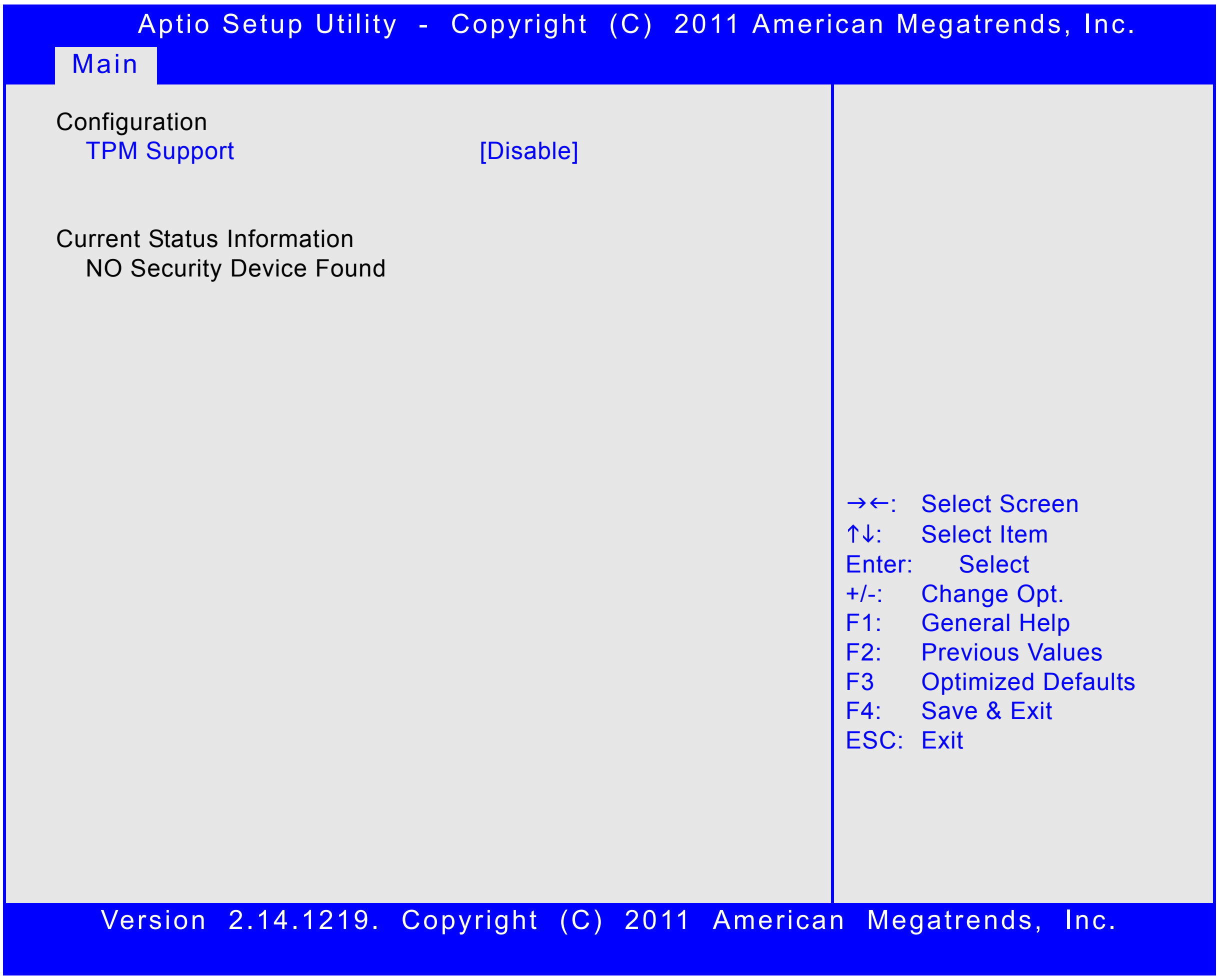
Information about the running uEFI BIOS version is reflected in the display-only function Project Version (parameter “012.00” indicates Rev. 12).

2.2 Memory Information

This function provides display-only information concerning the system memory.

2.3 Trusted Computing

This screen provides functions for specifying the TPM configuration settings and TPM displaying status information.



```
        Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main

   Configuration
      TPM Support                        [Disable]


   Current Status Information
      NO Security Device Found
                                                                     →←:   Select Screen
                                                                     ↑↓:   Select Item
                                                                     Enter:   Select
                                                                     +/-:  Change Opt.
                                                                     F1:   General Help
                                                                     F2:   Previous Values
                                                                     F3    Optimized Defaults
                                                                     F4:   Save & Exit
                                                                     ESC:  Exit

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```

2.3.1 Configuration

2.3.1.1 TPM Support

This function is used to provide the Trusted Platform Module (TPM) functionality to the OS.

Note: Trusted Platform Module support is available on request.

SETTING	DESCRIPTION
Disable	Use this setting to disable TPM support. If this setting is used, TPM is not present for the OS, regardless whether the function TPM State is enabled or not.
Enable	Use this setting to enable TPM support.

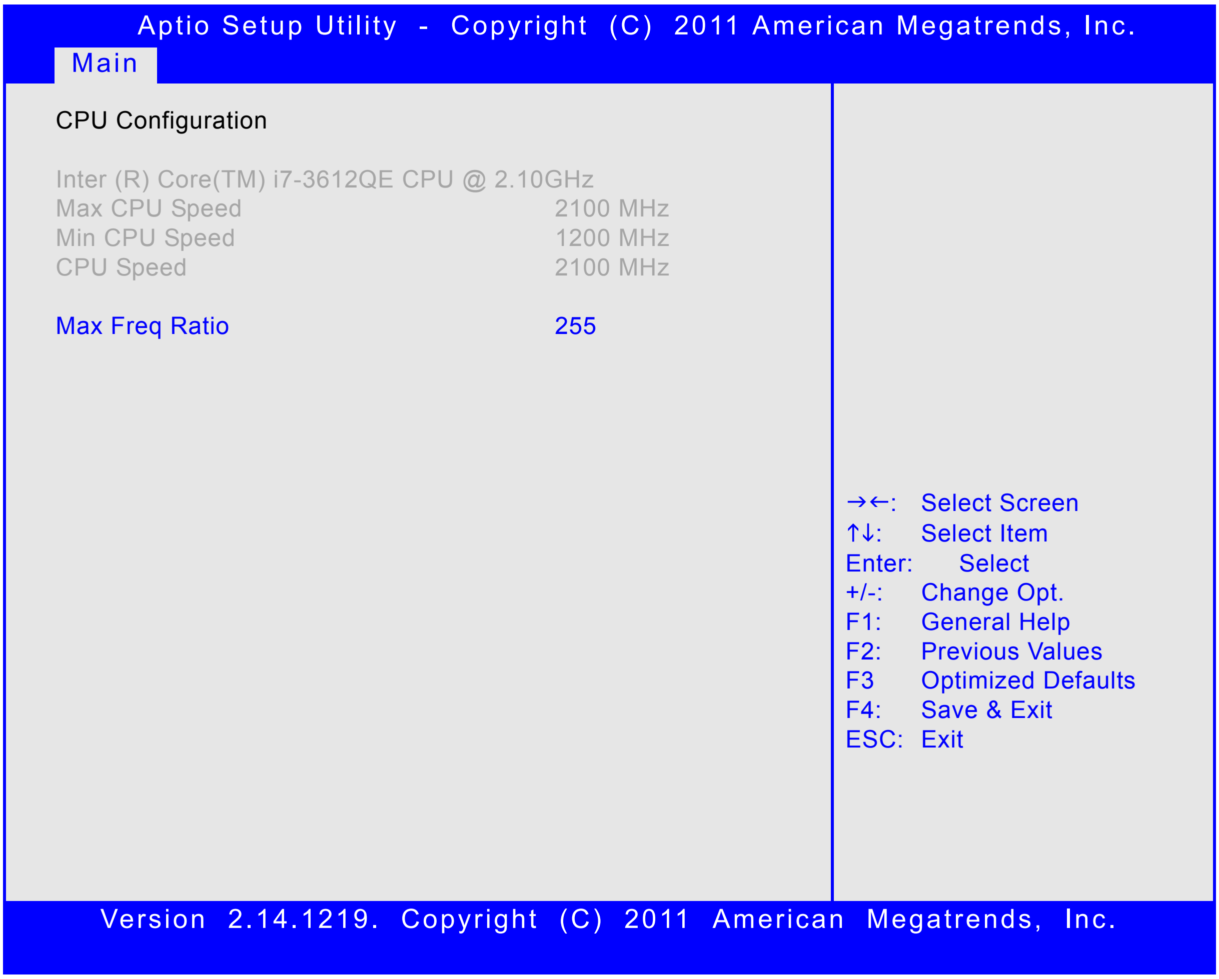
Default setting: Disable

2.3.2 Current Status Information

This is a display-only function which provides status information.

2.4 CPU Configuration

This screen provides information concerning the CPU operating frequencies and the ability to set the frequency ratio.



```
      Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
  Main

  CPU Configuration

  Inter (R) Core(TM) i7-3612QE CPU @ 2.10GHz
  Max CPU Speed                         2100 MHz
  Min CPU Speed                         1200 MHz
  CPU Speed                             2100 MHz

  Max Freq Ratio                        255

                                                      →←:    Select Screen
                                                      ↑↓:    Select Item
                                                      Enter:     Select
                                                      +/-:   Change Opt.
                                                      F1:    General Help
                                                      F2:    Previous Values
                                                      F3     Optimized Defaults
                                                      F4:    Save & Exit
                                                      ESC:   Exit

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```

2.4.1 Max Freq Ratio

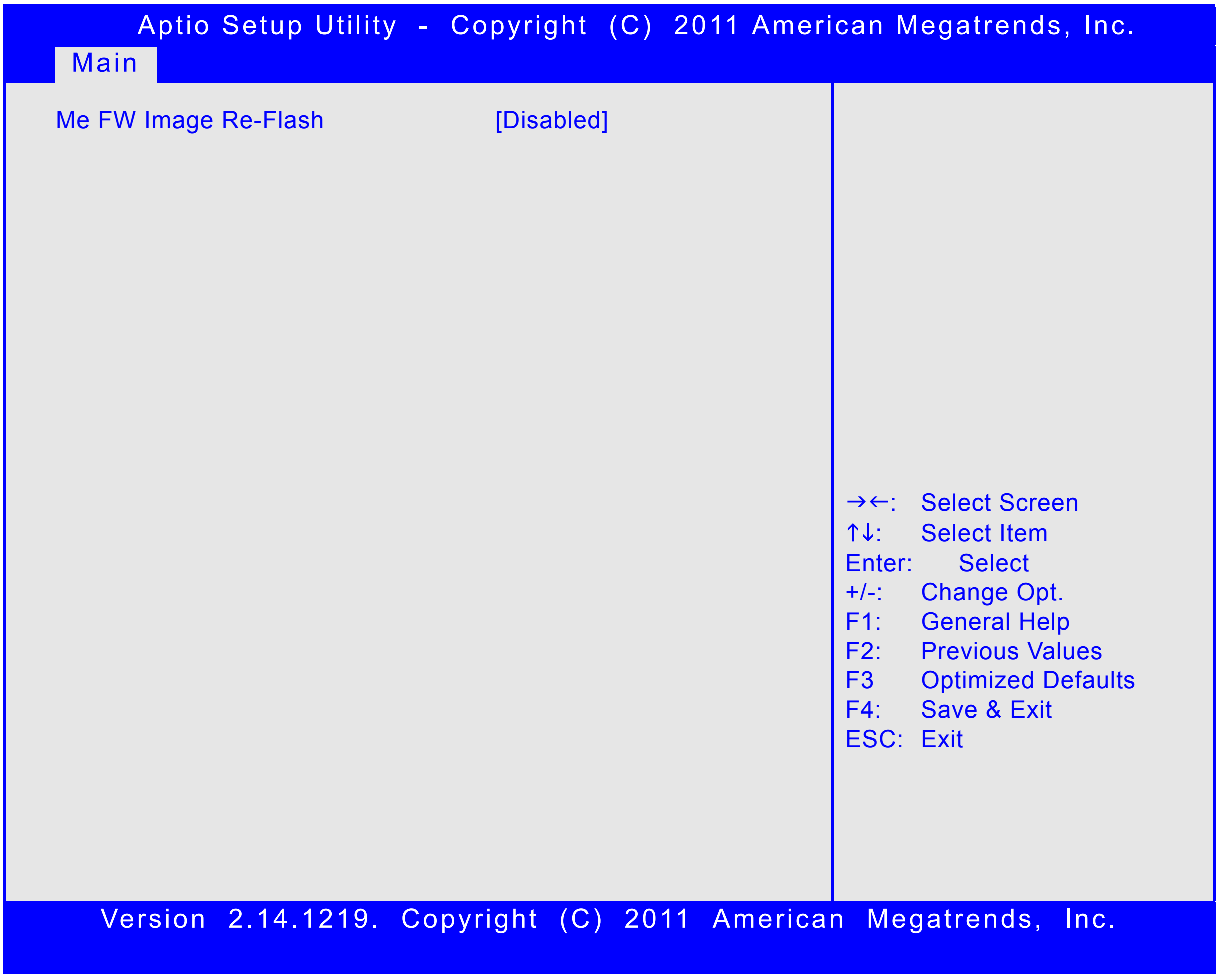
This function is used to permit the CPU frequency to be adjusted so as to make a reduction in power consumption possible when higher performance is not required.

To ensure that the maximum desired frequency is not exceeded, the CPU turbo mode must be disabled using the uEFI shell command:

“kboardconfig CpuTurbo disabled”

2.5 Firmware Update Configuration

This screen provides the capability to enable or disable the ME firmware image re-flash function.



```
         Aptio Setup Utility  -  Copyright  (C)  2011 American Megatrends, Inc.
  Main

  Me FW Image Re-Flash                 [Disabled]

                                                          →←:   Select Screen
                                                          ↑↓:   Select Item
                                                          Enter:   Select
                                                          +/-:  Change Opt.
                                                          F1:   General Help
                                                          F2:   Previous Values
                                                          F3    Optimized Defaults
                                                          F4:   Save & Exit
                                                          ESC:  Exit

        Version  2.14.1219.  Copyright  (C)  2011  American  Megatrends,  Inc.
```

2.5.1 Me FW Image Re-Flash

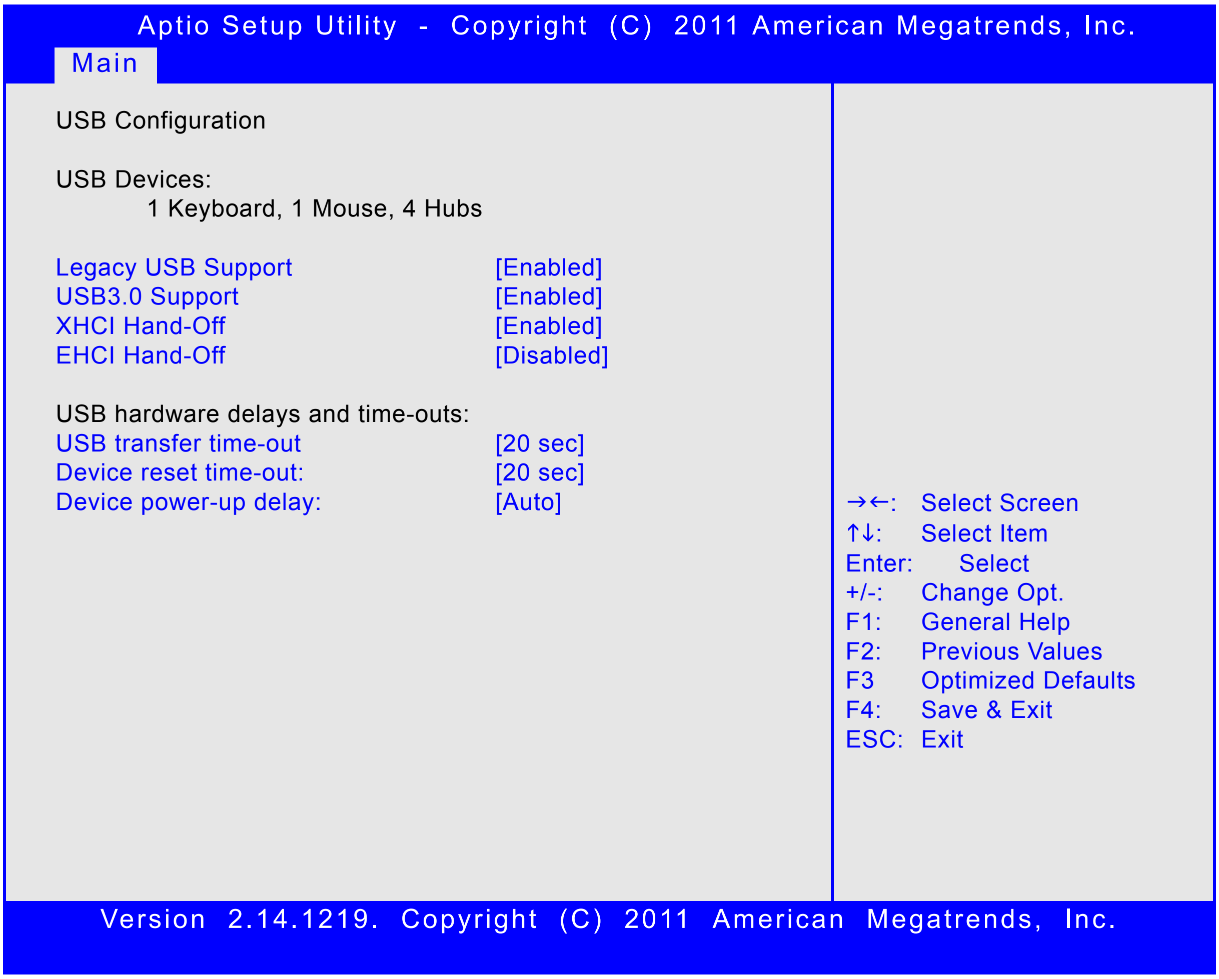
This function is used to enable or disable the Intel® Management Engine Firmware Re-flashing.

SETTING	DESCRIPTION
Disable	Use this setting to disable Me Firmware Re-flashing
Enable	Use this setting to enable Me Firmware Re-flashing

Default setting: Disable

2.6 USB Configuration

This screen provides information about support for USB devices as well as functions for specifying the USB configuration settings.



```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main

USB Configuration

USB Devices:
        1 Keyboard, 1 Mouse, 4 Hubs

Legacy USB Support              [Enabled]
USB3.0 Support                  [Enabled]
XHCI Hand-Off                   [Enabled]
EHCI Hand-Off                   [Disabled]

USB hardware delays and time-outs:
USB transfer time-out           [20 sec]
Device reset time-out:          [20 sec]
Device power-up delay:          [Auto]

                                          →←:    Select Screen
                                          ↑↓:    Select Item
                                          Enter:    Select
                                          +/-:   Change Opt.
                                          F1:    General Help
                                          F2:    Previous Values
                                          F3     Optimized Defaults
                                          F4:    Save & Exit
                                          ESC:   Exit

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```

2.6.1 USB Configuration

2.6.1.1 USB Devices

This is a display-only function providing general information about the USB devices detected.

2.6.1.2 Legacy USB Support

This function is required for booting from USB devices and for operating systems which do not support USB themselves (mainly DOS and some BootLoaders).

SETTING	DESCRIPTION
Disabled	Use this setting to disable legacy USB support.
Enabled	Use this setting to enable legacy USB support.
Auto	Use this setting to enable legacy USB support if there are USB devices present.

Default setting: Enabled

2.6.1.3 USB3.0 Support

This function is used to enable USB3.0 support.

SETTING	DESCRIPTION
Disabled	Use this setting to disable USB3.0 support.
Enabled	Use this setting to enable USB3.0 support.

Default setting: Enabled

2.6.1.4 XHCI Hand-Off

This function is used to enable a workaround for operating systems without XHCI Hand-Off support. The XHCI ownership change should be claimed by the XHCI driver.

Note: It is recommended to leave this function at the default setting.
For operating systems without USB3.0 support this function must be left at the default setting.

SETTING	DESCRIPTION
Disabled	Use this setting to disable XHCI Hand-Off support.
Enabled	Use this setting to enable XHCI Hand-Off support.

Default setting: Enabled

2.6.1.5 EHCI Hand-Off

This function is used to enable a workaround for operating systems without EHCI Hand-Off support. The EHCI ownership change should be claimed by the EHCI driver.

Note: It is recommended to leave this function at the default setting.
For operating systems without USB2.0 support this function must be left at the default setting.

SETTING	DESCRIPTION
Disabled	Use this setting to disable EHCI Hand-Off support.
Enabled	Use this setting to enable EHCI Hand-Off support.

Default setting: Disabled

2.6.2 USB Hardware Delays and Time-outs

2.6.2.1 USB Transfer Timeout

This setting selects the timeout in seconds that the USB core will wait for Control, Bulk, and Interrupt transfers.

SETTING	DESCRIPTION
1 sec 5 sec 10 sec 20 sec	Use one of these settings to specify how long the USB core is to wait for Control, Bulk, and Interrupt transfers.

Default setting: 20 sec

2.6.2.2 Device Reset Timeout

This setting selects the timeout in seconds that the POST will wait for a USB mass storage device to become ready after start unit command.

SETTING	DESCRIPTION
10 sec 20 sec 30 sec 40 sec	Use one of these settings to specify how long the POST will wait for a USB mass storage device to become ready after the start unit command.

Default setting: 20 sec

2.6.2.3 Device Power-up Delay

This setting determines the maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses a default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

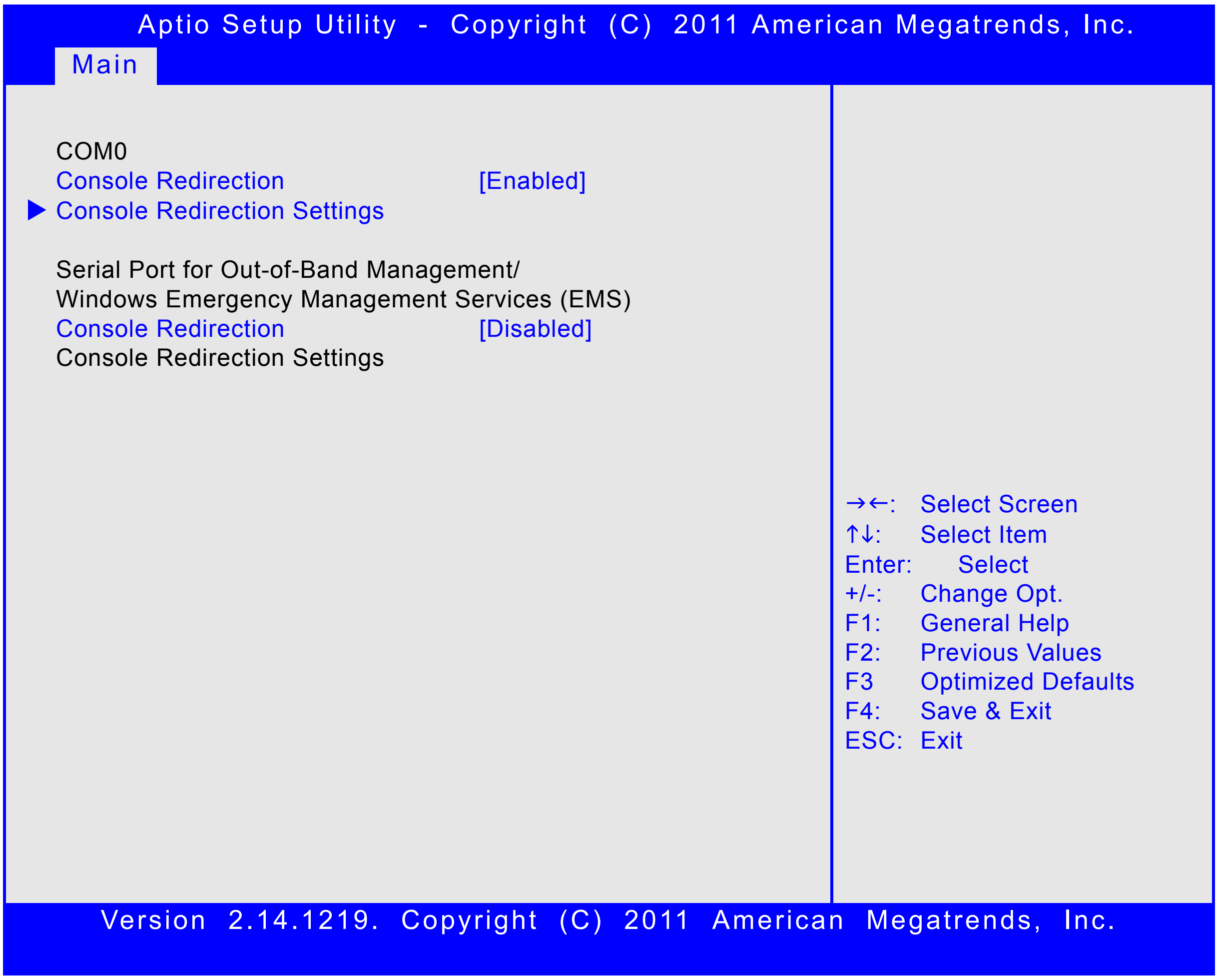
If the Manual option is chosen, the device power up delay in seconds field will be enabled to accept a delay ranging from 1 to 40 seconds.

SETTING	DESCRIPTION
auto	Use this setting to specify a default delay time for a Root or Hub port. (root port = 100ms; hub port = value in hub descriptor)
manual	Use this setting to specify a delay time from 1 to 40 seconds. (contents of seconds field)

Default setting: auto

2.7 Serial Port Console Redirection

This screen provides information about functions for specifying the Serial Port Console Redirection configuration settings. Console redirection can be used to remotely operate system settings and the EFI console.



```
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  Main

  COM0
  Console Redirection              [Enabled]
▶ Console Redirection Settings

  Serial Port for Out-of-Band Management/
  Windows Emergency Management Services (EMS)
  Console Redirection              [Disabled]
  Console Redirection Settings

                                                   →←:   Select Screen
                                                   ↑↓:   Select Item
                                                   Enter:    Select
                                                   +/-:  Change Opt.
                                                   F1:   General Help
                                                   F2:   Previous Values
                                                   F3    Optimized Defaults
                                                   F4:   Save & Exit
                                                   ESC:  Exit

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```

2.7.1 COM0

The COM0 port (serial port 0) in the uEFI BIOS corresponds to the COMA serial port on the front panel of the AM4022 or the AMC connector.

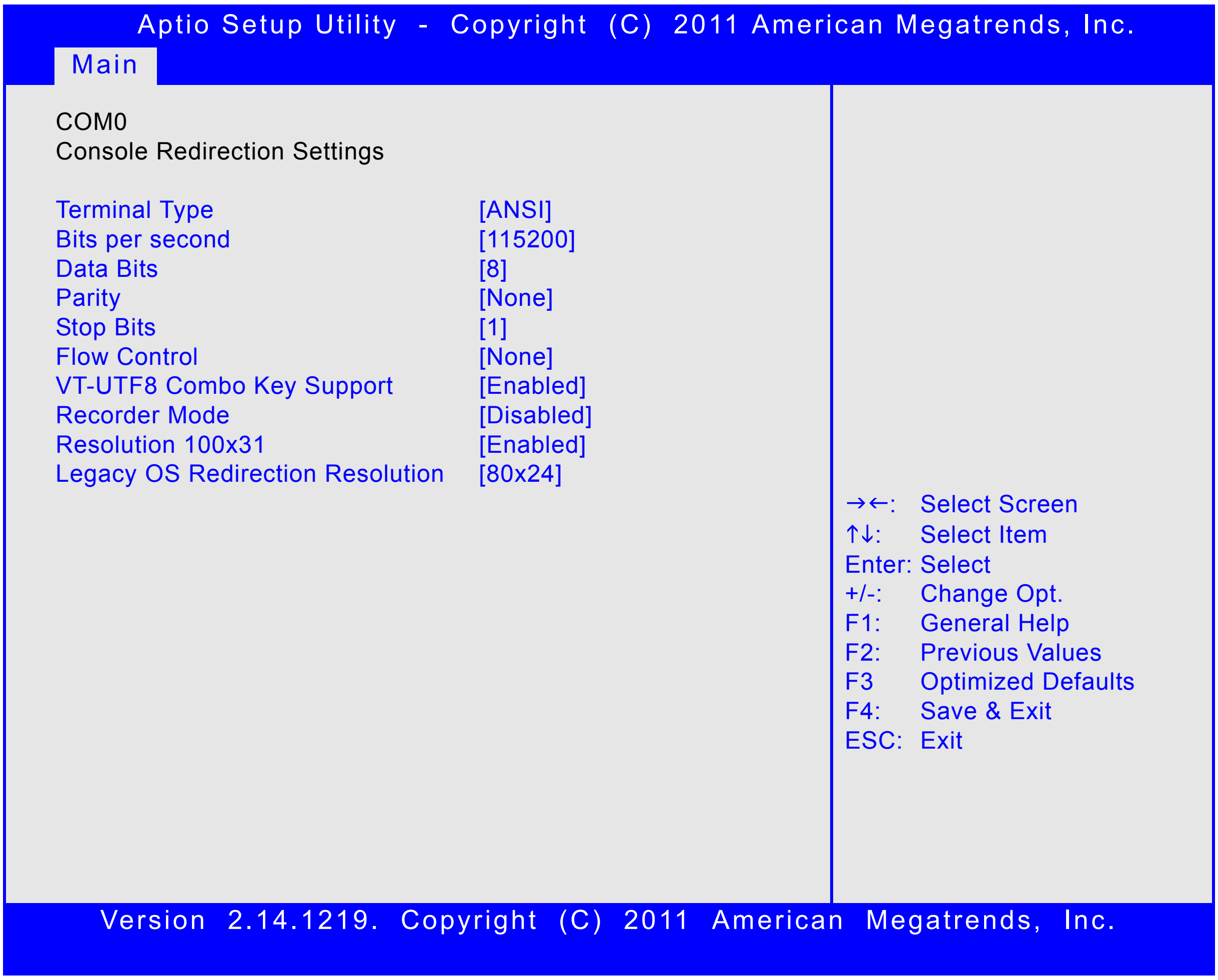
2.7.1.1 Console Redirection

SETTING	DESCRIPTION
Disabled	Use this setting to disable console redirection for the serial port 0.
Enabled	Use this setting to enable console redirection for the serial port 0.

Default setting: Enabled

2.7.1.2 Console Redirection Settings

This screen provides information about functions for specifying the Console Redirection configuration settings for the serial port 0 and a PCIe serial port. Each serial port can be independently configured.



```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main

COM0
Console Redirection Settings

Terminal Type                       [ANSI]
Bits per second                     [115200]
Data Bits                           [8]
Parity                              [None]
Stop Bits                           [1]
Flow Control                        [None]
VT-UTF8 Combo Key Support           [Enabled]
Recorder Mode                       [Disabled]
Resolution 100x31                   [Enabled]
Legacy OS Redirection Resolution    [80x24]

                                              →←:    Select Screen
                                              ↑↓:    Select Item
                                              Enter: Select
                                              +/-:   Change Opt.
                                              F1:    General Help
                                              F2:    Previous Values
                                              F3     Optimized Defaults
                                              F4:    Save & Exit
                                              ESC:   Exit

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```

2.7.1.2.1 COM0 Console Redirection Settings

2.7.1.2.1.1 Terminal Type

SETTING	DESCRIPTION
VT100	Use one of these settings to select the terminal type to be emulated.
VT100+	
VT-UTF8	
ANSI	

Default setting: ANSI

2.7.1.2.1.2 Bits per second

SETTING	DESCRIPTION
9600	Use one of these settings to select the baud rate of the serial port.
19200	
57600	
115200	

Default setting: 115200

2.7.1.2.1.3 Data Bits

SETTING	DESCRIPTION
7	Use one of these settings to specify the number of data bits per frame.
8	

Default setting: 8

2.7.1.2.1.4 Parity

SETTING	DESCRIPTION
None	Use one of these settings to select the parity for the serial port.
Even	
Odd	
Mark	
Space	

Default setting: None

2.7.1.2.1.5 Stop Bits

SETTING	DESCRIPTION
1	Use one of these settings to specify the number of stop bits for the serial port.
2	

Default setting: 1

2.7.1.2.1.6 Flow Control

SETTING	DESCRIPTION
None	Use one of these settings to specify the type of flow control to be used for this serial port.
Hardware RTS/CTS	
Software Xon/Xoff	

Default setting: None

2.7.1.2.1.7 VT-UTF8 Combo Key Support

Use this setting to enable or disable VT-UTF8 Combination Key Support for ANSI/ VT100 terminals.

SETTING	DESCRIPTION
Disabled	Use this setting the disable combination key support.
Enabled	Use this setting the enable combination key support.

Default setting: Enabled

2.7.1.2.1.8 Recorder Mode

Use this setting to specify whether display formatting characters are to be transmitted along with data or if only data is to be transmitted.

SETTING	DESCRIPTION
Disabled	Use this setting to specify normal terminal operation.
Enabled	Use this setting to specify that only text will be sent. Use this to capture terminal data.

Default setting: Disabled

2.7.1.2.1.9 Resolution 100x31

SETTING	DESCRIPTION
Disabled	Use this setting the disable extended terminal resolution.
Enabled	Use this setting the enable extended terminal resolution.

Default setting: Enabled

2.7.1.2.1.10 Legacy OS Redirection

SETTING	DESCRIPTION
80x24	Use one of these settings to select the number of rows and columns for legacy OS redirection.
80x25	

Default setting: 80x24

2.7.2 Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

The following functions control the presence and content of the ACPI serial port redirection table (SPCR). This table is mainly used by the Windows server variants to provide Windows Emergency Management Services (EMS). This functionality is totally independent from serial redirection of other console output.

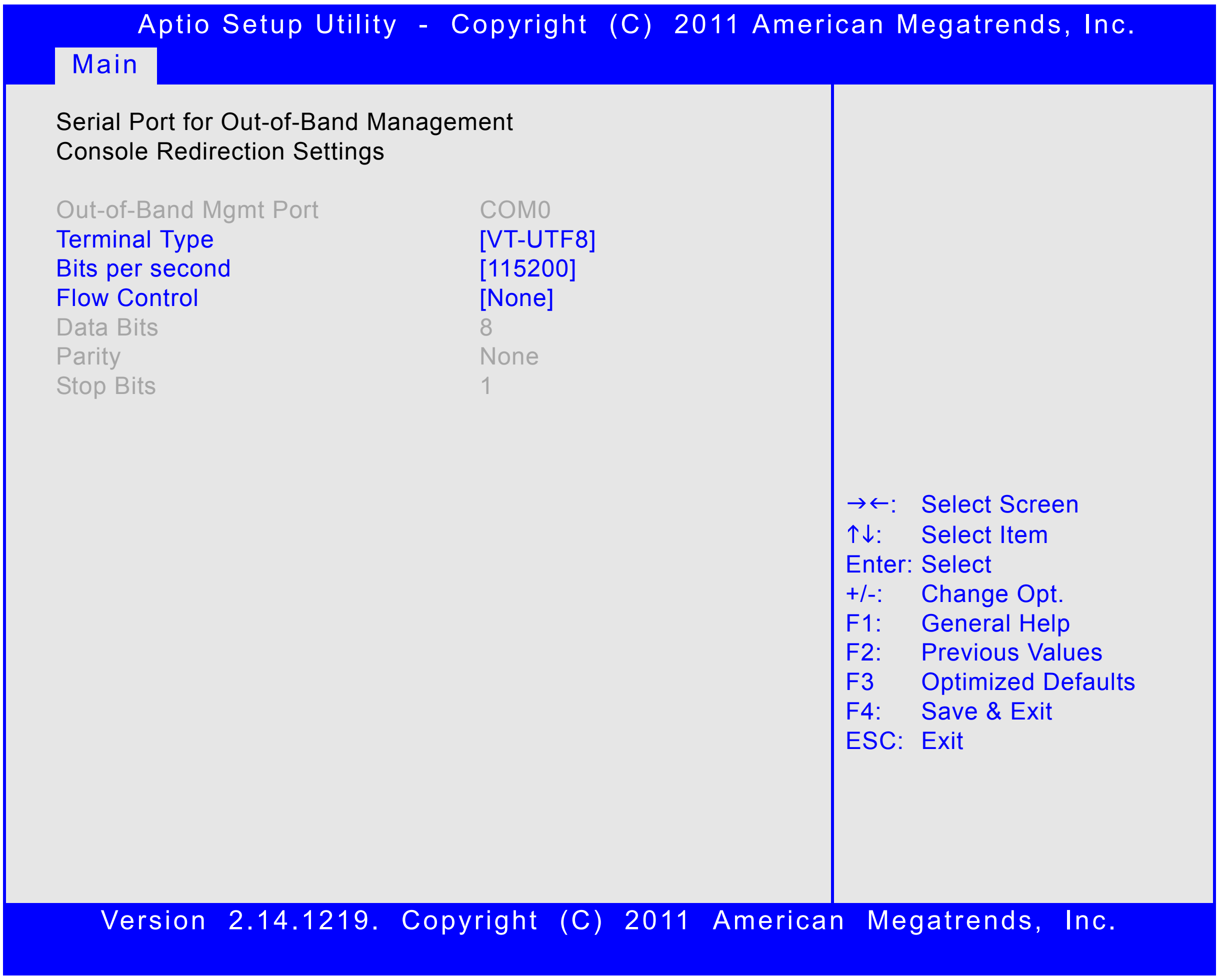
2.7.2.1 Console Redirection

SETTING	DESCRIPTION
Disabled	Use this setting to prevent the system from adding the SPCR table to the ACPI tables.
Enabled	Use this setting to add the SPCR table to the ACPI tables. The OS can further use the information provided for serial redirection services.

Default setting: Disabled

2.7.2.2 Console Redirection Settings

This screen provides information about functions for specifying the Console Redirection configuration settings for the serial port 0 and a PCIe serial port. Each serial port can be independently configured.



```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Main

Serial Port for Out-of-Band Management
Console Redirection Settings

Out-of-Band Mgmt Port        COM0
Terminal Type                [VT-UTF8]
Bits per second              [115200]
Flow Control                 [None]
Data Bits                    8
Parity                       None
Stop Bits                    1

                                         →←:    Select Screen
                                         ↑↓:    Select Item
                                         Enter: Select
                                         +/-:   Change Opt.
                                         F1:    General Help
                                         F2:    Previous Values
                                         F3     Optimized Defaults
                                         F4:    Save & Exit
                                         ESC:   Exit

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```

2.7.2.2.1 Serial Port Out-of-Band Management Console Redirection Settings

2.7.2.2.1.1 Out-of-Band Mgmt Port

This is a display-only function providing information about the serial port used for the Out-of-Band Management.

2.7.2.2.1.2 Terminal Type

SETTING	DESCRIPTION
VT100	Use one of these settings to select the terminal type to be emulated.
VT100+	
VT-UTF8	
ANSI	

Default setting: VT-UTF8

2.7.2.2.1.3 Bits per second

SETTING	DESCRIPTION
9600	Use one of these settings to select the baud rate of the serial port.
19200	
57600	
115200	

Default setting: 115200

2.7.2.2.1.4 Flow Control

SETTING	DESCRIPTION
None	Use one of these settings to specify the type of flow control to be used for this serial port.
Hardware RTS/CTS	
Software Xon/Xoff	

Default setting: None

2.7.2.2.1.5 Data Bits

This is a display-only function providing information about the frame width for the Out-of-Band Management.

2.7.2.2.1.6 Parity

This is a display-only function providing information about the parity for Out-of-Band Management.

2.7.2.2.1.7 Stop Bits

This is a display-only function providing information about the number of stop bits for Out-of-Band Management.

2.8 System Language

SETTING	DESCRIPTION
English	Use this function to select the system language. Currently, only English is supported.

2.9 System Date

SETTING	DESCRIPTION
<WD MM/DD/YYYY>	Use this function to change the system date. Select System Date using the Up and Down <Arrow> keys. Enter the new values through the keyboard or press +/- to increment/decrement values. Use “Tab” to switch between date elements.

2.10 System Time

SETTING	DESCRIPTION
<HH:MM:SS>	Use this function to change the system time. Select System Time using the Up and Down <Arrow> keys. Enter the new values through the keyboard or press +/- to increment/decrement values. Use “Tab” to switch between time elements.

Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

2.11 Access Level

This function provides display-only information concerning the uEFI BIOS Setup accessibility for the current Setup session. The access level is always “Administrator”. There are no limitations in the case that a password is set.

Chapter 3

Boot Setup

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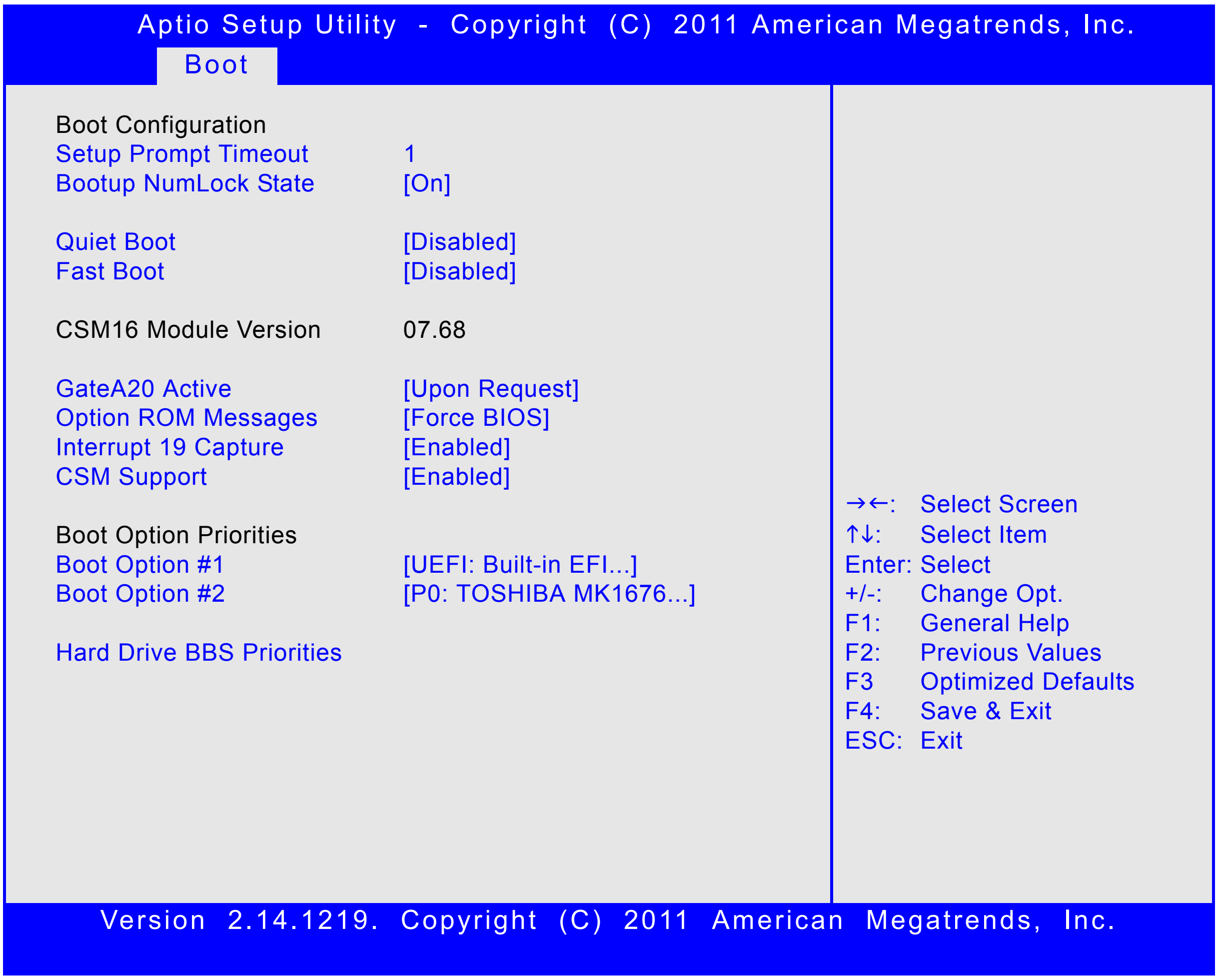
3. Boot Setup

Select the Boot tab to enter the Boot Setup screen. This screen lists the sub-screens for boot configuration and boot device priority.



```
          Aptio Setup Utility  -  Copyright  (C)  2011 American Megatrends, Inc.
              Boot

   Boot Configuration
   Setup Prompt Timeout          1
   Bootup NumLock State          [On]

   Quiet Boot                    [Disabled]
   Fast Boot                     [Disabled]

   CSM16 Module Version          07.68

   GateA20 Active                [Upon Request]
   Option ROM Messages           [Force BIOS]
   Interrupt 19 Capture          [Enabled]
   CSM Support                   [Enabled]
                                                                 →←:   Select Screen
   Boot Option Priorities                                        ↑↓:   Select Item
   Boot Option #1                [UEFI: Built-in EFI...]         Enter: Select
   Boot Option #2                [P0: TOSHIBA MK1676...]         +/-:  Change Opt.
                                                                 F1:   General Help
   Hard Drive BBS Priorities                                     F2:   Previous Values
                                                                 F3    Optimized Defaults
                                                                 F4:   Save & Exit
                                                                 ESC:  Exit

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```

3.1 Boot Configuration

3.1.1 Setup Prompt Timeout

This integer function is used to set an additional time the POST should wait for the operator to press the key to enter SETUP. The time is entered in seconds.

SETTING	DESCRIPTION
1 ⋮ 65535	Use one of these settings to specify the setup prompt timeout.

Default setting: 2

3.1.2 Bootup NumLock State

This function is used to set the state of the keyboard’s numlock function after POST.

SETTING	DESCRIPTION
On	Use this setting to switch on the keyboard’s numlock function after POST.
Off	Use this setting to switch off the keyboard’s numlock function after POST.

Default setting: On

3.1.3 Quiet Boot

This function is used to display either POST output messages or a splash screen during boot-up.

SETTING	DESCRIPTION
Disabled	Use this setting to display POST output messages during boot-up.
Enabled	Use this setting to display a splash screen during boot-up.

Default setting: Disabled

3.1.4 Fast Boot

This function is used to enable or disable boot with initialization of a minimal set of devices required to launch active boot option..

SETTING	DESCRIPTION
Disabled	Use this setting to disable fast boot.
Enabled	Use this setting to enable fast boot.

Default setting: Disabled

3.1.5 CSM16 Module Version

This function provides display-only information concerning the CSM Module and is intended for internal use only.

3.1.6 GateA20 Active

This function is used to enable or disable GateA20.

SETTING	DESCRIPTION
Upon Request	Use this setting to disable GateA20 in the uEFI BIOS.
Always	Use this setting to prevent the system from disabling GateA20.

Default setting: Upon Request

3.1.7 Option ROM Messages

This function is used to control the messages of the loaded PCI option ROMs.

SETTING	DESCRIPTION
Force BIOS	Use this setting to force to a BIOS-compatible output. This will show the option ROM messages.
Keep Current	Use this setting to keep the current video mode. This will suppress option ROM messages. Option ROMs requiring interactive inputs may not work properly in this mode.

Default setting: Force BIOS

3.1.8 Interrupt 19 Capture

This function is used to specify if legacy PCI option ROMs are allowed to capture software interrupt 19h.

SETTING	DESCRIPTION
Disabled	Use this setting to prevent legacy PCI option ROMs from capturing software interrupt 19h.
Enabled	Use this setting to allow legacy PCI option ROMs to capture software interrupt 19h.

Default setting: Enabled

3.1.9 CSM Support

This function is used to enable or disable CSM support.

SETTING	DESCRIPTION
Disabled	Use this setting to disable CSM support.
Enabled	Use this setting to enable CSM support.

Default setting: Enabled

3.2 Boot Option Priorities

3.2.1 Boot Option #1..2

These functions are used to form the boot order and are dynamically generated. They represent either a legacy BBS (BIOS Boot Specification) class of devices or a native EFI boot entry. Press Return on each option to select the BBS class / EFI boot entry desired.

3.2.2 Hard Drive BBS Priorities

This function leads to a sub-menu that allows configuring the boot order for a specific device class. These options are only visible if at least one device for this class is present. These functions are dynamically generated.

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Chapter 4

Security Setup

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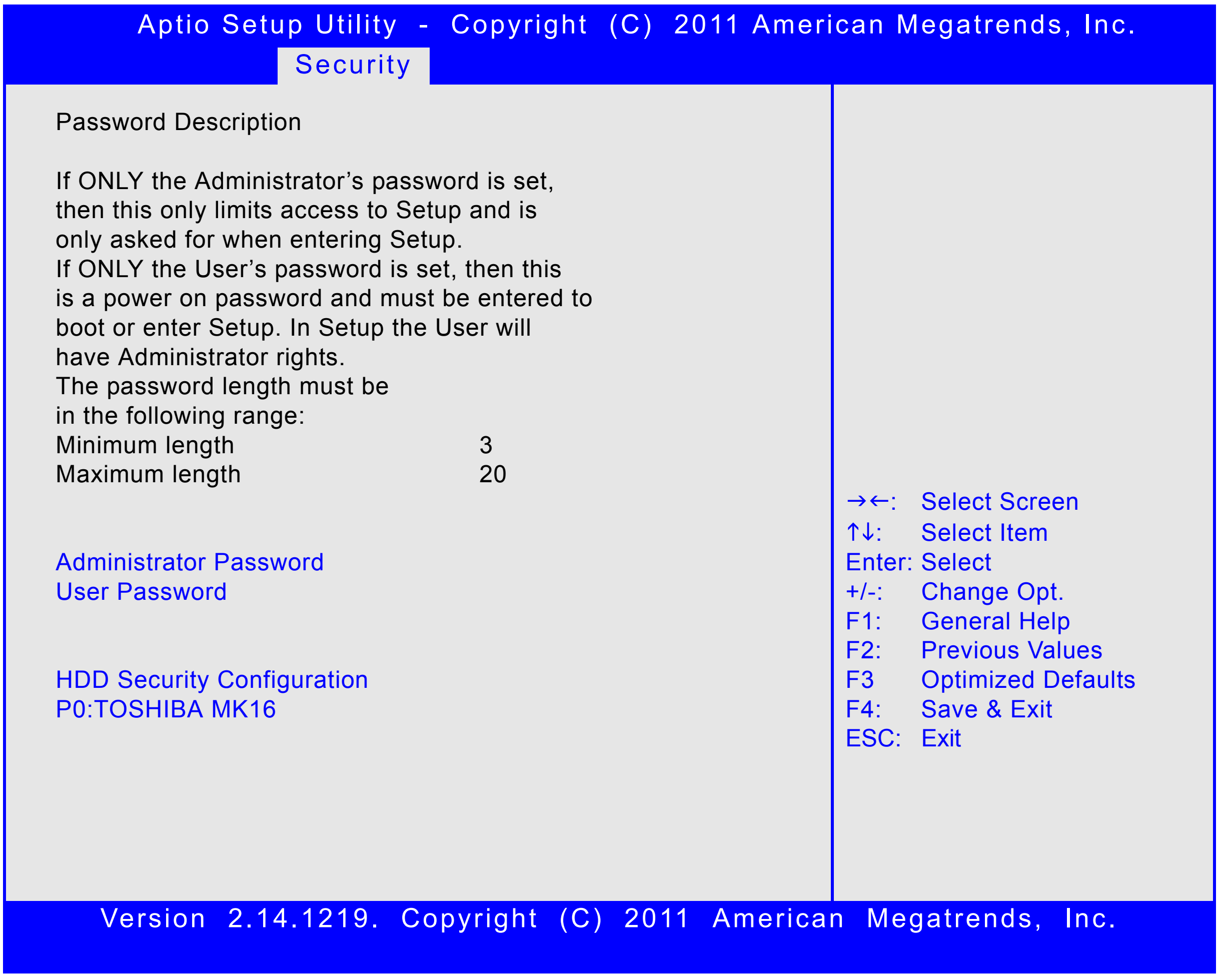
4. Security Setup

Select the Security tab to enter the Security Setup screen. This screen provides information about the passwords and functions for specifying the security settings.



Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Security

```
Password Description

If ONLY the Administrator's password is set,
then this only limits access to Setup and is
only asked for when entering Setup.
If ONLY the User's password is set, then this
is a power on password and must be entered to
boot or enter Setup. In Setup the User will
have Administrator rights.
The password length must be
in the following range:
Minimum length                  3
Maximum length                  20


Administrator Password
User Password


HDD Security Configuration
P0:TOSHIBA MK16
```

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

The following modes of security are provided:

SETTING	DESCRIPTION
No password is set	Booting the system as well as entering the Setup is unsecured.
Only Administrator password is set	Booting the system is unsecured. For entering the Setup, the Administrator password is required.
Only User password is set	The password is required for booting the system as well as for entering the Setup menu. On every startup, the user will be asked for the password.
Both User and Administrator passwords are set	Either the User or the Administrator password is required for booting the system as well as for entering the Setup menu. If the User password is entered here, limited access to the Setup is granted. Entering the Administrator password provides full access to all Setup entries.

Note: The AM4022 provides no factory-set passwords.

4.1 Administrator Password

This function is used to set, change or delete the Administrator password. If there is already a password installed, the system asks for this first. To clear a password, simply enter nothing and acknowledge by pressing Return. To set a password, enter it twice and acknowledge by pressing Return.

Note: The password is case sensitive.

4.2 User Password

This function is used to set, change or delete the User password. If there is already a password installed, the system asks for this first. To clear a password, simply enter nothing and acknowledge by pressing Return. To set a password, enter it twice and acknowledge by pressing Return.

Note: The password is case sensitive.

4.3 HDD Security Configuration

Allows access to set, modify and clear the harddisk User password. The harddisk User password must be set to enable harddisk security.

Note: The harddisk User password is case sensitive.

4.4 Remember the Password

It is highly recommended to keep a record of all passwords in a safe place. Forgotten passwords may lead to being completely locked out of the system.

If the system cannot be booted because neither the uEFI BIOS User password nor the Administrator password are known, refer to Chapter 4.1 in the AM4022 User Guide for information about clearing the uEFI BIOS settings, or contact Kontron for further assistance.

Note: The harddisk User password cannot be cleared using the above method.

Chapter 5

Save & Exit

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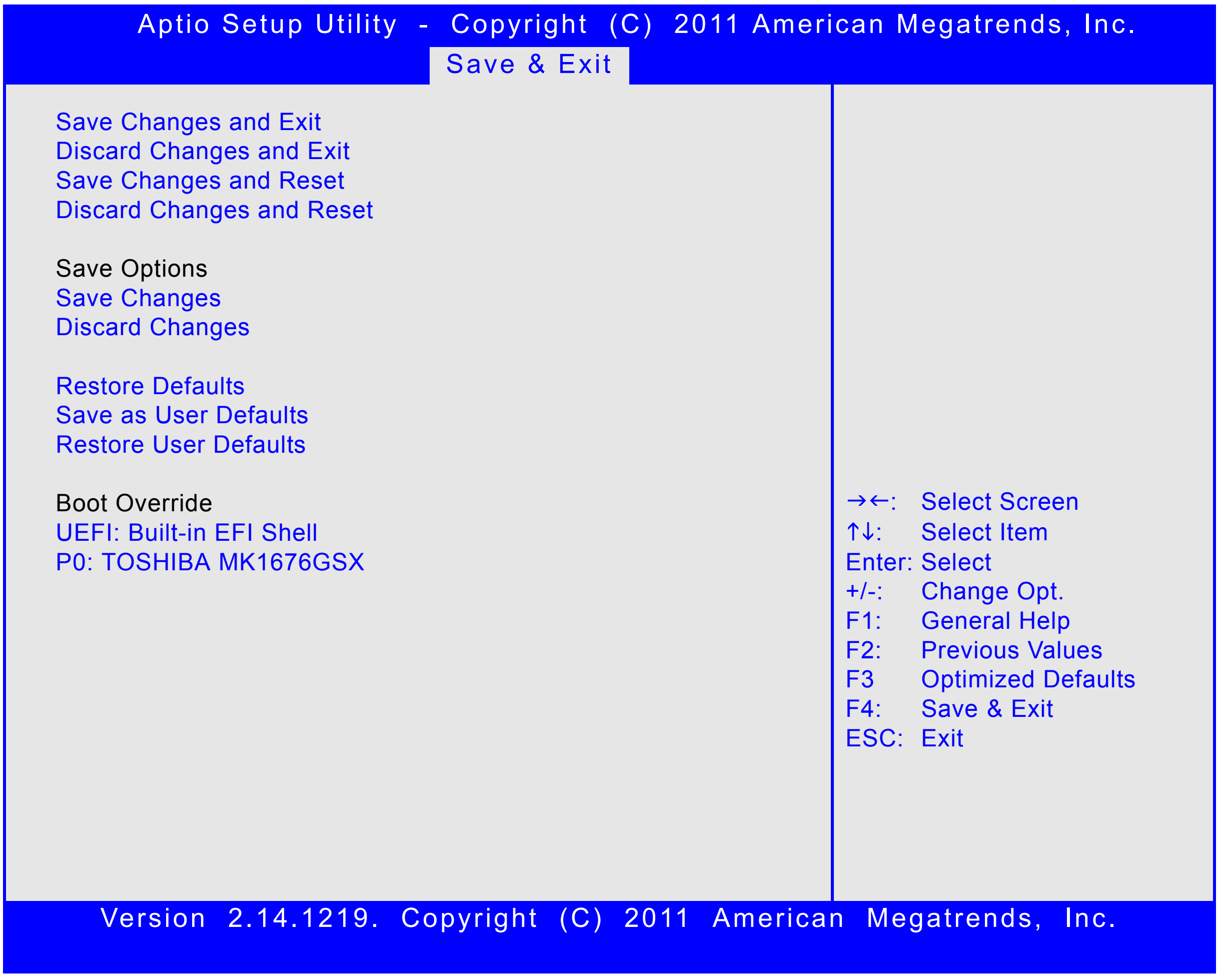
5. Save & Exit

Select the Save & Exit tab to enter the Save & Exit menu screen. This screen provides functions for handling changes made to the uEFI BIOS settings and the exiting of the Setup program.



```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                     Save & Exit

Save Changes and Exit
Discard Changes and Exit
Save Changes and Reset
Discard Changes and Reset

Save Options
Save Changes
Discard Changes

Restore Defaults
Save as User Defaults
Restore User Defaults

Boot Override                          →←:    Select Screen
UEFI: Built-in EFI Shell               ↑↓:    Select Item
P0: TOSHIBA MK1676GSX                  Enter: Select
                                       +/-:   Change Opt.
                                       F1:    General Help
                                       F2:    Previous Values
                                       F3     Optimized Defaults
                                       F4:    Save & Exit
                                       ESC:   Exit

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

5.1 Save Changes and Exit

This function is used to save all changes made within the Setup to flash. This function continues the boot process as long as no option was altered that requires a reboot.

Note: The Setup will ask for confirmation prior to executing this command.

5.2 Discard Changes and Exit

This function is used to discard all changes made within the Setup. This function continues the boot process.

Note: The Setup will ask for confirmation prior to executing this command.

5.3 Save Changes and Reset

This function is used to save all changes made within the Setup to flash. This function performs a reboot afterwards.

Note: The Setup will ask for confirmation prior to executing this command.

5.4 Discard Changes and Reset

This function is used to discard all changes made within the Setup. This function performs a reboot afterwards.

Note: The Setup will ask for confirmation prior to executing this command.

5.5 Save Changes (Save Options)

This function is used to save all changes made within the Setup to flash. This function returns to Setup.

Note: The Setup will ask for confirmation prior to executing this command.

5.6 Discard Changes (Save Options)

This function is used to discard all changes made within the Setup. This function returns to Setup.

Note: The Setup will ask for confirmation prior to executing this command.

5.7 Restore Defaults (Save Options)

This function is used to restore all tokens to factory default.

Note: The Setup will ask for confirmation prior to executing this command.

5.8 Save as User Defaults (Save Options)

This function is used to save all current settings as user default. The current setup state can later be restored using Restore User Defaults.

Note: The Setup will ask for confirmation prior to executing this command.

5.9 Restore User Defaults (Save Options)

This function is used to restore all tokens to settings previously stored by Save as User Defaults.

Note: The Setup will ask for confirmation prior to executing this command.

5.10 Boot Override

This group of functions includes a list of tokens, each of them corresponding to one device within the boot order. Select a drive to immediately boot that device regardless of the current boot order. If booting to EFI Shell this way, an exit from the shell returns to Setup.

Chapter 6

The uEFI Shell

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6. The uEFI Shell

The Kontron uEFI BIOS features a built-in and enhanced version of the uEFI Shell. For a detailed description of the available standard shell scripting refer to the EFI Shell User’s Guide. For a detailed description of the available standard shell commands, refer to the Shell Command Manual 1.0. Both documents can be downloaded from the EFI and Framework Open Source Community homepage (https://efi-shell.tianocore.org) under the “Documents and Files” section.

Please note that not all shell commands described in the Shell Command Manual 1.0 are provided by the Kontron uEFI BIOS.

6.1 Introduction, Basic Operation

The uEFI Shell forms an entry into the uEFI boot order and is the first boot option by default. It is simply started by putting the uEFI Shell first in boot and running the board as usual.

6.1.1 Shell Startup

If the shell is executed, it displays its signon message followed by a list of detected devices. The output produced by the device mapping table can vary depending on the board’s configuration.

```
EFI Shell version 2.31 [4.651]
Current running mode 1.1.2
Device mapping table
  fs0     :Removable HardDisk - Alias hd33b0b0b blk0
           Acpi(PNP0A03,0)/Pci(1D|7)/Usb(1, 0)/Usb(1, 0)/HD(Part1,Sig17731773)
  fs1     :Removable BlockDevice - Alias f33b0c0 blk1
           Acpi(PNP0A03,0)/Pci(1D|7)/Usb(1, 0)/Usb(2, 0)
  blk0    :Removable HardDisk - Alias hd33b0b0b fs0
           Acpi(PNP0A03,0)/Pci(1D|7)/Usb(1, 0)/Usb(1, 0)/HD(Part1,Sig17731773)
  blk1    :Removable BlockDevice - Alias f33b0c0 fs1
           Acpi(PNP0A03,0)/Pci(1D|7)/Usb(1, 0)/Usb(2, 0)
  blk2    :HardDisk - Alias (null)
           Acpi(PNP0A03,0)/Pci(1F|2)/Ata(Primary,Master)/HD(Part1,SigC811D18D)
  blk3    :BlockDevice - Alias (null)
           Acpi(PNP0A03,0)/Pci(1F|2)/Ata(Primary,Master)
  blk4    :Removable BlockDevice - Alias (null)
           Acpi(PNP0A03,0)/Pci(1D|7)/Usb(1, 0)/Usb(1, 0)

Press the ESC key within 5 seconds to skip startup.nsh, and any other key to
continue.
```

If the ESC key is pressed before the 5-second timeout has elapsed, the shell prompt is shown:

```
Shell>
```

6.2 Kontron-Specific uEFI Shell Commands

The Kontron uEFI implementation provides the following additional commands related to the specific HW features of the Kontron system:

- **kBiosRevision**
- **kboardconfig**
- **kboardinfo**
- **kboot**
- **kbootnsh**
- **kclearnvram**
- **kflash**
- **kipmi**
- **kmkramdisk**
- **kpassword**
- **kSettings**
- **kwdt**

The following tables provide information concerning these Kontron-specific commands. Where “RESPONSE” information is provided in “USAGE”, the value indicated in brackets is the currently selected setting. Where “SETTINGS” information is provided, the value indicated in brackets is the current setting.

6.2.1 kbiosrevision uEFI Shell Command

kbiosrevision

FUNCTION:

Get BIOS revision

SYNTAX:

```
kbiosrevision [-?|-lt|-eq|-gt] <number>
```

where:

-?	Show help
-lt	Check if current BIOS revision is less than <number>
eq	Check if current BIOS revision is equal to <number>
gt	Check if current BIOS revision is greater than <number>
<number>	(BIOS) revision number

DESCRIPTION:

The **kbiosrevision** command is used to display the current BIOS revision.

In scripting environments it can be used to perform checks against a BIOS revision number provided in the script.

USAGE:

Display current BIOS revision:

COMMAND / RESPONSE:

```
Shell> kbiosrevision
BIOS revision: 12
```

Check if current BIOS revision is equal to R12:
(used within EFI shell script)

```
kbiosrevsion -eq 12
if not %lasterror% == 0 then
   echo "NOT R12, need to update"
   goto _update
else
   "EFI R12 found"
endif
....
....
```

6.2.2 kboardconfig uEFI Shell Command

kboardconfig

FUNCTION: Configure the non-volatile board settings

SYNTAX:

```
kboardconfig -? -b -nc <option> <parameter>
```

where:

?	Used to show HELP
-b	Used to invoke page break in the display output
-nc	Used to disable color
<option>	Used to select option
<parameter>	Used to specifiy parameter for option selected

The command notation above indicates only the possible modifiers and not the command’s syntax logic.

There are eight defined variations of this command:

kboardconfig	lists options and their current status
kboardconfig -b	lists options, their current status, and invokes page breaks in the display output
kboardconfig -nc	lists options, their current status, and disables color in the display output
kboardconfig -?	provides HELP information
kboardconfig -? -b	provides HELP information and invokes page breaks in the display output
kboardconfig <option>	provides HELP for option specified and the current status of the option
kboardconfig <option> -nc	provides HELP for option specified, the current status of the option, and disables color in display output
kboardconfig <option> <parameter>	sets the <parameter> to be used with the <option> specified

DESCRIPTION: The **kboardconfig** command is used to configure non-volatile board settings. In USAGE, parameters in brackets indicate the current setting.

kboardconfig (continued)

USAGE:

Command: **kboardconfig**

Shows all options and their current parameter setting.

COMMAND / RESPONSE:

```
Shell> kboardconfig
Pxe            -> disabled
StorageOprom   -> enabled
PrimaryDisplay -> auto
SataMode       -> ahci
Sata0Speed     -> Gen3
Sata1Speed     -> Gen3
Sata2Speed     -> Gen2
Sata4Speed     -> Gen2
Sata0Hotplug   -> disabled
Sata1Hotplug   -> disabled
Sata2Hotplug   -> disabled
Sata4Hotplug   -> disabled
WrProtSata     -> disabled
WrProtEeprom   -> disabled
WrProtSpi      -> disabled
IntelVT        -> enabled
IntelHT        -> enabled
SpeedStep      -> enabled
CpuTurbo       -> enabled
C3State        -> disabled
C6State        -> disabled
C7State        -> enabled
PciCfgDelay    -> disabled
```

kboardconfig (continued)

USAGE:

Command: **kboardconfig -?**

Shows HELP information for the kboardconfig command.

COMMAND / RESPONSE:

```
Shell> kboardconfig -?
Control nonvolatile board settings

Example: kboardconfig <option> <parameter>

Show all options and their current status:
    kboardconfig

Show help:
    kboardconfig -?

Show all options and their current status with page
break:
    kboardconfig -b

Show all options and their current status without
color:
    kboardconfig -nc

Show help and status for a single option:
    kboardconfig <option>
    kboardconfig -nc <option>

Change parameter for an option:
    kboardconfig <option> <parameter>
```

USAGE:

Command: **kboardconfig <option>**

Show help and status for a single option:

COMMAND / RESPONSE:

```
Shell> kboardconfig Pxe
Pxe:
  PXE boot device
  Available parameters: [disabled], all, front_a,
front_b, amc_0, amc_1,
```

In this case “disabled” is the current setting.

kboardconfig (continued)

USAGE:

Command: **kboardconfig <option> <parameter>**

Set option “Pxe” to parameter “all”:

COMMAND / RESPONSE:

```
Shell> kboardconfig Pxe all
```

The response for “kboardconfig” with <option> and <parameter> is the display of a status line indicating the performance status of the command and one or more lines providing further information related to the command performance.

OPTIONS:

The listing below provides an overview of the possible options and a short description of their functionality.

To view all of the possible parameters for a given option, use the command “kboardconfig <option>”.

OPTION	DESCRIPTION
Pxe	Used to select a PXE boot device Parameters **front_a** and **front_b** correspond to GbE C and GbE D on the front panel
StorageOprom	Used to launch the Storage PCI OPROM When disabled it includes the onboard RAID option ROM
PrimaryDisplay	Used to select the primary display device
SataMode	Used to select the operational configuration for the SATA controller **ide**: SATA ports operate as two IDE controllers **ahci**: SATA ports operate as one 6-port AHCI controller **raid**: SATA ports form a RAID device Note: For this command to take effect, the system must be re-booted. During the bootup, it is possible to select a menu to specify the desired RAID configuration. Entry to this menu is achieved by pressing “Ctrl + I” when requested during the bootup.

kboardconfig (continued)

OPTIONS:	**Sata0Speed**	Indicates maximum speed supported by SATA port 0 (AMC port 2)
	Sata1Speed	Indicates maximum speed supported by SATA port 1 (AMC port 3)
	Sata2Speed	Indicates maximum speed supported by SATA port 2 (I/O extension)
	Sata4Speed	Indicates maximum speed supported by SATA port 4 (AMC port 12) Available parameters for above SATA options: Gen1 (SATA 1.5 Gb/s), Gen2 (SATA 3.0 Gb/s), Gen3 (SATA 6.0 Gb/s)
	Sata0Hotplug:	Enable hotplug for SATA port 0 (AMC port 2)
	Sata1Hotplug:	Enable hotplug for SATA port 1 (AMC port 3)
	Sata2Hotplug:	Enable hotplug for SATA port 2 (I/O extension)
	Sata4Hotplug:	Enable hotplug for SATA port 4 (AMC port 12)
	WrProtSata:	Used to select onboard SATA flash write protection If enabled, the onboard SATA flash is write-protected after POST. OS needs to be prepared to work with write-protected flash. For further information, refer to the operating system’s documentation. WARNING: CONTACT KONTRON BEFORE USING THIS FUNCTION!!!
	WrProtEeprom:	Used to select onboard system EEPROM write protection If enabled, the system EEPROM is write-protected after POST.
	WrProtSpi	Used to select onboard SPI boot flash write protection If enabled, both of the onboard SPI boot flashes are write-protected after POST.

kboardconfig (continued)

OPTIONS:	**IntelVT**	Used to enable Intel® VT-x Virtualization Technology
	IntelHT	Used to enable Intel® Hyper-Threading Technology
	SpeedStep	Used to enable Intel® SpeedStep®
	CpuTurbo	Used to enable CPU turbo mode
	C3State	Used to enable CPU C3-State report to OS
	C6State	Used to enable CPU C6-State report to OS
	C7State	Used to enable CPU C7-State report to OS
	PciCfgDelay	Used to Set delay for PCI config cycle

6.2.3 kboardinfo uEFI Shell Command

kboardinfo

FUNCTION: Show board identification data

SYNTAX: `kboardinfo`

DESCRIPTION: The **kboardinfo** command shows a summary of board-specific identification data. It is especially useful for support queries because it contains this data in a concentrated form.

USAGE: Show board identification data

COMMAND / RESPONSE:

```
Shell> kboardinfo
KOMaOEMF rev.:          4
Board ID:               0xB3F0
Hardware rev.:          0x0
Logic rev.:             0x0D
Boot flash:             Standard SPI Boot flash
Geographic address:     1
Material number:        1234-5678
Hardware index:         10
Serial number:          1234567001
EFI article name:       SK-EFI-B3F01
EFI material number:    1051-8483
EFI index:              12, standard
EFI build time:         08:39:15
EFI build date:         07/27/2012
CPU rev.:               0x8
Chipset rev.:           0x4
Microcode:              0x10
CPU ID:                 0x306A8
CPU Branding:           Intel(R) Core(TM) i7-3612QE CPU
                        @ 2.10 GHz
ME firmware rev.:       8.0.10.1464
VBIOS rev.:             2137
```

kboardinfo (continued)

USAGE: (continued)		
	KOMaOEMF rev.:	Revision of KOMaOEMF protocol
	Board ID:	Kontron board identification value (should be 0xB3F0 for the AM4022)
	Hardware rev.:	Hardware revision of this board
	Logic rev.:	Logic revision of this board
	Boot flash:	Current boot flash: either “Standard” or “Recovery”
	Geographic Address:	Geographic address of the MicroTCA backplane slot the board is currently plugged into
	Material number:	Kontron hardware reference number
	Hardware index:	Kontron hardware index
	Serial number:	This board’s unique serial number
	EFI article name:	Kontron uEFI reference name
	EFI material number:	Kontron uEFI reference number
	EFI index:	Version of this uEFI BIOS
	EFI build time:	Build time of this uEFI BIOS
	EFI build date:	Build date of this uEFI BIOS
	CPU rev.:	Chip revision of the die of the Intel® Core™ i7 processor)
	Chipset rev.:	Chip revision of the PCH
	Microcode:	Currently loaded microcode
	CPU ID:	CPUID
	CPU Branding:	CPU identification string
	ME firmware rev:	Revision of the Intel® ME Firmware
	VBIOS rev:	Revision of the Intel® Video BIOS

6.2.4 kboot uEFI Shell Command

kboot

FUNCTION:

Boot a legacy OS
Not to be used for uEFI BootLoaders!

SYNTAX:

```
kboot [-?|-d|-p|-p <path>|-n <name>|-t <type>]
```

where:

?	Show online help
-d	Boot default order
-p <path>	Specify the path to the device to boot from
-n <name>	Specify the device name to boot from
-t <type>	Specify the device type to boot from

Available types are:
floppy
harddrive
cdrom
network
usb-floppy
usb-harddrive
usb-cdrom

DESCRIPTION:

The **kboot** command boots a legacy OS. If the requested device is not present, boot returns to shell. The **kboot** command cannot boot native uEFI-aware operating systems. But since these are bootable from shell by calling their bootloader, this is not necessary either. If a requested device is present but not bootable, uEFI continues to boot with the next bootable device in the boot order.

USAGE:

Show all connected devices:

COMMAND / RESPONSE:

```
fs0:\> kboot
____BBS_TABLE____
00002 network "IBA GE Slot 0100 v1300"
00003 network "IBA GE Slot 0101 v1300"
00004 network "IBA GE Slot 0200 v1300"
00005 network "IBA GE Slot 0201 v1300"
00002 usb-harddrive "SanDisk uSSD 5000 0.1"
Device path: Acpi(PNP0A03,0)/Pci(1A|7)/Usb(1,0)
0001 usb-harddrive "KingstonDataTraveler 2.04.10"
Device path: Acpi(PNP0A03,0)/Pci(1D|7)/Usb(1,0)
```

Boot from device containing the string “Kingston”:

```
fs0:\> kboot -n Kingston
```

Boot from the first device found that is of type floppy:

```
fs0:\> kboot -t floppy
```

6.2.5 kbootnsh uEFI Shell Command

kbootnsh

FUNCTION:	Manage the startup script stored in the flash
SYNTAX:	`kbootnsh [-b][-?│-g <filename>│-p <filename>│-d]` where: -b Display output page by page -? Show online help -g <filename> Store the current boot script to disk. If there is no physical disk drive present, the **kmkramdisk** command may be used. -p <filename> Store the shell script pointed to by filename to flash. Note: The shell script cannot be larger then 400 bytes. -d Delete the current startup script from flash.
DESCRIPTION:	The **kbootnsh** command manages the flash stored startup script. If the shell is launched by the boot process, it executes a shell script stored in the flash. If the shell script terminates, the shell executes a **kboot -d** command to continue the boot process. However, the shell script can of course contain any other boot command.
USAGE:	Get current startup script to file named boot.nsh COMMAND / RESPONSE: `Shell> kbootnsh -g boot.nsh`
	Store file named boot.nsh to flash: COMMAND / RESPONSE: `Shell> kbootnsh -p boot.nsh`
	Delete startup script: COMMAND / RESPONSE: `Shell> kbootnsh -d`

6.2.6 kclearnvram uEFI Shell Command

kclearnvram

FUNCTION:	Clear the NVRAM to restore the system's default settings
SYNTAX:	`kclearnvram [-q]` where: -q Silent mode operation (for use of this command in shell scripts)
DESCRIPTION:	Invoking the **kclearnvram** command clears the system NVRAM. Since all EFI settings are stored inside the NVRAM, the default settings are loaded afterwards. When invoked without the "-q" option, this command must be confirmed by pressing "c". If invoked with the "-q" option, no confirmation is requested.

6.2.7 kflash uEFI Shell Command

kflash

FUNCTION:	Manage uEFI BIOS update
SYNTAX:	`kflash [-p [<file>]|-i|-v|-s|-c|-h|-?] [-q] [-f] [-r] [<file>]` where: -p Program flash -i Show information string and check CRC -v Verify flashed image -s Save current ROM image to file -c Clone flash content to second flash -h Show this help -? Show online help <file> uEFI BIOS binary file -f Force write -q Silent mode, no user interaction required (for use of this command in shell scripts) -r Raw image mode (.bin, .rom) (expert function, not recommended for standard usage)
DESCRIPTION:	The **kflash** command is used to program and verify the flash banks holding the uEFI BIOS code. uEFI BIOS binary files must be available from connected mass storage devices, such as USB flash drive or harddisk.
USAGE:	Get help: COMMAND / RESPONSE: `Shell> kflash -?`
	Get help: COMMAND / RESPONSE: `Shell> kflash -h`
	Program the uEFI BIOS into the standard SPI boot flash: COMMAND / RESPONSE: `Shell> kflash -p BIOS_file.kfl` **Note:** This function will select and update the standard SPI boot flash regardless of the DIP switch setting for boot flash selection.

kflash (continued)

USAGE: Copy the currently running uEFI BIOS into the inactive SPI boot flash:

COMMAND / RESPONSE:

```
Shell> kflash -c
```

Note: Using this function will overwrite the inactive SPI boot flash.

Failures during the process will make the inactive SPI boot flash invalid. In such cases, it will be necessary to execute the function again until the process completes successfully.

6.2.8 kipmi uEFI Shell Command

kipmi

FUNCTION:	Read or configure available MMC parameters from the uEFI shell	
SYNTAX:	`kipmi [-?] [-b] [<option>[ <parameter>]]`	
	where:	
	-?	show online help (for kipmi or kipmi + option)
	-b	display output page by page
		OPTIONS
	fru	display fru data
	info	show information about the device and firmware
	ipmb	ipmb bus settings
	irq	get / set KCS IRQ
	mode	set ipmi controller mode (do not use, the AM4022 supports only “smc”)
	net	display and change SOL network settings
	sel	handle system event log (do not use, the AM4022 does not support a system event log)
	sensor	shows sensor related information
	raw	execute raw ipmi command
	rawsendmessage	execute rawSendMessage ipmi cmd
		PARAMETERS
		Most of the above options have their own unique set of parameters. Use the online help (“-?”) for more information concerning the available parameters.
DESCRIPTION:	The **kipmi** command provides the capability to execute a comprehensive set of ipmi functions from the uEFI shell using the KCS interface.	
USAGE:	Display fru data: COMMAND / RESPONSE: `Shell> kipmi fru 0` “kipmi fru” alone returns parameter info or status	
	Display ipmb bus settings: COMMAND / RESPONSE: `Shell> kipmi ipmb` “kipmi ipmb” alone returns help on available parameters	

kipmi (continued)

USAGE:	Change IRQ configuration: COMMAND / RESPONSE: `Shell> kipmi irq 11`
	Show IRQ configuration: COMMAND / RESPONSE: `Shell> kipmi irq`
	Set Serial-over-LAN I/O/SOL parameters: COMMAND / RESPONSE: `Shell> kipmi net 1` “kipmi net” alone returns error message "invalid channel number"
	Show sensor related information: COMMAND / RESPONSE: `Shell> kipmi sensor list` “kipmi sensor” alone returns error message and help on available parameters
	Execute raw ipmi command. Example: Get self-test results. COMMAND / RESPONSE: `Shell> kipmi raw 0x06 0x00 0x04`
	Execute raw SendMessage command: COMMAND / RESPONSE: `Shell> kipmi rawsendmessage 0x20 0x00 0x06 0x00 0x01` “kipmi rawsendmessage” alone returns error message and help on available parameters

kipmi (continued)

OPTIONS:

The listing below provides an overview of the possible options and a short description of their functionality.

To view all of the possible parameters for a given option, use the command “kipmi -? <option>”.

OPTION	DESCRIPTION
`fru`	Used to display FRU data for the specified fru device Numeric FRU device ID. The FRU ID 0 is used by default if no FRU ID is entered.
`info`	Used to display IPMI firmware information
`ipmb`	Displays IPMB bus settings The redundant mode is not available on the AM4022. Please leave this function at single mode.
`irq`	Used to display or set the IRQ number of the KCS interface The board must be reset for the settings to be applied.
`mode`	Used to display or set the IPMI controller (MMC) operating mode The BMC mode is not available on the AM4022. If the parameter “bmc” is used, it is ignored.
`net`	Used to set IPMI-over-LAN (IOL) or Serial-over-LAN (SOL) parameters
`sel`	Display the system event log The AM4022 does not have a system event log.
`sensor`	Used to display all available board sensors or display a specific sensor’s data
`raw`	Used to issue a raw IPMI command from the uEFI shell to the onboard IPMI controller (MMC)
`rawsendmessage`	Used to issue a raw IPMI command from the uEFI shell to another device on the IPMB-L bus This command makes it possible for the AM4022 to communicate with other devices in the system using the IPMB-L bus.
`info`	Used to display IPMI firmware information

6.2.9 kmkramdisk uEFI Shell Command

kmkramdisk

FUNCTION: Create RAMdisk drives

SYNTAX:

```
kmkramdisk [-?|-s <size> <name>]
```

where:

-? show help

-s <size> <name> create a RAMdisk of given size in Megabytes with the mount point name <name>

DESCRIPTION: Creates a RAMdisk of variable size. Can be very useful to perform file operations when no real filesystem is connected to the system.

Note: The RAMdisk loses its mount point name after all drives are remapped by the **map -r** command. The RAMdisk will then be enumerated as any other connected drive and gain a mount point name like “fs0”. This is not a bug of the **kmkramdisk** command but a normal function of the uEFI framework.

USAGE: Create RAMdisk:

COMMAND / RESPONSE:

```
rd:\> kmkramdisk -s 5 myramdisk
Device mapping table
  myramdisk :BlockDevice - Alias (null)
      VenMsg’(93B5F448-127A-4B29-B306-
          5BE8AAC4826E)
Success - Force file system to mount
rd:\> myramdisk:
myramdisk:\> echo testfile > testfile
myramdisk:\> ls
Directory of: myramdisk:\

 05/24/08 04:39a      22 testfile
    1 File(s)         22 bytes
    0 Dir(s)
```

6.2.10 kpassword uEFI Shell Command

kpassword

FUNCTION:	Control EFI setup and shell passwords

SYNTAX:	`kpassword [[-u [-n <password>] [-o <password>]]│`
	`[-s [-n <password>] [-o <password>]]]`
	where:
	-u Install or change user password
	-s Install or change superuser password
	Additional options for automated scripting
	-n <password> New password to be set
	-o <password> Password to be overwritten if one is already set
	When used without option “-n” the password is cleared

DESCRIPTION:	The **kpassword** command is used to determine the status of both passwords (set or not set) and to set or clear the EFI shell and setup passwords. Both user and superuser (Administrator) passwords can be controlled with this command. Call without options to get current password status If a password has been previously entered, it must be re-entered to validate the command (-o <*old-password*>). Entering an empty password clears the password.

USAGE:	Set User password for EFI setup and shell
	COMMAND / RESPONSE:
	`kpassword -u`
	`No password is installed!`
	`Enter new USER password`
	`-->`
	`Retype password`
	`-->`
	`Done.`

6.2.11 ksettings uEFI Shell Command

ksettings

FUNCTION:	Verify the validity of the setup settings
SYNTAX:	`kSettings [-?|-s|-c] [<file>]` where: -? show help -s Save current setup settings to “file” -c Compare current setup settings to “file” <file> “file” to be used for saving or comparison
DESCRIPTION:	The **ksettings** command is used to create a binary file of the current setup settings. This file can later be used to check whether the settings have changed or not. To use this command a device with a FAT file system is required to be connected.

USAGE:	Save current setup settings
	(assumes that FAT file system is mapped to fs0:)
	COMMAND / RESPONSE
	`fs0:\> ksettings -s companyDefaults.bin`
	`Reading flash content... done`
	`Saving setup settings to file... done`

	Check whether current setup settings differ from “file”
	COMMAND / RESPONSE
	`fs0:\> ksettings -c companyDefaults.bin`
	`Reading flash content... done`
	`Setup settings and file match`

6.2.12 kwdt uEFI Shell Command

kwdt

FUNCTION: Configure the Kontron onboard Watchdog

SYNTAX:

```
kwdt [-?|-t <timeindex>]
```

where:

-?	Show help
-t <timeindex>	Configure the Watchdog with the time related to timeindex and activate it with reset routing Call kwdt -h to obtain a list of time index values and related times

DESCRIPTION: The **kwdt** command allows to enable the Kontron onboard Watchdog with reset target before OS boot. This can be used to detect if the OS fails to boot and react by reset. The OS Watchdog driver is required for this functionality to operate.

USAGE: Get help:

COMMAND / RESPONSE:

```
Shell> kwdt -?
-t [time]    - set Timer
value 0    =  125ms
value 1    =  250ms
value 2    =  500ms
value 3    =  1s
value 4    =  2s
value 5    =  4s
value 6    =  8s
value 7    =  16s
value 8    =  32s
value 9    =  64s
value 10   =  128s
value 11   =  256s
value 12   =  512s
value 13   =  1024s
value 14   =  2048s
value 15   =  4096s
```

kwdt (continued)

Set Watchdog to 16 seconds and activate it

COMMAND / RESPONSE (none):

```
Shell> kwdt -t 7
```

Note: Because there is no application which triggers the Watchdog, the system will be reset after 16 seconds in this case. This command should be invoked from a script, followed by an operating system boot, and the OS then has to start triggering the Watchdog.

Display Watchdog configuration:

COMMAND / RESPONSE:

```
Shell> kwdt
Kontron Board Watchdog Configuration:
Watchdog Configuration Register (0x28C):   0x00
```

6.3 uEFI Shell Scripting

6.3.1 Startup Scripting

If the ESC key is not pressed and the timeout is run out, the uEFI Shell tries to execute some startup scripts automatically. It searches for scripts and executes them in the following order:

1. Kontron flash-stored startup script
2. If there is no Kontron flash-stored startup script present, the uEFI-specified `startup.nsh` script is used. This script must be located on any of the attached FAT formatted disk drives under `\efi\boot\startup.nsh.`
3. If none of the startup scripts is present or the startup script terminates, the default boot order is continued.

6.3.2 Create a Startup Script

Startup scripts can be created using the uEFI Shell built-in editor **edit** or under any OS with a plain text editor of your choice. To create a startup shell script, simply save the script on any FAT-formatted drive attached to the system under the file name `\efi\boot\startup.nsh.` To copy the startup script to the flash use the **kbootnsh** uEFI Shell command.

In case there is no mass storage device attached, the startup script can be generated in a RAM disk and stored in the flash bank.

6.3.3 Examples of Startup Scripts

6.3.3.1 Automatic Booting from USB Flash Drive

Automatic booting is made from a USB flash drive, if present, otherwise the boot is made from the harddrive.

```
kboot -t usb-harddrive

kboot -t harddrive
```

If neither a USB flash drive nor a harddrive is present, the boot order is continued.

6.3.3.2 Execute Shell Script on Other Harddrive

This example executes the shell script named `bootme.nsh` located in the root of the first detected disc drive (`fs0`).

```
fs0:

bootme.nsh
```

6.3.3.3 Enable Watchdog and Control PXE Boot

The uEFI Shell provides environment variables used to control the execution flow.

The following sample start-up script shows two uEFI Shell environment variables, **`wdt_enable`** and **`pxe_first`**, used to control the boot process and the Watchdog.

```
echo -off
echo “Executing sample startup.nsh...”
if %wdt_enable% == “on” then
   kwdt -t 15
   echo “Watchdog enabled”
endif
if %pxe_first% == “on” then
   echo “forced booting from network”
   kboot -t network
endif
```

To create uEFI Shell environment variables, use the **set** uEFI Shell command as shown below:

```
Shell> set wdt_enable on
Shell> set pxe_first on
Shell> set
   pxe_first : on
   wdt_enable : on
Shell> reset
```

6.3.3.4 Handling the Startup Script in the Flash Bank

In case there is no mass storage device attached, the startup script can be generated in a RAM disk and stored in the flash bank using the following instructions:

1. Press <ESC> during power-up to log into the uEFI Shell.
2. Create a RAM disk and set the proper working directory as shown below:

   ```
   Shell> kmkramdisk -s 3 myramdisk
   Shell> myramdisk:
   ```

3. Enter the sample start-up script mentioned above in this section using the **edit** uEFI Shell command.

   ```
   myramdisk:\> edit boot.nsh
   ```

4. Save the start-up script to the uEFI flash bank using the **kbootnsh** uEFI Shell command.

   ```
   myramdisk:\> kbootnsh -p boot.nsh
   ```

5. Reset the board to execute the newly installed script using the **reset** uEFI Shell command.

   ```
   myramdisk:\> reset
   ```

6. If a script is already installed, it can be edited using the following **kbootnsh** uEFI Shell commands.

   ```
   myramdisk:\> kbootnsh -g boot.nsh
   myramdisk:\> edit boot.nsh
   ```

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Chapter 7

Updating the uEFI BIOS

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7. Updating the uEFI BIOS

BIOS updates are typically delivered as an Update CD ISO image. This ISO image needs just to be burned to a CD and booted. Follow the menu for updating the uEFI BIOS.

7.1 uEFI BIOS Fail-Over Mechanism

The AM4022 has two SPI boot flashes programmed with the uEFI BIOS, a standard SPI boot flash and a recovery SPI boot flash. The basic idea behind that is to always have at least one working uEFI BIOS flash available regardless if there have been any flashing errors or not.

7.2 Updating Procedure

An Update CD ISO image is provided for flashing the latest uEFI BIOS on the standard SPI boot flash. The standard SPI boot flash can also be programmed with the latest uEFI BIOS via the **kflash -p** uEFI Shell command.

Note: To have the same content in both SPI boot flashes, clone the standard SPI boot flash to the recovery SPI boot flash. For further information, please refer to Chapter 6.2.7, kflash uEFI Shell Command.

7.3 uEFI BIOS Recovery

In case of the standard SPI boot flash being corrupted and therefore the board not starting up, the IPMI controller boots the board from the recovery SPI boot flash if the DIP switch SW3, switch 2 is set to OFF.

For further information about the boot configuration, refer to the respective chapters in the board's user guide or contact Kontron for further assistance. Information about the boot configuration for the AM4022 is provided in the AM4022 User Guide, Chapter 4.1.

7.4 Determining the Active Flash

Sometimes it may be necessary to check which flash is active. On the AMI Aptio-based uEFI BIOS, the information is available using the **kboardinfo** uEFI Shell command. For further information, refer to Chapter 6.2.3, kboardinfo uEFI Shell Command.

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