V2101
Hardware User's Manual

www.moxa.com/product

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Introduction

The V2101 embedded computers are based on the Intel Atom Z510PT x86 processor, and feature 2 serial ports, dual Gigabit LAN ports, 4 USB 2.0 hosts, and an SD socket. The V2101 Series offers both VGA and LVDS outputs, making it particularly well-suited for industrial applications, such as SCADA and factory automation.

The V2101 computers' 2 serial ports make them ideal for connecting a wide range of serial devices, and the dual 10/100/1000 Mbps Ethernet ports offer a reliable solution for network redundancy, promising continuous operation for data communication and management. As an added convenience, the V2101 computers have 3 DIs and 3 DOs for connecting digital input/output devices. In addition, the SD and USB sockets provide the V2101 computers with the reliability needed for industrial applications that require data buffering and storage expansion.

Pre-installed with Linux, Windows CE 6.0, or Windows Embedded Standard 2009, the V2101 Series provides programmers with a friendly environment for developing sophisticated, bug-free application software at a lower cost.

In this chapter, we cover the following topics:

❑ **Overview**
❑ **Package Checklist**
❑ **Product Features**
❑ **V2101 Hardware Specifications**
❑ **Hardware Block Diagram**

Overview

The V2101 embedded computers are based on the Intel Atom Z510PT x86 processor, and feature 2 serial ports, dual Gigabit LAN ports, 4 USB 2.0 hosts, and an SD socket. The V2101 Series offers both VGA and LVDS outputs, making it particularly well-suited for industrial applications, such as SCADA and factory automation.

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Pre-installed with Linux, Windows CE 6.0, or Windows Embedded Standard 2009, the V2101 Series provides programmers with a friendly environment for developing sophisticated, bug-free application software at a lower cost.

Wide temperature models that operate reliably in temperatures ranging from -40 to 85°C are also available. This is particularly convenient for industrial applications in extremely cold or hot environments and helps establish a stable architecture for a variety of industrial tasks.

Package Checklist

The V2101 Series includes the following models:

V2101-T-CE:
x86 ready-to-run embedded computer with Intel Atom Z510PT, VGA, LVDS, audio, 2 LANs, 2 serial ports, 3 DIs, 3 DOs, 4 USB 2.0 ports, SD, WinCE 6.0, -40 to 85°C operating temperature.

V2101-T-XPE:
x86 ready-to-run embedded computer with Intel Atom Z510PT, VGA, LVDS, audio, 2 LANs, 2 serial ports, 3 DIs, 3 DOs, 4 USB 2.0 ports, SD, Win XPe SP3, -40 to 85°C operating temperature.

V2101-T-LX:
x86 ready-to-run embedded computer with Intel Atom Z510PT, VGA, LVDS, audio, 2 LANs, 2 serial ports, 3 DIs, 3 DOs, 4 USB 2.0 ports, SD, Linux 2.6, -40 to 85°C operating temperature.

Each model is shipped with the following items:

- V2101 Embedded Computer
- Terminal Block to Power Jack Converter
- DIN-Rail Mounting Kit
- Wall Mounting Kit
- Quick Installation Guide
- Document & Software CD or DVD
- Product Warranty Statement (printed)

NOTE: Please notify your sales representative if any of the above items are missing or damaged.

Product Features

V2101 series embedded computers have the following features:

- Intel Atom Z510PT 1.1 GHz processor, 400 MHz FSB
- DDR2 SODIMM socket, supporting DDR2 400 up to 2 GB
- Dual independent displays (VGA + LVDS)
- 2 Gigabit Ethernet ports
- 4 USB 2.0 ports for high speed peripherals
- 3 DIs and 3 DOs
- 2 RS-232/422/485 ports
- CompactFlash socket for storing OS
- 4 USB 2.0 hosts supporting system boot up
- Ready-to-run Embedded Linux, Windows CE 6.0, or Windows XPe platform
- -40 to 85°C wide operating temperature models for harsh environments

V2101 Hardware Specifications

Computer	
CPU	Intel Atom Z510PT 1.1 GHz processor
OS (pre-installed)	Linux, Windows CE 6.0, or Windows XPe
DRAM	1 x 200-pin DDR2 SODIMM socket supporting DDR2 400 up to 2 GB (1 GB built in)
BIOS	8 Mbit Flash BIOS, ACPI function supported (XPE model only)
System Chipset	Intel US15WPT
FSB	400 MHz
USB	4 USB 2.0 compliant hosts with type A connector, supports system boot up
Storage	
Built-in	2 GB CompactFlash to store OS (This CompactFlash card is used to store OS; if you need additional storage capacity, we suggest you use the SD card for storage expansion.)
Storage Expansion	SD socket for SD card expansion
Display	
Graphics Controller	Intel Graphics Media Accelerator 500 Graphics. A hardware accelerator for 2D and 3D graphics
Video	The Poulsbo XL SCH supports full hardware acceleration of video decode standards such as H.264, MPEG2, MPEG4, and WMV9.
SDVO	Chrontel CH7317 CRT (1280 x 1024 @85Hz)
CRT Interface	VGA output (DB15 female connector)
LVDS Interface	Up to 24-bit single channel LVDS (1366 x 768 @85Hz)
Ethernet Interface	
LAN	2 auto-sensing 10/100/1000 Mbps ports (RJ45)
Magnetic Isolation	1.5 K built-in

Protection	
Serial Interface	
Serial Standards	2 RS-232/422/485 ports, software selectable (DB9 male)
Serial Communication Parameters	
Data Bits	5, 6, 7, 8
Stop Bits	1, 1.5, 2
Parity	Non, Even, Odd, Space, Mark
Serial Signals	
RS-232	TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422	TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w	TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w	Data+, Data-, GND
Digital Input	
Input Channels	3, source type
Input Voltage	0 to 30 VDC
Digital Input Levels for Dry Contacts	Logic level 0: Close to GND Logic level 1: Open
Digital Input Levels for Wet Contacts	Logic level 0: +3V max. Logic level 1: +10V to +30V (COM to DI)
Digital Output	
Output Channels	3, sink type
Output Current	Max. 200 mA per channel
On-state Voltage	24 VDC nominal, open collector to 30 V
LEDs	
System	Power, Storage
LAN 1 & 2	Act/Link 10/100/1000 Mode (on connectors)
Serial	Tx, Rx
Switches and Buttons	
Switch	Power on/off x 1 (side)
Reset Button	Reset button for system warm reboot x 1 (front side)
Physical Characteristics	
Housing	Aluminum
Weight	940 g
Dimensions	Without ears: 150 x 48.7 x 125.2 mm (5.91 x 1.92 x 4.93 in) With ears: 178 x 51.7 x 125.2 mm (7.01 x 2.04 x 4.93 in)
Mounting	DIN-Rail, Wall, VESA (75 x 75 mm) compliance
Environmental Limits	
Operating Temperature	-40 to 85°C (-40 to 185°F)
Operating Humidity	5 to 95% non-condensing
Storage Temperature	-40 to 85°C, 5 to 95% RH
Anti-vibration	2 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis
Anti-shock	20 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements	
Input Voltage	9-36 VDC (3-pin terminal block for V+, V-, SG)
Power Consumption (without connecting the LVDS panel)	With no load on 4 USB ports: • 1.88 A @ 9 VDC, 17 W • 583 mA @ 24 VDC 14 W • 422 mA @ 36 VDC 15 W With full load on 4 USB ports: • 3 A @ 9 VDC 27 W • 1 A @ 24 VDC 24 W • 700 mA @ 36 VDC 25.2 W
Regulatory Approvals	
EMC	CE (EN 55022 Class A, EN 61000-3-2 Class D, EN 61000-3-3, EN 55024), FCC (Part 15 Subpart B: 2008 CISPR 22 Class A, ANSI C63.4)
Safety	UL, LVD, CCC
Green Product	RoHS, CRoHS, WEEE
Reliability	
Automatic Reboot Trigger	Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable
Warranty	
Warranty Period	3 years
	Details: See www.moxa.com/warranty

Note: The Hardware Specifications apply to the embedded computer unit itself, but not to the accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

Hardware Block Diagram
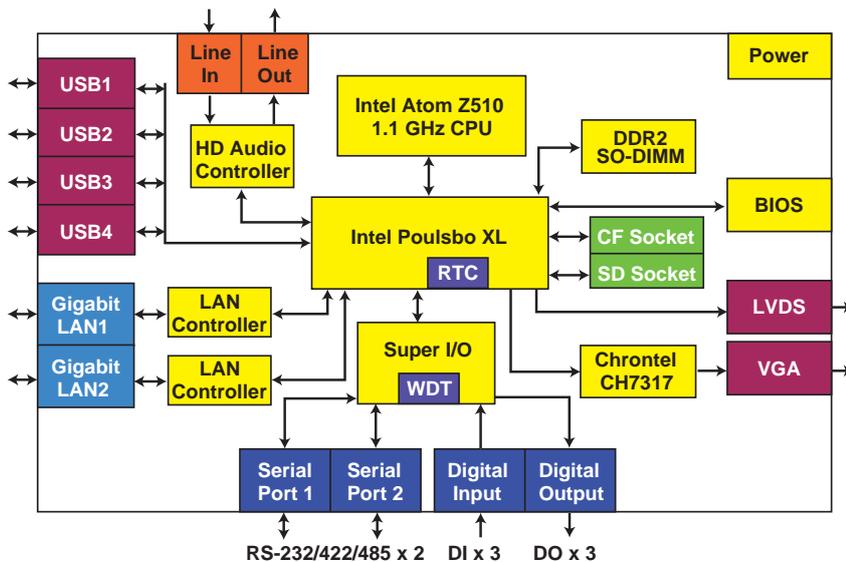
2

Hardware Introduction

The V2101 series embedded computers are compact, well-designed, and built rugged enough for industrial applications. LED indicators help you monitor performance and identify trouble spots, multiple serial ports allow you to connect different devices for wireless operation, and the reliable and stable hardware platform lets you devote your attention to developing your applications.

In this chapter, we cover the following topics:

❑ **Appearance**
❑ **Dimensions**
❑ **LED Indicators**
❑ **Reset Button**
❑ **Real Time Clock**

Appearance

V2101

Front View

Reset Button

LED Indicators (Tx, Rx)

MOXA

SD Socket — USB 2.0 Host x 1 — LED Indicators (Power/Storage)

Rear View

Audio Input

DI x 3/DO x 3 Channels

USB 2.0 Host x 3

10/100/1000 Mbps Ethernet x 2

Audio Output   VGA Output   RS-232/422/485 Serial Port x 2

Side View

LVDS Output

Power Input

Power Button
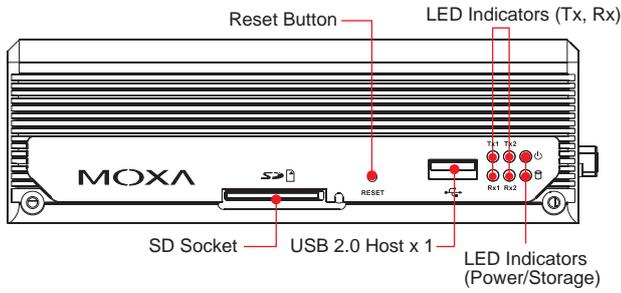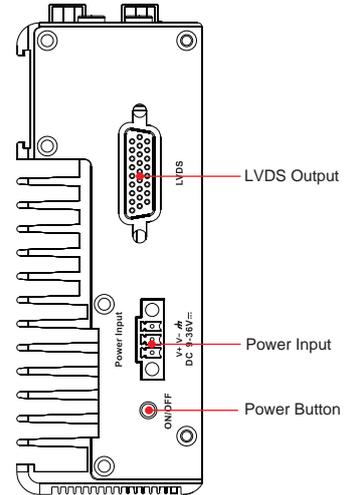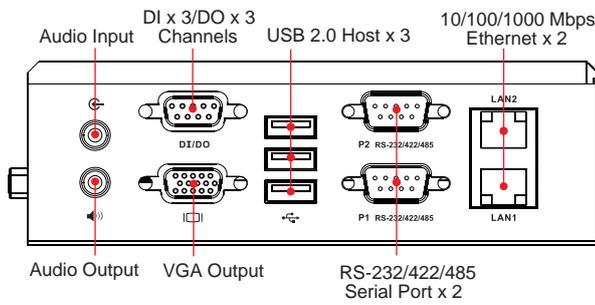
Dimensions

V2101
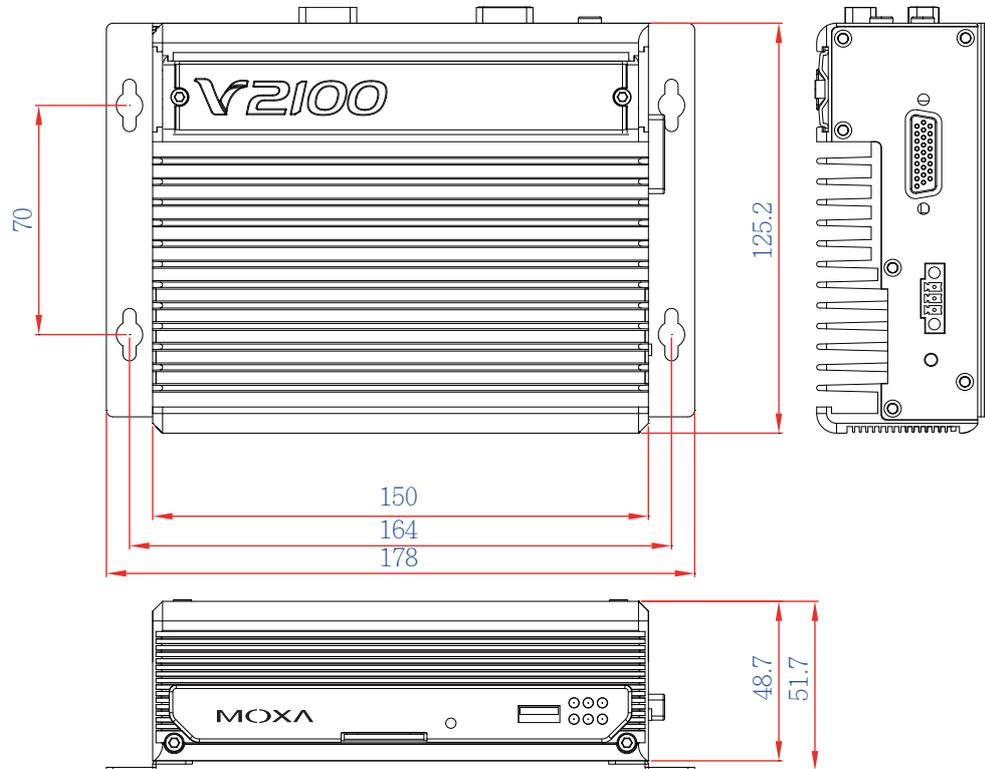
LED Indicators

LED Name	LED Color	LED Function
Power	Green	Power is on and functioning normally
	Off	Power is off or a power error exists
Storage	Yellow	SD card is detected
	Off	SD card is not detected
LAN	Green	100 Mbps Ethernet mode
	Yellow	1000 Mbps (Gigabit) Ethernet mode
	Off	No activity or 10 Mbps Ethernet mode
Tx1, Tx2 (P1-P2)	Green	Serial ports P1-P2 transmitting data
	Off	Serial ports P1-P2 not transmitting data
Rx1, Rx2 (P1-P2)	Yellow	Serial ports P1-P2 receiving data
	Off	Serial ports P1-P2 not receiving data

Reset Button

Press the **Reset Button** on the front panel of the V2101 to reboot the system automatically. The Ready LED will blink on and off for the first 5 seconds, and then maintain a steady glow once the system has rebooted.

The V2101 does not support a "Reset to Default" function.

Real Time Clock

The embedded computer's real-time clock is powered by a lithium battery. We strongly recommend that you **NOT** replace the lithium battery on your own. If the battery needs to be changed, please contact the Moxa RMA service team.

⚠️ **ATTENTION**

There is a risk of explosion if the wrong type of battery is used. To avoid this potential danger, always be sure to use the correct type of battery. Contact the Moxa RMA service team if you need to replace your battery.

Caution

There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the instructions on the battery.

3

Hardware Connection Description

The V2101 series embedded computers support multiple connection types, including serial port communication, USB ports for storage expansion, and DI/DO channels. In addition, the computers provide either a VGA or LVDS output for field site monitoring. In this chapter, we show how to connect the embedded computers to the network and to various devices.

In this chapter, we cover the following topics:

❑ **Installing the V2101**

❑ **Wiring Requirements**

> ➢ Connecting the Power

> ➢ Grounding the Unit

❑ **Connecting Data Transmission Cables**

> ➢ Connecting to the Network

> ➢ Connecting to a Serial Device

❑ **Installing an SD Card**

> ➢ Installing an SD Card for Storage Expansion

❑ **Connecting to the USB Device**

❑ **DI/DO**

❑ **Connecting to a VGA Monitor**

❑ **Connecting to an LVDS Monitor**

❑ **Connecting to a Speaker or a Headphone**

Installing the V2101

DIN-Rail Mounting

Step 1: Use two screws to attach the DIN-rail attachment plate to the bottom of the V2101. When attaching the plate to the V2101, make sure that the stiff metal spring is at the top.
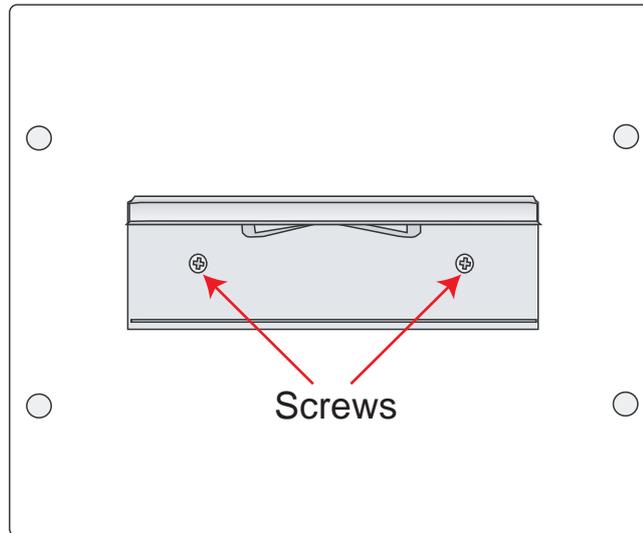
Step 2: Insert the top of the DIN-Rail into the slot just below the stiff metal spring.

Step 3: The DIN-Rail attachment unit will snap into place as shown below.
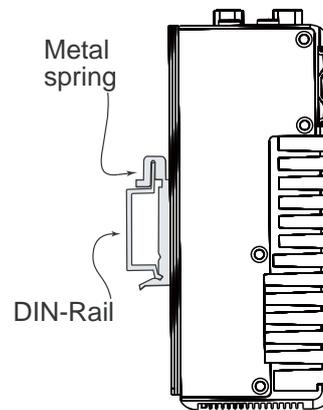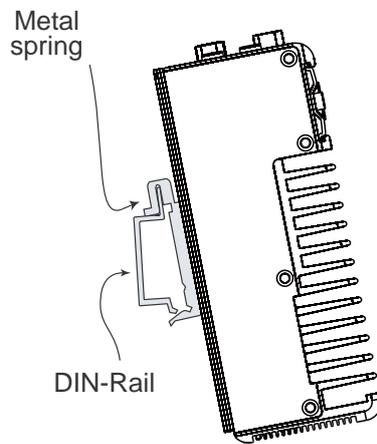
Wall or Cabinet Mounting

The V2101 comes with two metal brackets for attaching it to a wall or the inside of a cabinet.

Step 1: Use two screws for each bracket and attach the bracket to the rear of the V2101.
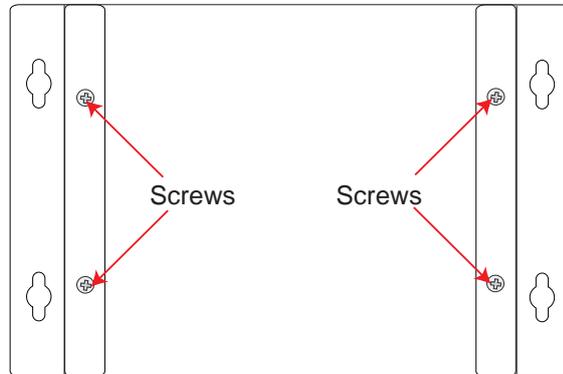
Step 2: Use two screws per side to attach the V2101 to a wall or cabinet.
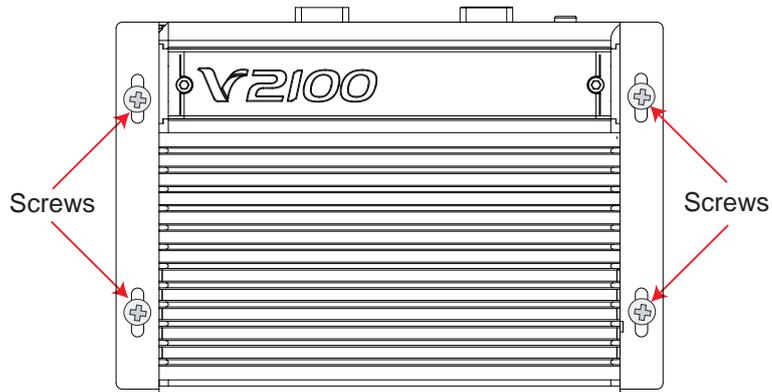
VESA Mounting (not included in the Package)

The V2101 has four screw holes on the bottom panel for attaching the computer to a 75 x 75 mm VESA mounting kit. Use four screws to attach the computer to the VESA mounting kit.
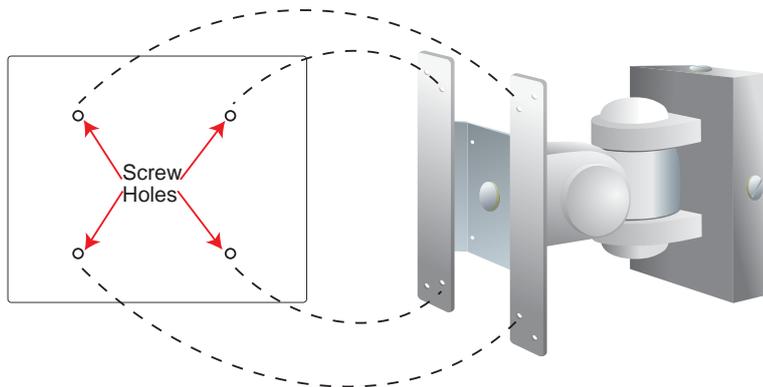
Wiring Requirements

This section describes how to connect serial devices to the embedded computer.

You should read and follow these common safety precautions before proceeding with the installation of any electronic device:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

  NOTE: Do not run signal or communication wiring together with power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

- Use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.

- Keep input wiring and output wiring separate.

- It is advisable to label the wiring to all devices in the system.

⚠ **ATTENTION**

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your V2101.

Wiring Caution!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

Temperature Caution!

Be careful when handling the unit. When the unit is plugged in, the internal components generate heat, and consequently the outer casing may feel hot to the touch.

Connecting the Power

The PC's power source should be provided by a UL listed class 2 or "Limited Power Source" (LPS), with external adaptor output rated 9 to 36 VDC, 1.8 A @ 9 VDC, 422 mA @ 36 VDC. If the power is supplied properly, the "Ready" LED will glow a solid green after a 25 to 30 second delay.

Grounding the Unit

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Before connecting any devices, run a ground wire from the ground screw to the grounding surface.

> ⚠️ **ATTENTION**
>
> This product should be mounted to a well-grounded mounting surface such as a metal panel.

Power Input

SG

V+ V─ ⏚
DC 9-36V⎓
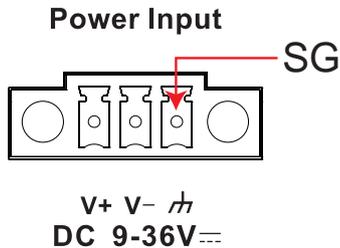
SG: The *Shielded Ground* (sometimes called Protected Ground) contact is the right most of the 3-pin power terminal block connector when viewed from the angle shown here. Connect the SG wire to an appropriate grounded metal surface.

Connecting Data Transmission Cables

This section describes how to connect the V2101 embedded computers to the network and serial devices.

Connecting to the Network

Plug your network cable into the embedded computer's Ethernet port. The other end of the cable should be plugged into your Ethernet network. When the cable is properly connected, the LEDs on the embedded computer's Ethernet port will glow to indicate a valid connection.

The 10/100/1000 Mbps Ethernet LAN port uses 8-pin RJ45 connectors. The following diagram shows the pinouts for these ports.
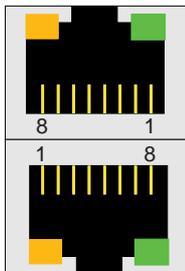
The LED indicators on the right top and right bottom corners glow a solid green color when the cable is properly connected to a 100 Mbps Ethernet network. The LED will flash on and off when Ethernet packets are being transmitted or received.

The LED indicators on the left top and left bottom corners glow a solid yellow color when the cable is properly connected to a 1000 Mbps Ethernet network. The LED will flash on and off when Ethernet packets are being transmitted or received.

Pin	10/100 Mbps	1000 Mbps
1	ETx+	TRD(0)+
2	ETx-	TRD(0)-
3	ERx+	TRD(1)+
4	---	TRD(2)+
5	---	TRD(2)-
6	ERx-	TRD(1)-
7	---	TRD(3)+
8	---	TRD(3)-

Connecting to a Serial Device

Use a serial cable to plug your serial device into the embedded computer's serial port. Serial ports P1 to P2 have male DB9 connectors and can be configured for RS-232, RS-422, or RS-485 communication by software. The pin assignments are shown in the following table:
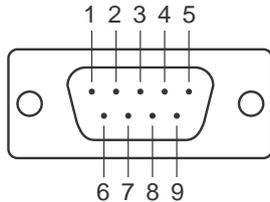
DB9 Male Port   **RS-232/422/485 Pinouts**

Pin	RS-232	RS-422	RS-485 (4-wire)	RS-485 (2-wire)
1	DCD	TxDA(-)	TxDA(-)	---
2	RxD	TxDB(+)	TxDB(+)	---
3	TxD	RxDB(+)	RxDB(+)	DataB(+)
4	DTR	RxDA(-)	RxDA(-)	DataA(-)
5	GND	GND	GND	GND
6	DSR	---	---	---
7	RTS	---	---	---
8	CTS	---	---	---

Installing an SD Card

Installing an SD Card for Storage Expansion

The V2101 has an internal SD slot for storage expansion. The SD slot allows users to plug in a Secure Digital (SD) memory card compliant with the SD 1.0 standard for up to 1 GB space, and a Secure Digital High Capacity (SDHC) memory card compliant with the SD 2.0 standard for up to 16 GB of additional memory. The following steps show how to install the SD card.

The SD slot is located in the middle of the V2101's front panel. To install an SD card, make sure the embedded computer is powered off, remove the protective cover from the left to access the slot, and then plug the SD card directly into the slot.

Step 1:   Gently remove the outer cover from the left.

Step 2:   After removing the cover, insert the SD memory card into the slot.

Step 3:   Gently move the protective cover back to the SD slot. Power on the embedded computer and start the operating system.

NOTE: To remove the SD card from the slot, press the SD card in slightly with your finger, and then remove your finger to allow the card to spring out partially. You may now grasp the top of the card with two fingers and pull it out.

Connecting to the USB Device

The V2101 comes with 4 USB 2.0 hosts. One is located on the front panel and the other three are on the rear panel. The hosts can be used for an external flash disk or hard drive for storing large amounts of data. You can also use these USB hosts to connect to a keyboard or a mouse.
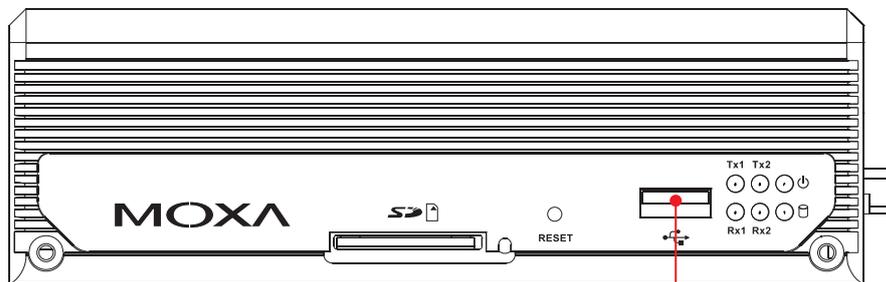
USB Port x 1
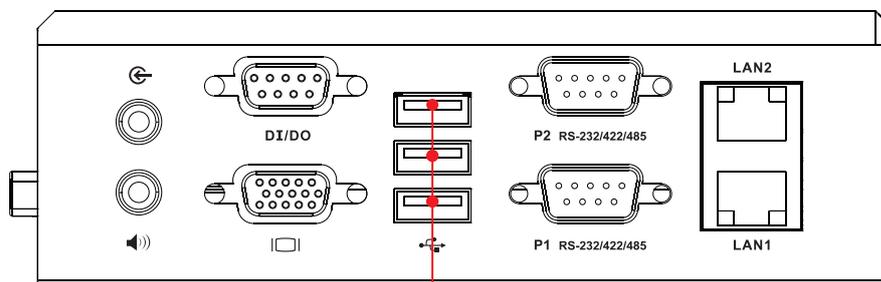
USB Port x 3

DI/DO

The V2101 comes with a 3-ch digital input and a 3-ch digital output through a DB9 female connector. The pin assignments are shown below.
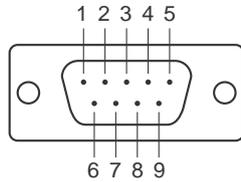
PIN	Signal
1	COM
2	DO 1
3	N/A
4	DI 1
5	GND
6	DO 0
7	DO2
8	DI 0
9	DI 2

Connecting to a VGA Monitor

The V2101 comes with a D-Sub 15-pin female connector on the rear panel to connect a VGA CRT monitor. To ensure that the monitor image remains clear, be sure to tighten the monitor cable after connecting it to the V2101. The pin assignments of the VGA connector are shown below.

DB15 Female Connector
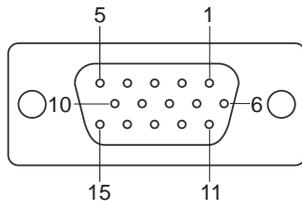
Pin No.	Signal Definition
1	Red
2	Green
3	Blue
4	NC
5	GND
6	GND
7	GND
8	GND
9	VCC
10	GND
11	NC
12	DDC2B Data
13	HSYNC
14	VSYNC
15	DDC2B Clock

Connecting to an LVDS Monitor

The V2101 also comes with a 26-pin LVDS connector on the side panel to connect a panel with an LVDS cable. The pin assignments of the LVDS connector are shown below.

LVDS Female Connector	Pin No.	Signal Definition
	1	VDD_12V
	2	GND
	3	LVDS_CLK_N
	4	LVDS_DAT_P3
	5	GND
	6	LVDS_DAT_N2
	7	LVDS_DAT_P1
	8	GND
	9	LVDS_DAT_N0
	10	VDD_12V
	11	N/C
	12	LVDS_CLK_P
	13	GND
	14	LVDS_DAT_N3
	15	LVDS_DAT_P2
	16	GND
	17	LVDS_DAT_N1
	18	LVDS_DAT_P0
	19	VDD_5V
	20	VDD_5V
	21	VDD_3V3
	22	VDD_3V3
	23	GND
	24	BKLT_EN
	25	L_DDC_CLK
	26	L_DDC_DAT

Connecting to a Speaker or a Headphone

The V2101 comes with audio input and output interfaces for connecting a microphone and speaker or headphones. See the following figure for details.

4
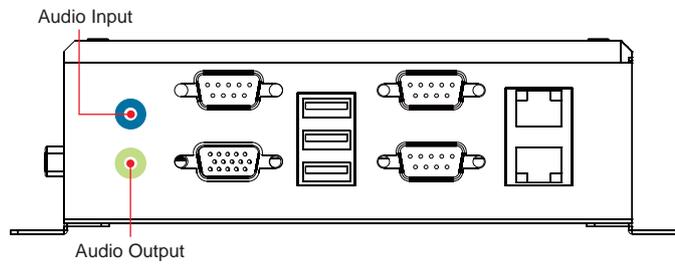
BIOS Setup

This chapter describes the BIOS settings of the V2101 embedded computers. The BIOS is a set of input/output control routines for peripherals. The BIOS is used to initialize basic peripherals and helps boot the operating system before the operating system is loaded. The BIOS setup allows the user to modify the system configurations of these basic input/output peripherals. All of the configurations will be stored in the battery backed up CMOS RAM, which retainsthe system information after system reboots or the power is removed.

This chapter covers the following topics:

❑ **Entering the BIOS Setup Utility**
❑ **Modifying the BIOS Main Settings**
  ➢ Basic Configuration
  ➢ System Security
❑ **Advanced Settings**
  ➢ Hard Disk Boot Priority
  ➢ Advanced BIOS Features
  ➢ CPU Features
  ➢ Advanced Chipset Settings
❑ **Peripherals**
  ➢ OnChip IDE Device
  ➢ Onboard Device
  ➢ Onboard I/O Chip Setup
❑ **Power**
❑ **Hardware Monitor**
❑ **Load Defaults**
❑ **Exiting the BIOS Setup**
❑ **Upgrading the BIOS**

Entering the BIOS Setup Utility

To enter the BIOS setup utility, press the "Del" key while the system is booting up. The main BIOS Setup screen will appear.

A basic description of each function key is listed at the bottom of the screen. Refer to these descriptions to learn how to scroll about the screen, how to select by pressing "Enter," and how to use the other hot keys listed below.

F1: General Help

F5: Previous Value

F6: Default Settings

F7: Turbo Settings

F10: Save

ESC: Exit

```
                Phoenix - AwardBIOS CMOS Setup Utility
  ┌───────┐
  │ Main  │ Advanced  Peripherals  Power  HW Monitor  Defaults  Exit
  └───────┘
 ┌──────────────────────────────────────────────────┬──────────────────────┐
 │                                                   │      Item Help       │
 │     Date (mm:dd:yy)         Thu, Feb 19 2009      ├──────────────────────┤
 │     Time (hh:mm:ss)           9 : 56 : 21         │ Menu Level    ▶      │
 │                                                   │                      │
 │  ▶ IDE Channel 0 Master     [ None]               │ <Tab> :              │
 │  ▶ IDE Channel 0 Slave      [ None]               │ <Enter> :            │
 │  ▶ Security                                       │   to select field    │
 │                                                   │                      │
 │    Base Memory                  639K              │ <-> :                │
 │    Extended Memory           1038336K             │ <+> :                │
 │    Total Memory              1039360K             │ <PgUp> :             │
 │                                                   │ <PgDn> :             │
 │                                                   │ <0-9> :              │
 │                                                   │   to set date        │
 │                                                   │                      │
 │                                                   │                      │
 ├───────────────────────────────────────────────────┴──────────────────────┤
 │ ↑↓→←:Move   Enter:Select   +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
 │ F5:Previous Values        F6:Default Settings        F7:Turbo Settings    │
 └───────────────────────────────────────────────────────────────────────────┘
```

Modifying the BIOS Main Settings

Basic Configuration

After entering the BIOS Setup, or choosing the "Main" option, the BIOS main menu will be displayed. Use this menu to check the basic system information such as memory and IDE hard drive. You can also use the menu for configuring basic system parameters, such as date, time, hard drive, display, and system security.

System Security

To set up system security, select the "Security" option under "Main" to bring up the following screen.

```
              Phoenix - AwardBIOS CMOS Setup Utility
   Main

               Security                          Item Help

     Set Password          [Press Enter]     Menu Level    ▶▶
     Security Option       [Setup]
                                             Change/Set/Disable
                                             Password




↑↓→←:Move   Enter:Select   +/-/PU/PD:Value   F10:Save   ESC:Exit   F1:General Help
F5:Previous Values        F6:Default Settings           F7:Turbo Settings
```
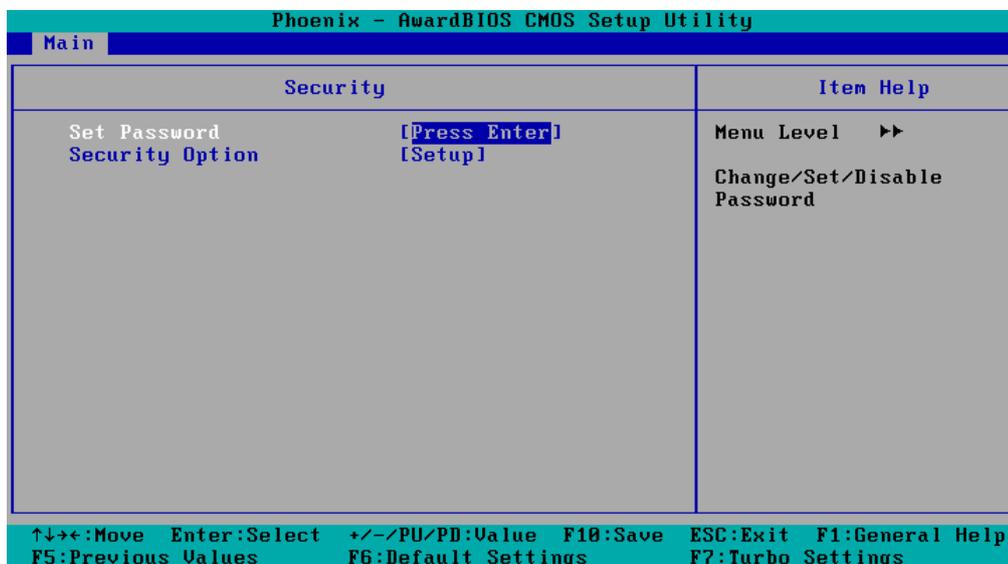
This menu includes two options: "Set Password" and "Security Option."

When you select the Set Password option, a pop-up "Enter Password:" window will appear on the screen. The password that you type will replace the password stored in the CMOS memory. You will be required to confirm the new password. Just re-type the password and then press **<Enter>**. You may also press **<Enter>** to abort the selection and not enter a password.

To clear an existing password, just press **<Enter>** when you are prompted to enter the password. A message will show up confirming that the password will be disabled. Once the password is disabled, the system will boot and you can enter the "BIOS Setup Menu" without entering a password.

Once a password has been set, you will be prompted to enter the password each time you enter Setup. This prevents unauthorized persons from changing any part of your system configuration. In addition, when a password setting is enabled, you can set up the BIOS to request a password each time the system is booted up. The "Security Option" setting determines when a password prompt is required. If the "Security Option" is set to "System," the password must be entered both at boot up and when entering the BIOS Setup Menu. If the password is set for "Setup," the password prompt only occurs when you enter the "BIOS Setup Menu."

Advanced Settings

The "Advanced Features" screen will appear when choosing the "Advanced" item from the main menu.

```
          Phoenix - AwardBIOS CMOS Setup Utility
   Main  Advanced  Peripherals  Power  HW Monitor  Defaults  Exit

 ▶ Hard Disk Boot Priority                          Item Help

   First Boot Device        [CDROM]
   Second Boot Device       [Hard Disk]     Menu Level   ▶
   Third Boot Device        [Removable]
                                            Select Hard Disk Boot
 ▶ Advanced BIOS Features                    Device Priority
 ▶ Advanced Chipset Features









 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
 F5:Previous Values        F6:Default Settings        F7:Turbo Settings
```

Hard Disk Boot Priority

First/Second/Third Boot Device

This option allows users to select or change the device boot priority. You may set 3 levels of priority to determine the boot up sequence for different bootable devices, such as a hard drive, CD-ROM, and removable devices. Select the order in which devices will be searched in order to find a boot device. The available options are "CDROM (default for first boot device)," "Removable" (default for third boot device), "Hard Disk" (default for second boot device) and "Disabled."

Advanced BIOS Features

When you select the "Advanced BIOS Features" option under the "Advanced" menu, the following configuration menu will appear.

```
              Phoenix - AwardBIOS CMOS Setup Utility
      Advanced
┌────────────────────────────────────────────┬──────────────────────┐
│      Advanced BIOS Features                 │      Item Help       │
│                                             │                      │
│ ▶  CPU Feature           [Press Enter]      │  Menu Level    ▶     │
│    CPU L1 & L2 Cache     [Enabled]          │                      │
│    Hyper-Threading Technology[Disabled]     │                      │
│    Quick Power On Self Test  [Enabled]      │                      │
│                                             │                      │
│                                             │                      │
│                                             │                      │
│                                             │                      │
│                                             │                      │
│                                             │                      │
│                                             │                      │
│                                             │                      │
│                                             │                      │
│                                             │                      │
└────────────────────────────────────────────┴──────────────────────┘
 ↑↓→←:Move   Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
 F5:Previous Values        F6:Default Settings       F7:Turbo Settings
```
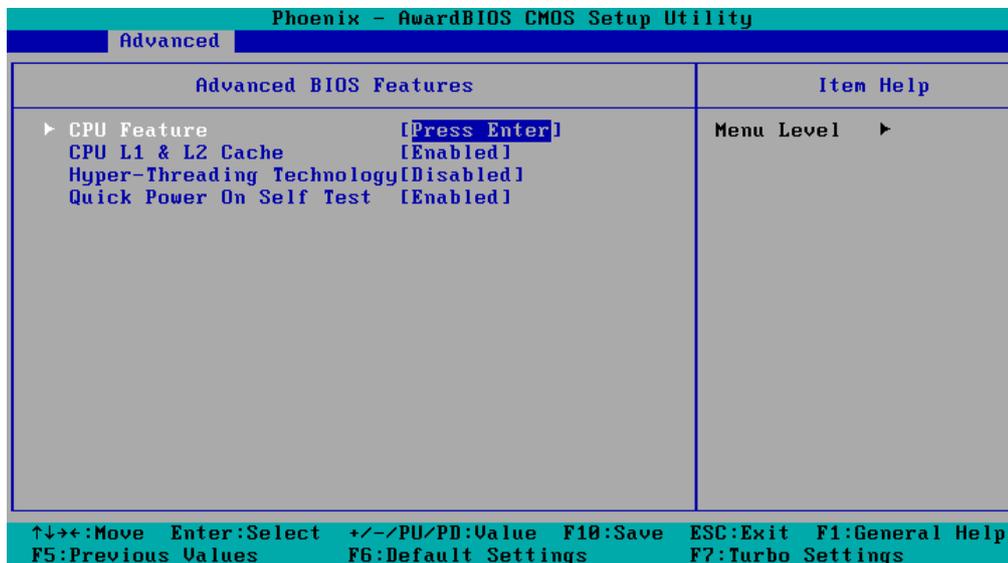
CPU Features

C1E Function

This item allows you to configure the power-saving mode when the CPU is in C1 status.

Options: Disabled (default), Auto

CPU C State Capability

This item allows you to configure the power saving mode when the CPU is in C2, C4, or C6 status.

Options: Disabled (default), C2, C4, C6

CPU L1 & L2 Cache

Make the CPU internal cache active or inactive. System performance may degrade if you disable this item.

Options: Enabled (default), Disabled.

Hyper-Threading Technology

This item allows you to enable or disable the hyper-threading function, which allows the system to handle more than one thread at the same time.

Options: Disabled (default), Enabled

Advanced Chipset Settings

```
         Phoenix - AwardBIOS CMOS Setup Utility
       Advanced

       Advanced Chipset Features                    Item Help

   DRAM Timing Selectable     By SPD         Menu Level    ▶

   ** VGA Setting **
   On-Chip Frame Buffer Size [ 8MB]
   Boot Type                 [CRT]
   LCD Panel Type            [1024x768 generic]
   Panel Scaling             [AUTO]
   Panel Data Format Select  [24 Bit]




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
 F5:Previous Values        F6:Default Settings        F7:Turbo Settings
```

On-chip Frame Buffer Size

This item determines the frame buffer size for the VGA function, and will share the system memory.

Options: 1 MB, 4 MB, 8 MB (default),

Boot Type

This item determines the boot type of the display. Select either CRT or LVDS.

Options: CRT (default), LVDS

LCD Panel Type

This item allows you to choose the resolution of the panel. From the list, select the correct resolution of your panel.

Default: 1024x768 generic

Panel Scaling

This item allows you to zoom in and zoom out with the same ratio of the panel.

Options: Auto (default), Force, Off

Panel Data Format Select

This item allows to select the data format according to the LVDS display.

Options: 24 bit (default), 18 bit

ATTENTION

Note that you must select the correct resolution for your LVDS display based on your LVDS specifications, or it will not be properly shown on your panel. When you encounter this problem, take the following steps:

1. Press the **Insert** key after you hear the beep.

2. Restart your computer and press the **Del** key while the system is booting up.

3. Reconfigure the VGA setting in the BIOS menu and select the correct resolution and data format for your LVDS.

Peripherals

```
             Phoenix - AwardBIOS CMOS Setup Utility
   Main  Advanced  Peripherals  Power  HW Monitor  Defaults  Exit
 ┌─────────────────────────────────────────────┬──────────────────────┐
 │ ▶ OnChip IDE Device                          │      Item Help       │
 │ ▶ Onboard Device                             │                      │
 │   Onboard Serial Port 1      [3F8/IRQ4]      │ Menu Level    ▶      │
 │   Onboard Serial Port 2      [2F8/IRQ3]      │                      │
 │   Debug Port                 [3E8/IRQ4]      │                      │
 │                                              │                      │
 │                                              │                      │
 │                                              │                      │
 │                                              │                      │
 │                                              │                      │
 │                                              │                      │
 │                                              │                      │
 │                                              │                      │
 │                                              │                      │
 │                                              │                      │
 └─────────────────────────────────────────────┴──────────────────────┘
  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5:Previous Values      F6:Default Settings       F7:Turbo Settings
```
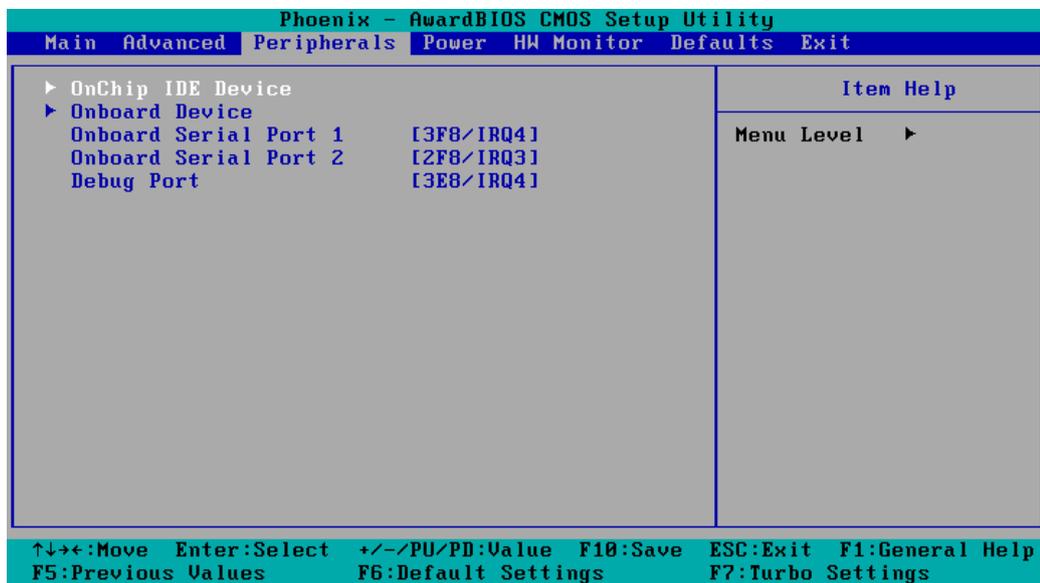
OnChip IDE Device

```
        Phoenix - AwardBIOS CMOS Setup Utility
             Peripherals

      OnChip IDE Device                          Item Help

   IDE HDD Block Mode        [Enabled]      Menu Level  ▶▶
   IDE Primary Master UDMA   [Auto]
                                            If your IDE hard drive
                                            supports block mode
                                            select Enabled for
                                            automatic detection of
                                            the optimal number of
                                            block read/writes per
                                            sector the drive can
                                            support



  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5:Previous Values        F6:Default Settings         F7:Turbo Settings
```

IDE HDD Block Mode

Block mode is otherwise known as block transfer, multiple commands, or multiple sector read/write. Select the "Enabled" option if your IDE hard drive supports block mode (most new drives do). The system will automatically determine the optimal number of blocks to read and write per sector.

Options: Enabled (default), Disabled

IDE Primary Master UDMA

This item allows you to select the UDMA value for the primary Master Disk.

Options: Auto (default), Disabled, UDMA33, UDMA66, UDMA100

Onboard Device

```
            Phoenix - AwardBIOS CMOS Setup Utility
              Peripherals

         Onboard Device                              Item Help

   Intel HD Audio Controller  [Auto]          Menu Level    ▶▶
   SDIO/MMC Controller        [Enabled]
   Onboard LAN Boot ROM       [Disabled]




   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5:Previous Values       F6:Default Settings        F7:Turbo Settings
```
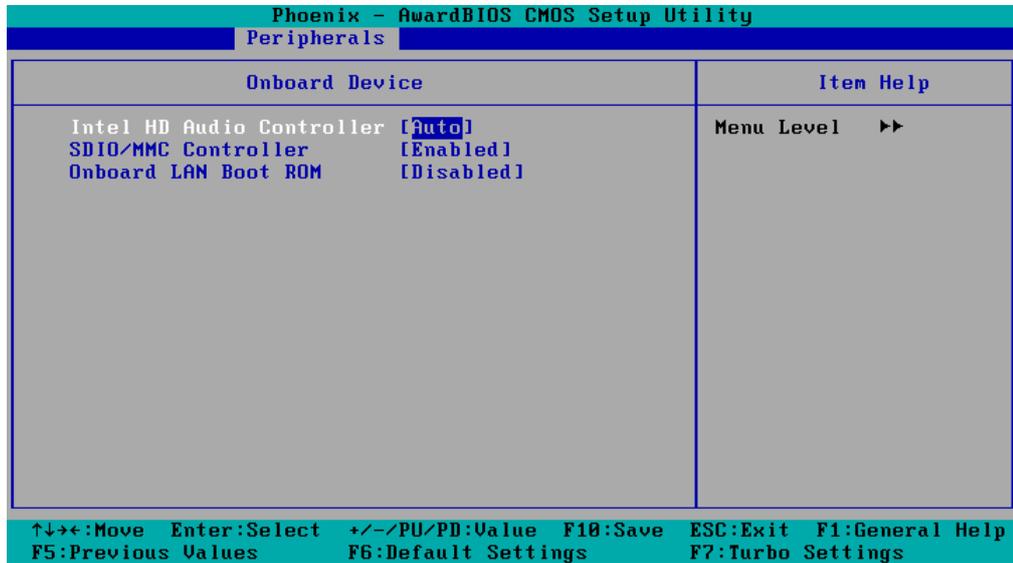
Intel HD Audio Controller

This feature allows you to enable/disable the HD audio controller.

Options: Auto (default), Disabled

SDIO/MMC Controller

This feature allows you to enable/disable the SD controller.

Options: Enabled (default), Disabled

Onboard LAN Boot ROM

Decide whether to invoke the boot ROM of the onboard LAN chip.

Options: Enabled, Disabled (default)

Onboard I/O Chip Setup

Onboard Serial Port 1

```
            Phoenix - AwardBIOS CMOS Setup Utility
     Main  Advanced  Peripherals  Power  HW Monitor  Defaults  Exit

   ▶ OnChip IDE Device                                      Item Help
   ▶ Onboard Device
     Onboard Serial Port 1        [3F8/IRQ4]       Menu Level    ▶
     Onboard Serial Port 2        [2F8/IRQ3]
     Debug Port
                      ┌──────────────────────────────┐
                      │  Onboard Serial Port 1        │
                      │                               │
                      │  Disabled                     │
                      │  3F8/IRQ4                      │
                      │                               │
                      │                               │
                      │                               │
                      │                               │
                      │                               │
                      │   ↑↓:Move ENTER:Accept ESC:Abort │
                      └──────────────────────────────┘

   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5:Previous Values         F6:Default Settings      F7:Turbo Settings
```

This function allows you to enable/disable serial port 1 communication. The V2101 computer will automatically distribute the IRQ value for serial port 1 as the default value. If you wish to disable, select **Disabled**.

Onboard Serial Port 2

```
            Phoenix - AwardBIOS CMOS Setup Utility
     Main  Advanced  Peripherals  Power  HW Monitor  Defaults  Exit

   ▶ OnChip IDE Device                                      Item Help
   ▶ Onboard Device
     Onboard Serial Port 1        [3F8/IRQ4]       Menu Level    ▶
     Onboard Serial Port 2        [2F8/IRQ3]
     Debug Port
                      ┌──────────────────────────────┐
                      │  Onboard Serial Port 2        │
                      │                               │
                      │  Disabled                     │
                      │  2F8/IRQ3                      │
                      │                               │
                      │                               │
                      │                               │
                      │                               │
                      │                               │
                      │   ↑↓:Move ENTER:Accept ESC:Abort │
                      └──────────────────────────────┘

   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5:Previous Values         F6:Default Settings      F7:Turbo Settings
```

This function allows you to enable/disable serial port 2 communication. The V2101 computer will automatically distribute the IRQ value for serial port 2 as the default value. If you wish to disable, select **Disabled**.

Debug Port

```
                    Phoenix - AwardBIOS CMOS Setup Utility
        Main   Advanced   Peripherals   Power   HW Monitor   Defaults   Exit
    ┌─────────────────────────────────────────────┬──────────────────────────┐
    │  ▶ OnChip IDE Device                         │        Item Help         │
    │  ▶ Onboard Device                            ├──────────────────────────┤
    │    Onboard Serial Port 1        [3F8/IRQ4]   │  Menu Level    ▶         │
    │    Onboard Serial Port 2        [2F8/IRQ3]   │                          │
    │    Debug Port        ┌──────────────────────────────┐                  │
    │                      │  Debug Port                   │                  │
    │                      │                               │                  │
    │                      │  Disabled                     │                  │
    │                      │  3E8/IRQ4                     │                  │
    │                      │                               │                  │
    │                      │                               │                  │
    │                      │                               │                  │
    │                      │                               │                  │
    │                      │  ↑↓:Move ENTER:Accept ESC:Abort │                │
    │                      └──────────────────────────────┘                  │
    │                                                                         │
    ├─────────────────────────────────────────────────────────────────────────┤
    │ ↑↓→←:Move   Enter:Select   +/-/PU/PD:Value   F10:Save   ESC:Exit   F1:General Help │
    │ F5:Previous Values          F6:Default Settings        F7:Turbo Settings │
    └─────────────────────────────────────────────────────────────────────────┘
```

This function allows you to enable/disable the debug port communication. The V2101 computer will automatically distribute the IRQ value for the debug port as the default value. If you wish to disable, select **Disabled**. This port is only for engineers who are debugging programs.

Power

The Power Setup Menu allows you to configure your system power-up/ power-down options.

```
                    Phoenix - AwardBIOS CMOS Setup Utility
        Main   Advanced   Peripherals   Power   HW Monitor   Defaults   Exit
    ┌─────────────────────────────────────────────┬──────────────────────────┐
    │    PCI Express PME            Enabled        │        Item Help         │
    │  ▶ HPET Feature                              ├──────────────────────────┤
    │                                              │  Menu Level    ▶         │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    │                                              │                          │
    ├─────────────────────────────────────────────────────────────────────────┤
    │ ↑↓→←:Move   Enter:Select   +/-/PU/PD:Value   F10:Save   ESC:Exit   F1:General Help │
    │ F5:Previous Values          F6:Default Settings        F7:Turbo Settings │
    └─────────────────────────────────────────────────────────────────────────┘
```
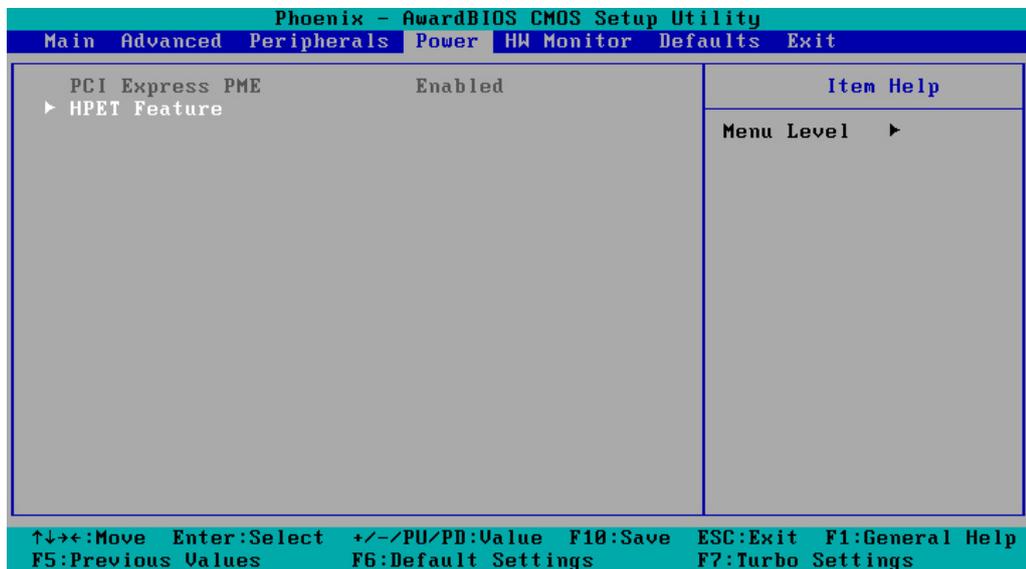
HPET Support

This feature allows you to enable/disable the HPET (High Precision Event Timer) function.

Option: Disabled, Enabled (default)

Hardware Monitor

```
              Phoenix - AwardBIOS CMOS Setup Utility
   Main  Advanced  Peripherals  Power  HW Monitor  Defaults  Exit
┌─────────────────────────────────────────────┬─────────────────────────┐
│  Current CPU Temperature        63°C         │       Item Help         │
│  CPU Vcore                      0.91V        │                         │
│  DDR2 Vcore                     1.77V        │  Menu Level    ▶        │
│  +3.3 (V)                       3.29V        │                         │
│  +5.0 (V)                       4.97V        │                         │
│  VBAT (V)                       3.28V        │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
└─────────────────────────────────────────────┴─────────────────────────┘
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
 F5:Previous Values         F6:Default Settings        F7:Turbo Settings
```
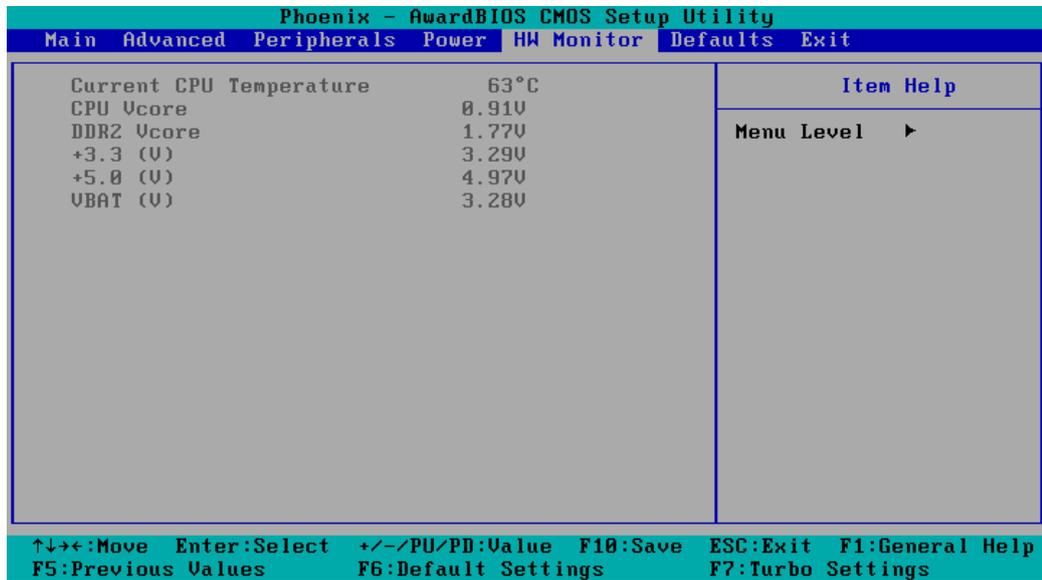
This item helps monitor the status of the system, including CPU temperature and the voltage of the CPU, SDRAM and battery.

Load Defaults

```
              Phoenix - AwardBIOS CMOS Setup Utility
   Main  Advanced  Peripherals  Power  HW Monitor  Defaults  Exit
┌─────────────────────────────────────────────┬─────────────────────────┐
│  Load System Default Settings                │       Item Help         │
│  Load System Turbo Settings                  │                         │
│  Load CMOS From BIOS                          │  Menu Level    ▶        │
│  Save CMOS To BIOS                            │                         │
│                                              │  Load System Default    │
│                                              │  Settings               │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
│                                              │                         │
└─────────────────────────────────────────────┴─────────────────────────┘
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
 F5:Previous Values         F6:Default Settings        F7:Turbo Settings
```
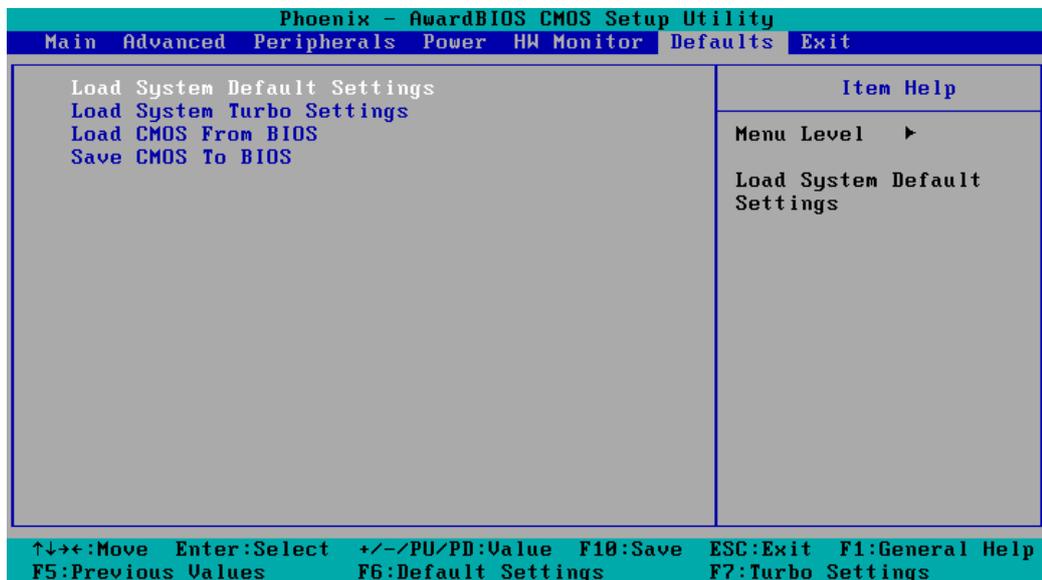
Load System Default Settings

Use this option to load system factory default settings instead of the current BIOS settings. This option is useful for when the system is unstable. Users do not need to remember what settings were active before the system fails.

Load System Turbo Settings

Use this option to load system optimized settings. If the system is not stable, please load the system default settings.

Load CMOS from BIOS

Use this option to load BIOS settings from flash ROM to CMOS.

Save CMOS to BIOS

Use this option to save the BIOS settings from the CMOS to flash ROM.

Exiting the BIOS Setup

To exit the BIOS setup utility, choose "Exit." Pressing **<ESC>** will achieve the same result.

```
            Phoenix - AwardBIOS CMOS Setup Utility
    Main  Advanced  Peripherals  Power  HW Monitor  Defaults  Exit

      Save & Exit Setup                              Item Help
      Exit Without Saving
                                            Menu Level    ▶

                                            Save Data to CMOS




    ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5:Previous Values       F6:Default Settings       F7:Turbo Settings
```
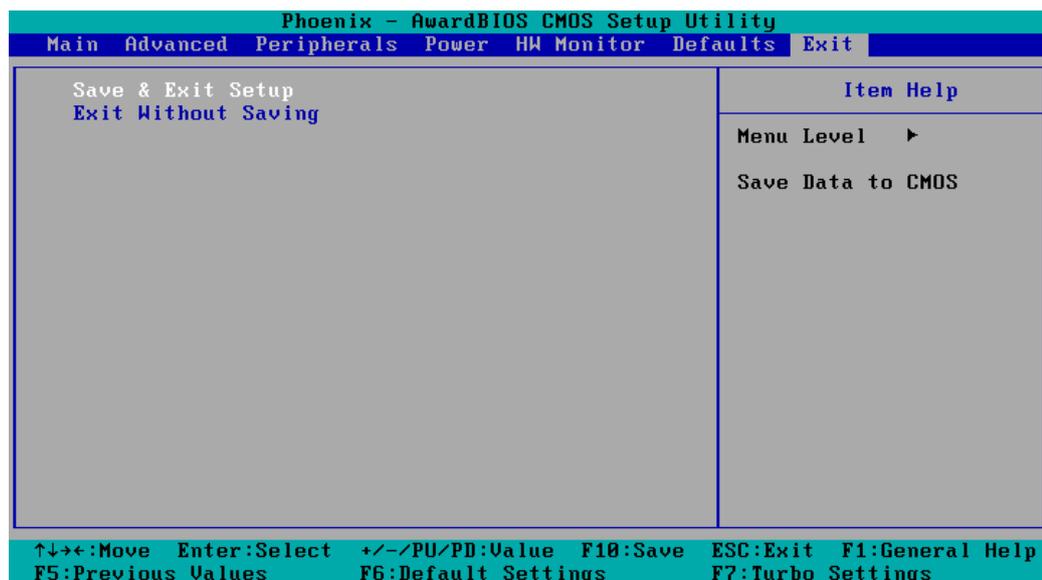
Save & Exit Setup

Save all configuration changes to CMOS (memory) and exit setup. A confirmation message will be displayed before proceeding.

Exit Without Saving

Abandon all changes made during the current session and exit setup. A confirmation message will be displayed before proceeding.

Upgrading the BIOS

This section describes how to upgrade the BIOS. However, please note that upgrading the BIOS involves high risk of damage to your computer. We strongly recommend that you contact Moxa's TS staff for assistance and obtain all necessary tools and files before attempting to upgrade.

Step 1:   Create a Bootable USB Disk.

We suggest you use the HP USB Disk Format Tool to create a bootable USB disk. You may download this tool from the Internet. Search the Internet using the phrase "HP USB Disk Storage Format Tool", and then download the tool from one of the listed websites.

You will also need to download the FreeDos system files **kernel.sys** and **command.com** from http://www.freedos.org/kernel/.

1. Copy DOS system files **kernel.sys** and **command.com** to a specified directory (**C:\FreeDOS** in this example).

2. Start the HP USB Disk Storage Format Tool and select the USB device that you want to use as a bootable disk in the **Device** drop down box.

3. Select **FAT** in the **File system** drop down box.

4. Type the disk name in the **Volume label field**.

5. Check the option **Create a DOS startup disk** under format options.

6. Specify the directory of the system files (for example, **C:\FreeDOS**).

7. Click **Start** to format and create the USB disk.
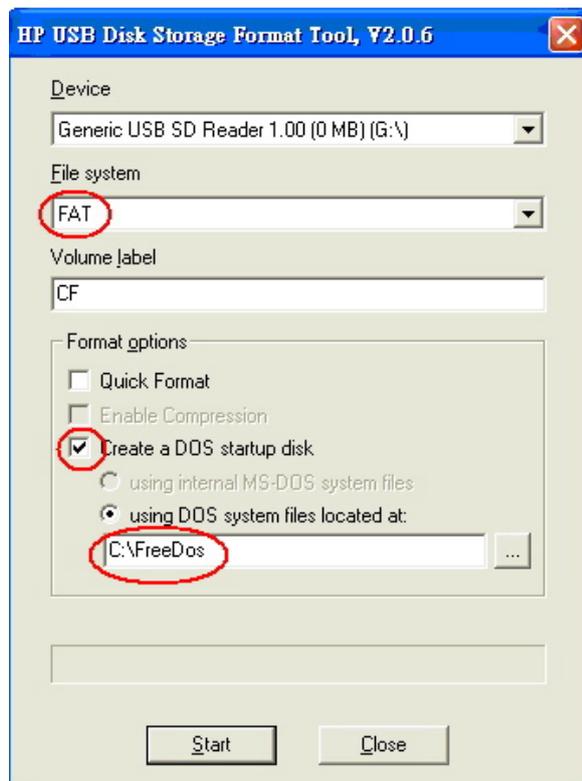
> ⚠️ **ATTENTION**
>
> We suggest you use a USB drive with under 2 GB in disk space, as larger USB drives may not support FAT file format and consequently fail to boot.

Step 2:   Prepare the Upgrade Tool and BIOS Binary File.

You must use the BIOS upgrade installation file to upgrade the BIOS. You can download it from the Moxa Download Center at:

http://web4.moxa.com/support/download_center.asp

1. Get the BIOS upgrade installation file. The file name should have following format: **210010.s00**.

2. Copy the file to the Bootable USB Disk.

3. Double click to extract the BIOS update installation file. The file includes a binary file in the form **s210010.s00** and the upgrade utility named **awdflash.exe**.

Step 3:   Set up the BIOS to Boot from the USB Disk.

1. Insert the USB disk.

2. Power on and press **DEL** to enter the BIOS Setup menu.

3. Select **Advanced → Hard Disk Boot Priority** and then press **Enter**.

4. From the Setup menu, use "↑" or "↓" to select the USB device.

```
                  Phoenix - AwardBIOS CMOS Setup Utility
          Advanced

         Hard Disk Boot Priority                      Item Help

      1. USB-HDD0  :  KingstonDataTraveler 2     Menu Level    ▶
      2. Ch0 M.    :  SILICON POWER
      3. Bootable Add-in Cards                   Use <↑> or <↓> to
                                                 select a device , then
                                                 press <+> to move it
                                                 up , or <-> to move it
                                                 down the list. Press
                                                 <ESC> to exit this
                                                 menu.




     ↑↓:Move      PU/PD/+/-:Change Priority     F10:Save      ESC:Exit
        F5:Previous Values    F6:System  Defaults    F7:Turbo  Defaults
```

5. Press "+" to move it up to the first priority, and press "Esc" to exit the setup menu.

6. Make sure the first boot device is **Hard Disk**. If it isn't, press **Enter** to change it.

```
              Phoenix - AwardBIOS CMOS Setup Utility
    Main  Advanced  Peripherals  Power  HW Monitor  Defaults  Exit

   ▶ Hard Disk Boot Priority                              Item Help
     First Boot Device          [Hard Disk]
     Second Boot Device         [Hard Disk]           Menu Level    ▶
     Third Boot Device          [Removable]
     Boot Other Device          [Enabled]             Select Your Boot
                                                      Device Priority.
   ▶ Advanced BIOS Features                            Please set
   ▶ Advanced Chipset Features                         'Peripherals →
                                                        Onboard Device →
                                                        Onboard LAN Boot ROM'
                                                      to enable when you
                                                      would like to boot
                                                      from onboard Lan.




   ↑↓→←:Move   Enter:Select   +/-/PU/PD:Value  F10:Save   ESC:Exit  F1:General Help
   F5:Previous Values         F6:Default Settings        F7:Turbo Settings
```

7. Select **Exit → Save & Exit Setup** and then press **Enter**.

8. Choose **Y** to save to the CMOS and then exit.

Step 4:   Run awdflash.exe to upgrade the BIOS.

1. While in the BIOS Setup menu and before upgrading the BIOS, you may choose to save the old BIOS files to a specific location. Type **Y** to do so, or N to begin the upgrade.

2. If the BIOS Setup is correct, it will restart and boot from the USB disk.

3. Run **awdflash 210010.S00** from the command line to upgrade the BIOS. Replace xxxxxxx.Sxx with the BIOS binary file name discussed in Step 2.

4. Press **F1** to reset the system after the bios update is complete. The system should reboot at this time.
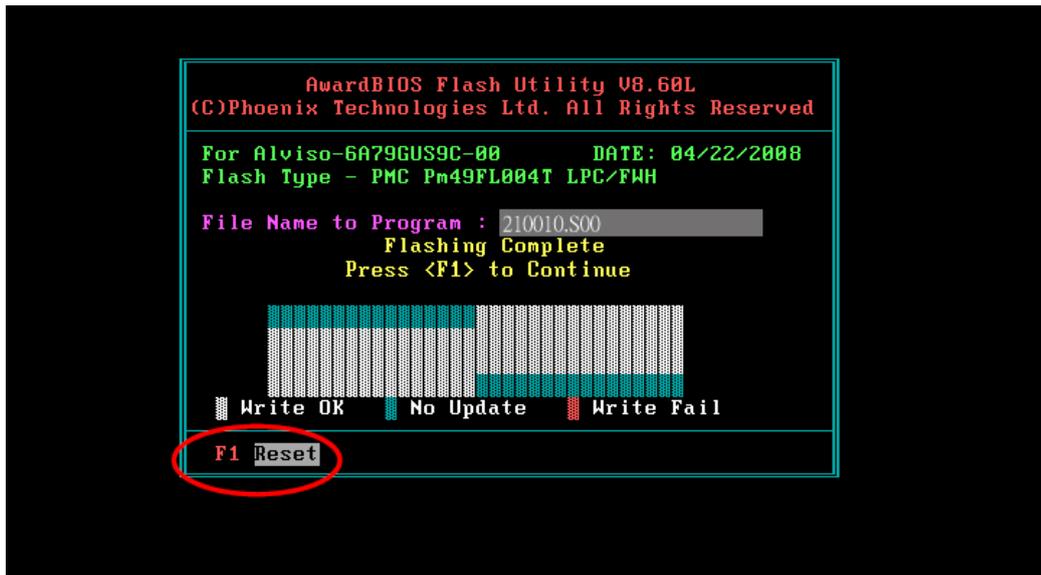
5. Please note that once the BIOS is successfully upgraded, the default BIOS values will be automatically loaded. However, if you wish to re-configure the BIOS settings, press **DEL** while booting.

⚠️ **ATTENTION**

Do **NOT** switch off the power supply during the BIOS upgrade, since doing so may cause the system to crash.

A
Regulatory Approval Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

European Community

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