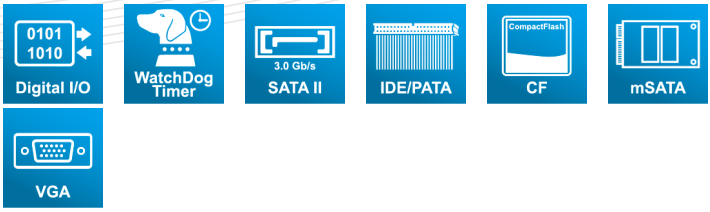
# AMB-VDX3H2

## An ISA Half-Size Board with DM&P Vortex86DX3 CPU

- ***AMB-VDX3H2-A***
  *(1GHz CPU, 512MB Memory, 1x RS232, 1x RS232/RS422/RS485, CF+IDE)*
- ***AMB-VDX3H2-A1***
  *(1GHz CPU, 512MB Memory, 1x RS232, 1x RS232/RS422/RS485, CF+mSATA)*




# User Manual

Acrosser Technology Co., Ltd.
www.acrosser.com

## Disclaimer

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## Copyright



## Trademarks

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## Purpose

This document is intended to provide the information about the features and use of the product.

## Audience

The intended audiences are technical personnel, not for general audiences.

## WARNING

Danger of explosion if batteries are incorrectly replaced. Always replace the battery with the same specifications. Dispose of used batteries according to the manufacturer's instructions.

Before running the system, make sure the power cord is firmly plugged into the socket.

## CAUTION


IEC 60417-6042 (2010-11)


IEC 60417-6172 (2012-09)

All power cords must be disconnected during product repair.

**Ver: 100-005**
**Date: Mar. 10, 2022**

**To read this User Manual on your smart phone, you will have to install an APP that can read PDF file format first. Please find the APP you prefer from the APP Market.**

# Table of Contents

# 1. Introduction

AMB-VDX3H2 Series is an ISA half-size board that is equipped with DM&P Vortex86 DX3 Dual-core CPU, which is an evolution version versus the AMB-VDX3H1 of the past model, meanwhile, it can help to solve several issues now we facing in the client.

For now, the Vortex Vortex 86 CPU is still the best choice of ISA card for industrial SBC of the factory automation environment.

## 1.1. Specifications

### General

| | |
|---|---|
| **CPU** | • DM&P Vortex86DX3, Single Core 1GHz CPU |
| **Memory** | • Onboard DDR3 512MB |
| **BIOS** | • Onboard SPI Flash |
| **Real Time Clock** | • 1x System RTC |
| **Battery** | • 1x Lithium Battery, 3V 220mAH (CR2032) |

### Video

| | |
|---|---|
| **Graphic Controller** | • Integrated |
| **Video Interface** | • 1x VGA |

### Storage

| | |
|---|---|
| **IDE** | • 1x IDE, For AMB-VDX3H2-A only |
| **CF** | • 1x CF Socket |
| **mSATA** | • 1x mSATA Connector, For AMB-VDX3H2-A1 only |

### Communication and I/O

| | |
|---|---|
| **Expansion** | • 1x PC/104 Connector |
| **ISA** | • 1x ISA Gold Finger |
| **Ethernet** | • 1x RJ45 10/100Mbps LAN |
| **Serial Ports** | • COM1 RS-232 (DB9)<br>• COM2 RS232/RS422/RS485 (Pin Header, Jumper select) |
| **USB Ports** | • 4x USB 2.0 |
| **GPIO** | • 16 bit GPIO (1~8 = Header 1, 9~16 = Header 2) |
| **I2C** | • 1x I2C Pin |

| | |
|---|---|
| **Keyboard/Mouse** | • 1x PS/2 Connector<br>• 1x JST Pin Header<br>* There is only one type can be worked at the same time. |
| **Indicator** | • Power LED<br>• HDD LED |

## Hardware Features

| | |
|---|---|
| **Watchdog Timer** | • Software Programmable 0 ~ 511 Seconds, (0=disable timer) |
| **Buzzer** | • 1x Onboard |

## Power Requirement

| | |
|---|---|
| **Power Input** | • ISA Gold Finger or 4-pin ATX Peripheral Power Connector<br>• +5V Only for system boot up. +12V for ISA. |

## Software

| | |
|---|---|
| **OS support** | • DOS<br>• Windows XP (32 bit)<br>• Windows 7 (32 bit)<br>• Win CE 6.0 (32 bit)<br>• (IDE port cannot support Windows XP & Windows 7) |

## Mechanical & Environment

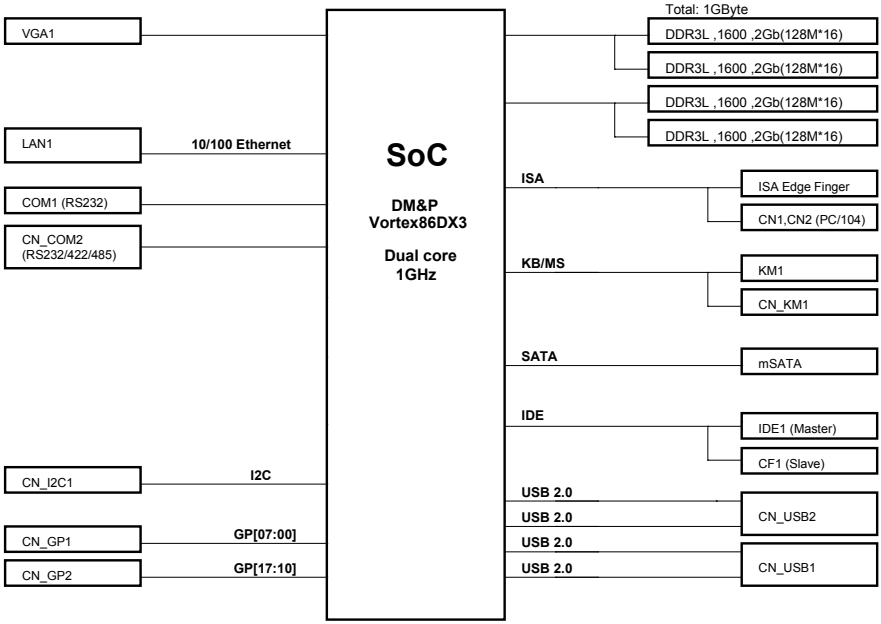
| | |
|---|---|
| **Dimension** | • 185mm x 122mm (7.29” x 4.81”) |
| **Operating Temp.** | • 0 ~ 60°C (32 ~ 140°F) |
| **Storage Temp.** | • -20 ~ 80°C (-4 ~ 176°F) |
| **Relative Humidity** | • 0 ~ 90% @ 40°C, non-condensing |
| **Safety** | • CE, FCC Class A |

## 1.2. Packing List

Check if the following items are included in the package.

| | Item | Q'ty |
|---|---|---|
| ☐ | AMB-VDX3H2 Series Board | 1 |
| ☐ | Quick Guide | 1 |

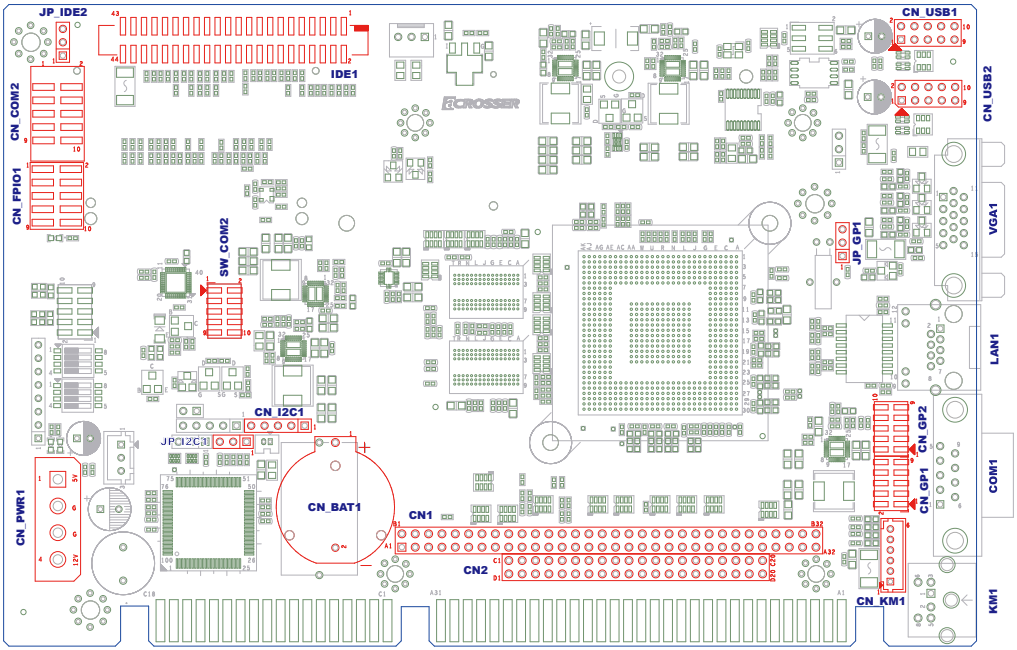
## 1.3. Block Diagram



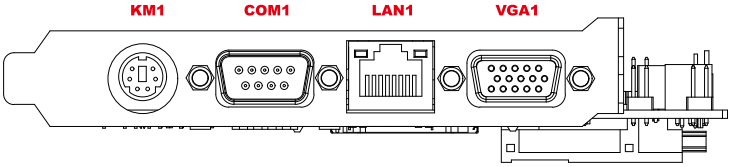
# 2. Hardware Information

## 2.1. Mainboard Layout

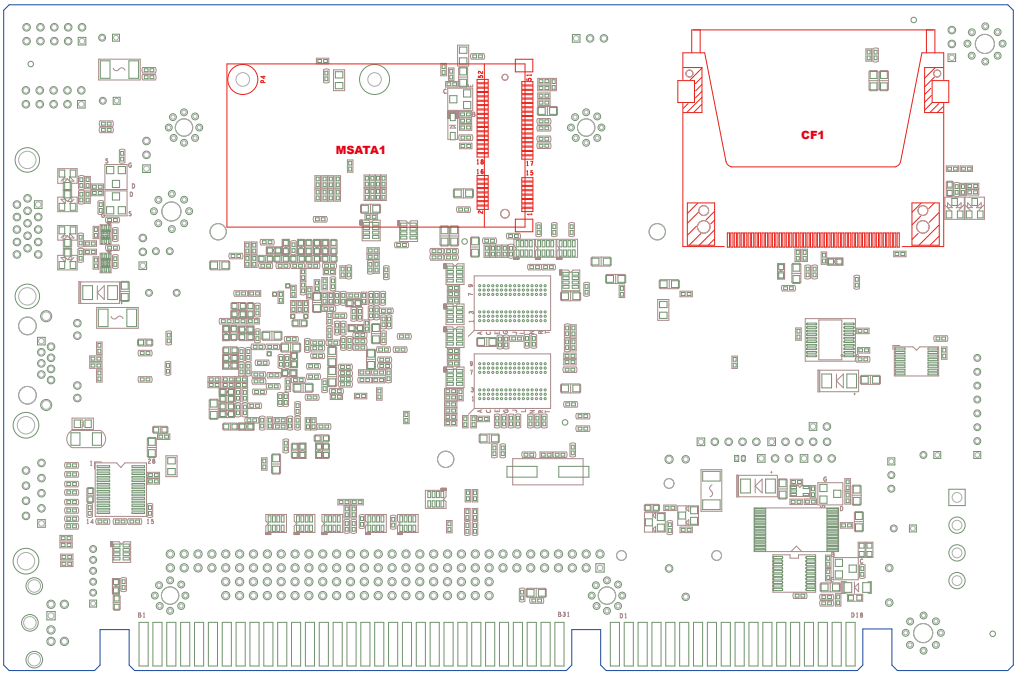
### 2.1.1. Top View



## 2.1.2. IO View



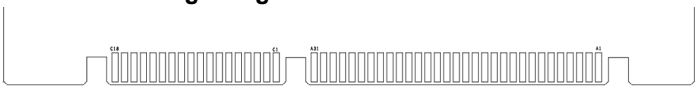

## 2.1.3. Bottom View



## 2.2. Headers/Connectors Pin Define & Jumper Setting (Top)

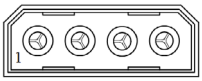
**ISA1**
**(DC Power in option 1)**

**Standard ISA Edge Finger**



**CN_PWR1**
**(DC Power in option 2)**

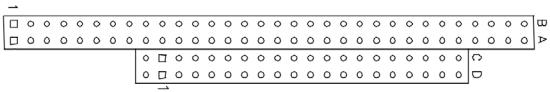
**ATX 4Pin DC +5V & +12V Power in Peripheral Connector**




| Pin # | Signal |
|---|---|
| 4 | +12V (1.2A min) |
| 3 | GND |
| 2 | GND |
| 1 | +5V (4A min) |

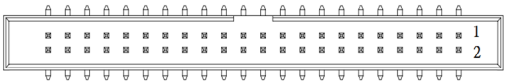
**CN1**
**CN2**

**Standard PC/104 Module Connector**




**IDE1**

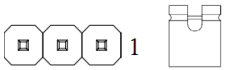
**Standard IDE 44-pin Connector**




PS: Pin 41, 42: +5V/1.5A max

**JP_IDE2**

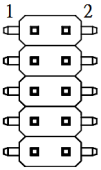
**IDE1 Vcc Jumper Setting (Pitch: 2.54mm)**




| Short | Function |
|---|---|
| 1-2 | +5V / 1.5A (default for HDD) |
| 2-3 | +3.3V / 1.5A |

**CN_FPIO1**

**Power/HDD LED & Reset Button Cable Connector (Pitch: 2.54mm)**



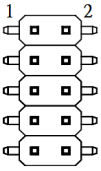

| Pin # | Signal | Pin # | Signal |
|---|---|---|---|
| 1 | HDD LED+ | 2 | Power LED+ |
| 3 | HDD LED- | 4 | Power LED- |
| 5 | Reset SW+ | 6 | NC |
| 7 | Reset SW- | 8 | NC |
| 9 | NC | 10 | NC |

**CN_COM2**

**RS-232/422/485 Port Multi-protocol Connector: (Pitch: 2.54mm)**

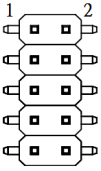
*Note: RTS is the TX enable signal of RS-485. RS-485 will have output only when RTS is Low.*

**RS-232 Mode (SW_COM2 must set 001)**



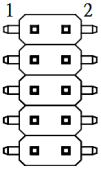

| Pin # | Signal | Pin # | Signal |
|---|---|---|---|
| 1 | DCD | 2 | DSR |
| 3 | RxD | 4 | RTS |
| 5 | TxD | 6 | CTS |
| 7 | DTR | 8 | RI |
| 9 | GND | 10 | NC |

**RS-422 Mode (SW_COM2 must set 000 or 100)**



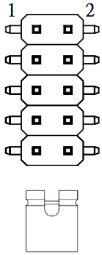

| Pin # | Signal | Pin # | Signal |
|---|---|---|---|
| 1 | TX(B) | 2 | |
| 3 | TX(A) | 4 | |
| 5 | RX(A) | 6 | |
| 7 | RX(B) | 8 | |
| 9 | GND | 10 | |

**RS-485 Mode (SW_COM2 must set 010 or 110)**




| Pin # | Signal | Pin # | Signal |
|---|---|---|---|
| 1 | D- (B) | 2 | |
| 3 | D+ (A) | 4 | |
| 5 | | 6 | |
| 7 | | 8 | |
| 9 | GND | 10 | |

**SW_COM2**

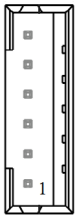



**CN_COM2 Jumper Setting (Pitch: 2mm)**

| Mode | Pin 9-10 | Pin 7-8 | Pin 5-6 | Pin 3-4 | Pin 1-2 | Mode Description |
|---|---|---|---|---|---|---|
| 000 | Open | Open | Short | Short | Short | RS422 Full Duplex |
| 001 | Open | Open | Short | Short | Open | RS232 Pure |
| 010 | Open | Open | Short | Open | Short | RS485 Half Duplex (TXEN#) |
| 100 | Open | Open | Open | Short | Short | RS422 Full Duplex w/ termination |
| 101 | Open | Open | Open | Short | Open | Reserved |
| 110 | Open | Open | Open | Open | Short | RS485 Half Duplex w/ termination (TXEN#) |
| 111 | Open | Open | Open | Open | Open | Reserved |

**CN_KM1**

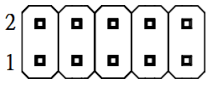
**KB/MS Cable Connector (Pitch: 2mm)**




| Pin # | Signal |
|---|---|
| 1 | MS DAT |
| 2 | KB DAT |
| 3 | GND |
| 4 | +5V |
| 5 | MS CLK |
| 6 | KB CLK |

**CN_USB1**
**CN_USB2**

**USB 2.0 Cable Connector (Pitch: 2.54mm)**

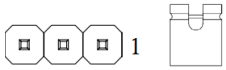



| Pin # | Signal | Pin # | Signal |
|---|---|---|---|
| 1 | +5V | 2 | +5V |
| 3 | USB Port A - | 4 | USB Port B - |
| 5 | USB Port A + | 6 | USB Port B + |
| 7 | GND | 8 | GND |
| 9 | NC | 10 | NC |

**CN_I2C1** **I2C Cable Connector (Pitch: 2.54mm)**

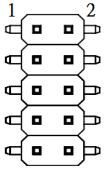

| Pin # | Signal |
|---|---|
| 1 | Vcc Setting by JP_I2C1 |
| 2 | DAT |
| 3 | CLK |
| 4 | NC |
| 5 | GND |

**JP_I2C1** **CN_I2C1 Vcc Jumper Setting (Pitch: 2.54mm)**




| Short | Function |
|---|---|
| 1-2 | +3.3V / 1.5A (default) |
| 2-3 | +5V / 1.5A |

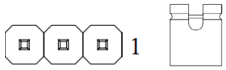
**CN_GP1**
**CN_GP2** **16bits GPIO Cable Connector (Pitch: 2mm)**




| Pin # | Signal | Pin # | Signal |
|---|---|---|---|
| 1 | GP00 / GP10 | 2 | GP07 / GP17 |
| 3 | GP01 / GP11 | 4 | GP06 / GP16 |
| 5 | GP02 / GP12 | 6 | GP05 / GP15 |
| 7 | GP03 / GP13 | 8 | GP04 / GP14 |
| 9 | GND | 10 | Vcc setting by JP_GP1 |

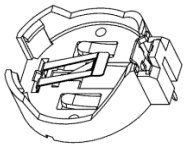
Note 1: w/o protection & isolation.
Note 2: 3.3V w/ 5V I/O tolerant.

**JP_GP1** **CN_GP1 & CN_GP2 Vcc Jumper Setting (Pitch: 2.54mm)**



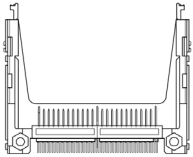

| Short | Function |
|---|---|
| 1-2 | +3.3V / 1.5A (default) |
| 2-3 | +5V / 1.5A |

**CN_BAT1** **CR2032 Battery Holder**



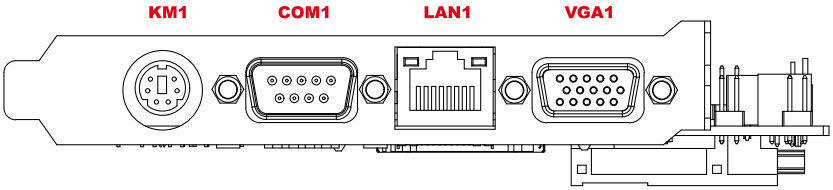
## 2.3. Headers/Connectors Pin Define & Jumper Setting (Bottom)

**CF1** **Standard CF Memory Card Connector**

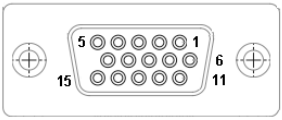


**MSATA1** **mSATA Connector**

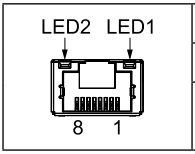
## 2.4. Panel I/O Connectors Definition




**VGA1** **Standard VGA (D-Sub15 / Female) Connector**

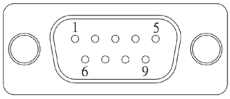



**LAN1** **Standard IEEE802.3 & RJ45 Connector**



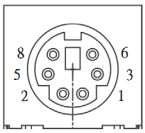

| LED | | 10Mbps | 100Mbps |
|---|---|---|---|
| LED1 | Link | Green | Green |
| LED2 | Active | Yellow Blinking | Yellow Blinking |

**COM1** **Standard RS232/DTE (D-Sub9 / Male) Connector**




| Pin # | Signal | Pin # | Signal |
|---|---|---|---|
| 1 | DCD | 2 | RX |
| 3 | TX | 4 | DTR |
| 5 | GND | 6 | DSR |
| 7 | RTS | 8 | CTS |
| 9 | RI | | |

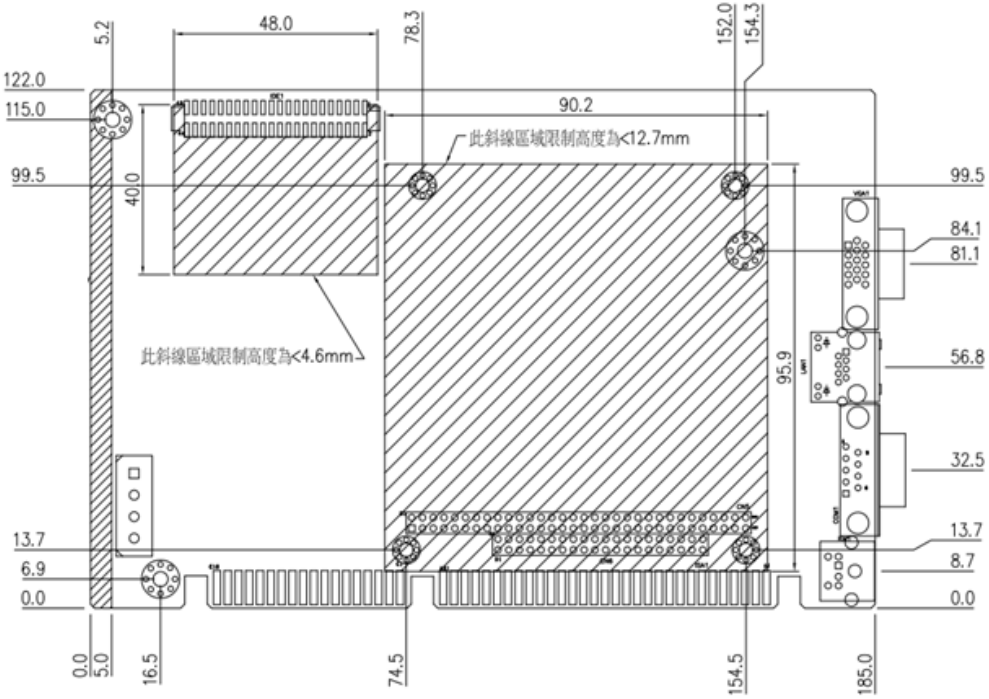
**KM1** **PS/2 Keyboard & Mouse Mixed Connector**




| Pin # | Signal | Pin # | Signal |
|---|---|---|---|
| 1 | KB_DAT | 2 | MS_DAT |
| 3 | GND | 5 | +5V |
| 6 | KB_CLK | 8 | MS_CLK |

## 2.5. Board Dimension

(Unit: mm)

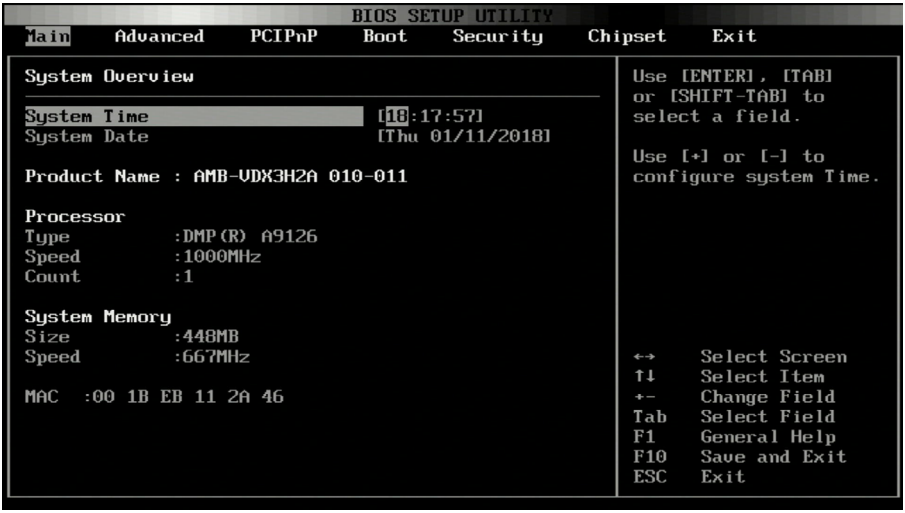


# 3. BIOS Settings

This chapter describes the BIOS menu displays and explains how to perform common tasks needed to get the system up. It also gives detailed explanation of the elements found in each of the BIOS menus. The following topics are covered:

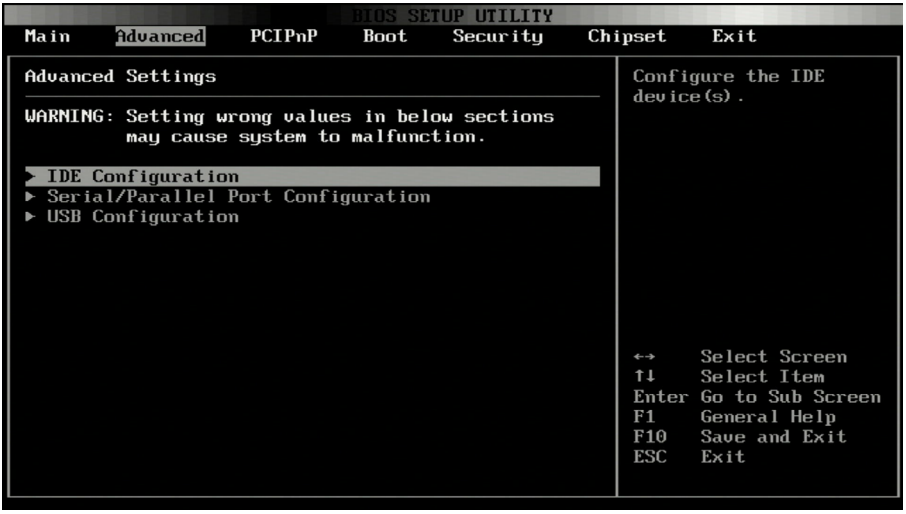
- Main Setup
- Advanced Setup
- PCIPnP Setup
- Boot Setup
- Security Setup
- Chipset Setup
- Exit Setup

## 3.1. Main Setup

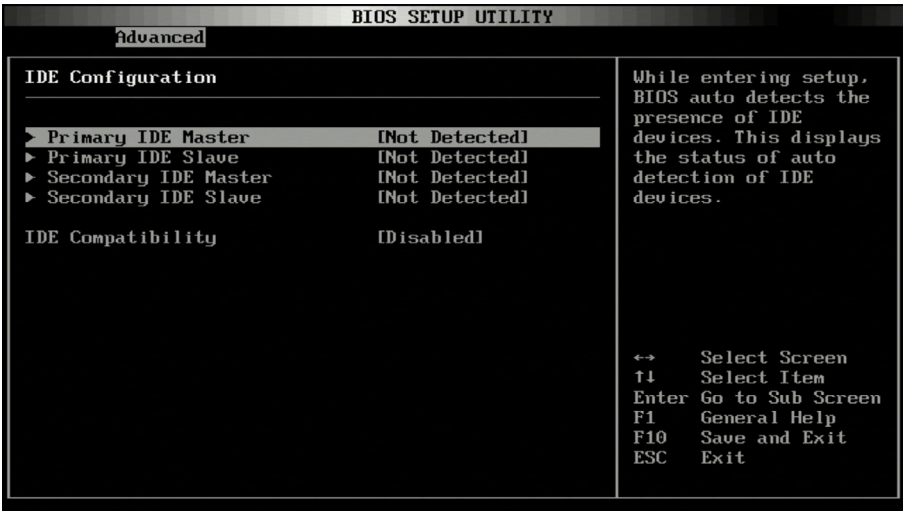



- **System Time**
  Set the system time. Use [ENTER], [TAB], or [SHIFT-TAB] to select a field. Use [+] or [-] to configure system time.
- **System Date**
  Set the system date. Use [ENTER], [TAB], or [SHIFT-TAB] to select a field. Use [+] or [-] to configure system date.

## 3.2. Advanced Setup

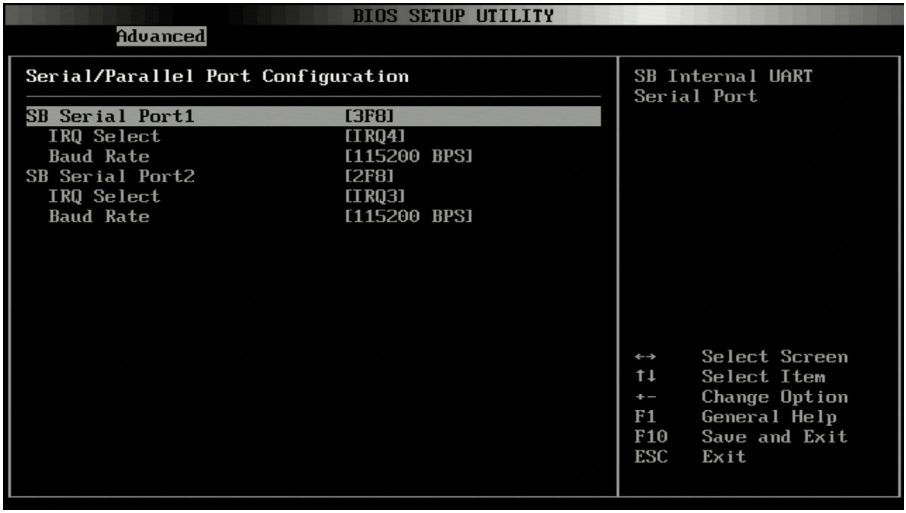



### 3.2.1. IDE Configuration




These settings allow you to configure the features of the integrated IDE controllers.

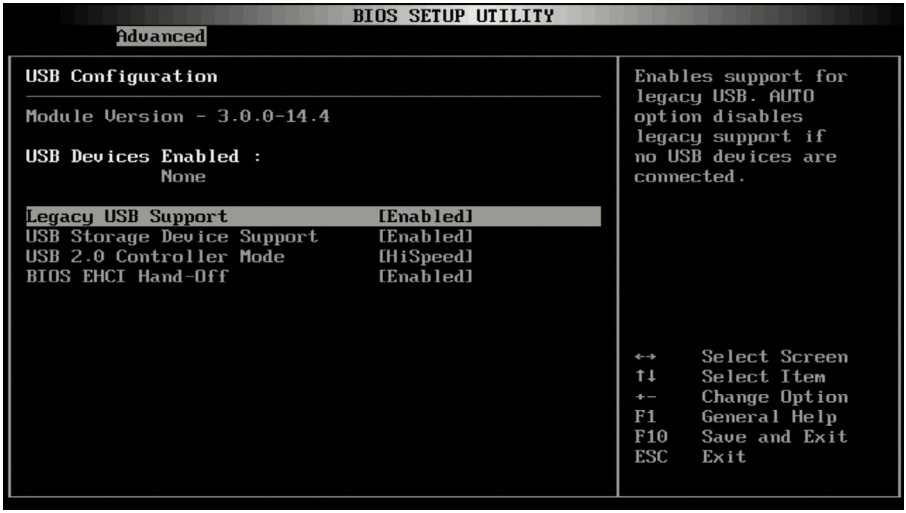
## 3.2.2. Serial/Parellel Port Configuration




These options specify the serial port address and the parallel port mode and select the IRQ of Serial/Parallel Port.

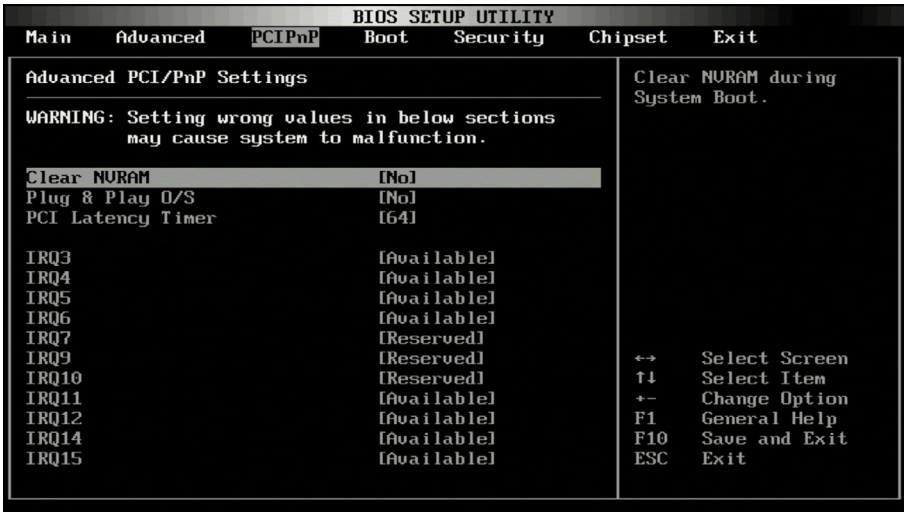
- **SB Serial Port1 ~ Port2**
  SB Internal UART Serial Port.
- **IRQ Select**
  SB Internal UART Serial Port. Serial Port IRQ Select.
- **Baud Rate**
  SB Internal UART Serial Port. Serial Port Baud Rtae Settings.

## 3.2.3. USB Configuration



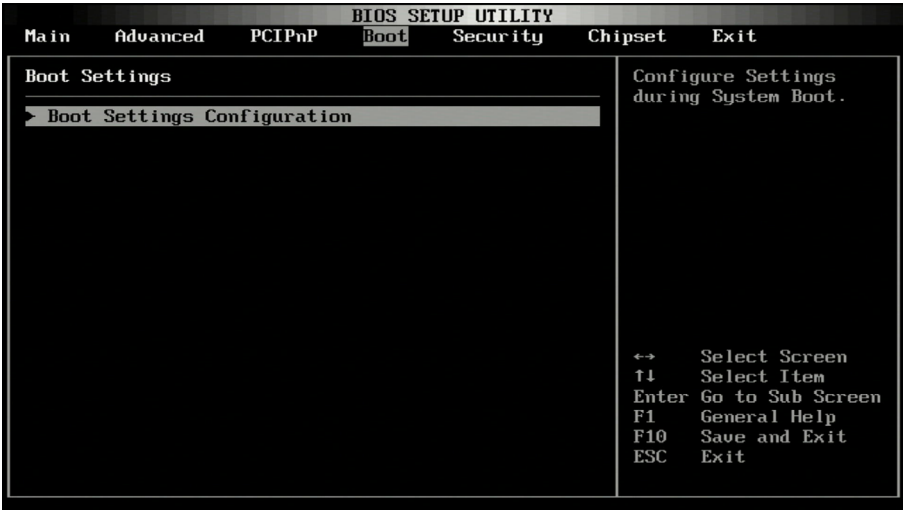

- **Legacy USB Support**
  The Legacy USB support settings allow a USB mouse and keyboard to control the system even if no USB drivers are loaded on the system.
- **USB Storage Device Support**
  Select Enabled for USB Mass Storage Driver support.
- **USB 2.0 Controller Mode**
  Allows you to select the HiSpeed (480Mbps) or FullSpeed (12Mbps).
- **BIOS EHCI Hand-Off**
  This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change shoudle claim by EHCI driver.

## 3.3. PCIPnP Setup

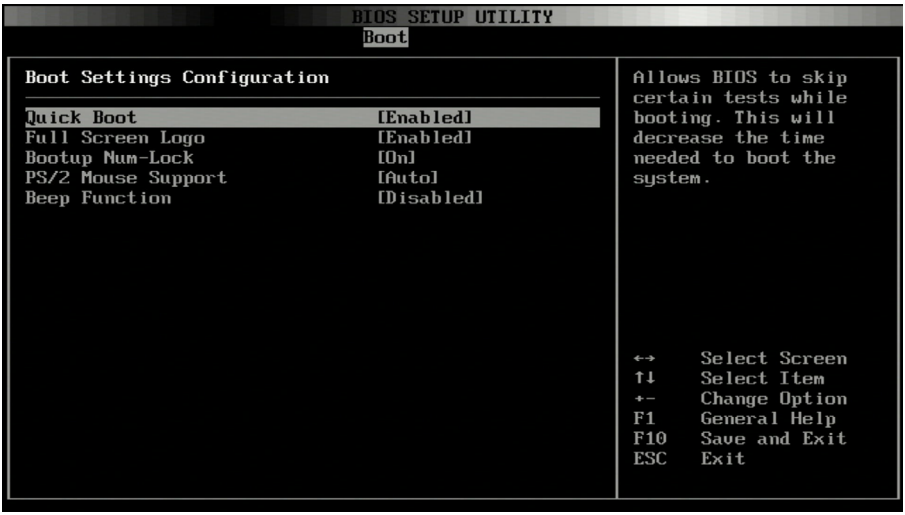



- **Clear NVRAM**
  Clear NVRAM during system boot.
- **Plug & Play O/S**
  No: Lets the BIOS configure all the devices in the system.
  Yes: Lets the operating system configure Plug & Play (PnP) devices not required for boot if your system has a Plug & Play operating system.
- **PCI Latency Timer**
  Allow you to select the value in units of PCI clocks for all of the PCI device latency timer register. Configuration option: 32, 64, 96, 128, 160, 192, 224, 248.
- **IRQ**
  Available: The specified IRQ is available to be used by PCI/PnP devices.
  Reserved: The specified IRQ is reserved for use by legacy ISA devices.

## 3.4. Boot Setup




### 3.4.1. Boot Settings Configuration




- **Quick Boot**
  Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.

- **Full Screen Logo**
  Disabled: Displays normal POST messages.

  Enabled: Displays OEM Logo instead of POST messages.

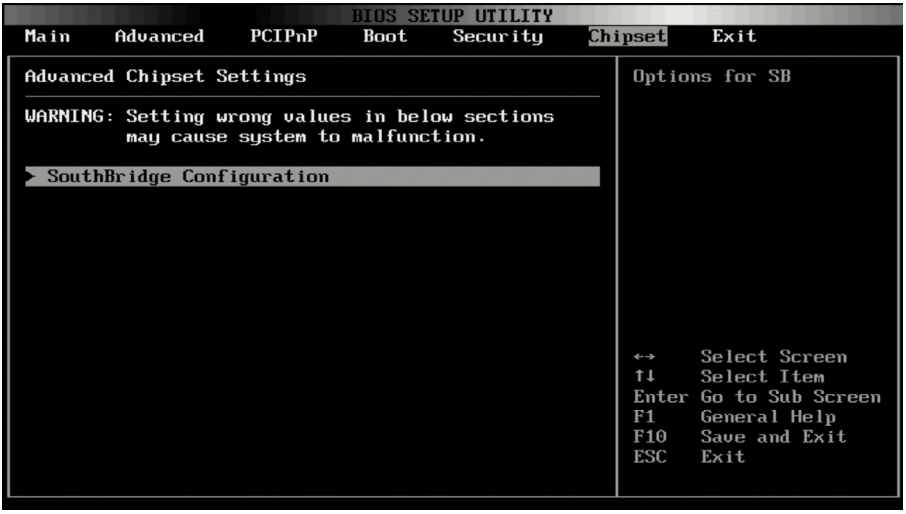
- **Boot-up Num-Lock**
  Select Power-on state for Numlock.
- **PS/2 Mouse Support**
  Select support for PS/2 mouse.
- **Beep Function**
  Enable or Disable beep function.

## 3.5. Security Setup

The Security menu items allow you to change the system security settings. Select an item then press <Enter> key to display the configuration options.

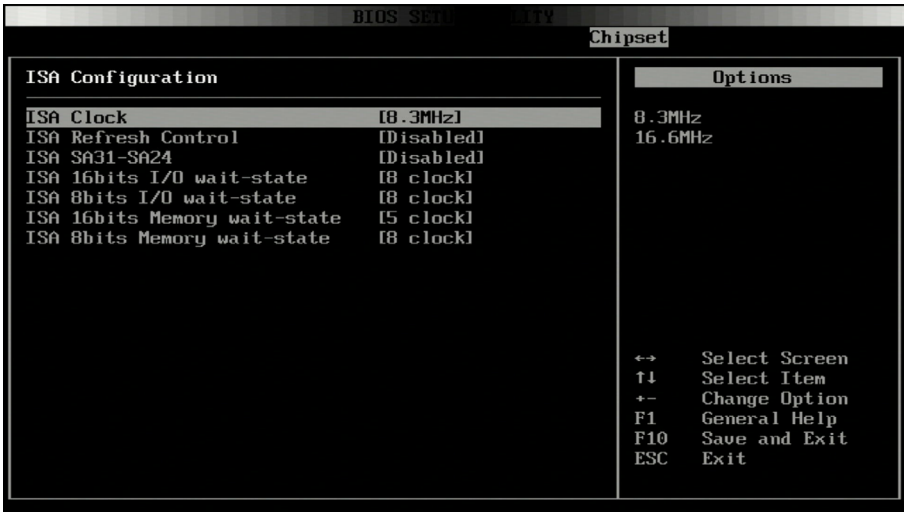

- **Supervisor Password**
  Indicate whether a supervisor password has been set. If the password has been installed, ***Installed*** displays. If not, ***Not Installed*** displays.
- **Change Supervisor Password**
  Install or change the password.

# 3.6. Chipset Setup




- **SouthBridge Configuration**
  Select options for the South Bridge Configuration.

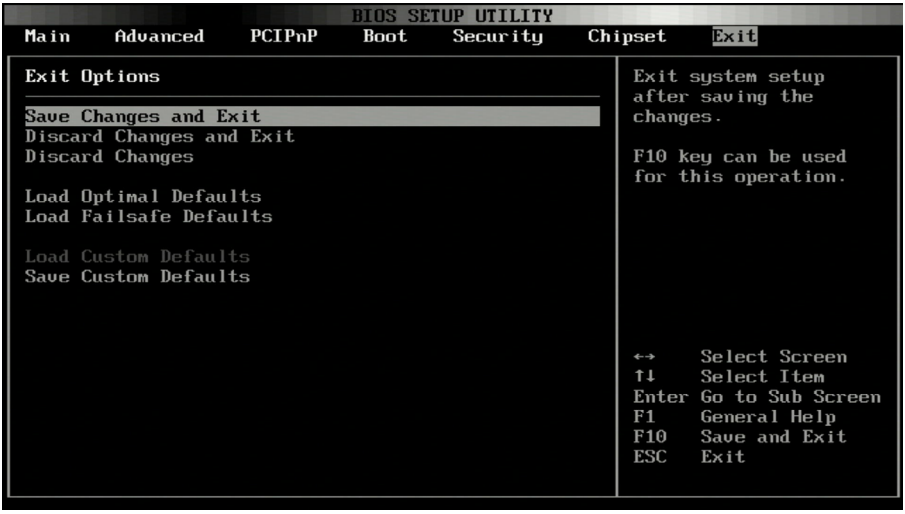
- **ISA Configuration**




This allows you to set the ISA bus frequency and to select the clock value of I/O and Memory.

The ISA bus default speed is 8.3MHz. It can be set to 16.6MHz for increased performance. The number of wait states can also be modified for optimum performance. Not all add-on boards will support higher speed or different wait state settings. If your system does not behave reliably, reset the settings to their default values.

# 3.7. Exit Setup

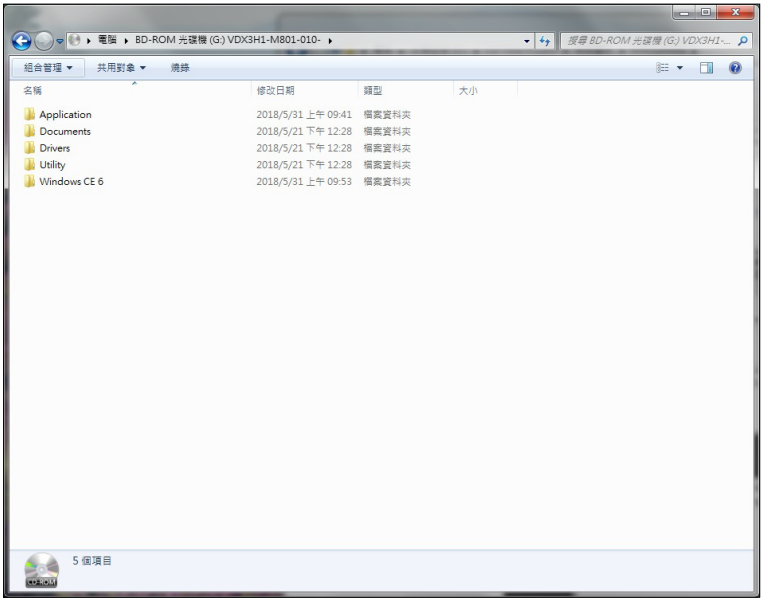



- **Save Changes and Exit**
  Exit system setup after saving the changes. F10 key can be used for this operation.
- **Discard Changes and Exit**
  Exit system setup without saving any changes. ESC key can be used for this operation.
- **Discard Changes**
  Discard changes done so far to any of the setup questions. F7 key can be used for this operation.
- **Load Optimal Defaults**
  Load Optimal Default values for all the setup questions. F9 key can be used for this operation.
- **Load Failsafe Defaults**
  Load Failsafe Default values for all the setup questions. F8 key can be used for this operation.

# 4. Utility Installation

To test the utility, put the Driver CD into your CD-ROM drive.

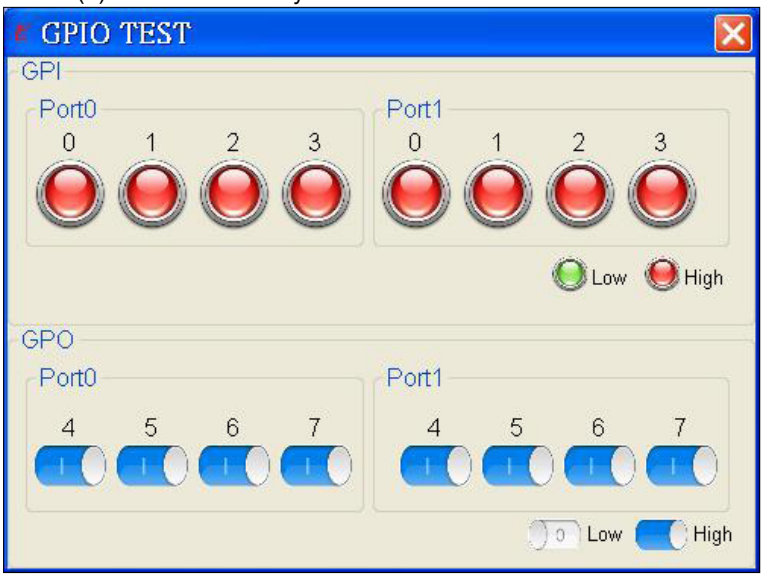
Step 1: Enter the "**Utility**" folder. Run the excution file.



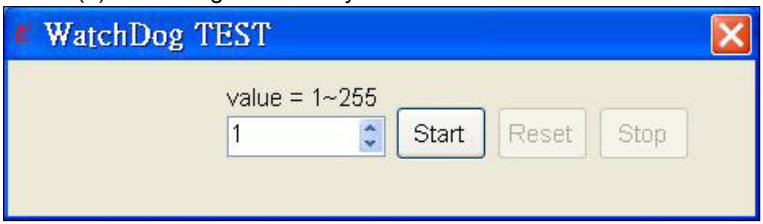

Step 2: The "**Test Utility**" screen appears.

Click Test Item:

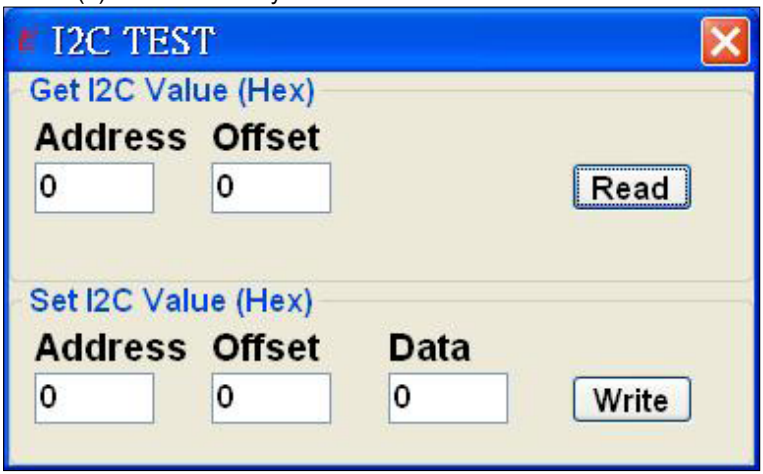

Select (1) GPIO TEST Utility:



Select (2) WatchDog TEST Utility:




Select (3) I2C TEST Utility:



# 5. Software Installation and Programming Guide

## 5.1. Introduction

### 5.1.1. Environment

This test utility develop based on Windows CE 6.0, Windows XP (32bit), and Windows 7 (32bit).

### 5.1.2. GPIO and Watchdog

This model provides both GPIO interface and Watchdog timer. Users can use the GPIO and Watchdog APIs to configure and to access the GPIO interface and the Watchdog timer. he GPIO has 16 input or output pins. The Watchdog timer can be set to 1~511 seconds. Setting the timer to zero disables the timer. The remaining seconds of the timer to reboot can be read from the timer.

## 5.2. API List and Descriptions

### 5.2.1. General

| **Syntax:** | **lib_init(void)** |
|---|---|
| **Description:** | library initialization, using this library must call this function first.<br>Note: The initialization may have to wait for 1 minute due to scan pic port. |
| **Parameters:** | None |
| **Return Value:** | 0: Successful, -1: Fail. |

| **Syntax:** | **lib_close(void)** |
|---|---|
| **Description:** | library close, when not using this library must call this function. |
| **Parameters:** | None |
| **Return Value:** | 0: Successful, -1: Fail. |

## 5.2.2. GPIO

The GPIO port 0 and 1 are always free for use normally.

GPIO direction and data registers:

| | Port 0 | Port 1 | Description |
|---|---|---|---|
| **Data Register** | 78H | 79H | |
| **Direction Register** | 98H | 99H | 0: GPIO pin is input mode<br>1: GPIO pin is output mode |

If send value 0FH to port 98H, it means that GPIO port0 [7-4] are input mode and port[3-0] are output mode.

If send value 00H to port 98H, it means that GPIO port0 [7-0] are input mode.

If send value FFH to port 98H, it means that GPIO port0 [7-0] are output mode.

If send value 03H to port 98H, it means that GPIO port0 [7-2] are input mode and port[1-0] are output mode.

| **Syntax:** | **byte readPort (byte nPort)** |
|---|---|
| **Description:** | Get the status of GPIO data register |
| **Parameters:** | nPort: Direction register value |
| **Return Value:** | 0x00~0xFF (output mode: bit = 0 is Low, bit = 1 is High) |

| **Syntax:** | **void writePort(byte nPort, byte dbValue)** |
|---|---|
| **Description:** | Set the status of GPIO data register |
| **Parameters:** | nPort: Direction register value<br>dbValue: Data register value |
| **Return Value:** | None |

### 5.2.3. Watchdog

| Syntax: | void wdt_start(int nTime, byte nEvent) |
|---|---|
| **Description:** | This function sets the watchdog timer register to the value 'val' and starts to count down. The value could be 1 ~ 511. The unit is second. |
| **Parameters:** | nTime: The range is 1~511.<br>nEvent:<br>IRQ3 = 0x10<br>IRQ4 = 0x20<br>IRQ5 = 0x30<br>IRQ6 = 0x40<br>IRQ7 = 0x50<br>IRQ9 = 0x60<br>IRQ10 = 0x70<br>IRQ11 = 0x80<br>IRQ12 = 0x90<br>IRQ14 = 0xA0<br>IRQ15 = 0xB0<br>NMI = 0xC0<br>SYS_RESET = 0xD0 |
| **Return Value:** | None |

| Syntax: | void wdt_reset() |
|---|---|
| **Description:** | This function reset trigger timer. |
| **Parameters:** | None |
| **Return Value:** | None |

| Syntax: | void wdt_disable() |
|---|---|
| **Description:** | This function stop trigger timer. |
| **Parameters:** | None |
| **Return Value:** | None |

### 5.2.4. I2C

| Syntax: | int i2c_read_byte(byte device_address, byte index, byte *data) |
|---|---|
| Description: | This function get the i2c index data. The data value save to pointer data. |
| Parameters: | None |
| Return Value: | If this function works successfully, the function returns 0, any other value stands for error. |

| Syntax: | int i2c_write_byte(byte device_address, byte index, byte data) |
|---|---|
| Description: | This function write the i2c index data. |
| Parameters: | None |
| Return Value: | If this function works successfully, the function returns 0, any other value stands for error. |

# 6. FAQ

***Q 1. Where can I find the serial number of this product?***

- The serial number (S/N) is a label printed with alpha-numeric character. You can find the S/N label on the bottom of this product or on its packing box.

# Technical Support Form

We deeply appreciate your purchase of Acrosser products. Please find the "**tech_form.doc**" file in our utility CD. If you have any questions or problems about Acrosser products, please fill in the following information. We will answer your questions in the shortest time possible.

## Describe Your Info and Acrosser System Info

- Your Company Name: _____
- Your Contact Info: _____ Phone Number: _____
- Your E-Mail Address: _____
- Your Company Address: _____

  _____
- Acrosser Model Name: _____
- Acrosser Serial Number: _____

## Describe System Configuration

- CPU Type: _____
- Memory Size: _____
- Storage Device (e.g. HDD, CF, or SSD): _____
- Additional Peripherals (e.g. Graphic Card): _____
- Operating System & Version (e.g. Windows 7 Embedded): _____
- Special API or Driver: _____

  (If yes, please provide it for debug.)
- Running Applications: _____
- Others: _____

## Describe Your Problems or Questions:

## Send the above information to one of the following Acrosser contacts:

- Acrosser Local Sales Representative
- Acrosser Authorized Sales Channels
- Acrosser Inquiry --- http://www.acrosser.com/inquiry.html
- Acrosser FAX Number --- 886-2-29992887

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