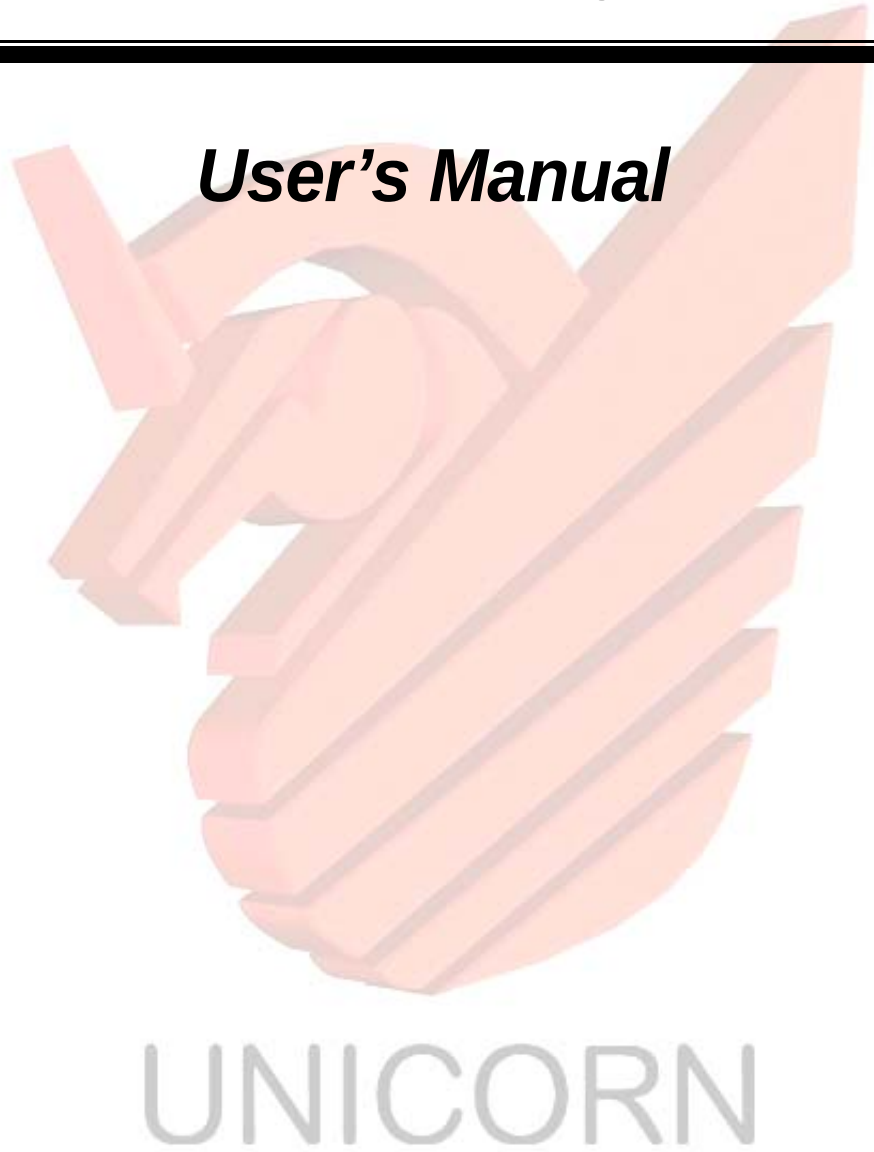
# ENDAT-2794A USERS MANUAL

***UNICORN COMPUTER CORP.***

# ENDAT-2794A

## *User's Manual*

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## Copyright Notice



## Installation Notice

The manufacturer recommends using a grounded plug to ensure proper motherboard operation. Care should be used in proper conjunction with a grounded power receptacle to avoid possible electrical shock. All integrated circuits on this motherboard are sensitive to static electricity. To avoid damaging components from electrostatic discharge, please do not remove the board from the anti-static packing before discharging any static electricity to your body, by wearing a wrist-grounding strap. The manufacturer is not responsible for any damage to the motherboard due to improper operation.

## Specification:

| Model | ENDAT-2794A |
|---|---|
| System Chipset | Intel 945GSE + ICH7-M |
| CPU Supporting | Intel ATOM N270 (1.6GHz 2.5Watt) |
| Memory | One 240-Pin DDR2 socket supports Single-Channel DDR2 400/533 SDRAM up to 2 GB memory |
| Ethernet | 2 x REALTEK RTL8111B 10/100/1000M |
| VGA | Intel® 945GSE Integrated GMA 950 Graphics, shares System Memory |
| Dual view | **ENDAT-2794A** : CRT+LVDS1 (LVDS 18bit)<br>**ENDAT-2794A-L**(Optional) : CRT+LVDS2 (LVDS 18bit or 24bit) or LVDS1 (LVDS 18bit) + LVDS2 (LVDS 18bit)<br>**ENDAT-2794A-D** (Optional): CRT+DVI |
| LVDS support | CH7308B-TF18/24/36/48 bit LVDS support (Optional) |
| Serial/Print | 1 x LPT Port + 4 x Serial Ports with +5V & +12V Power Selector |
| RS 422 / 485 | via COM 2 (Optional) |
| SATA | 2 x SATA2/300M connectors |
| IDE | 1 Enhance IDE Connector for 2 x UDMA 33/66/100 devices |
| USB | USB 2.0 x 6 (4 external + 2 internal) |
| Expansion | One PCI Slot |
| Watch Dog Timer | On-chip supports 1 to 255 seconds / minutes |
| AUDIO | On-board supports HD Audio with 1.2W amplifier |
| Back Panel I/O | PS/2 Keyboard / Mouse Connector |
| | 2 x USB(2.0) + RJ-45 Connector |
| | Double deck D-sub Connector for COM 1/2/3 |
| | 1 x VGA |
| | 1 x SPK |
| I/O Onboard | 8 x Digital I/O (4 x input + 4 x output) Pin Header |
| | Speaker out, Line-in, CD-in, MIC-in, SPDIF, SM Bus Pin Header |
| | VGA / COM4 / LPT1 Box Header |
| | 2 ports USB 2.0 Pin Header |
| Power Supply | Single DC 12V |
| Form Factor | MINI-ITX (170mm x 170mm) with 8 Layers PCB |

# ENDAT-2794A USERS MANUAL

***UNICORN COMPUTER CORP.***

## TABLE OF CONTENTS

# Chapter 1. Introduction

In order to cope with the challenges of the low power consumption issues and demand of much more robust embedded system in diverse application, ENDAT-2794A system board provides the ultimate solution by the Intel® Atom™ N270 processor is validated with the mobile Intel® 945GSE Express Chipset, consisting of the Intel® 82945GSE Graphics Memory Controller Hub and Intel® I/O Controller Hub 7-M.

The ENDAT-2794A features power-efficient graphics with an integrated 32-bit 3D graphics engine based on Intel® Graphics Media Accelerator 950 (GMA950) architecture with SDVO, LVDS and CRT display ports.

The ENDAT-2794A provides rich I/O capabilities and flexibility via high-bandwidth interfaces such as Gigabit Ethernet, Serial ATA, and Hi-Speed USB 2.0 connectivity.

**ENDAT-2794A** supports single +12VDC power input for cost and mechanical efficiency system solution.

**ENDAT-2794A** supports one 240pins DDR2 DIMM socket up to 2GB memory. The highest speed of system memory is up to DDR2-533.

**ENDAT-2794A** provides two on-board REALTEK RT8111B Gigabit Ethernets. It could get more throughputs in communication performance.

**The ideal solutions of ENDAT-2794A**

- POS system
- KIOSK
- Vehicle system
- Interactive system
- Industrial controller
- Gaming system
- Medical system
- Embedded system equipment

## 1-1. Features

### Basic Features:

- Intel® Atom™ N270 processor
- One DDR2 DIMM socket supports 400/533 MHz up to 2 GB
- Intel® Graphics Media Accelerator 950(GMA950)
- Dual PCI Express interface Gigabit Ethernet chip on-board
- HD Audio supports with 1.2W amplifier built-in
- Four fully function serial ports
- Single +12VDC input power

### Software Support

- Drivers for major embedded operating systems: Linux, Windows XP, Windows XP embedded and Windows CE 5.0/6.0.

### Ordering information:

- **Standard edition:**

  **ENDAT-2794A with CRT + LVDS1 (18/36bit LVDS)**

- **Optional features for ENDAT-2794A:**

  **ENDAT-2794A-L: CRT + LVDS2 (18/36/24/48bit LVDS)**

  1. Standard BIOS support CRT + LVDS2 (18/24/36/48bit LVDS)
  2. OEM BIOS is required to support dual view:
     LVDS1 (LVDS 18/36bit) + LVDS2 (LVDS 18/36bit),
     and the display resolution must be identical on both LCD.

  **ENDAT-2794A-D: CRT + DVI**

## 1-2. Unpacking

The motherboard comes securely packaged in a sturdy cardboard shipping carton. In addition to the User's Manual, the motherboard package includes the following items:

- ENDAT-2794A System Board
- One SATA HDD Cables
- LCD cable **(Optional)**
- CD with Driver utilities for on-board chipsets, VGA and LAN adapter

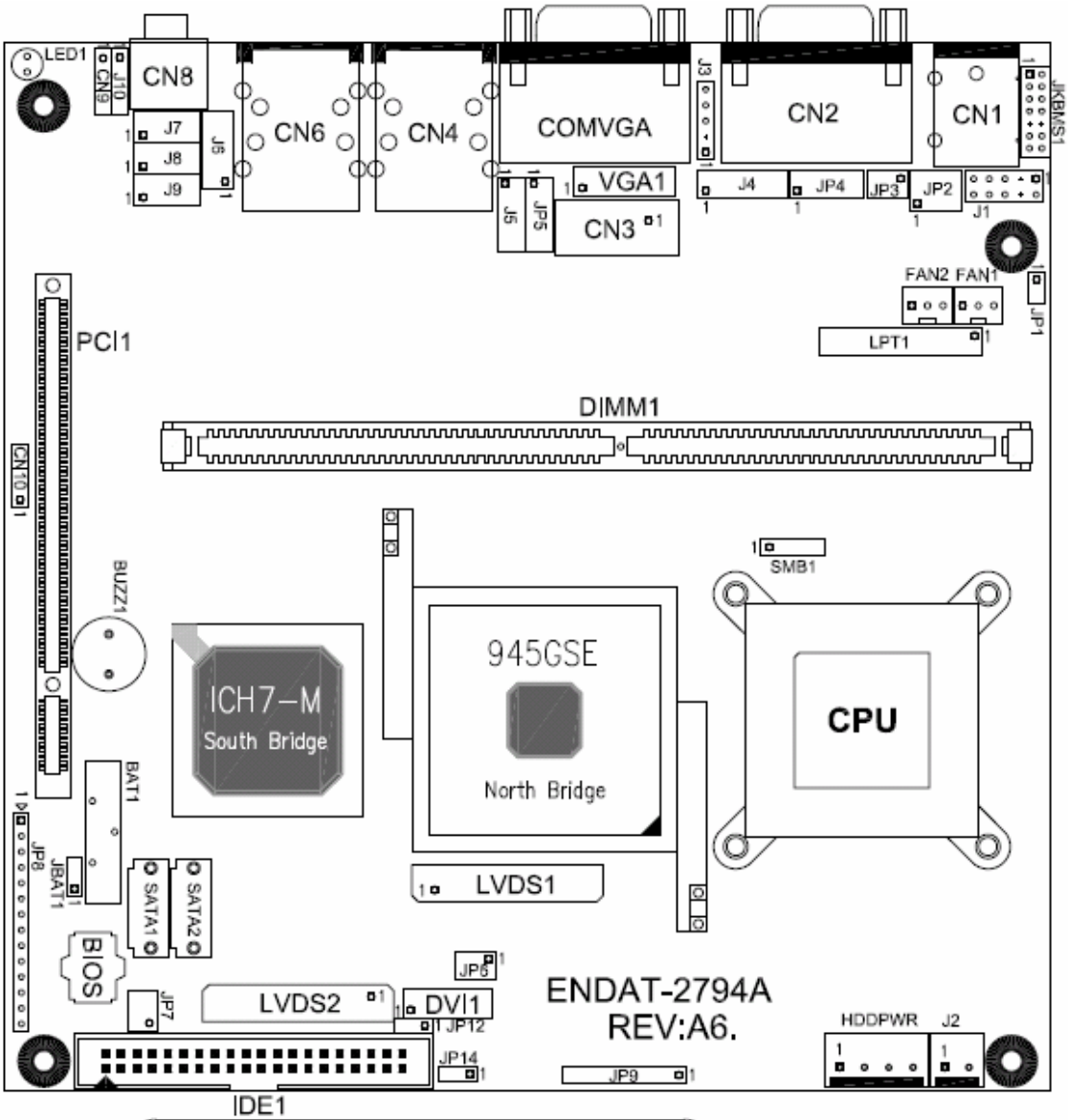
If there is any item missing or damaged, please contact the dealer from whom you purchased the motherboard. Save the shipping material and carton in the event that you want to ship or store the board in the future.

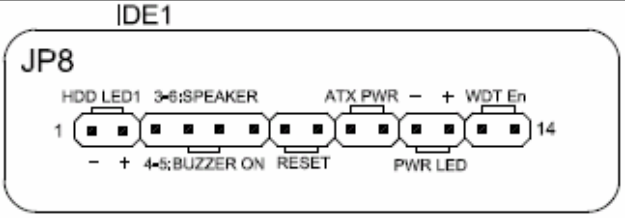
**Note:** Leave the motherboard in its original package until you are ready to install it!

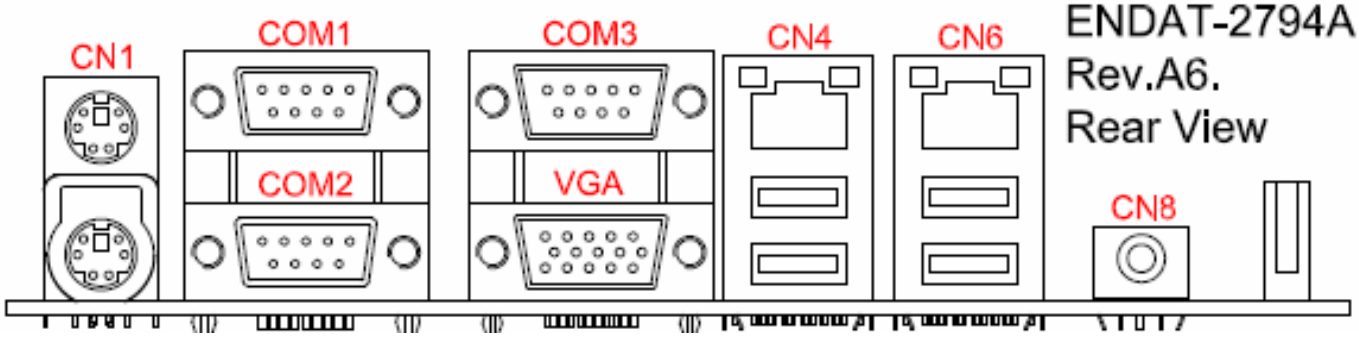
## 1-3. Electrostatic Discharge Precautions

Make sure you properly ground yourself before handling the motherboard, or other system components. Electrostatic discharge can easily damage the components. Note: You must take special precaution when handling the motherboard in dry or air-conditioned environments.

## 1-4. MOTHERBOARD LAYOUT.



# Chapter 2. Setting up the Motherboard

## 2-1. Connectors / Headers and Jumpers

**Connectors Overview:**

| Function | Connectors |
|---|---|
| **Cooling Fan Connector** | FAN1, FAN2 |
| **DC Power Supply Connector** | J2 |
| **HDD Power Connector** | HDDPWR |
| **PS/2 Mouse/KB** | CN1 |
| **LAN/USB Port** | CN4, CN6 |
| **SATA 1, SATA 2** | SATA1, SATA2 |
| **DDR2 RAM Socket** | DIMM1 |
| **CRT & COM3 Output Connector** | COMVGA |
| **COM1 & COM2 Connector** | CN2 |
| **HD Audio Speaker Output** | CN8 |
| **18/36 bit LCD Panel Connector** | LVDS1 |
| **18/24/36/48 bit LCD Panel Connector** | LVDS2 |

**Box Headers, Pin Headers Overview:**

| | |
|---|---|
| **VGA Box Header** | VGA1 |
| **IDE1 Box Header** | IDE1 |
| **Printer Port Box Header** | LPT1 |
| **COM4 Box Header** | CN3 |
| **USB Port Header** | J6 |
| **PS/2 Mouse/KB Header** | J1 |
| **External PS/2 Device Header** | JKBMS |
| **IR Pin Header** | J3 |
| **HD Audio Speaker Output Pin Header** | CN9 |
| **HD Audio Surround Out(Center) & MIC-IN Pin Header** | J7 |
| **HD Audio Surround Out(Left & Right) Pin Header** | J8 |
| **Line-In、CD-In Pin Header** | J9 |
| **Line-In Header** | CN10 |
| **SM Bus** | SMB1 |
| **Digital I/O Pin Header** | J4 |
| **SPDIF Pin Header** | J10 |

**Jumpers Overview:**

| | | |
|---|---|---|
| **LVDS1** | **LCD Voltage Select** | JP6 |
| | **LCD Backlight Voltage Select** | JP9(Pin3-5) |
| | **LCD Backlight Control Voltage Select** | JP9(Pin6-8) |
| | **LCD Backlight Voltage (for +3.3V)** | JP9(Pin9-10) |
| **LVDS2** | **LCD Voltage Select** | JP7 |
| | **LCD Backlight Voltage Select** | JP14 |
| | **LCD Backlight Control Voltage Select** | JP12 |
| | **LCD Backlight Voltage (for +3.3V)** | JP9(Pin1-2) |
| **Clear CMOS** | | JBAT1 |
| **COM1/2/3/4 Voltage Selector** | | JP5, JP4 |
| **RS232 / 485 Selector for COM2** | | JP2, JP3 |
| **Header for Case Panel** | | JP8 |
| **HDD LED** | | JP8: Pin 1(-), Pin 2(+) |
| **External Speaker** | | JP8: Pin 3(-), Pin 6(+) |
| **Buzzer On/Off** | | JP8: Pin 4, Pin 5 |
| **Hardware Reset Switch** | | JP8: Pin 7, Pin 8 |
| **ATX Power Supply On/Off Switch** | | JP8: Pin 9, Pin 10 |
| **Power LED** | | JP8: Pin 11(-), Pin 12(+) |
| **WDT Function Enable/Disable** | | JP8: Pin 13, Pin 14 |

*Please double-check the insertion and orientation of the LCD cable before applying power. Improper installation will result in permanent damage LCD panel.*

## Part 1: Onboard Jumpers

**JBAT1: CMOS Data Clear (1x3 with 2.0mm)**

| | |
|---|---|
| **Pin 2-3 *** | Normal |
| **Pin 1-2** | Close for clear CMOS |

**JP2, JP3: RS232 / 422 / 485 Selectors for COM2 (2.0mm)**

| TYPE | JP2 (3x4 with 2mm) | JP3 (2x3 with 2mm) |
|---|---|---|
| **RS-232 *** | 1-2, 4-5, 7-8, 10-11 | 1-2 |
| **RS-422** | 2-3, 5-6, 8-9, 11-12 | 3-4 |
| **RS-485** | 2-3, 5-6, 8-9, 11-12 | 5-6 |

**JP4, JP5: COM Port Voltage Selector (2x6 with 2.0mm)**

| Voltage | +12V(DC) | R.I. * | +5V(DC) |
|---|---|---|---|
| JP4 (COM1) | 1-2 | 3-4 | 5-6 |
| JP4 (COM2) | 7-8 | 9-10 | 11-12 |
| JP5 (COM3) | 1-2 | 3-4 | 5-6 |
| JP5 (COM4) | 7-8 | 9-10 | 11-12 |

**JP6, JP7: LCD Voltage Select**

| Voltage | +3.3V * | +5V | +12V |
|---|---|---|---|
| JP6 (LVDS1) | 1-2 | 3-4 | 5-6 |
| JP7 (LVDS2) | 1-2 | 3-4 | 5-6 |

**JP9(Pin3-5), JP14: LCD Backlight Voltage Select**

| Voltage | +5V | +12V * |
|---|---|---|
| JP9,Pin3-5 (LVDS1) | 4-5 | 3-4 |
| JP14 (LVDS2) | 1-2 | 2-3 |

**JP9(Pin6-8), JP12: LCD Backlight Control Voltage Select**

| Voltage | +3.3V * | +5V |
|---|---|---|
| JP9,Pin6-8 (LVDS1) | 6-7 | 7-8 |
| JP12 (LVDS2) | 1-2 | 2-3 |

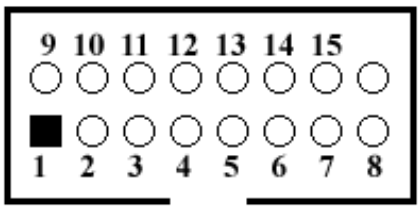
**JP9(Pin6-8), JP12: LCD Backlight Voltage (for +3.3V)**

| | Voltage |
|---|---|
| JP9,Pin1-2 (LVDS1) | +3.3V |
| JP9,Pin9-10 (LVDS2) | +3.3V |

## Part 2: Onboard Connectors and Headers

**VGA1: CRT Box Header Connector (2x8 with 2.0mm)**

| Pin No. | Description | Pin No. | Description |
|---|---|---|---|
| 1 | RED | 9 | N.C. |
| 2 | GREEN | 10 | GND |
| 3 | BLUE | 11 | N.C. |
| 4 | N.C. | 12 | DDC DAT |
| 5 | GND | 13 | H-Sync |
| 6 | GND | 14 | V-Sync |
| 7 | GND | 15 | DDC CLK |
| 8 | GND | | |



**D-SUB Type Connector for COM1 ~ COM3 port (RS-232)**

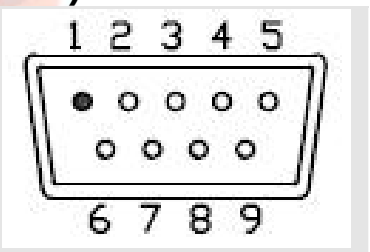
| Pin No. | Description | Pin No. | Description |
|---|---|---|---|
| **1** | DCD | **6** | DSR |
| **2** | RXD | **7** | RTS |
| **3** | TXD | **8** | CTS |
| **4** | DTR | **9** | RI |
| **5** | GND | | |

**D-SUB Type Connector for COM2 port (RS-422→ 4 Wire)**

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| **1** | –TXD | **6** | NA |
| **2** | +RXD | **7** | NA |
| **3** | +TXD | **8** | NA |
| **4** | NA | **9** | –RXD |
| **5** | NA | | |

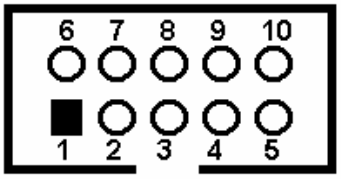
**D-SUB Type Connector for COM2 port (RS-485→ 2 Wire)**

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| **1** | Data – | **6** | NA |
| **2** | NA | **7** | NA |
| **3** | Data + | **8** | NA |
| **4** | NA | **9** | NA |
| **5** | NA | | |




**CN3: COM4 port Box Headers (2x5 with 2.54mm)**

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| **1** | DCD | **6** | DSR |
| **2** | RXD | **7** | RTS |
| **3** | TXD | **8** | CTS |
| **4** | DTR | **9** | RI |
| **5** | GND | **10** | N.C. |




**SMB1: SM Bus (1x4 with 2.54mm)**

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| **1** | SMBCLK | **3** | +3.3V |
| **2** | SMBDATA | **4** | GND |

**LPT1: Printer Port Box Header (2x13 with 2.0mm)**

| Pin No. | Description | Pin No. | Description |
|---|---|---|---|
| **1** | STB# | **10** | ACK# |
| **2** | PD0 | **11** | BUSY |
| **3** | PD1 | **12** | PE |
| **4** | PD2 | **13** | SLCT |
| **5** | PD3 | **14** | AFD# |
| **6** | PD4 | **15** | ERR# |
| **7** | PD5 | **16** | INIT# |
| **8** | PD6 | **17** | SLIN# |
| **9** | PD7 | **18-25** | GND |

**J1: PS/2 Keyboard / Mouse Header (2x5 with 2.54mm)**

| Pin No. | Signal (KB) | Pin No. | Signal (MS) |
|---|---|---|---|
| **1** | KB Data | **2** | MS Data |
| **3** | KEY | **4** | KEY |
| **5** | GND | **6** | GND |
| **7** | +5V(DC) | **8** | +5V(DC) |
| **9** | KB_CLK | **10** | MS_CLK |

**JKBMS1: External PS/2 Device Header (2x7 with 2.0mm)**

| Pin No. | Signal (KB) | Pin No. | Signal (MS) |
|---|---|---|---|
| **1** | MS Data Out | **2** | KB Data Out |
| **3** | MS Data In | **4** | KB Data In |
| **5** | MS CLK Out | **6** | KB CLK Out |
| **7** | MS CLK In | **8** | KB CLK In |
| **9** | KEY | **10** | KEY |
| **11** | +5V(DC) | **12** | +5V(DC) |
| **13** | GND | **14** | GND |

**J6: Pin Header for USB ports (2x5 with 2.54mm)**

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| **1** | USB_VCC | **2** | USB_VCC |
| **3** | USBD4- | **4** | USBD5- |
| **5** | USBD4+ | **6** | USBD5+ |
| **7** | USB_GND | **8** | USB_GND |
| **9** | KEY | **10** | USB_GND |

**J9: LINE-IN & CD-IN Header (2x4 with 2.54mm)**

| Pin No. | Signal (KB) | Pin No. | Signal (MS) |
|---|---|---|---|
| **1** | LINE_IN_R | **2** | CD_IN_R |
| **3** | JACK_DETECT | **4** | GND_AUD |
| **5** | GND_AUD | **6** | GND_AUD |
| **7** | LINE_IN_L | **8** | CD_IN_L |

***Notice: Please connect the jack detect pin to "GND_AUD" if the actual connector cannot support the jack detect function!***

**J8: Surround Out (Left & Right) Header (2x4 with 2.54mm)**

| Pin No. | Signal (KB) | Pin No. | Signal (MS) |
|---|---|---|---|
| **1** | SIDE_SURR_OUT_R | **2** | SURR_OUT_R |
| **3** | SIDE_JACK_DETECT | **4** | JACK_DETECT |
| **5** | GND_AUD | **6** | GND_AUD |
| **7** | SIDE_SURR_OUT_L | **8** | SURR_OUT_L |

***Notice: Please connect the jack detect pin to "GND_AUD" if the actual connector cannot support the jack detect function!***

**J7: Surround Out (Center) & MIC Header (2x4 with 2.54mm)**

| Pin No. | Signal (KB) | Pin No. | Signal (MS) |
|---|---|---|---|
| **1** | MIC_ R | **2** | LFE_OUT |
| **3** | JACK_DETECT | **4** | JACK_DETECT |
| **5** | GND_AUD | **6** | GND_AUD |
| **7** | MIC_ L | **8** | CENTER_OUT |

***Notice: Please connect the jack detect pin to "GND_AUD" if the actual connector cannot support the jack detect function!***

**CN9: SPEAK OUT Pin Header (1x4 with 2.54mm)**

| Pin No. | Function |
|---|---|
| **1** | SPK_OUT_R |
| **2** | JACK_DETECT |
| **3** | GND_AUD |
| **4** | SPK_OUT_L |

**CN10: LINE OUT Pin Header (1x4 with 2.54mm)**

| Pin No. | Function |
|---|---|
| **1** | FRONT_R |
| **2** | GND_AUD |
| **3** | GND_AUD |
| **4** | FRONT_L |

**J10: SPDIF Header (1x5 with 2.0mm)**

| Pin No. | Signal (KB) | Pin No. | Signal (MS) |
|---|---|---|---|
| **1** | +5V | **4** | GND |
| **2** | N.C | **5** | SPDIF-IN |
| **3** | SPDIF-OUT | | |

**J3: IRDA Header (1x5 with 2.54mm)**

| Pin No. | Signal (KB) | Pin No. | Signal (MS) |
|---|---|---|---|
| **1** | +5V | **4** | GND |
| **2** | N.C. | **5** | IR_TX |
| **3** | IR_RX | | |

**J4: DIGITAL I/O Pin Header (2x7 with 2.0mm)**

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| **1** | +5V | **2** | +5V |
| **3** | DIO-O0 | **4** | DIO-I0 |
| **5** | DIO-O1 | **6** | DIO-I1 |
| **7** | GND | **8** | GND |
| **9** | DIO-O2 | **10** | DIO-I2 |
| **11** | DIO-O3 | **12** | DIO-I3 |
| **13** | +3.3V | **14** | +3.3V |

**FAN1, FAN2: Cooling Fan Connector**

| Pin No. | Function |
|---|---|
| **1** | GND |
| **2** | +12V |
| **3** | Sensor Pin |

**J2: DC Power Supply Connector (1x2 with 3.96mm)**

| Pin No. | Function |
|---|---|
| **1** | +12V |
| **2** | GND |

**HDDPWR: Cooling Fan Connector (1x4 with 3.96mm)**

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| **1** | +5V | **3** | GND |
| **2** | GND | **4** | +12V |

**IDE1: IDE Box Header (2x20 with 2.54mm)**

| Pin No. | Description | Pin No. | Description |
|---|---|---|---|
| **1** | IDE Reset# | **2** | GND |
| **3** | IDE data7 | **4** | IDE data8 |
| **5** | IDE data6 | **6** | IDE data9 |
| **7** | IDE data5 | **8** | IDE data10 |
| **9** | IDE data4 | **10** | IDE data11 |
| **11** | IDE data3 | **12** | IDE data12 |
| **13** | IDE data2 | **14** | IDE data13 |
| **15** | IDE data1 | **16** | IDE data14 |
| **17** | IDE data0 | **18** | IDE data15 |
| **19** | GND | **20** | N.C. |
| **21** | IDE REQ | **22** | GND |
| **23** | IDE IOW# | **24** | GND |
| **25** | IDE IOR# | **26** | GND |
| **27** | IDE Ready | **28** | GND |
| **29** | IDE ACK# | **30** | GND |
| **31** | IDE IRQ | **32** | N.C. |
| **33** | IDE A1 | **34** | P66DET |
| **35** | IDE A0 | **36** | IDE A2 |
| **37** | IDECS1# | **38** | IDESC3# |
| **39** | HDLED# | **40** | GND |

**LVDS1: Dual Channel LVDS (18/36 bit only, 1.25mm)**

| Pin No. | Signal | Pin No. | Signal |
|---|---|---|---|
| **1** | VBL (+12V) | **2** | VBL (+12V) |
| **3** | GND | **4** | GND |
| **5** | DISP.ON/OFF | **6** | GND |
| **7** | LCD POWER | **8** | LCD POWER |
| **9** | GND | **10** | GND |
| **11** | TxO0+ | **12** | TxO0- |
| **13** | TxO1+ | **14** | TxO1- |
| **15** | TxO2+ | **16** | TxO2- |
| **17** | N.C. | **18** | N.C. |
| **19** | TxOC+ | **20** | TxOC- |
| **21** | GND | **22** | KEY |
| **23** | TxE0+ | **24** | TxE0- |
| **25** | TxE1+ | **26** | TxE1- |
| **27** | TxE2+ | **28** | TxE2- |
| **29** | N.C. | **30** | N.C. |
| **31** | TxEC+ | **32** | TxEC- |
| **33** | LCD POWER | **34** | LCD POWER |
| **35** | GND | **36** | GND |
| **37** | GND | **38** | GND |
| **39** | VBL (+12V) | **40** | VBL (+12V) |

***Please make sure the Pin 1 location before inserting the LCD connector.***
***Please leave NC for pin-23 to pin-32 if single channel LVDS supports.***

**LVDS2: Dual Channel LVDS (18/24/36/48 bit, 1.25mm)**

| Pin No. | Signal | Pin No. | Signal |
|---|---|---|---|
| **1** | VBL (+12V) | **2** | VBL (+12V) |
| **3** | GND | **4** | GND |
| **5** | DISP.ON/OFF | **6** | GND |
| **7** | LCD POWER | **8** | LCD POWER |
| **9** | GND | **10** | GND |
| **11** | TxO0+ | **12** | TxO0- |
| **13** | TxO1+ | **14** | TxO1- |
| **15** | TxO2+ | **16** | TxO2- |
| **17** | TxO3+ | **18** | TxO3- |
| **19** | TxOC+ | **20** | TxOC- |
| **21** | GND | **22** | KEY |
| **23** | TxE0+ | **24** | TxE0- |
| **25** | TxE1+ | **26** | TxE1- |
| **27** | TxE2+ | **28** | TxE2- |
| **29** | TxE3+ | **30** | TxE3- |
| **31** | TxEC+ | **32** | TxEC- |
| **33** | LCD POWER | **34** | LCD POWER |
| **35** | GND | **36** | GND |
| **37** | GND | **38** | GND |
| **39** | VBL (+12V) | **40** | VBL (+12V) |

***Please make sure the Pin 1 location before inserting the LCD connector.***
***Please leave NC for pin-23 to pin-32 if single channel LVDS supports.***

## 2-2. Installing Memory

The ENDAT-2794A CPU board offers one 240pin DDR2 DIMM socket supporting up to 2GB memory. The speed of DDR2 memory can be **DDR2-533, DDR2-667 or DDR2-800**.

Note: The memory speed will be down grade to DDR2-533 automatically when using a higher speed of DDR2 module from DDR2-533.

## 2-3. Shared VGA Memory

The ENDAT-2794A applies built-in Intel® GMA950 graphic engine with DVMT - **up to 224MB** of system memory. The amount of video memory on motherboard determines the number of colors and the video graphic resolution.

## 2-4. Watch Dog Timer

Watch dog Timer (WDT) is a special design for system monitoring to secure the system work normally. WDT has an independent clock from the oscillator and could set time and clear/refresh WDT counter function. When time is up, WDT will send hardware RESET signal to reset system.

**Timeout Value Range**

-1 to 255

-Second or Minute

**Sample code** (using TurboC/C++ 3.0):

```
outportb(0x4e,0x87); //Unlock register
outportb(0x4e,0x87); //Unlock register
outportb(0x4e,0x07); //Set Logic Device number pointer
outportb(0x4f,0x07); //Set Logic Device number
outportb(0x4e,0xF5);
outportb(0x4f,0x40);
outportb(0x4e,0xF6);
outportb(0x4f,0x00);//0-7 Bit :Time out value for watch dog timer
outportb(0x4e,0xF5);
outportb(0x4f,0x20);//Bit 5:If this bit is set to 1, the counting of watch dog time is enabled (bit 1:0 are select output pulse width of RESET signal: 0 for 1 ms, 1 for 25 ms, 2 for 125ms and 3 for 5 seconds)
```

## 2-5. Digital I/O

**Pin define:**

**J5: DIGITAL I/O Pin Header (2 x 7 with 2.0mm)**

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| **1** | +5V | **2** | +5V |
| **3** | DIO-O0 | **4** | DIO-I0 |
| **5** | DIO-O1 | **6** | DIO-I1 |
| **7** | GND | **8** | GND |
| **9** | DIO-O2 | **10** | DIO-I2 |
| **11** | DIO-O3 | **12** | DIO-I3 |
| **13** | +3.3V | **14** | +3.3V |

Voltage tolerance: +/- 5% with 0V to +5V.

**DIGITAL I/O Pin** (DIO-I3:DIO-I0) Register configuration (register number: E2):

| bit No | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| Map | NA | NA | NA | NA | DIO-I3 | DIO-I2 | DIO-I1 | DIO-I0 |

Sample code for input (using Turbo C/C++ 3.0)

```
#define input_port 0x4f  // Digital input data port
        Unsigned char read_data;
        outportb(0x4e,0x87);                    //Unlock register
        outportb(0x4e,0x87);                    //Unlock register
        outportb(0x4e,0x07);                    //Set Logic Device number pointer
        outportb(0x4f,0x06);                    //Set Logic Device number.
        outportb(0x4e,0xE2);                    //Set active register is CRE2
        read_data=inportb(input_port);          // Read digital input data
        read_data=read_data&&0x0f;              //Get bit3~0
        printf("DIO-Input=%x\n",read_data);     //Show digital input data on screen
```

**DIGITAL I/O Pin** (DIO-O1:DIO-O0) Register configuration (register number: E1):

| bit No | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| Map | DIO-O1 | NA | NA | DIO-O0 | NA | NA | NA | NA |

Sample code for output (using Turbo C/C++ 3.0)

```
        outportb(0x4e,0x87);        //Unlock register
        outportb(0x4e,0x87);        //Unlock register
        outportb(0x4e,0x07);        //Set Logic Device number pointer
        outportb(0x4f,0x06);        //Set Logic Device number.
        outportb(0x4e,0xE1);        //Set active register is CRE1
        outportb(0x4f,0x10);        // Set bit4 (DIO-O0) as logical high
        outportb(0x4f,0x80);        //Set bit7 (DIO-O1) as logical high
```

**DIGITAL I/O Pin** (DIO-O2) Register configuration (register number: F1):

| bit No | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| Map | DIO-O2 | NA | NA | NA | NA | NA | NA | NA |

Sample code for output (using Turbo C/C++ 3.0)

```
        outportb(0x4e,0x87);        //Unlock register
        outportb(0x4e,0x87);        //Unlock register
        outportb(0x4e,0x07);        //Set Logic Device number pointer
        outportb(0x4f,0x06);        //Set Logic Device number.
        outportb(0x4e,0xF1);        //Set active register is CRF1
        outportb(0x4f,0x80);        //Set bit7 (DIO-O2) as logical high
```

**DIGITAL I/O Pin** (DIO-O3) Register configuration (register number: D1):

| bit No | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| Map | NA | NA | NA | NA | NA | NA | NA | DIO-O3 |

Sample code for output (using Turbo C/C++ 3.0)

```
outportb(0x4e,0x87);      //Unlock register
outportb(0x4e,0x87);      //Unlock register
outportb(0x4e,0x07);      //Set Logic Device number pointer
outportb(0x4f,0x06);      //Set Logic Device number.
outportb(0x4e,0xD1);      //Set active register is CRD1
outportb(0x4f,0x01);      //Set bit7 (DIO-O3) as logical high
```

# Chapter 3. AWARD BIOS SETUP

## Phoenix – Award BIOS CMOS Setup Utility

| | |
|---|---|
| **> Standard CMOS Features** | **> PC Health Status** |
| **> Advanced BIOS Features** | **Load Optimized Defaults** |
| **> Advanced Chipset Features** | **Set Supervisor Password** |
| **> Integrated Peripherals** | **Set Password** |
| **> Power Management Setup** | **Save & Exit Setup** |
| **> PnP/PCI Configurations** | **Exit Without Saving** |

Use the BIOS CMOS setup program to modify the system parameters to reflect the environment installed in your system and to customize the system as desired. Press the <DEL> key to enter into the BIOS CMOS setup program when you turn on the power. Settings can be accessed via arrow keys. Press <Enter> to choose an option to configure the system properly.

In the main menu, press F10 or “SAVE & EXIT SETUP” to save your changes and reboot the system. Choose “EXIT WITHOUT SAVING” to ignore the changes and exit the setup procedure. Pressing <ESC> at anywhere during the setup will return to the main menu.

All of the above CMOS BIOS items require board knowledge on PC/AT system architecture. Incorrect setup could cause system malfunctions.

## 3-1. Standard CMOS Features

The Standard Setup is used for the basic hardware system configuration. The main function is for Data/Time and Hard Disk Drive settings.

| Item | Optimized defaults |
|---|---|
| **Date (mm:dd:yy)** | |
| **Time (hh:mm:ss)** | |
| **IDE Channel 0 Master** | **Press Enter** |
| **IDE Channel 0 Slave** | **Press Enter** |
| **IDE Channel 1 Master** | **Press Enter** |
| **IDE Channel 1 Slave** | **Press Enter** |
| **IDE Channel 2 Master** | **Press Enter** |
| **IDE Channel 3 Master** | **Press Enter** |
| **Video** | EGA/VGA |
| **Halt On** | All Errors |

### · Video

Select the type of primary video subsystem.
<Choice: EGA / VGA, CGA 40, CGA 80, MONO>

**IDE Channel 0~3 Primary Master/Slaver**

| Item | Optimized defaults |
|---|---|
| **IDE HDD Auto-Detection** | **Press Enter** |
| **IDE Channel** | **Auto** |
| **Access Mode** | **Auto** |

### · IDE HDD Auto-Detection

Press <Enter> to auto-detect the parameters of the IDE/SATA device on this channel. IDE Channel 0, 1, 2, 3 Master/Slave configure your IDE/SATA devices by using one of the three methods below:

## · IDE Channel Master/Slave

Configure your IDE/SATA devices by using one of the three methods below:

Auto: Lets BIOS automatically detect IDE/SATA devices during the POST. (Default)

None: If no IDE/SATA devices are used, set this item to None so the system will skip the detection of the device during the POST for faster system startup.

Manual: Allows you to manually enter the specifications of the hard drive when the hard drive access mode is set to CHS.

## · Access Mode

Set the hard drive access mode. Options are: Auto (default), CHS, LBA, and Large.

# 3-2. Advanced BIOS Features

This section allows you configuring your system for basic operation. You have the opportunity to select the system's default speed, boot-up priority, keyboard operation and security.

| Item | Optimized defaults |
|---|---|
| **CPU Feature** | **Press Enter** |
| **Hard Disk Boot Priority** | **Press Enter** |
| **Virus Warning** | **Disabled** |
| **Hyper-Threading Technology** | **Enabled** |
| **Quick Power On Self Test** | **Enabled** |
| **First Boot Device** | **Hard Disk** |
| **Second Boot Device** | **CDROM** |
| **Third Boot Device** | **Removable** |
| **Boot Other Device** | **Enabled** |
| **Boot Up NumLock Status** | **On** |
| **Gate A20 Option** | **Normal** |
| **Typematic Rate Setting** | **Disabled** |
| **Typematic Rate (Chars/Sec)** | **6** |
| **Typematic Delay (Msec)** | **250** |
| **Security Option** | **Setup** |
| **APIC Mode** | **Enabled** |
| **MPS Version Control For OS** | **1.4** |
| **OS Select For DRAM > 64MB** | **Non-OS2** |

## · Hyper-Threading Technology

Hyper-Threading technology is a technique which enables a single CPU to act like multiple CPU's.

### · APIC Mode

This item can enable or disable the APIC (Advanced Programmable Interrupt Controller). Due to compliance to PC2001 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQs resources for the system. Leave this field in its default setting.

### · MPS Version Control For OS

This item allows you selecting which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version that is supported by your operating system. To find out which version to use, consult the vendor of your operating system.

## 3-3. Advanced Chipset Features

This section allows you configuring the system based on the specific features of the installed chipset. This chipset manages bus speeds and the access to the system memory resources, such as DRAM and the external cache. It also coordinates the communications with the PCI bus. It must be stated that these items should never be altered. The default settings have been set as they provide the best operating conditions for your system. Users can change settings if find any data is lost while operating the system.

| Item | Optimized defaults |
|---|---|
| **Video BIOS Cacheable** | **Enabled** |
| **System BIOS Cacheable** | **Enabled** |
| **Memory Hole At 15M-16M** | **Disabled** |
| **** VGA Setting **** | |
| **On-Chip Frame Buffer Size** | **8MB** |
| **DVMT Mode** | **DVMT** |
| **DVMT/FIXED Memory Size** | **128MB** |
| **Boot Display** | **CRT** |
| **Panel Number** | **1024x768x24bit 1CH** |

### · On-Chip Frame Buffer Size

This field is used to select the onboard VGA's frame buffer size that is shared from the system memory.
<Choice: 1MB, 8MB>

### · DVMT Mode

Intel's Dynamic Video Memory Technology (DVMT) allows the system to dynamically allocate memory resources according to the demands of the system at any point in time. The key idea in DVMT is to improve the efficiency of the memory allocated to either system or graphics processor.

It is recommended that you set this BIOS feature to DVMT Mode for maximum performance. Setting it to DVMT Mode ensures that system memory is dynamically allocated for optimal balance between graphics and system performance.

### · DVMT/FIXED Memory

When set to DVMT/FIXED Mode, the graphics driver will allocate a fixed amount of memory as dedicated graphics memory, as well as allow more system memory to be dynamically allocated between the graphics processor and the operating system.

## 3-4. Integrated Peripherals

The IDE hard drive controllers support up to two separate hard drives. These drives have a master/slave relationship that is determined by the cabling configuration used to attach them to the controller.

**Integrated Peripherals**

| Item | Optimized defaults |
|---|---|
| **OnChip IDE Device** | **Press Enter** |
| **Onboard Device** | **Press Enter** |
| **SuperIO Device** | **Press Enter** |
| **Onboard Lan Boot ROM** | **Disabled** |
| **Onboard Serial Port 3** | **3E8H** |
| **Serial Port 3 IRQ** | **IRQ5** |
| **Onboard Serial Port 4** | **2E8H** |
| **Serial Port 4 IRQ** | **IRQ10** |
| **IR Function** | **Disabled** |
| **USB Device Setting** | **Press Enter** |

### · Onboard LAN Boot ROM

By default, this field is disabled. Enable this field if you wish to use the boot ROM (instead of a disk drive) to boot-up the system and access the local area network directly.

**OnChip IDE Device**

| Item | Available Options: |
|---|---|
| IDE HDD Block Mode | Enabled |
| IDE DMA transfer access | Enabled |
| On-Chip Primary PCI IDE | Enabled |
| IDE Primary Master PIO | Auto |
| IDE Primary Slave PIO | Auto |
| IDE Primary Master UDMA | Auto |
| IDE Primary Slave UDMA | Auto |
| On-Chip Secondary PCI IDE | Enabled |
| IDE Secondary Master PIO | Auto |
| IDE Secondary Slave PIO | Auto |
| IDE Secondary Master UDMA | Auto |
| IDE Secondary Slave UDMA | Auto |
| *** On-Chip Serial ATA Setting *** | |
| On-Chip Serial ATA | Auto |
| SATA Port Speed Settings | Disabled |
| PATA IDE Mode | Secondary |
| SATA Port | P0,P2 is Primary |

## · IDE Primary Master/Slave PIO and IDE Secondary Master/Slave PIO

The four IDE PIO (programmed Input/Output) fields let you set a PIO mode (0-4) for each IDE device that the internal PCI IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

## · IDE Primary Master/Slave UDMA and IDE Secondary Master/Slave UDMA

These fields allow you to set the Ultra DMA in use. When Auto is selected, the BIOS will select the best available option after checking your hard drive or CD-ROM.

***Notice: The Secondary IDE channel is not available for this board. All settings of Secondary IDE channel will be ignore by system BIOS.***

## · IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sectors read/write.

## On-Chip Serial ATA

| | |
|---|---|
| **Disabled** | Disables the onboard SATA. |
| **Auto** | The system will detect the existing SATA and IDE drives then automatically set them to the available master/slave mode. |
| **Combined Mode** | This option allows you to use both IDE and SATA drives; allowing a maximum of 4 drives. You must manually set the SATA drives' master/slave mode in the "Serial ATA Port0 Mode" and "Serial ATA Port1 Mode" fields. |
| **Enhanced Mode** | This option allows you to use both IDE and SATA drives; allowing a maximum of 6 drives. |
| **SATA Only** | This option automatically sets the SATA drives to Primary Master and Secondary Master modes. Since both drives are in master mode, you cannot set the IDE drives to Master mode. The "Serial ATA Port0 Mode" and "Serial ATA Port1 Mode" fields will not be configurable. |

## SATA PORT Speed Settings

The SATA PORT Speed Settings option controls the maximum access speed allowed for the connected SATA devices, with the GEN I setting used for SATA-150 type devices and GEN II used for SATA II type devices.

## PATA IDE Mode

These fields are used to select the master/slave mode of the serial ATA drives. Make sure they do not conflict with the settings of the IDE hard drives.

**SuperIO Device**

| Item | Available Options: |
|---|---|
| **POWER ON Function** | **BUTTON ONLY** |
| **Onboard Serial Port 1** | **3F8/IRQ4** |
| **Onboard Serial Port 2** | **2F8/IRQ3** |
| **Onboard Parallel Port** | **378/IRQ7** |
| **Parallel Port Mode** | **SPP** |
| **ECP Mode Use DMA** | **3** |
| **PWRON After PWR-Fail** | **off** |

- **Parallel Port Mode**

  Set the parallel port mode.

  <Choice: SPP, EPP, ECP, ECP + EPP,>

- **PWRON After PWR-Fail**

  This item enable to power on the system after power failure

**USB Device Setting**

| Item | Available Options: |
|---|---|
| USB 1.0 Controller | Enabled |
| USB 2.0 Controller | Enabled |
| USB Operation Mode | Full/Low Speed |
| USB Keyboard Function | Enabled |
| USB Storage Function | Enabled |

## 3-5. Power Management Setup

The Power Management Setup allows users configuring the system to save energy in a most effective way while operating in a manner consistent with their own style of computer use.

| Item | Optimized defaults |
|---|---|
| ACPI function | Enabled |
| ACPI Suspend Type | S1(POS) |
| Run VGABIOS if S3 Resume | AUTO |
| Power Management | User Define |
| Video off Method | DPMS |
| Vido off In Suspend | Yes |
| Suspend Type | Stop Grant |
| Suspend Mode | Disabled |
| HDD Power Down | Disabled |
| Soft-Off by PWR-BTTN | Instant-Off |
| USB KB Wake-Up From S3 | Disabled |
| Power-On by Alarm | Disabled |
| Resume by Alarm | Disabled |
| Date (of Month) Alarm | 0 |
| Time (hh:mm:ss) Alarm | 0 : 0 : 0 |

## · ACPI Function

This function should be enabled only in operating systems that support ACPI. Currently, only Windows® 98SE/2000/ME/XP supports this function. When this field is enabled, the system will ignore the settings in the “Suspend Mode” and “HDD Power Down” fields. If you want to use the Suspend to RAM function, make sure this field is enabled then select“S3 (STR)” in the field below.

## · ACPI Suspend Type

This field is used to select the type of Suspend mode.

| | |
|---|---|
| **S1(POS)** | Enables the Power On Suspend function. |
| **S3(STR)** | Enables the Suspend to RAM function. |
| **S1 & S3** | If S3 state is supported by the system, by default [S3] is automatically selected. Otherwise [S1] is selected. |

## · Resume On RTC Alarm

When [Enabled], your can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode.

## · Power Management

This field allows you to select the type of power saving management modes.

## · Video Off Method

This field defines the Video Off features.

| | |
|---|---|
| **Blank Screen** | Writes blanks to the video buffer. |
| **V/H SYNC + Blank** | Enables the Suspend to RAM function. |
| **DPMS** | Allows BIOS to control the video display. |

## · Soft-Off by PWR-BTTN

This field defines the power-off mode when using an ATX power supply.

# 3-6. PnP/PCI Configurations

This section describes the configuration of the PCI bus system. PCI is a system that allows I/O device to operate at speeds nearing the speed of the CPU itself, when communicating with its own special components. This section covers some very technical items. It is strongly recommended that only experienced users make any changes to the default settings.

| Item | Optimized defaults |
|---|---|
| **Init Display First** | **PCI Slot** |
| **Reset Configuration Data** | **Disabled** |
| **Resources Controlled By** | **Auto(ESCD)** |
| **IRQ Resources** | **Press Enter** |

.

· **Reset Configuration Data**

| | |
|---|---|
| **Enabled** | The BIOS will reset the Extended System Configuration Data (ESCD) once automatically. It will then recreate a new set of configuration data. |
| **Disabled** | The BIOS will not reset the configuration data. |

· **Resources Controlled By**

| | |
|---|---|
| **Auto(ESCD)** | The system will automatically detect the settings for you. |
| **Manual** | Choose the specific IRQ in the “IRQ Resources” field. |

## 3-7. PC Health Status

This screen shows the information of temperature, Fan speed and Vcore etc. It also can set CPU warning temperature to protect CPU.

**PC Health Status**

| Item | Optimized defaults |
|---|---|
| **Shutdown Temperature** | **Disabled** |
| **VCC** | |
| **CPU Vcore** | |
| **+5V Voltage** | |
| **+12V Voltage** | |
| **+1.8V Voltage** | |
| **CPU Temperature** | |
| **Fan 1 Speed** | |
| **Fan 2 Speed** | |

# Chapter 4. VGA, SDVO and drivers

## 4-1. Graphic controller Features

The ENDAT-2794A integrated a high performance Intel® GMA950 GFX engine with Intel® DVMT technology. The Intel® GMA950 offering the 3D enhancements enable greater flexibility and scalability. Improved realism with support for Microsoft DirectX* 9.1.

The ENDAT-2794A integrated graphics device (IGD) delivering cost competitive 3D, 2D and video capabilities. It's contains an extensive set of instructions for 3D operations, 2D operations, motion compensation, overlay, and display control. The video engines support video conferencing and other video applications. The Intel® GMA950 uses a UMA configuration with Intel® DVMT for graphics memory.

The ENDAT-2794 provides two LVDS ports to support multiple digital display application through on-chip (18/36bit LVDS) and SDVO port (18/24/36/48 bit LVDS).

The build-in Graphics Controller's main features include:

- High Performance 3D and 2D graphics controller
- Support Microsoft DirectX* 9.1
- DVMT 3.0
- Support resolution up to 1600 x 1200 (through on-chip 18/36 bit LVDS)
- Support resolution up to 1920 x 1080 (through SDVO 18/24/36/48 bit LVDS)
- Support resolution up to 1920 x 1080 (through DVI single link)
- Support resolution up to 2048 x 1536 (through CRT)

## 4-2. Driver Utility Installation Guide

1. When finishing the installation of Windows XP, Vista, please install the relative Intel® chipsets, display and AUDIO driver manually for compliance compatibility of hardware environment.

2. Please contact sales department of UNICORN for Embedded OS user driver (Linux, Windows CE and Windows XP embedded). All of embedded OS driver is not be included in any versions of driver CD-ROM from UNICORN.

***Please download or check from Intel® web site: www.intel.com for more information or last versions of driver as needs!***

# Appendix A: FLASH Memory Utility

Using this utility to update the system BIOS from a disk file to the on board Flash memory. Be aware the improper change of the system BIOS will cause the system to malfunction.

Using utility as follows:

1. Prepare a bootable (MS-DOS) storage (HDD, USB sticker, ZIP…etc) and copy the BIOS file and flash utility to same direction.
2. At the DOS prompt, type A:>AWDFLASH (or C:\AWDFLASH) and press <Enter>

| AwardBIOS FLASH Utility V8.24G<br>C>Phoenix Technologies Ltd. All Rights Reserved |
|---|
| Flash Type –<br><br>File Name to Program: |
| Message: |

3. Enter the name of the system BIOS disk file into the "File Name to Program" field. The following message appears in the "Message" field
4. Do you want to save BIOS (y/n)?
5. To update the FLASH memory from the system BIOS disk file, type Y
6. After complete updating, please re-boot the system (press "**F1**" key)
7. For upgrade BIOS procedure, please refer to our web site: http://www.unicorn-computer.com.tw

**** Please turn off system and clear CMOS data by JBAT1.***

**** Please restart your system and load setup default.***

# Appendix B: LIMITED WARRANTY

Standard Two years limited warranty on all our ENDAT series all-in-one motherboards and embedded board. Products that become defective during the warranty period shall be repaired, or subject to manufacturer's option, replaced. The limited warranty applies to normal proper usage of the hardware and does not cover products that have been modified or subjected to unusual electrical or physical stress. Unicorn Computer Corp is not liable to repair or replace defective goods caused by improper using or use of unauthorized parts. The following situations will be charged:

1. The products during the warranty but defective caused by improper using or artificial external pressure and result in the components damages. According to the damage situation, the manufacturer has the rights to decide to repair or not. The manufacturer will charge the parts/repair cost and the returning shipping charge.
2. The products out of warranty will charge the parts/repair cost and the returning shipping charge as per the repair status.
3. The manufacturer has the rights to decide to repair or not based on the stock of parts for the products which are phased out of the production.
4. Please e-mail or fax the RMA Service Request Form when have the defective products.

## RMA SERVICE REQUEST FORM

When requesting RMA service, please fill out this “RMA Service Request Form”. This form needs to be shipped with your returns. Service cannot begin until we have this information.

## RMA NO.:

| | |
|---|---|
| Company: | Person to Contact: |
| Phone No: | Purchase Date : |
| Fax No. : | Applied Date : |
| Return Shipping Address: | |

| Model No. | Serial No. | Problem Code | Remark |
|---|---|---|---|
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| | | | |

- **Issue Code of defect.**

| | | | |
|---|---|---|---|
| 01 | Second Times R.M.A. | 11 | Memory Socket Bad |
| 02 | No Screen (No Boot) | 12 | Hang Up Hardware |
| 03 | VGA (Display) Fail | 13 | Hang Up Software |
| 04 | CMOS Data Lost | 14 | PCB Problem |
| 05 | FDC Fail | 15 | CPU Socket Bad |
| 06 | HDC Fail | 16 | LAN Fail |
| 07 | Bad Slot | 17 | Audio Fail |
| 08 | BIOS Problem | 18 | Serial Port Fail |
| 09 | Keyboard Controller Fail | 19 | Parallel Port Fail |
| 10 | Cache RAM Problem | 20 | Others |

Please specify the following when returning the RMA boards:
(1) Hardware Configuration (2) OS or Software (3) Testing Program

_____
Authorized Signature