ENDAT-4946i/M

User's Manual

Rev. A6

PCB version: A6 and later

Jan.4.2010

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-4946i/M
Form Factor	Mini-ITX 170 mm x 170 mm (6.69"x6.69")
System Chipset	INTEL® 945GM + INTEL® ICH7
CPU Supporting	**ENDAT-4946M:** 533/667 FSB with 478 pin Intel® Celeron® M 423 processor
	ENDAT-4946i: 533/667 FSB with 478 pin Intel® Core™ Solo, Intel® Core™ Duo and Intel® Core™2 Duo processor
Memory	1 x 240 pin DDR2 socket supports DDR2 533/667 up to 2GB
Ethernet	Realtek 8111B PCIE Gigabit LAN
VGA	INTEL® GMA950 Graphic Controller with DVMT up to 224MB(max)
LCD Interface	Onboard LVDS support 18/24/36/48bit Single/Dual Channels via internal box header **(optional)**
DVI Interface	Onboard DVI output via internal pin header **(optional)**
Display ratio	4:3 and 16:9
Serial / Parallel	4 Serial Port w/+5V, +12V Power Selector / 1 Parallel port
Watchdog Timer	Winbond 83627THG on-chip support 1 to 255 seconds/minutes
IDE Connector	1 x 40pin IDE connector support UDMA 33/66/100
SATA Connector	2 ports 300MHz Serial ATA Device
AUDIO	On-board AC'97 with 1.2W amplifier
Expansion Slot	One PCI slot with PCI 2.2 compliance
I/O Port	PS/2 Keyboard / Mouse Connector
	2 x USB (2.0) + RJ-45 Connector w/LED indicator
	D-sub Connector for COM 1, 2, 3 with POWER
	1 x 25 Pins D-Sub Connector (LPT)
	1 D-Sub Connector (VGA)
	Internal pin header: KB, MS, USB (2.0) x4, AUX/CD-IN, SPDIF IN/OUT, RF MIC IN, IR
Digital IO	8 bit input and 8 bit output (TTL level) by pin header
RS-422/485	Via COM2 **(Optional)**
USB Port	6 x USB2.0 onboard
Power Supply	ATX power supply

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Chapter 1. Introduction

ENDAT-4946i/M supports high performance processor of Intel® Celeron® M 423 (for ENDAT-4946M), Intel® Core™ Solo, Intel® Core™ Duo and Intel® Core™2 Duo processor (for ENDAT-4946i) with 533 and 667 Front Side Bus. It also supports high speed DDR-2 memory with 64-bit wide interfaces with non-ECC DIMM (up to 2GB). Only Double-Data-Rate Two Synchronous Dynamic Random Access Memory is supported and the speed of memory can be 533 and 667 MHz.

ENDAT-4946i/M provides an integrated graphics (Intel® Graphics Media Accelerator 950) accelerator delivering cost competitive 3D, 2D, and video capabilities.
ENDAT-4946i/M video engines support video conferencing and other video applications. Instead of a dedicated local graphics memory interface, ENDAT-4946i/M uses a UMA configuration for optimal memory utilization and performance that deliver 3D graphics with sharp images, fast rendering, smooth motion and extreme detail.

ENDAT-4946i/M contains one integrated Serial ATA host controllers capable of independent DMA operation on two ports. The SATA controllers are completely software transparent with the IDE interface, while providing a lower pin count and higher performance. The data transfer rate is up to 300 MB/s.

ENDAT-4946i/M is an ideal model for various kind of application:

- POS system
- KIOSK
- Interactive system
- Airport Terminal Controller
- Industrial controller
- Digital entertainment
- Embedded system equipment

1-1. Features

Basic Feature:

- Board format: Mini-ITX (170mm x 170 mm)
- Supports Socket 478 CPU (FSB 400/533/667 MHz)
- Digital I/O: 8 bits in and 8 bits out (5V)
- Supports DDR-2 533/667 SDRAM up to 2GB
- Serial ATA connector x 2
- Enhance IDE connector x 1
- Multiple I/O ports: COM port x 4; USB (2.0) x 6
- All COM ports with +5V, +12V power selector
- Watchdog Timer
- Realtek Gigabit LAN and Audio function onboard

Optional features:

- On board chip provides LVDS interface (18/24/36/48 bit, single/dual channels)
- DVI Output interface
- RS 422/485 via COM 2
- Barebones system: niche into Unicorn U-6000 & U-8000 Chassis

Full Software Support:

- Drivers for major operating systems and APIs: Windows 2000, Windows XP, Direct3D, DirectDraw and DirectShow, OpenGL ICD and DXVA for Windows 2000 and Windows XP

1-2Unpacking

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-4946i/M System Board

HDD / IO Cables

LCD cable (Optional)

CDROM Driver includes: Drivers for Windows 2000, XP and AMI / AWARD FLASH ROM utilities.

Driver utilities for on-board VGA drivers, LAN adapter

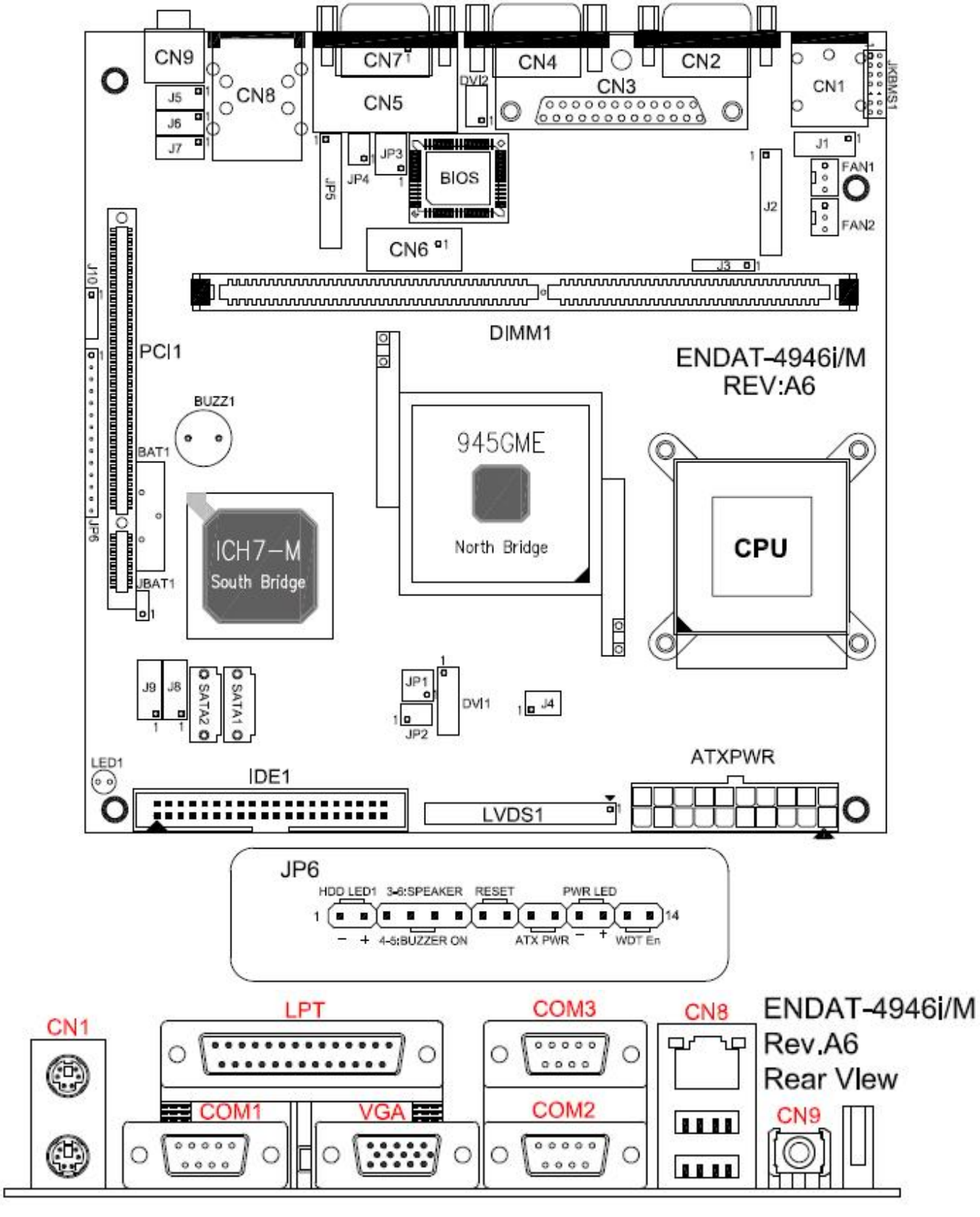
If any of these items are missing or damage, please contact the dealer from whom you purchase the motherboard. Save the shipping material and carton in the event that you want to ship or store the board in the future.

Note: Please 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. Jumpers And Connectors

Jumpers/Connectors Overview:

Function	Jumpers/Connectors
Cooling Fan Connector	FAN1, FAN2
ATX Power Supply Connector	ATXPWR
DVI Output Pin Header	DVI1, DVI2
LCD Panel Connector	LVDS1
LCD Voltage Selector	JP2
Clear CMOS	JBAT1
PS/2 Mouse/KB Pin Header	J1
PS/2 Mouse/KB	CN1
USB Port	CN8, J8, J9
40-Pin IDE Connector	IDE1
SATA 1, SATA2	SATA 1, SATA2
Header for Case Panel	JP6
HDD LED	JP6: Pin 1(-), Pin 2(+)
External Speaker	JP6: Pin 3(-), Pin 6(+)
Buzzer On/Off	JP6: Pin 4, Pin 5
Hardware Reset Switch	JP6: Pin 7, Pin 8
ATX Power Supply On/Off Switch	JP6: Pin 9, Pin 10
Power LED	JP6: Pin 11(-), Pin 12(+)
WDT Function Enable/Disable	JP6: Pin 13, Pin 14
External Power Good	JP6: Pin 15, Pin 16
Internal Power Good	JP6: Pin 16, Pin 17
DDR2 RAM Socket	DIMM1
CRT Output	CN4
IR Pin Header	J3
COM1/2/3/4 Voltage Selector	JP5
COM1 Connector	CN2
COM2 & COM3 Connector	CN5
LPT1	CN3
LAN Connector	CN8
AC'97 Speaker Output	CN9
AC'97' Speaker Output, MIC-In Pin Header	J5

Function	Jumpers/Connectors
5.1Ch Speaker output Pin Header	J6
Line-In, CD-In Pin Header	J7
COM2 Box Header	CN7
COM4 Box Header	CN6
RS232 / 422 / 485 Selector for COM2	JP3, JP4
DIGITAL I/O Pin Header	J2
SPDIF Pin Header	J10

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

JP2: LCD Voltage Selector (2.0mm)

LCD power	JP2 (2.54mm)
Pin-1, 2*	+3.3V
Pin-3, 4	+5V
Pin-5, 6	+12V

Caution: Improper setting will damage LCD panel.

JP3, JP4: RS232 / 422 / 485 Selector for COM2 (2.0mm)

TYPE	JP3 (3x4/2mm)	JP4 (2x3/2mm)
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

JP5: COM1/2/3/4 Voltage Selector (2.0mm)

Voltage	COM1	COM2	COM3	COM4
+12V	1-2	7-8	13-14	19-20
R.I*	3-4	9-10	15-16	21-22
+5V	5-6	11-12	17-18	23-24

JP6: Header for Case Panel (2.54mm)

Pin No.	Function
1(-), 2(+)	IDE LED
3(-), 6(+)	External Speaker
4,5	Buzzer On/Off
7,8	Hardware Reset Switch
9,10	ATX Power On/Off
11(-), 12(+)	Power LED
13,14	Close: Enable WDT function
15,16	External Power Good
16,17	Internal Power Good(Default)

Part 2: Onboard Connectors

J1: PS/2 Keyboard / Mouse Pin Header Connector (2.54mm)

Pin No.	Function	Pin No.	Function
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

J2: Digital I/O Pin Header (2.54mm)

Pin No.	Function	Pin No.	Function
1	+5V	2	+5V
3	DIO-O0	4	DIO-I0
5	DIO-O1	6	DIO-I1
7	DIO-O2	8	DIO-I2
9	DIO-O3	10	DIO-I3
11	DIO-O4	12	DIO-I4
13	DIO-O5	14	DIO-I5
15	GND	16	GND
17	DIO-O6	18	DIO-I6
19	DIO-O7	20	DIO-I7
21	+3.3V	22	+3.3V

J3: IR Pin Header (2.54mm)

Pin No.	Function	Pin No.	Function
1	VCC	**4**	GND
2	N.C	**5**	IRTX
3	IRRX		

J5: AC'97 Speaker Output, MIC-In Pin Header (2.54mm)

Pin No.	Function	Pin No.	Function
1	Speaker Output–RIGHT	**2**	Alternative LFE–Output
3	GND	**4**	GND
5	GND	**6**	GND
7	Speaker Output–LEFT	**8**	First MIC Input/CEN–Output

J6: 5.1Ch Speaker output Pin Header (2.54mm)

Pin No.	Function	Pin No.	Function
1	Surround Output – LEFT	**2**	Center Output
3	GND	**4**	GND
5	GND	**6**	GND
7	Surround Output – RIGHT	**8**	Low Frequency Effect Output

J7: Line-In, CD-In Pin Header (2.54mm)

Pin No.	Function	Pin No.	Function
1	Line Input – RIGHT	**2**	CD Input – RIGHT
3	GND	**4**	GND
5	GND	**6**	GND
7	Line Input – LEFT	**8**	CD Input – LEFT

J8, J9: USB Port Pin Header (2.54mm)

Pin No.	Function	Pin No.	Function
1	USB_VCC	**2**	USB_VCC
3	USBD 2/4-	**4**	USBD 3/5-
5	USBD 2/4+	**6**	USBD 3/5+
7	USB_GND	**8**	USB_GND
9	USB_GND	**10**	USB_GND

J10: SPDIF Pin Header (2.54mm)

Pin No.	Function	Pin No.	Function
1	+5V	**4**	GND
2	KEY	**5**	SPDIF-IN
3	SPDIF-OUT		

ATXPWR: ATX Power Supply Connector (3.96mm)

Pin No.	Function	Pin No.	Function
1	+3.3V	**2**	+3.3V
3	+3.3V	**4**	-12V
5	GND	**6**	GND
7	+5V	**8**	PS-ON
9	GND	**10**	GND
11	+5V	**12**	GND
13	GND	**14**	GND
15	POWER OK	**16**	-5V
17	5V_SB	**18**	+5V
19	+12V	**20**	+5V

FAN1, FAN2: Cooling Fan Connector

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

CN3: Printer (LPT1) Connector

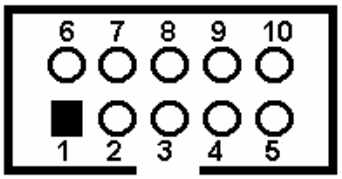
Pin No.	Function	Pin No.	Function
1	STB#	**10**	ACK#
2	PD0	**11**	BUSY
3	PD1	**12**	PE
4	PD2	**13**	SLCT
5	PD3	**14**	AFD#
6	PD4	**15**	ERR#
7	PD5	**16**	INIT#
8	PD6	**17**	SLIN#
9	PD7	**18-25**	GND

CN4: CRT Connector

Pin No.	Function	Pin No.	Function
1	RED	**9**	n/c / +5V
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		

CN6: COM4 Pin Header (RS-232)

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



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

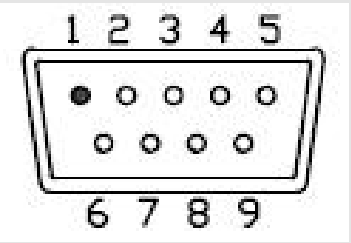
Pin No.	Function	Pin No.	Function
1	–TXD	**6**	NA
2	+RXD	**7**	NA
3	+TXD	**8**	NA
4	NA	**9**	–RXD
5	NA		

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		

D-SUB Type Connector for COM port (RS-232)

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



DVI1: DVI-DIGITAL Output Pin Header (2.0mm)

Pin No.	Function	Pin No.	Function
1	TD2-	**2**	+5V
3	TD2+	**4**	KEY
5	EDID DATA	**6**	HPDET
7	EDID CLOCK	**8**	TD0-
9	TD1-	**10**	TD0+
11	TD1	**12**	LVDS_GND
13	TLC-	**14**	TLC+

DVI2: DVI-ANALOG Output Pin Header (2.0mm)

Pin No.	Function	Pin No.	Function
1	CRT_RED	**2**	VGAVSYNC
3	CRT_GREEN	**4**	GND_CRT
5	CRT_BLUE	**6**	VGAHSYNC
7	n/c	**8**	CRT-Pin-6

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

Pin No.	Function	Pin No.	Function
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 of LVDS I/F (2.0mm)

Pin No.	Function	Pin No.	Function
1	VBL (+12V)	**2**	VBL (+12V)
3	GND	**4**	GND
5	DISP.ON/OFF	**6**	GND
7	LVDD	**8**	LVDD
9	GND	**10**	GND
11	RxO0+	**12**	RxO0-
13	RxO1+	**14**	RxO1-
15	RxO2+	**16**	RxO2-
17	RxO3+	**18**	RxO3-
19	RxOC+	**20**	RxOC-
21	GND	**22**	KEY
23	RxE0+	**24**	RxE0-
25	RxE1+	**26**	RxE1-
27	RxE2+	**28**	RxE2-
29	RxE3+	**30**	RxE3-
31	RxEC+	**32**	RxEC-
33	LVDD	**34**	LVDD
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.

LVDS1: Single Channel of LVDS I/F (2.0mm)

Pin No.	Signal	Pin No.	Signal
1	VBL (+12V)	**2**	VBL (+12V)
3	GND	**4**	GND
5	DISP.ON/OFF	**6**	GND
7	LVDD	**8**	LVDD
9	GND	**10**	GND
11	Rx0+	**12**	Rx0-
13	Rx1+	**14**	Rx1-
15	Rx2+	**16**	Rx2-
17	Rx3+	**18**	Rx3-
19	RxCLK+	**20**	TxCLK-
21	GND	**22**	KEY
23	n/c	**24**	n/c
25	n/c	**26**	n/c
27	n/c	**28**	n/c
29	n/c	**30**	n/c
31	n/c	**32**	n/c
33	LVDD	**34**	LVDD
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.

LCD Panel Number:

Panel Number
1024x768 24Bit 1CH
1280x1024 48Bit 2CH
1280x768 24Bit 1CH
1366x768 24Bit 1CH

2-2. Installing Memory

ENDAT-4946i/M system board offers one 240pin DDR-2 SDRAM socket supports up to 2GB memory and the speed can be 533 / 667 MHz.

2-3. Shared VGA Memory

ENDAT-4946i/M is using built-in INTEL® GMA950 Graphic with INTEL DVMT 3.0 **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. Assigning IRQs for Expansion Cards

Some expansion cards require an IRQ (Interrupt request vector) to operate. Generally, each IRQ must be exclusively assigned to specific use. In a standard design, there are 16 IRQ available with 11 of them already in used by other part of the system.

Some PCI expansion cards need IRQ; any remaining IRQ could be assigned to PCI Bus. Microsoft's Diagnostic (MSD.EXE) utility included in the Windows directory can be used to see their map. Clients can not have more than one device apply the same IRQ in the system or it will cause the system hang up, crash, and unexpected results. To simplify the process, this motherboard complies with the Plug and Play (PnP) specifications, which was developed to allow automatic system configuration. Whenever a PnP-compliant card is added to the system, PnP card and IRQs will automatically assigned if available. The PCI and PnP configuration in the BIOS setup utility can indicate which IRQs have being used by Legacy cards.

In the PCI Bus design, the BIOS is automatically assigned an IRQ to a PCI slot that has a card in it which requires an IRQ. To install PCI cards via riser card, you need to set the correct "ADSEL" and "INT" (interrupt) assignment on the jumper of riser card.

IRQ	Status	Assignment
0	Used	Timer
1	Used	Keyboard
2	Used	Second 8259
3	Used	COM2
4	Used	COM1
5	Used	COM3
6	Used	Floppy Disk
7	Used	LPT1
8	Used	RTC
9	Used	Audio
10	Used	COM4
11	Used	LAN Adapter (on board)
12	Used	PS/2 Mouse
13	Used	Coprocessor
14	Used	Hard Disk (IDE 1)
15	Used	Reserved (IDE 2)

2-5. Watchdog Timer

Watchdog 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

Program Sample

```
#include <stdio.h>
#include <dos.h>
#include <dir.h>
void show_ver();
void main()
{
        unsigned int tt;
        clrscr();
        show_ver();
        tt=0;
        while((tt==0)||(tt>255))
        {
                printf("\n\nPlease key in how many seconds you want to reset system
(1~255):");
                scanf("%d",&tt);
        }
        outportb(0x2e,0x87);    //Unlock register
        outportb(0x2e,0x87);    //Unlock register
        outportb(0x2e,0x07);    //Set Logic Device number pointer
        outportb(0x2f,0x08);    //Set Logic Device number
        outportb(0x2e,0xf5);    //Set active register is CRF5
        outportb(0x2f,0x00);    //Set register value (bit3=1: minute. =0: second)
        outportb(0x2e,0xf7);    //Set active register is CRF7
        outportb(0x2f,0x00);    //Disable all WDT interrupt (bit7=Mouse,
bit6=Keyboard)
        outportb(0x2e,0xf6);    //Set active register is CRF6
        outportb(0x2f,tt); //Set time out value of WDT
}

void show_ver()
{
        unsigned char tmp0;
        printf("Designed by ROBERT LIOU of UNICORN computer corp.
\n2004/03/02  release version:1.0a\n");
        printf("This program is design for test Watchdog Timer for W83627.\n");
}
```

2-6. Digital I/O

1) Pin out of digital I/O header (J2):

Pin No.	Function	Pin No.	Function
1	+5V	**2**	+5V
3	DIO-O0	**4**	DIO-I0
5	DIO-O1	**6**	DIO-I1
7	DIO-O2	**8**	DIO-I2
9	DIO-O3	**10**	DIO-I3
11	DIO-O4	**12**	DIO-I4
13	DIO-O5	**14**	DIO-I5
15	GND	**16**	GND
17	DIO-O6	**18**	DIO-I6
19	DIO-O7	**20**	DIO-I7
21	+3.3V	**22**	+3.3V

This function is supported by onboard super I/O chip; it can be control easily by change the register of super I/O chip via I/O port “2Eh” “2Fh” and “4Eh” “4Fh”. Please see the sample code of below for implement.
Voltage tolerance: +/- 5% with 0V to +5V.

2) Digital I/O control port (2E,2Fh):

Register configuration:

Bit No	7	6	5	4	3	2	1	0
Map	IN3	IN2	OUT3	OUT2	OUT1	OUT0	IN1	IN0

Sample code for input bit 0~3 (using Turbo C/C++ 3.0):

```
#define input_port 0x2f
outportb(0x2e,0x87);    //Unlock register
outportb(0x2e,0x87);    //Unlock register
outportb(0x2e,0x07);    //Set Logic Device number pointer
outportb(0x2f,0x07);    //Set Logic Device number
outportb(0x2e,0xF1);    //Set active register is CRF1
read_data=inportb(input_port);    // Read digital input data
printf(“DIO-Input=%02X\n”,read_data);    //Show digital input data on screen
```

Sample code for output bit 0~3 (using Turbo C/C++ 3.0):

```
outportb(0x2e,0x87);    //Unlock register
outportb(0x2e,0x87);    //Unlock register
outportb(0x2e,0x07);    //Set Logic Device number pointer
outportb(0x2f,0x07);    //Set Logic Device number
outportb(0x2e,0xF2);    //Set active register is CRF2
outportb(0x2f,0x00);    //Write data to digital output
```

3) Digital I/O control port (4E,4Fh):

Register configuration:

Bit No	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Map	IN7	IN6	OUT7	OUT6	OUT5	OUT4	IN5	IN4

Sample code for input bit 4~7(using Turbo C/C++ 3.0):

```
#define input_port 0x2f
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,0xF1);    //Set active register is CRF1
read_data=inportb(input_port);    // Read digital input data
printf("DIO-Input=%02X\n",read_data);    //Show digital input data on screen
```

Sample code for output bit 4~7(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,0x07);    //Set Logic Device number
outportb(0x4e,0xF2);    //Set active register is CRF2
outportb(0x4f,0x00);    //Write data to digital output
```

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 User Password**
> **Power Management Setup**	> **Save & Exit Setup**
> **PnP/PCI Configurations**	> **Exit Without Saving**

Use the 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 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.

“Advanced BIOS Features”, “Advanced Chipset Features” and “PnP/PCI Configurations” requires board knowledge on PC/AT system architecture and Intel chipset specification. They intend to be used by well-trained technicians and experienced users. Press the <F10> key to save CMOS setting to EEPROM, Press <F7> key can load CMOS setting from EEPROM. 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	Available Options:
Date (mm:dd:yy)	
Time (hh:mm:ss)	
＞IDE Channel 0 Master:	Auto
＞IDE Channel 0 Slave :	Auto
＞IDE Channel 1 Master:	Auto
＞IDE Channel 1 Slave :	Auto
Video	EGA/VGA
Halt On	All , But Keyboar

· 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.

· Video

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

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	Available Options:
＞CPU Feature	Press Enter
＞Hard Disk Boot Priority	Press Enter
Virus Warning	Disabled
CPU L1 & L2 Cache	Enabled
CPU L3 Cache	Enabled
Hyper-Threading Technology	Enabled
Quick Power On Self Test	Enabled
First Boot Device	Hard Disk
Second Boot Device	CDROM
Third Boot Device	LS120
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
OS Select For DRAM > 64MB	Non-OS2
Small Logo(EPA)	Enabled

- **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.

3-3. Advanced Chipset Features

This section allows you to configure 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 chosen because they provide the best operating conditions for your system. You might consider making any changes only if you discover that the data has been lost while using your system.

Item	Available Options:
DRAM Timing Selectable	**By SPD**
CAS Latency Time	**Auto**
DRAM RAS# to CAS	**Auto**
DRAM RAS# Precharge	**Auto**
Precharge dealy	**Auto**
System Memory Frequency	**Auto**
SLP_S4# Assertion Width	**4 to 5 Sec.**
System BIOS Cacheable	**Enabled**
Video BIOS Cacheable	**Enabled**
Memory Hole At 15M-16M	**Disabled**
**** VGA Setting ****	
PEG/Onchip VGA Control	**Onboard VGA**
On-Chip Frame Buffer Size	**8MB**
DVMT Mode	**DVMT**
DVMT/FIXED Memory Size	**128MB**
Boot Display	**CRT**
Panel Number	**1024x768 24Bit 1CH**

• System Memory Frequency

This main board supports different memory frequencies depend on the CPU FSB (Front Side Bus) and the type of DDR DIMM.

CPU FSB	DDR2 DIMM Type	Memory Frequency
667 MHz	PC2-5300/PC2-4200	667/533 MHz
533 MHz	PC2-4200	533 MHz

• On-Chip Frame Buffer Size

This selection is supplied for legacy VGA and SVGA graphics support and compatibility.

- **DVMT Mode**

  This field is used to select the type of DVMT mode. DVMT (Dynamic Video Memory Technology) is an architecture that offers breakthrough performance for the motherboard through efficient memory utilization.

FIXED	A fixed-size fragment of the system memory is allocated to the graphics core.
DVMT	The graphics driver allocates memory as needed for running graphics applications and is cooperatively using this memory with other system components.
BOTH	This mode guarantees that at least 64MB of memory is available to the graphics core, with a possibility to increase this amount to 128MB, if necessary.

- **Boot Display**

  This field is used to select the type of display to use when the system boots. EFP means DVI or LCD display by main board.

CRT	Select this option if you want the system to boot the CRT display.
EFP	Select this option if you want the system to boot the DVI or LCD flat panel display. **(Optional Item)**
CRT+EFP	Select this option if you want the system to boot both of the CRT and DVI or LCD display. **(Optional Item)**

- **Panel Number (Optional Item)**

  If you apply one of the standard panels shown above, select the appropriate option according to the type of panel that you apply. Or, please contact your dealer or sales representative for custom-made BIOS that will suit the panel that you apply. When main board offers DVI output, this option will not be shown.

Panel Number
1024x768 24Bit 1CH
1280x1024 48Bit 2CH
1280x768 24Bit 1CH
1366x768 24Bit 1CH

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. Your system supports two IDE controllers--a primary and a secondary--so you can install up to four separate hard disks.

Integrated Peripherals

Item	Available Options:
＞OnChip IDE Device	Press Enter
＞Onboard Device	Press Enter
＞SuperIO Device	Press Enter
Onboard Lan Boot ROM	Disabled
Onboard Serial Port 3	3E8
Serial Port 3 Use IRQ	IRQ5
Onboard Serial Port 4	2E8
Serial Port 4 Use IRQ	IRQ10

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

Onboard Device

Item	Available Options:
USB Controller	Enabled
USB 2.0 Controller	Enabled
USB Keyboard Support	Enabled
AC97 Audio Select	Enabled

SuperIO Device

Item	Available Options:
POWER ON Function	Button ONLY
KB Power ON Password	Enter
Hot Key Power ON	Ctrl-F1
Onboard Serial Port 1	3F8/IRQ4
Onboard Serial Port 2	2F8/IRQ3
UART Mode Select	Normal
RxD, TxD Active	Hi,Lo
IR Transmission Delay	Enabled
UR2 Duplex Mode	Half
Use IR Pins	IR-Rx2Tx2
Onboard Parallel Port	378/IRQ7
Parallel Port Mode	ECP+EPP
EPP Mode Select	EPP1.7
ECP Mode Use DMA	3
PWRON After PWR-Fail	Off

- **Onboard LAN Boot ROM**

  The default setting is enabled or disabled LAN boot up function.

- **IDE HDD Block Mode**

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

- **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.

- **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.

- **USB Controller**

  Select "Enabled" if your system contains a Universal Serial Bus (USB) controller and you have a USB peripheral.

- **USB 2.0 Controller**

  The options for this field are Enabled and Disabled. By default, this field is set to Disabled. In order to use USB 2.0, necessary OS drivers must be installed first.

- **AC97 Audio Select**

  The AC97 Audio Select option allows the user to enable or disable onboard audio function.

- **UART Mode Select**

  Select an operating mode for the serial port 2.
  <Choice: IrDA, ASKIR, Normal>

- **Parallel Port Mode**

  This field allows you to determine parallel port mode function.
  <Choice: SPP, EPP, ECP, ECP + EPP, Normal>

- **PWRON After PWR-Fail**

  This item allows you to select if you want to power on the system after power failure

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	Available Options:
＞PCI Express PM Function	Press Enter
ACPI function	Enabled
ACPI Support Type	S1(POS)
Run VBIOS if S3 Resume	Auto
Power Management	User Define
Video Off Method	Blank Screen
Video Off In Suspend	Yes
Suspend Type	Stop Grant
Suspend Mode	Disabled
HDD Power Down	Disabled
Soft-Off by PWR-BTTN	Instant-Off
CPU THRM-Throttling	75.0%
USB KB Wake-Up From S3	Disabled
Resume by Alarm	Disabled
Date(of Month) Alarm	0
Time(hh:mm:ss) Alarm	0 : 0 : 0
** Reload Global Timer Events **	
Primary IDE 0	Disabled
Primary IDE 1	Disabled
Secondary IDE 0	Disabled
Secondary IDE 1	Disabled
FDD,COM,LPT Port	Disabled
PCI PIRQ[A-D]#	Disabled

PCI Express PM Function

Item	Available Options:
PCI Express PME	Enabled

• 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.

• 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.

• CPU THRM-Throttling

When the system enters Doze mode, the CPU clock runs only part of the time. You may select the percent of time that the clock runs.

.

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	Available Options:
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.

• PCI/VGA Palette Snoop

When set to [Enabled], multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled).

3-7. PC Health Status

This screen shows the information of temperature, Fan speed and Vcore etc.

PC Health Status

Item	Available Options:
Temperature 1	℃
Temperature 2	℃
Temperature 3	℃
VcoreA	
VcoreB	
+3.3 V	
+5 V	
+ 12 V	
CPU Fan	RPM
System Fan	RPM

Chapter 4. VGA, LCD Feature

4-1. VGA Feature

ENDAT-4946i/M provides an integrated graphics (Intel® Graphics Media Accelerator 950) accelerator delivering cost competitive 3D, 2D, and video capabilities. It contains an extensive set of instructions for 3D operations, BLT (Block Level Transfers) and Stretch BLT operations, motion compensation, overlay, and display control. ENDAT-4946i/M video engines support video conferencing and other video applications. Instead of a dedicated local graphics memory interface, ENDAT-4946i/M applies UMA configuration for optimal memory utilization and performance that deliver 3D graphics with sharp images, fast rendering, smooth motion and extreme detail.

The Intel® 945GM Express chipset's low power design enables up to 28% less average power consumption compared to previous generations. Featuring the Intel® Graphics Media Accelerator 950, the Intel 945GM Express chipset delivers up to 2 x improvements in graphics performance over the previous generation chipset. The Intel® 945GM Express chipset enables up to 25% higher data transfer rate compared to the previous generation bus speed.

ENDAT-4946i/M applies Intel® DVMT 3.0 for optimum the system utilization via system chipset. DVMT is a concept be applied in the Intel® 945GM chipset wherein the optimum amount of memory is dynamically allocated and de-allocated as needed for balanced graphics and system performance, through Intel® Direct AGP and a highly efficient memory utilization scheme.

The on-board INTEL® GMA950 Graphic Controller supports a full AGP implementation internally to remain compatible with existing software and programming models. However, since the engine is integrated, it enjoys a higher bandwidth and lower latency than is possible with discrete solutions.

The controller of ENDAT-4946i/M supports 3 types of display: CRT, DVI and LVDS panel.

4-2. LVDS Panel Feature (optional)

The on-board graphic controller supports industry standard LCD panel, LVDS interface only, with 1 channel (18 or 24) and 2 channels (36 or 48bit) data width.

LVDS interface provides low voltage, high speed and low EMI serial DC-balanced differential data via optional onboard LVDS.

The flat panel interface provides or supports following functions for various panels:

- Generates LVDS flat panel channels like clock and data channel.
- Generates different video data formats to directly drive different types of panels (18, 24, 36 or 48bit)
- Wide screen resolution as 16:9 or 16:10.
- Vertical and horizontal expansion of video displays to LCD panel resolution
- Vertical and horizontal centering
- Panel power sequence

Please note that the default setting is with "CRT". If the LCD display features is required, the setting will need to be revised in the system BIOS setting: "CRT+EFP" under "Advanced Chipset Features" unless clients specified the display type while order.

4-3. Driver Utility Installation Guide

When finishing the installation of Windows platform (2000/XP), please install the relative "INF" driver of Intel® chipsets firstly for compliance compatibility of hardware environment.

Please follow the step of CD-ROM driver and complete the VGA, AUDIO, ETHERNET and USB2.0 setup procedure. Insert the support CD that supplied with motherboard into CD-ROM driver, which enable the access with auto-run mode; or double –click the CD driver icon in "My Computer" to bring up the screen.

Please download or check from Intel® ***Web site: www.intel.com if you prefer to install the drivers individually or you need more information.***

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. Insert the FLASH memory utility distribution floppy diskette in drive A:
2. At the DOS prompt, type A:>AWDFLASH and press <Enter>

AwardBIOS FLASH Utility V8.63E C>Phoenix Technologies Ltd. All Rights Reserved
Flash Type – 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 optimal defaults setting.***

Appendix B: LCD Pin Assignment

LVDS1: Dual Channel LVDS (2.54mm)

Pin No.	Signal	Pin No.	Signal
1	VBL (+12V)	**2**	VBL (+12V)
3	GND	**4**	GND
5	DISP.ON/OFF	**6**	GND
7	LVDD	**8**	LVDD
9	GND	**10**	GND
11	RxO0+	**12**	RxO0-
13	RxO1+	**14**	RxO1-
15	RxO2+	**16**	RxO2-
17	RxO3+	**18**	RxO3-
19	RxOC+	**20**	RxOC-
21	GND	**22**	KEY
23	RxE0+	**24**	RxE0-
25	RxE1+	**26**	RxE1-
27	RxE2+	**28**	RxE2-
29	RxE3+	**30**	RxE3-
31	RxEC+	**32**	RxEC-
33	LVDD	**34**	LVDD
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.

LVDS1: Single Channel of LVDS I/F (2.0mm)

Pin No.	Signal	Pin No.	Signal
1	VBL (+12V)	**2**	VBL (+12V)
3	GND	**4**	GND
5	DISP.ON/OFF	**6**	GND
7	LVDD	**8**	LVDD
9	GND	**10**	GND
11	Rx0+	**12**	Rx0-
13	Rx1+	**14**	Rx1-
15	Rx2+	**16**	Rx2-
17	Rx3+	**18**	Rx3-
19	RxCLK+	**20**	TxCLK-
21	GND	**22**	KEY
23	n/c	**24**	n/c
25	n/c	**26**	n/c
27	n/c	**28**	n/c
29	n/c	**30**	n/c
`31	n/c	**32**	n/c
33	LVDD	**34**	LVDD
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.

BIOS LCD panel type list (Advance Chipset Setup/Panel Type)

Panel Number
1024x768 24Bit 1CH
1280x1024 48Bit 2CH
1280x768 24Bit 1CH
1366x768 24Bit 1CH

Appendix C: Limited Warranty

Standard two years limited warranty on all our ENDAT series all-in-one motherboards and embedded boards. 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

- **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