



**VORTEX86-6049LV-L2S6**  
**Embedded Vortex86 CPU AIO Board**  
**with 6S/CRT/LCD/ Dual LAN/CF/Audio/USB**  
**128MB DRAM Onboard**

**User's Manual**

**(Revision 1.0A)**

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Manual No. IUM6049000-01 Ver.1.0A ● August, 2005

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# Table of Contents

|                        |                                            |
|------------------------|--------------------------------------------|
| Table of Contents..... | iii                                        |
| Chapter 0              | Startup                                    |
| 0.1                    | Packing List..... 1                        |
| 0.2                    | Specification ..... 2                      |
| 0.3                    | Board Dimension ..... 4                    |
| Chapter 1              | Introduction                               |
| 1.1                    | Features ..... 5                           |
| 1.2                    | VGA Interface ..... 6                      |
| Chapter 2              | Installation                               |
| 2.1                    | Board Outline ..... 7                      |
| 2.2                    | Connectors & Jumpers Location ..... 8      |
| 2.3                    | Connectors & Jumpers Summary ..... 10      |
| 2.4                    | Pin Assignments & Jumper Settings ..... 12 |
| 2.5                    | IRQ Mapping..... 23                        |
| 2.6                    | Watchdog Timer ..... 24                    |
| Chapter 3              | SVGA Setup                                 |
| 3.1                    | Introduction ..... 27                      |
| 3.2                    | Flat Panel BIOS Setting..... 28            |
| 3.3                    | Flat Panel Wiring..... 28                  |
| Chapter 4              | Network Interface                          |
| 4.1                    | Introduction ..... 29                      |
| 4.2                    | Software Support..... 29                   |
| Warranty .....         | 30                                         |



# Chapter 0

## Startup

### 0.1 Packing List

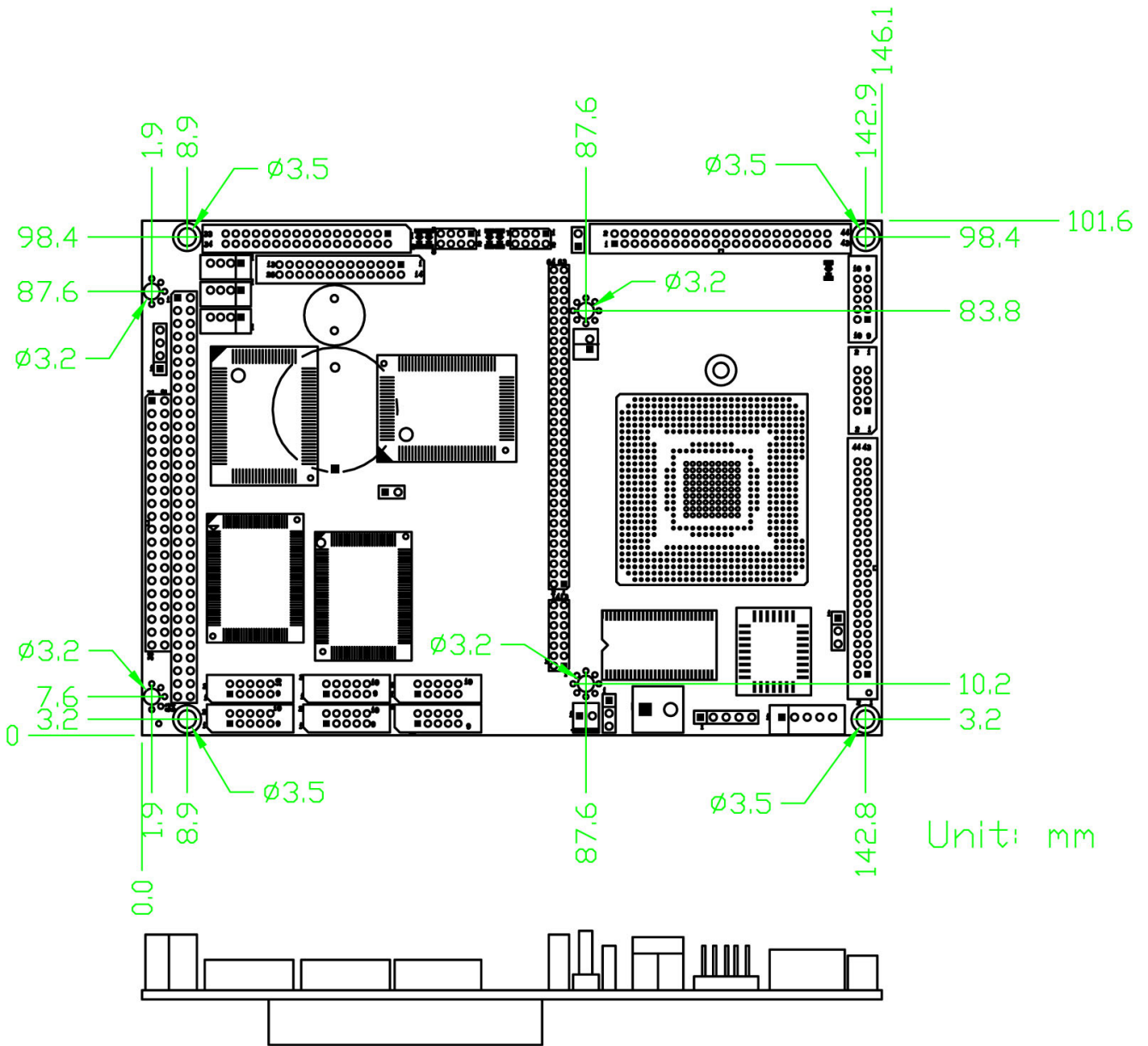
| Product Name         | Package                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VORTEX86-6049LV-L2S6 | <ul style="list-style-type: none"><li>● Embedded Vortex86 CPU All-in-One Board</li><li>● Manual &amp; Drivers CD x 1</li><li>● RS232 cable x 6</li><li>● PRINTER cable x1</li><li>● FDD cable x 1</li><li>● IDE cable x 1 (44pin to 40 pin)</li><li>● VGA cable x 1</li><li>● Audio cable x 3</li><li>● USB cable x 1 (USB port x 2)</li><li>● PS/2 Mouse cable x 1</li><li>● PS/2 Keyboard cable x1</li></ul> |

## 0.2 Specification (VORTEX86-6049LV-L2S6)

| Features       | VORTEX86-6049-L2S6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chipset        | DM&P(SiS) Vortex86™ System-on-Chip CPU–166MHz (Low Voltage)<br>Real Time Clock with Lithium Battery Backup                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BIOS           | AMI BIOS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| System Memory  | 128MB SDRAM onboard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Bus Interface  | Specific 32-bit x-PCI bus Interface<br>PC/104 Standard Compliant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Watchdog Timer | Software programmable from 4ms to 1hour                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| VGA            | AGP Rev.2.0 compliant<br>Shared system memory up to 64MB (Default 8 MB)<br>Support resolution up to 1,280x1,024 true colors<br>VGA and TFT/LVDS Flat Panel interface support                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| LAN 1          | Realtek 8100B 10/100Mbps Ethernet Controller<br>Half/Full duplex capability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LAN 2          | Realtek 8100B 10/100Mbps Ethernet Controller<br>Half/Full duplex capability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Audio          | Compliant with AC97 V2.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| I /O Interface | <ul style="list-style-type: none"> <li>● Enhanced IDE interface</li> <li>● RS232 port x 5</li> <li>● RS232/485 port x1 (RS485 with Auto Direction)</li> <li>● Parallel port x1</li> <li>● FDD interface x1</li> <li>● USB port x2 (USB 1.1 version)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Connectors     | <ul style="list-style-type: none"> <li>● 2.0mm Ø 44-pin box header for IDE x1</li> <li>● 2.0mm Ø 34-pin box header for FDD x1</li> <li>● 2.0mm Ø 26-pin box header for Printer x1</li> <li>● 2.0mm Ø 10-pin box header for RS-232 x6</li> <li>● 2.54mmØ 2-pin header for RS-485</li> <li>● 2.0mm Ø 10-pin box header for LAN x 2</li> <li>● 2.0mm Ø 10-pin box header for USB</li> <li>● 2.0mm Ø 10-pin box header for VGA</li> <li>● 2.0mm Ø 44-pin box header for LCD Interface</li> <li>● 4-pin box header for Audio x 3 (Audio-in,Audio-out, Mic-in)</li> <li>● 2.54mm 5-pin header for keyboard x 1</li> <li>● 2.54mm 5-pin header for Mouse x 1</li> <li>● Type I/II CF socket x 1</li> </ul> |

|                       |                                                                                                                                  |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Flash Disk Support    | <ul style="list-style-type: none"> <li>● 44-pin IDE Flash Disk( EmbedDisk 16MB or above)</li> <li>● Type I/II CF Card</li> </ul> |
| Power Requirement     | Single Voltage +5V @980 mA                                                                                                       |
| Dimension             | 102mm X 144mm (4.01" x 5.67 inches)                                                                                              |
| Weight                | 170g                                                                                                                             |
| Operating Temperature | -20°C ~ +70°C                                                                                                                    |

## 0.3 Board Dimension





# Chapter 1

## Introduction

### 1.1 Features

- **Embedded CPU:** DM&P Vortex86™ System-on-Chip CPU – 166MHz, Realtime clock, and watchdog timer.
- **BIOS:** AMI system BIOS
- **DRAM Memory:** Onboard 128MB
- **Bus Interface:** X-PCI Bus & PC/104 Standard Compliant
- **Data Bus:** 64-bit
- **Bus Speeds:** PCI Bus – 33MHz
- **DMA Channels:** 7
- **Interrupt Levels:** 15
- **Enhanced IDE:** supports one port and up to two hard drives or Enhanced IDE devices of PIO mode 4. BIOS enabled/disabled
- **Watchdog Timer:** generates either a RESET, NMI or an IRQ when your application loses control over the system. Optionally the watchdog can trigger a user specified interrupt. The watchdog is configurable from 16 msec. to 512 seconds
- **Real-time Clock:** included in Vortex86 SOC with onboard lithium battery backup for 10 years of data retention. CMOS data backup of BIOS setup and BIOS default.
- **PS/2 Keyboard & Mouse:** Supports PS/2 Keyboard and mouse
- **Serial ports:** Supports high speed RS-232 port x3, high speed RS-232/485 port x1 (jumper selectable). The RS485 interface is Auto Direction.
- **USB ports:** Version 1.1 USB port x2
- **Floppy Disk Drive Interface:** supports up to two floppy drives, 5¼" (360 KB or 1.2 MB) and 3½ " (720 KB, 1.44 MB). BIOS enabled / disabled
- **Bi-directional Parallel Port:** supports SPP, EPP and ECP mode. BIOS enabled/disabled

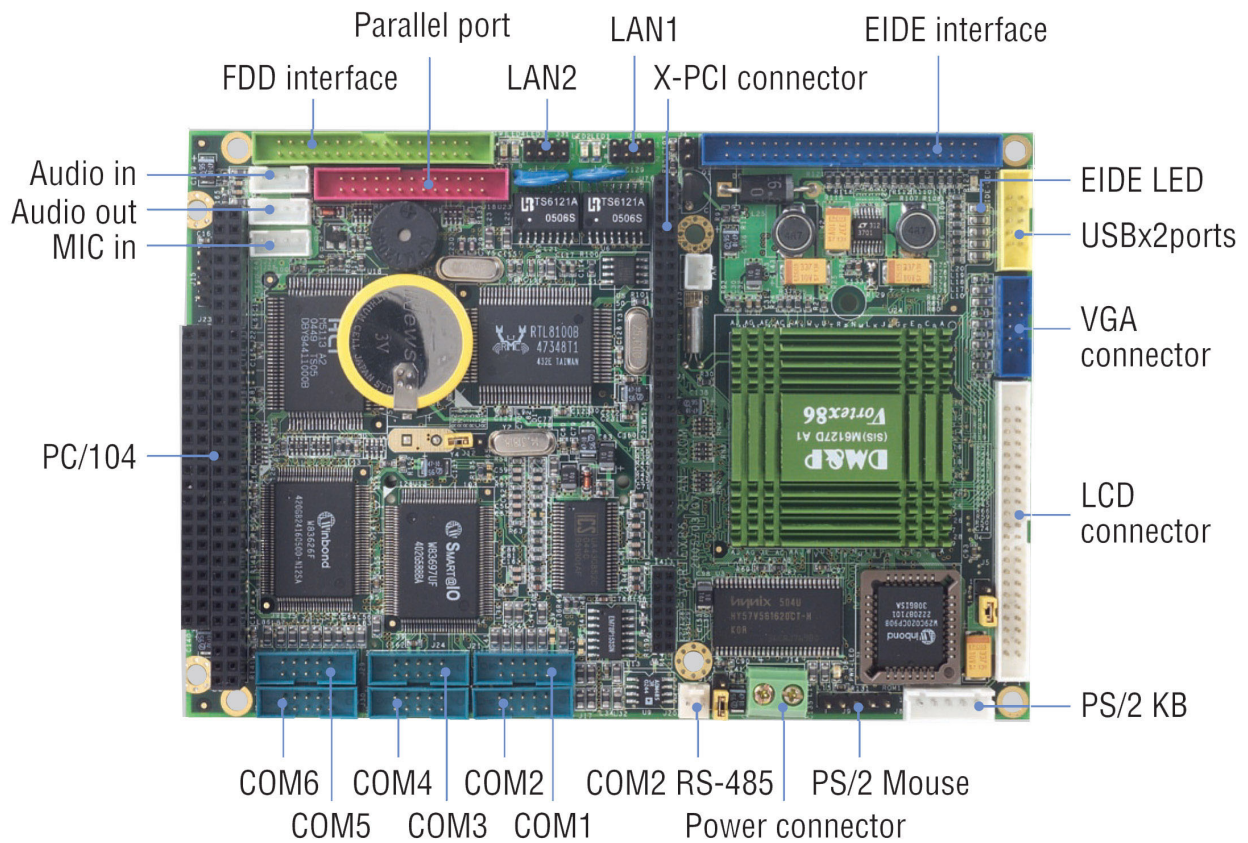
## 1.2 VGA Interface

- **Chipset:** DM&P Vortex86™ SOC
- **Memory:** Shared system memory up to 32MB
- **System Bus:** 33-bit PCI bus
- **Panel Data Bus:** 18-bit
- **Display:** CRT and LCD Flat Panel
  
- **Compliance:**
  - AGP 2.0 / 4X Compliant / Fully DirectX 8 Compliant

# Chapter 2

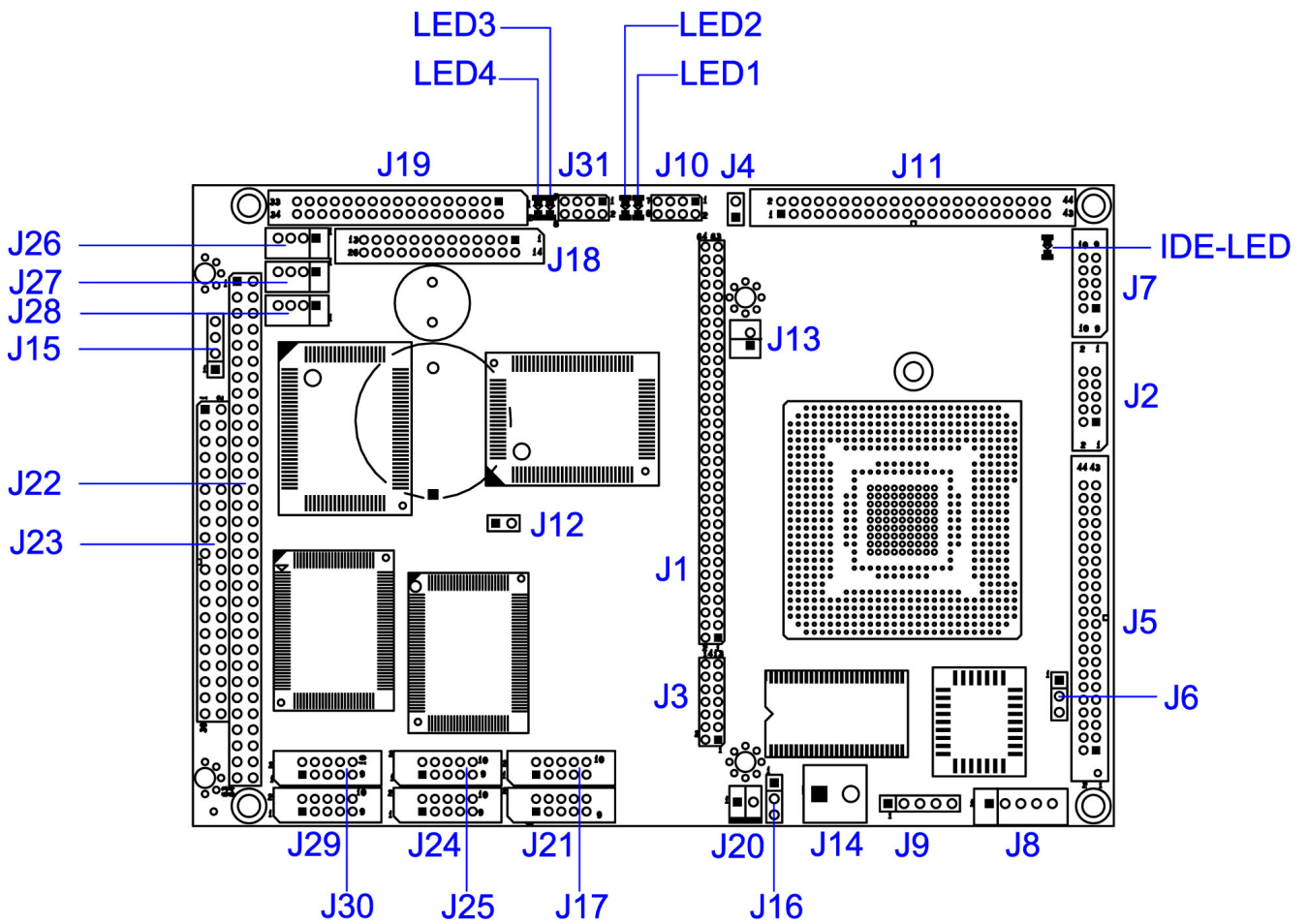
## Installation

### 2.1 Board Outline

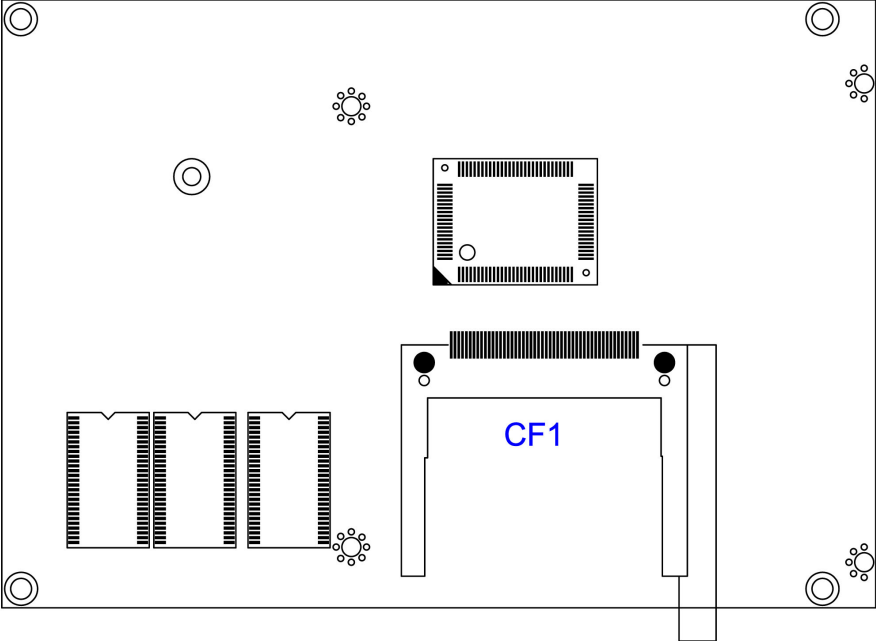


## 2.2 Connectors & Jumpers Location

### Solder Side



# Bottom side



## 2.3 Connectors & Jumpers Summary

Summary Table

| Nbr  | Description                 | Type of Connections       | Pin nbrs. |
|------|-----------------------------|---------------------------|-----------|
| J1   | X-PCI                       | Box Header, 2.0Ø , 32x2   | 64-pin    |
| J2:  | VGA                         | Pin Header, 2.0Ø , 5x2    | 10-pin    |
| J3:  | LPC                         | Box Header, 2.0Ø , 7x2    | 14-pin    |
| J4:  | RESET                       | Pin Header, 2,54Ø, 1x2    | 2-pin     |
| J5:  | LCD Connector               | Box Header, 2.0Ø , 22x2   | 44-pin    |
| J6:  | LCD Volts Sel.              | Pin Header, 2.54Ø , 3x1   | 3-pin     |
| J7:  | USB                         | Box Header, 2.0Ø , 5x2    | 10-pin    |
| J8:  | Keyboard                    | Pin Header, 2,54Ø, 1x5    | 5-pin     |
| J9:  | Mouse                       | Pin Header, 2,54Ø, 1x5    | 5-pin     |
| J10: | LAN 1                       | Pin Header, 2.0Ø , 5x2    | 8-pin     |
| J11: | IDE                         | Box Header, 2.0Ø , 22x2   | 44-pin    |
| J12  | CF Card Master/Slave Select | Pin Header, 2.54Ø, 2x1    | 2-pin     |
| J13  | FAN                         | Molex Header, 2.0Ø , 2x1  | 2-pin     |
| J14  | Power Connector             | Terminal Block 5.0Ø , 2x1 | 2-pin     |
| J15  | 4P Power Source             | Pin Header, 2.54Ø , 4x1   | 4-pin     |
| J16  | RS232/RS485 Select (COM 2)  | Pin Header, 2.54Ø, 3x1    | 3-pin     |
| J17  | COM1                        | Pin Header, 2.0Ø , 5x2    | 10-pin    |
| J18  | PRINT                       | Pin Header, 2.0Ø , 13x2   | 26-pin    |
| J19  | FDD                         | Pin Header, 2.0Ø , 17x2   | 34-pin    |
| J20  | RS485                       | Molex Header 2.54Ø , 2x1  | 2-pin     |
| J21  | COM2                        | Pin Header, 2.0Ø 5x2      | 10-pin    |
| J22  | PC104 Connector – 64 pin    | Box Header, 2.54Ø 32x2    | 64-pin    |
| J23  | PC104 Connector – 40 pin    | Box Header, 2.54Ø 20x2    | 40-pin    |
| J24  | COM3                        | Pin Header, 2.0Ø 5x2      | 10-pin    |
| J25  | COM4                        | Pin Header, 2.0Ø 5x2      | 10-pin    |
| J26  | LINE IN                     | Molex Header, 2.0Ø, 4x1   | 4-pin     |
| J27  | LINE OUT                    | Molex Header, 2.0Ø, 4x1   | 4-pin     |
| J28  | MIC IN                      | Molex Header, 2.0Ø, 4x1   | 4-pin     |
| J29  | COM5                        | Pin Header, 2.0Ø 5x2      | 10-pin    |
| J30  | COM6                        | Pin Header, 2.0Ø 5x2      | 10-pin    |
| J31  | LAN 2                       | Pin Header, 2.0Ø , 5x2    | 8-pin     |
| CF1: | Compact Flash               | Type I/II CF Connector    | 50-pin    |

|         |                            |  |  |
|---------|----------------------------|--|--|
| IDE-LED | IDE Active LED ( Orange )  |  |  |
| LED 1   | LAN 1 Link LED ( Yellow )  |  |  |
| LED 2   | LAN 1 Active LCD ( Green ) |  |  |
| LED 3   | LAN 2 Link LED ( Yellow )  |  |  |
| LED 4   | LAN 2 Active LCD ( Green ) |  |  |

## 2.4 Pin Assignments & Jumper Settings

### J1: X-PCI - Box Header - 2.0 Ø 32x2

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | GND         | 2     | GND         |
| 3     | AD0         | 4     | AD1         |
| 5     | AD2         | 6     | AD3         |
| 7     | AD4         | 8     | AD5         |
| 9     | AD6         | 10    | AD7         |
| 11    | AD8         | 12    | AD9         |
| 13    | AD10        | 14    | AD11        |
| 15    | AD12        | 16    | AD13        |
| 17    | AD14        | 18    | AD15        |
| 19    | VCC         | 20    | VCC         |
| 21    | AD16        | 22    | AD17        |
| 23    | AD18        | 24    | AD19        |
| 25    | AD20        | 26    | AD21        |
| 27    | AD22        | 28    | AD23        |
| 29    | AD24        | 30    | AD25        |
| 31    | AD26        | 32    | AD27        |
| 33    | AD28        | 34    | AD29        |
| 35    | AD30        | 36    | AD31        |
| 37    | VCC3        | 38    | VCC3        |
| 39    | CBE-0       | 40    | CBE-1       |
| 41    | CBE-2       | 42    | CBE-3       |
| 43    | PGNT-0      | 44    | PREQ-0      |
| 45    | PGNT-1      | 46    | PREQ-1      |
| 47    | PGNT-2      | 48    | PREQ-2      |
| 49    | INT-A       | 50    | INT-B       |
| 51    | INT-C       | 52    | INT-D       |
| 53    | GND         | 54    | GND         |
| 55    | FRAME-      | 56    | IRDY-       |
| 57    | TRDY-       | 58    | STOP-       |
| 59    | SERR-       | 60    | PAR         |
| 61    | DEVSEL-     | 62    | PLOCK-      |
| 63    | PCIRST-     | 64    | PCICLK1     |



## J2: VGA

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | R OUT       | 2     | GND         |
| 3     | G OUT       | 4     | GND         |
| 5     | B OUT       | 6     | GND         |
| 7     | HSYNC       | 8     | GND         |
| 9     | VSYNCD      | 10    | GND         |

## J3: LPC

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | SIRQ        | 2     | GND         |
| 3     | VOSCX       | 4     | GND         |
| 5     | PCIRST      | 6     | GND         |
| 7     | AC RESET    | 8     | GND         |
| 9     | SDATI0      | 10    | SDAT0       |
| 11    | SYNC        | 12    | VCC3        |
| 13    | SDATI1      | 14    | GND         |

## J4: RESET

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | VCC         | 2     | GND         |

## J5: LCD Connector (for 18-bit TFT LCD)

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | LCDVCC      | 2     | LCDVCC      |
| 3     | G2          | 4     | G3          |
| 5     | G4          | 6     | G5          |
| 7     | -----       | 8     | -----       |
| 9     | R0          | 10    | R1          |
| 11    | R2          | 12    | R3          |
| 13    | R4          | 14    | R5          |
| 15    | GND         | 16    | -----       |
| 17    | -----       | 18    | -----       |
| 19    | -----       | 20    | GND         |
| 21    | -----       | 22    | -----       |
| 23    | B0          | 24    | B1          |
| 25    | B2          | 26    | B3          |
| 27    | B4          | 28    | B5          |
| 29    | -----       | 30    | -----       |
| 31    | G0          | 32    | G1          |
| 33    | GND         | 34    | GND         |
| 35    | -----       | 36    | XCLK        |
| 37    | -----       | 38    | DEN         |
| 39    | -----       | 40    | HSYNC       |
| 41    | -----       | 42    | VSYNC       |
| 43    | -----       | 44    | VDDEN       |

## J6: LCD Volts Sel.

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1-2   | +5V         | 2-3   | +3.3V       |

## J7: USB

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | VCC         | 2     | VCC         |
| 3     | -DATA1      | 4     | -DATA0      |
| 5     | +DATA1      | 6     | +DATA0      |
| 7     | GND         | 8     | GND         |
| 9     | GND         | 10    | GND         |

## J8: Keyboard

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | KBCLK       | 2     | KBDAT       |
| 3     | NC          | 4     | GND         |
| 5     | SB5V        |       |             |

## J9: Mouse

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | PMCLK       | 2     | PMDAT       |
| 3     | NC          | 4     | GND         |
| 5     | SB5V        |       |             |

## J10: LAN1

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | TX+         | 2     | TX-         |
| 3     | RX+         | 4     | LED0        |
| 5     | LED0+       | 6     | RX-         |
| 7     | LED1+       | 8     | LED1        |

## J11: IDE

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | IDERST-     | 2     | GND         |
| 3     | IDED7       | 4     | IDED8       |
| 5     | IDED6       | 6     | IDED9       |
| 7     | IDED5       | 8     | IDED10      |
| 9     | IDED4       | 10    | IDED11      |
| 11    | IDED3       | 12    | IDED12      |
| 13    | IDED2       | 14    | IDED13      |
| 15    | IDED1       | 16    | IDED14      |
| 17    | IDED0       | 18    | IDED15      |
| 19    | GND         | 20    | NC          |
| 21    | IDEREQ      | 22    | GND         |
| 23    | IDEIOW-     | 24    | GND         |
| 25    | IDEIOR-     | 26    | GND         |
| 27    | ICHRDY      | 28    | GND         |
| 29    | IDACK-      | 30    | GND         |
| 31    | IDEIRQ      | 32    | NC          |
| 33    | IDESA1      | 34    | CBLID       |
| 35    | IDESA0      | 36    | IDESA2      |
| 37    | IDECS-0     | 38    | IDECS-1     |
| 39    | DASP        | 40    | GND         |
| 41    | VCC         | 42    | VCC         |
| 43    | GND         | 44    | NC          |

## J12: CF Card Master/Slave Select

| Pin # | Signal Name |
|-------|-------------|
| 2     | VCC         |
| 1     | GND         |

## J13: FAN

| Pin # | Signal Name |
|-------|-------------|
| 1     | VCC         |
| 2     | GND         |

## J14: Power Connector

| Pin # | Signal Name |
|-------|-------------|
| 1     | SB5V        |
| 2     | GND         |

## J15: 4P Power Source

| Pin # | Signal Name |
|-------|-------------|
| 1     | +12V        |
| 2     | -12V        |
| 3     | -5V         |
| 4     | GND         |

## J16: RS232/RS485 Select(COM2)

| Pin # | Signal Name |
|-------|-------------|
| 1-2   | COM2 RS232  |
| 2-3   | RS485       |

## J17: COM1

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | DCD1        | 2     | RXD1        |
| 3     | TXD1        | 4     | DTR1        |
| 5     | GND         | 6     | DSR1        |
| 7     | RTS1        | 8     | CTS1        |
| 9     | RI1         | 10    | VCC         |

## J18: PRINT

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | STB-        | 2     | PD0         |
| 3     | PD1         | 4     | PD2         |
| 5     | PD3         | 6     | PD4         |
| 7     | PD5         | 8     | PD6         |
| 9     | PD7         | 10    | ACK-        |
| 11    | BUSY        | 12    | PE          |
| 13    | SLCT        | 14    | AFD-        |
| 15    | ERR-        | 16    | PRINIT-     |
| 17    | SLIN-       | 18    | GND         |
| 19    | GND         | 20    | GND         |
| 21    | GND         | 22    | GND         |
| 23    | GND         | 24    | GND         |
| 25    | GND         | --    | --          |

## J19: FDD

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 34    | DSKCHG\     | 33    | GDN         |
| 32    | HDSEL\      | 31    | GDN         |
| 30    | RD\         | 29    | GDN         |
| 28    | WP\         | 27    | GDN         |
| 26    | TR0\        | 25    | GDN         |
| 24    | WG\         | 23    | GDN         |
| 22    | WD\         | 21    | GDN         |
| 20    | STEP\       | 19    | GDN         |
| 18    | DIR\        | 17    | GDN         |
| 16    | MTR1\       | 15    | GDN         |
| 14    | DS0\        | 13    | GDN         |
| 12    | DS1\        | 11    | GDN         |
| 10    | MTR0\       | 9     | GDN         |
| 8     | INDEX\      | 7     | GDN         |
| 6     | NC          | 5     | GDN         |
| 4     | NC          | 3     | GDN         |
| 2     | DENSEL      | 1     | GDN         |

## J20: RS485

| Pin # | Signal Name |
|-------|-------------|
| 1     | RS485+      |
| 2     | RS485-      |

## J21: COM2

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | DCD2        | 2     | RXD2        |
| 3     | TXD2        | 4     | DTR2        |
| 5     | GND         | 6     | DSR2        |
| 7     | RTS2        | 8     | CTS2        |
| 9     | RI2         | 10    | VCC         |

## J22: PC104 Connector – 64pin

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | IOCHCHK *   | 2     | GND         |
| 3     | SD7         | 4     | RESETDRV    |
| 5     | SD6         | 6     | +5V         |
| 7     | SD5         | 8     | IRQ9        |
| 9     | SD4         | 10    | -5V         |
| 11    | SD3         | 12    | DRQ2        |
| 13    | SD2         | 14    | -12V        |
| 15    | SD1         | 16    | ENDXFR *    |
| 17    | SD0         | 18    | +12V        |
| 19    | IOCHRDY     | 20    | (KEY)       |
| 21    | AEN         | 22    | SMEMW *     |
| 23    | SA19        | 24    | SMEMR *     |
| 25    | SA18        | 26    | IOW *       |
| 27    | SA17        | 28    | IOR *       |
| 29    | SA16        | 30    | DACK3 *     |
| 31    | SA15        | 32    | DRQ3        |
| 33    | SA14        | 34    | DACK1 *     |
| 35    | SA13        | 36    | DRQ1        |
| 37    | SA12        | 38    | REFRESH *   |
| 39    | SA11        | 40    | SYSCLK      |
| 41    | SA10        | 42    | IRQ7        |
| 43    | SA9         | 44    | IRQ6        |
| 45    | SA8         | 46    | IRQ5        |
| 47    | SA7         | 48    | IRQ4        |
| 49    | SA6         | 50    | IRQ3        |
| 51    | SA5         | 52    | DACK2 *     |
| 53    | SA4         | 54    | TC          |
| 55    | SA3         | 56    | SALE        |
| 57    | SA2         | 58    | +5V         |
| 59    | SA1         | 60    | OSC         |
| 61    | SA0         | 62    | GND         |
| 63    | GND         | 64    | GND         |

## J23: PC104 Connector – 40pin

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | GND         | 2     | GND         |
| 3     | MEMCS16 *   | 4     | SBHE *      |
| 5     | IOCS16 *    | 6     | LA23        |
| 7     | IRQ10       | 8     | LA22        |
| 9     | IRQ11       | 10    | LA21        |
| 11    | IRQ12       | 12    | LA20        |
| 13    | IRQ15       | 14    | LA19        |
| 15    | IRQ14       | 16    | LA18        |
| 17    | DACK0 *     | 18    | LA17        |
| 19    | DRQ0        | 20    | MEMR *      |
| 21    | DACK5 *     | 22    | MEMW *      |
| 23    | DRQ5        | 24    | SD8         |
| 25    | DACK6 *     | 26    | SD9         |
| 27    | DRQ6        | 28    | SD10        |
| 29    | DACK7 *     | 30    | SD11        |
| 31    | DRQ7        | 32    | SD12        |
| 33    | +5V         | 34    | SD13        |
| 35    | MASTER *    | 36    | SD14        |
| 37    | GND         | 38    | SD15        |
| 39    | GND         | 40    | (KEY)       |

## J24: COM3

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | DCD3        | 2     | RXD3        |
| 3     | TXD3        | 4     | DTR3        |
| 5     | GND         | 6     | DSR3        |
| 7     | RTS3        | 8     | CTS3        |
| 9     | RI3         | 10    | VCC         |



## J25: COM4

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | DCD4        | 2     | RXD4        |
| 3     | TXD4        | 4     | DTR4        |
| 5     | GND         | 6     | DSR4        |
| 7     | RTS4        | 8     | CTS4        |
| 9     | RI4         | 10    | VCC         |

## J26: LINE IN

| Pin # | Signal Name |
|-------|-------------|
| 1     | LINEIN_R    |
| 2     | GND         |
| 3     | GND         |
| 4     | LINEIN_L    |

## J27: LINE OUT

| Pin # | Signal Name |
|-------|-------------|
| 1     | LOUTR       |
| 2     | GND         |
| 3     | GND         |
| 4     | LOUTL       |

## J28: MIC IN

| Pin # | Signal Name |
|-------|-------------|
| 1     | VREFOUT     |
| 2     | GND         |
| 3     | GND         |
| 4     | MIC1        |

## J29: COM5

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | DCD5        | 2     | RXD5        |
| 3     | TXD5        | 4     | DTR5        |
| 5     | GND         | 6     | DSR5        |
| 7     | RTS5        | 8     | CTS5        |
| 9     | RI5         | 10    | VCC         |

## J30: COM6

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | DCD6        | 2     | RXD6        |
| 3     | TXD6        | 4     | DTR6        |
| 5     | GND         | 6     | DSR6        |
| 7     | RTS6        | 8     | CTS6        |
| 9     | RI6         | 10    | VCC         |

## J31: LAN2

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | TX+         | 2     | TX-         |
| 3     | RX+         | 4     | LED0        |
| 5     | LED0+       | 6     | RX-         |
| 7     | LED1+       | 8     | LED1        |

## 2.5 IRQ Mapping

| IRQ#  | Description              |
|-------|--------------------------|
| IRQ0  | System Timer             |
| IRQ1  | Keyboard Controller      |
| IRQ2  | Cascade for IRQ8 - 15    |
| IRQ3  | Serial Port 2            |
| IRQ3  | Serial Port 6            |
| IRQ4  | Serial Port 1            |
| IRQ4  | Serial Port 5            |
| IRQ5  | Ethernet 10/100M LAN # 1 |
| IRQ5  | Ethernet 10/100M LAN # 2 |
| IRQ6  | Floppy Disk Controller   |
| IRQ7  | Parallel Port 1          |
| IRQ8  | Real Time Clock          |
| IRQ9  | USB                      |
| IRQ10 | Serial Port 3            |
| IRQ11 | Serial Port 4            |
| IRQ12 | PS/2 Mouse               |
| IRQ13 | Math Coprocessor         |
| IRQ14 | Hard Disk Controller     |
| IRQ15 | Unassigned               |

## 2.6 Watchdog Timer

The watchdog timer work flow of Vortex86 is: If the watchdog timer expires the first time, the expired event will set SFTMR0\_STS and timer will reload its initial value and count again. If the timer expire the second time, the expired event will set SFTMR1\_STS.

### Software Watchdog Timer Initial Value: Default Value: FFh

| I/O Address | Bit | Access | Description                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------|-----|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 84Ah        | 7:0 | R/W    | Software Watchdog Timer Initial Value<br>Writing to this register will reload the software watchdog timer with the value specified in this register. If the software watchdog timer expires the first time, the expired event will set the SFTMR0_STS and the timer will reload its initial value and count again. If the timer expire the second time, the expired event will set the SFTMR1_STS. The timer value can't be read from this field. |

### Software Watchdog Timer Control Register: Default Value: 00h

| I/O Address | Bit | Access | Description                                                                                                             |
|-------------|-----|--------|-------------------------------------------------------------------------------------------------------------------------|
| 84Bh        | 7   | R/W    | Software Watchdog Timer Counting Enable<br>The software watchdog timer will start to count when this bit is set to one. |
|             | 6   | RO     | Reserved                                                                                                                |
|             | 5:4 | R/W    | Software Watchdog Timer Clock Select<br>00 : 4 ms<br>01 : 1 second<br>10 : 1 minute<br>11 : 1 hour                      |

|     |     |                                                                                                                                                                                                                                            |
|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3:2 | R/W | Software Watchdog Timer Expiration Event 1 Routing Select<br>When SFTMR1_STS is set to one, an SMI#/SFTIRQ/PCIRST# will be generated according to the following combination.<br>00 : No effect<br>01 : SMI#<br>10 : SFTIRQ<br>11 : PCIRST# |
| 1:0 | R/W | Software Watchdog Timer Expiration Event 0 Routing Select<br>When SFTMR0_STS is set to one, an SMI#/SFTIRQ/PCIRST# will be generated according to the following combination.<br>00 : No effect<br>01 : SMI#<br>10 : SFTIRQ<br>11 : PCIRST# |

### Legacy Event Status Register: Default Value: 00h

| I/O Address | Bit | Access | Description                                                                                                                                                                                                                 |
|-------------|-----|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 841h        | 7   | R/WC   | Software Watch Dog Timer Event 1 Status (SFTMR1_STS)<br>This bit is set when the software watchdog timer expires the second time. This status bit does not have its corresponding enable bit and can survive under PCIRST#. |
|             | 6   | R/WC   | Software Watch Dog Timer Event 0 Status (SFTMR0_STS)<br>This bit is set when the software watchdog timer expires the second time. This status bit does not have its corresponding enable bit and can survive under PCIRST#. |

### C Example

Those C code for DOS will show you more: ([Download C source code for DOS and execute file](#))

```
#include <conio.h>
#include <stdio.h>
#include <time.h>

void main()
{
    clock_t clk;
    int     nTime = 5;
```

```

/* set time out */
outp(0x84a, nTime);

/* set timer clock to 1 second and "Timer Expiration Event 0/1" to reset system. */
outp(0x84b, 0x9c);

printf("Press any key to stop clearing watchdog timer status...\n");
while(!kbhit())
{
    /* clear "Timer Expiration Event 0/1" bit */
    outp(0x841, 0xc0);
}

getch();

printf("System will be reset after %d seconds.\n", nTime * 4);

clk = clock();
while(!kbhit())
    printf("%2.2fr", (clock() - clk) / CLK_TCK);
}

```

## Assembler Example code

```

mov dx,84ah ; set timeout = 20 second
mov al,5
out dx,al
mov dx,84bh ; set timer clock to 1 second and "Timer Expiration Event 0/1" to reset
system.
mov al,9ch
out dx,al

; clearing watchdog timer status
mov dx,841h
mov al,0c0h
out dx,al

```

# Chapter 3

## SVGA Setup

### 3.1 Introduction

The VORTEX86-6049-L2S6 offers high performance/low cost Vortex™ SoC (System on Chip) solution that integrates a x86 compatible processor, high performance North Bridge, advanced hardware GUI engine and Super-South bridge into a single chipset. It also has a built-in VGA controller.

#### 3.1.1 SoC Chipset

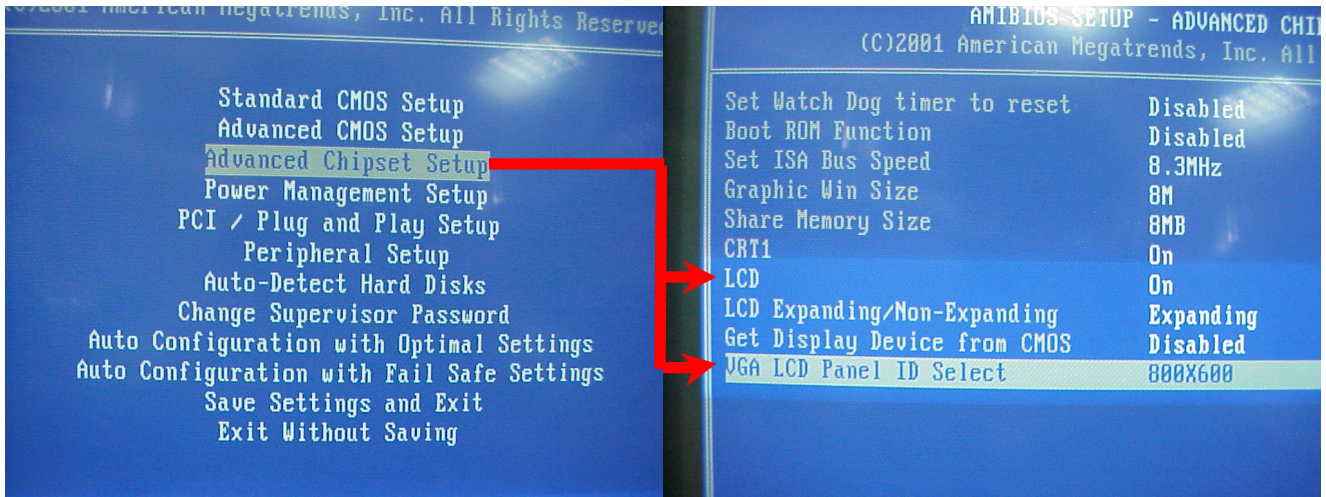
The embedded video uses the integrated Ultra-AGP™ VGA controller for Hardware 2D/video/Graphics Accelerators, this board supports conventional analog CRT monitor or flat panel. It is both AGP 4X / Fully DirectX 8 Compliant. It also provides Monitor / Secondary CRT Monitor output. This video SVGA controller supports conventional analog CRT monitor or flat panel. In addition, it also supports interlaced and non-interlaced analog monitors (color and monochrome VGA) in high-resolution modes while maintaining complete IBM VGA compatibility. Multiple frequency (multi-sync) monitors are handled as if they were analog monitors.

#### 3.1.2 Display memory

The VGA controller can drive CRT displays or color panel displays with resolutions up to 1920 x 1440 at 256 colors (True colors). It supports Shared System Memory up to 32 MB.

### 3.2 Flat Panel BIOS Setting

The VORTEX86-6049-L26S offers the option in the BIOS Setting to ON/OFF the LCD Flat Panel. Before you connect the LCD Flat Panel to CPU Board, please go to BIOS → Advanced Chipset Setup, to turn “ON” the “LCD”, and select the corresponding resolution on “VGA LCD Panel ID Select”.



### 3.3 Flat Panel Wiring

Before you connect the LCD Flat Panel with VORTEX86-6049-L26S, please make the your LCD Flat Panel is 3.3V or 5V, then place the J6 (Jumper 6, see page 15) on the correct position.

For the Wiring, please refer to page 15, J4 , LCD connector. Or mail to [info@icop.com.tw](mailto:info@icop.com.tw) if you have any question.



# Chapter 4

## Network Interface

### 4.1 Introduction

The Realtek RTL-8100B 10/100Mbps Ethernet controller board supports both 10/100BASE-T and Coax 10Base-2 'BNC' connectors, and allows direct connection to your 10/100Mbps Ethernet based Local Area Network for full interaction with local servers, wide area networks such as the Internet.

I/O and IRQ settings can be done by software with the supplied utility software, or it can be set for Plug and Play compatibility. The controller supports : Full-Duplex Ethernet function to double channel bandwidth, auto media detection.

- **Chipset:** Realtek 8100B single chip
- **Type:** 10/100BASE-T
- **Transfer Mode:** Full duplex, doubles effective bandwidth
- **Buffer:** Built-in 16KB RAM Buffer.
- **Connectors:** 8-pin male header , pitch 2.0mm
- **Monitoring LEDs:** network ready indicator, network activity indicator

### 4.2 Software Support

- On-board EEPROM (93C46) programming
- Setup/Diagnostic program for DOS
- Help utility for easy installation
- RPL boot ROM for Novell Netware, Microsoft NT
- NDIS2 (DOS, OS/2, Lantastic, WFW3.11;K;K)
- NDIS3, NDIS4, NDIS5 for WIN95,98, NT3.51,4.0,5.0, WFW3.11
- Netware 16-bit ODI driver for DOS, OS/2 and 32-bit ODI driver for Netware 3.x,4.x,5.0 Server
- Packet driver for UNIX Client
- SCO Unix driver
- Linux driver

# Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster. Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, originality to use this product. Vendor will not be liable for any claim made by any other related party. Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.