



User's Manual

2801050

Mini ITX Board

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CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type

To be recommended by the manufacturer.

Dispose of used batteries according

To the manufacturer's instructions

August 2007, Version A2

ESD Precautions

Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This helps to discharge any static electricity on your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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Chapter 1

Introduction



The **2801050** is an Intel® LGA775 for Pentium 4 and Celeron D CPU equipped Mini ITX board with graphics, Fast and Giga Ethernet and audio interface. Designed with the space-limited applications in mind, the **2801050** is practically the finest embedded Pentium 4 board that exists. To simplify system

integration, it packs provisions such as super I/Os, UXGA, LCD, Ethernet, solid state disk, all on a single board. Unique embedded features such as 4 serial ports (3 x RS-232, 1 x RS-232/422/485) Mini ITX bility and that allow adoption of an extensive array of PC peripherals. The industrial-grade construction of **2801050 series** allows your system to endure the continuous operation in hostile environments where stability and reliability are basic requirements. System dependability of **2801050 series** are enhanced by its built-in watchdog timer, a special industrial feature not commonly seen on other motherboards.

Designed for the professional embedded developers, the Pentium 4 embedded board **2801050 Series** is virtually the ultimate one-step solution for embedded system applications.

1.1 Specifications

- **CPU:** LGA775 for Pentium 4 and Celeron D
- **Chipset:** Intel 915GV + ICH*6
- **Bus Clock:** 533/800MHz
- **BIOS:**
 - Phoenix-Award BIOS, Y2K compliant
 - 4Mbit Flash, DMI, Plug and Play
 - SmartView for multiple LCD type selection, display mode option and application extension features
 - RPL/PXE Ethernet Boot ROM
 - "Load Optimized Default" to backup customized Setting in the BIOS flash chip to prevent from CMOS battery fail
- **System Memory:**
 - 2*240-pin DDR2 400/533 DIMM max.
 - Maximum up to 2GB in dual-channel interleaved mode.
- **L2 Cache:** integrated in CPU
- **Onboard IDE:**
 - 1 parallel ATA-100 as 1* 44-pin 2.0 pitch box-header.
 - 2*STA-150 connectors

- **Compact Flash Socket:**
 - One Compact Flash Type II Socket(Optional)
- **Onboard Multi I/O:**
 - One floppy port (Optional)
 - 3 x RS-232, 1x RS-232/422/485
 - One LPT port.
- **USB Interface:** 4 USB ports with fuse protection and complies with USB Spec. Rev. 2.0
- **Real Time Clock:** Integrate Intel® ICH*6
- **Watchdog Timer:**
 - 1~255 seconds; up to 255 levels
- **Graphics/Streaming:**
 - Integrate Intel® 915GV
 - Unified Memory Architecture shares system memory up to 128MB
 - Single display mode maximum resolutions:
 - ◆ CRT: 1600 x1200 @ 60Hz
 - ◆ LVDS LCD: 1600 x 1200
 - DualView display mode:
 - ◆ CRT: 1600 x1200 @60 Hz
 - ◆ LVDS LCD: 1600 x 1200
 - LCD backlight control supported
- **Ethernet:**
 - One Intel 82562GZ Fast Ethernet
 - optional Intel 82573E Gigabit
 - Wake On LAN (via ATX power supply)
 - Equipped with RJ-45 interface
- **Audio:**
 - Realtek AC'97 codec audio
 - MIC-in, Line-out
- **Power Management:** ACPI (Advanced Configuration and Power Interface)

- **Form Factor:** Mini ITX form factor
- **Size:** 170mm* 170mm

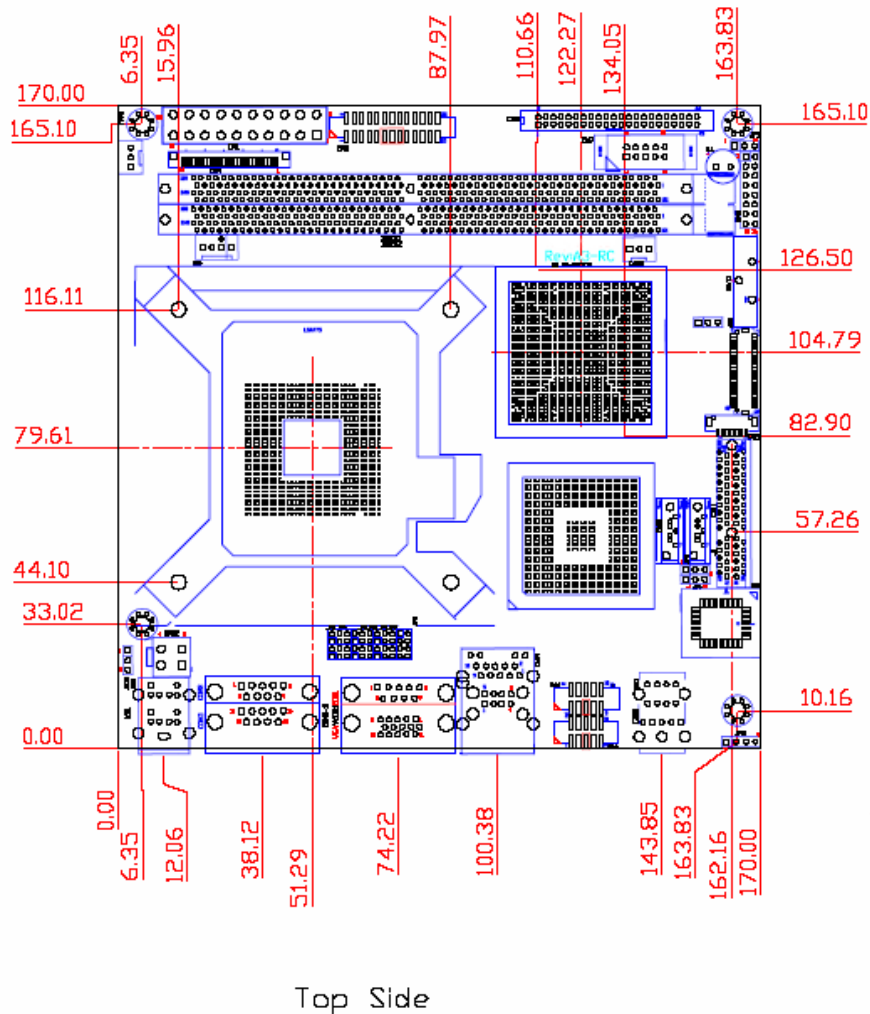
NOTE: *Specifications are subject to change without notice.*

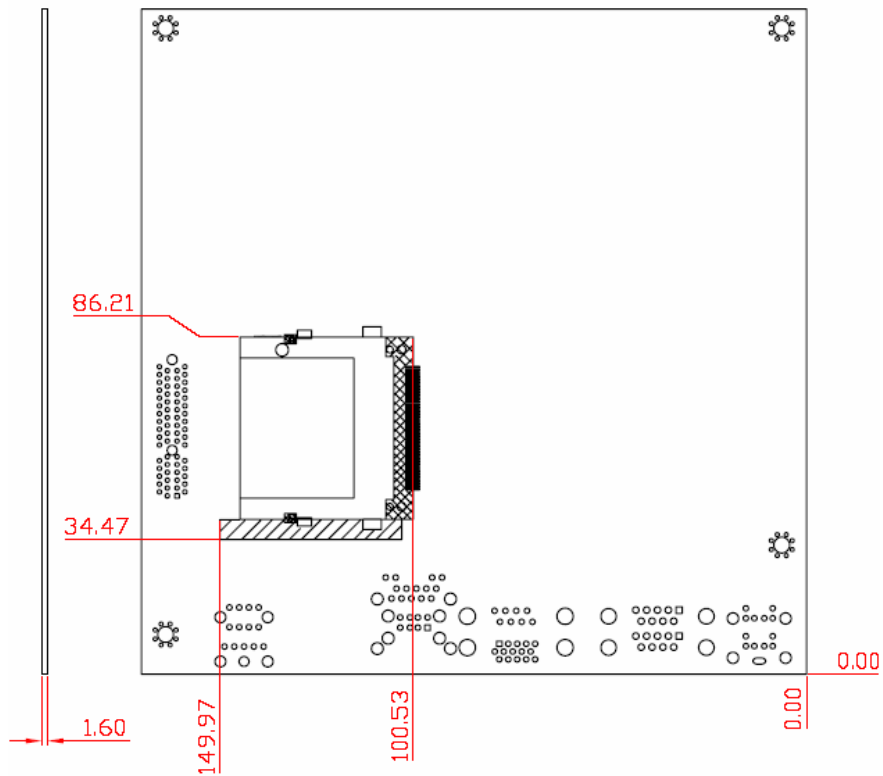
1.2 Utilities Supported

- Chipset Driver
- Ethernet Driver
- VGA Drivers
- Audio Drivers

Chapter 2 Jumpers and Connectors

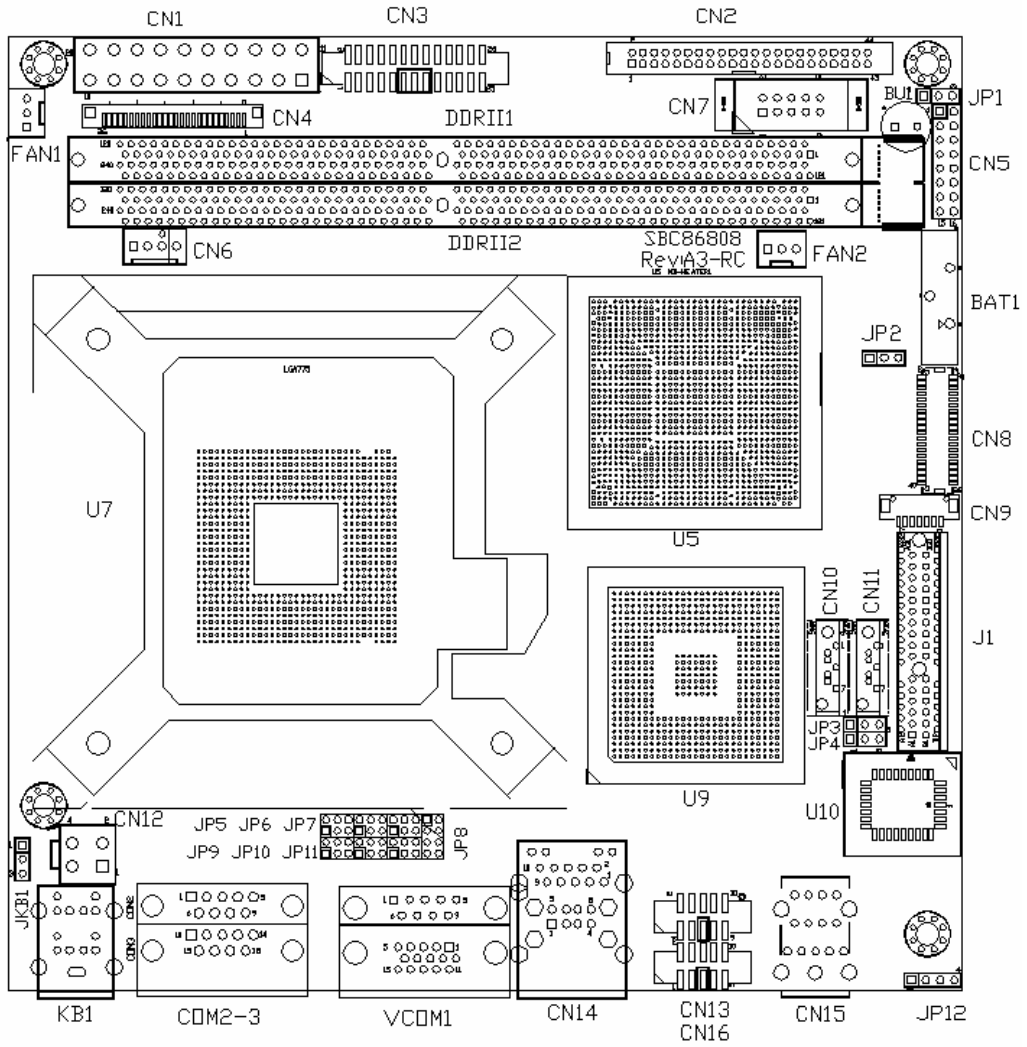
2.1 Board Layout and Fixing Holes

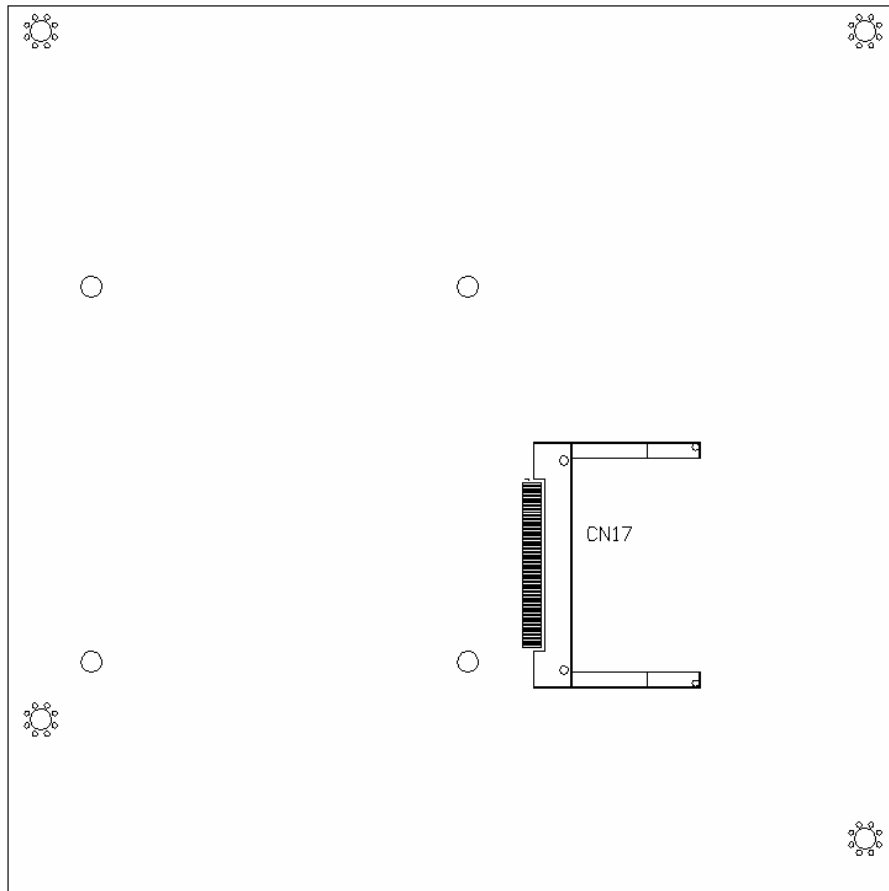




Bottom Side

2.2 Placement





2.3 Jumper Settings

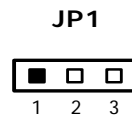
The **2801050 Series** is configured to match the needs of your application with the proper jumper settings. The table below is a summary of all the jumpers and their corresponding functions onboard the **2801050 Series**. The succeeding tables show the correct jumper settings for the onboard devices. 2801050

Jumper setting :

| Jumper | Default Setting | Jumper Setting | |
|--------|---|-------------------|-----------|
| JP1 | Clear CMOS Setting : Normal | Short 1-2 | |
| JP2 | LVDS Voltage select : 3.3V | Short 1-2 | |
| JP3 | Compact Flash Power Select : 3.3V | Short 1-2 | |
| JP4 | Compact Flash Select : Slave | Short 1-2 | |
| JP5 | COM2 Mode Select: RS-232 | Short 3-5,4-6 | |
| JP6 | COM4 Mode Select | CN16 Pin 1: DCD | Short 3-5 |
| | | CN16 Pin 8: RI | Short 4-6 |
| JP7 | COM2 Mode Select | COM2-3 Pin 1: DCD | Short 3-5 |
| | | COM2-3 Pin 8: RI | Short 4-6 |
| JP8 | COM2 Mode Select: RS-232 | Short 1-2 | |
| JP9 | COM2 Mode Select: RS-232 | Short 3-5,4-6 | |
| JP10 | COM3 Mode Select | COM2-3 Pin 1: DCD | Short 3-5 |
| | | COM2-3 Pin 8: RI | Short 4-6 |
| JP11 | COM1 Mode Select | VCOM1 Pin 1: DCD | Short 3-5 |
| | | VCOM1 Pin 8: RI | Short 4-6 |
| JKB1 | Power on by PS/2 Keyboard/Mouse : Disable | Short 1-2 | |

2.3.1 CMOS Clear Jumper: JP1

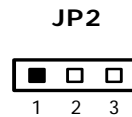
| Options | Settings |
|------------|---------------------|
| Normal | Short 1-2 (default) |
| Clear CMOS | Short 2-3 |



2.3.2 LVDS Voltage Setting : JP2

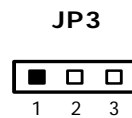
2801050 supports 3.3V or +5V flat panel displays. Configure the jumper **JP2** to the appropriate voltage of the flat panel

| VDDM | Settings |
|------|---------------------|
| 3.3V | Short 1-2 (default) |
| 5V | Short 2-3 |



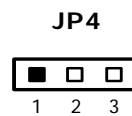
2.3.3 Compact Flash Power: JP3

| Options | Settings |
|---------|--------------------|
| 3.3V | Short 1-2(default) |
| 5V | Short 2-3 |



2.3.4 Compact Flash Master/Slave Selection: JP4

| Options | Settings |
|---------|---------------------|
| Slave | Short 1-2 (default) |
| Master | Short 2-3 |



2.3.5 COM1 Mode Select: JP11

| VCOM1 | JP11 |
|-------|------|
| | |

| | | |
|-------------------------------------|---------------------------------|--------------------|
| *Pin 1=D _{CD} *Pin 1=5V | Short 3-5(default) Short 1-3 | <p>JP11</p> |
| *Pin 9=RI *Pin 9=+12V | Short 4-6(default) Short 2-4 | |

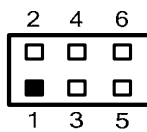
2.3.6 COM2 Mode Select: JP7

| COM2-3 | JP7 | <p>JP7</p> |
|-------------------------------------|---------------------------------|-------------------|
| *Pin 1=D _{CD} *Pin 1=5V | Short 3-5(default) Short 1-3 | |
| *Pin 9=RI *Pin 9=+12V | Short 4-6(default) Short 2-4 | |

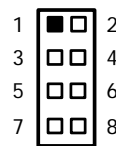
2.3.7 COM2 Mode Select for RS-232/422/485: JP8/JP5/JP9

| COM2 | JP8 | JP5 | JP9 |
|------------------|----------|----------|----------|
| RS-232 (default) | 1-2 | 3-5, 4-6 | 3-5, 4-6 |
| RS-422 | 3-4, 7-8 | 1-3, 2-4 | 1-3, 2-4 |
| RS-485 | 5-6, 7-8 | 1-3, 2-4 | 1-3, 2-4 |

JP5/JP9

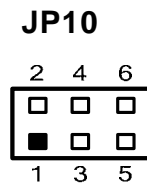


JP8



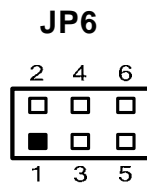
2.3.8 COM3 Mode Select: JP10

| COM2-3 | JP10 |
|----------------------------|---------------------------------|
| *Pin 10=DCD *Pin 10=5V | Short 3-5(default) Short 1-3 |
| *Pin 18=RI *Pin 18=+12V | Short 4-6(default) Short 2-4 |



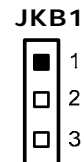
2.3.9 COM4 Mode Select: JP6

| CN16 | JP6 |
|--------------------------|---------------------------------|
| *Pin 1=DCD *Pin 1=5V | Short 3-5(default) Short 1-3 |
| *Pin 8=RI *Pin 8=+12V | Short 4-6(default) Short 2-4 |



2.3.10 Keyboard & Mouse Power Selection: JKB1

| Options | Settings |
|---------|--------------------|
| 5V | Short 1-2(default) |
| 5VSB | Short 2-3 |

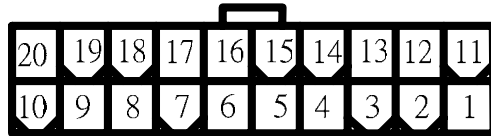


2.4 Connectors

The connectors allow the CPU card to connect with other parts of the system. Some problems encountered by your system may be a result from loose or improper connections. Ensure that all connectors are in place and firmly attached. The following table lists the function of each connector on the **2801050 Series**.

| Connectors | Label |
|---|---------|
| ATX Power Connector | CN1 |
| Parallel IDE Connector | CN2 |
| Printer Port Connector | CN3 |
| FDD Connector | CN4 |
| Front Panel Bezel Connector | CN5 |
| CPU FAN1 Connector | CN6 |
| USB Port2 & Port3 Connector | CN7 |
| LVDS Connector | CN8 |
| LVDS Inverter Connector | CN9 |
| SATA 1 Connector | CN10 |
| SATA 0 Connector | CN11 |
| 12V Power Connector | CN12 |
| Digital I/O Connector | CN13 |
| LAN & Dual USB Connector | CN14 |
| Audio Connector | CN15 |
| Serial Port1 4 Connector | CN16 |
| Compact Flash Connector | CN17 |
| DDRII DIMM | DDRII 1 |
| DDRII DIMM | DDRII 2 |
| Serial Port1 2/3 Connector | COM2-3 |
| VGA & Serial Port1 1 Connector | VCOM1 |
| 6-Pin Mini Dim Keyboard/Mouse Connector | KB1 |
| CPU FAN 2 Connector | FAN1 |
| System FAN Connector | FAN2 |
| Speaker Out Connector | JP12 |
| PCI-Express Extension Slot | J1 |

2.4.1 ATX Power Connector: CN1



| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | 3.3V | 2 | 3.3V |
| 3 | GND | 4 | 5V |
| 5 | GND | 6 | 5V |
| 7 | GND | 8 | PW_OK |
| 9 | 5VSB | 10 | 12V |
| 11 | 3.3V | 12 | -12V |
| 13 | GND | 14 | PS_ON |
| 15 | GND | 16 | GND |
| 17 | GND | 18 | -5V |
| 19 | 5V | 20 | 5V |

2.4.2 Parallel IDE Connector: CN2

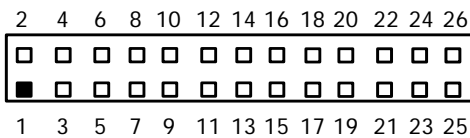
The **2801050** includes a PCI bus enhanced IDE controller that can support master/slave mode and post write transaction mechanisms with 64-byte buffer and master data transaction.

44-pin IDE Interface Connector:

| Pin | Description | Pin | Description | Pin | Description |
|-----|-------------|-----|--------------|-----|--------------|
| 1 | Reset # | 2 | GND | 3 | Data 7 |
| 4 | Data 8 | 5 | Data 6 | 6 | Data 9 |
| 7 | Data 5 | 8 | Data 10 | 9 | Data 4 |
| 10 | Data 11 | 11 | Data 3 | 12 | Data 12 |
| 13 | Data 2 | 14 | Data 13 | 15 | Data 1 |
| 16 | Data 14 | 17 | Data 0 | 18 | Data 15 |
| 19 | GND | 20 | No connector | 21 | No connector |

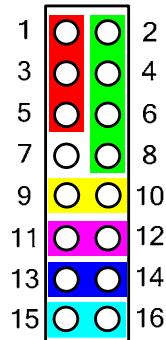
| | | | | | |
|----|--------------|----|--------------|----|--------------|
| 22 | GND | 23 | IOW # | 24 | GND |
| 25 | IOR # | 26 | GND | 27 | IOCHRDY |
| 28 | No connector | 29 | No connector | 30 | GND-Default |
| 31 | Interrupt | 32 | No connector | 33 | SA1 |
| 34 | No connector | 35 | SA0 | 36 | SA2 |
| 37 | HDC CS0 # | 38 | HDC CSI # | 39 | HDD Active # |
| 40 | GND | 41 | VCC | 42 | VCC |
| 43 | GND | 44 | N.C | | |

2.4.3 Printer Port Connector: CN3



| Pin | Description | Pin | Description |
|-----|----------------|-----|--------------------|
| 1 | Strobe# | 2 | Auto Form Feed# |
| 3 | Data 0 | 4 | Error# |
| 5 | Data 1 | 6 | Initialize# |
| 7 | Data 2 | 8 | Printer Select In# |
| 9 | Data 3 | 10 | GND |
| 11 | Data 4 | 12 | GND |
| 13 | Data 5 | 14 | GND |
| 15 | Data 6 | 16 | GND |
| 17 | Data 7 | 18 | GND |
| 19 | Acknowledge# | 20 | GND |
| 21 | Busy | 22 | GND |
| 23 | Paper Empty# | 24 | GND |
| 25 | Printer Select | 26 | NC |

2.4.4 Front Panel Bezel Connector: CN5



Power LED

This 3-pin connector, designated at **Pins 1 and 5** of **CN5**, connects the system power LED indicator to its respective switch on the case. **Pin 1** is +, and **pin 5** is assigned as -. The Power LED lights up when the system is powered ON.

External Speaker and Internal Buzzer Connector

Pins 2, 4, 6, and 8 of **CN5** connect to the case-mounted speaker unit or internal buzzer. **Short pins 4-6** when connecting the to an internal buzzer. When connecting an external speaker, set these jumpers to **Open** and install the speaker cable on **pin 8** (+) and **pin 2** (-).

ATX Power On/Off Button

This 2-pin connector, designated at **Pins 9 & 10** of **CN5**, connects the ATX power button of the front panel to the **2801050** - allowing user to control the power on/off state of the ATX power supply.

System Reset Switch

Pins 11 & 12 of **CN5** connect to the case-mounted reset switch and allow rebooting of your computer instead of turning OFF the power switch. This is a preferred method of rebooting in order to prolong the life of the system's power supply.

HDD Activity LED

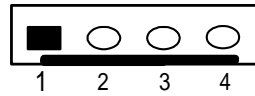
This connector extends to the hard drive activity LED on the control

panel. This LED will flash when the HDD is being accessed. **Pins 15 & 16 of CN5** connect the hard disk drive and the front panel HDD LED. **Pins 15** is -, and **pin 16** is assigned as +.

* **Pins 13** connect to Ground , and **Pins 14** is not use.

2.4.5 CPU FAN1 Connector: CN6

| Pin | Description |
|-----|-------------|
| 1 | GND |
| 2 | +12V |
| 3 | Sensor |
| 4 | Control |

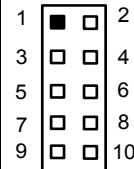


2.4.6 USB0~3 Connectors: CN7, CN14(USB)

The **2801050** features Four Universal Serial Bus (USB) connectors as USB 2.0 compliant (480Mbps) that can adapt any USB peripherals, such as monitor, keyboard and mouse etc. The **2801050** has a box-header connectors (**CN7**) and one USB connectors (**CN14**).

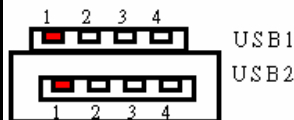
CN7: USB Connector Pin Assignment

| Pin | Description | Pin | Description |
|-----|--------------|-----|--------------|
| 1 | VCC | 2 | VCC |
| 3 | D0- | 4 | D1- |
| 5 | D0+ | 6 | D1+ |
| 7 | Ground (GND) | 8 | Ground (GND) |
| 9 | Ground (GND) | 10 | Ground (GND) |



CN14: USB Connector Pin Assignment

| Pin | Signal Name |
|-----|-------------|
| | |
| | |
| | |
| | |



2.4.7 LVDS Connector: CN8, CN9

The LVDS interface which is with 40-pin connector supports 18/24-bit single/dual channel type of LCD.

Remark:

The LVDS connector on the **2801050** is a 40-pin connector. The matching connector is strongly recommended to use JST SHDR-40V-S-B.

The 7-pin inverter connector on the **2801050** is with Hirose connector. The matching connector is strongly recommended to use Hirose DF13-7S-1.25C.

| Pin | Deception | Pin | Deception |
|-----|----------------|-----|---------------|
| 1 | VCCM | 2 | VCCM |
| 3 | VCCM | 4 | VCCM |
| 5 | VCCM | 6 | VCCM |
| 7 | N.C. | 8 | N.C. |
| 9 | GND | 10 | GND |
| 11 | Channel B D3- | 12 | Channel B D0- |
| 13 | Channel B D3+ | 14 | Channel B D0+ |
| 15 | GND | 16 | GND |
| 17 | Channel B CLK- | 18 | Channel B D1- |
| 19 | Channel B CLK+ | 20 | Channel B D1+ |
| 21 | GND | 22 | GND |
| 23 | Channel A D0- | 24 | Channel B D2- |
| 25 | Channel A D0+ | 26 | Channel B D2+ |

| | | | | |
|----|---------------|----|----------------|--|
| 27 | GND | 28 | GND | |
| 29 | Channel A D1- | 30 | Channel A D3- | |
| 31 | Channel A D1+ | 32 | Channel A D3+ | |
| 33 | GND | 34 | GND | |
| 35 | Channel A D2- | 36 | Channel A CLK- | |
| 37 | Channel A D2+ | 38 | Channel A CLK+ | |
| 39 | GND | 40 | GND | |

CN9: LVDS Inverter Connector

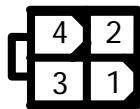
| PIN | Description |
|-----|-------------|
| 1 | 12V |
| 2 | 12V |
| 3 | 5V |
| 4 | ENAB |
| 5 | GND |
| 6 | GND |
| 7 | GND |

2.4.8 SATA Connector: CN10/CN11

| PIN | Description |
|-----|-------------|
| 1 | GND |
| 2 | TX+ |
| 3 | TX- |
| 4 | GND |
| 5 | RX- |
| 6 | RX+ |
| 7 | GND |

2.4.9 12V Power Connector: CN12

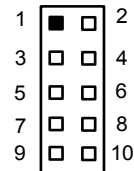
This connector connected to an ATX12V power supply and used for CPU Core Voltage.



| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | GND | 2 | GND |
| 3 | 12V | 4 | 12V |

2.4.10 Digital I/O: CN13

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Out-1 | 2 | In-1 |
| 3 | Out-2 | 4 | In-2 |
| 5 | Out-3 | 6 | In-3 |
| 7 | Out-4 | 8 | In-4 |
| 9 | GND | 10 | GND |



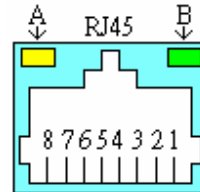
Open-drain output

2.4.11 LAN Connector: CN14

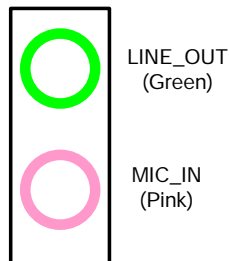
The RJ-45 connector is used for Ethernet. To connect the **2801050** to 10-Base-T or 100-Base-T hub, just plug one end of the cable into the **CN14** and connect the other end (phone jack) of the cable to a 10-Base-T hub or 100-Base-T hub.

CN14: RJ-45 Connector Pin Assignment

| Pin | Signal |
|-----|----------------------------------|
| 1 | Tx+ (Data transmission positive) |
| 2 | Tx- (Data transmission negative) |
| 3 | Rx+(Data reception positive) |
| 4 | RJ-1(For 100 base T-Only) |
| 5 | RJ-1(For 100 base T-Only) |
| 6 | Rx- (Data reception negative) |
| 7 | RJ-1(For 100 base T-Only) |
| 8 | RJ-1(For 100 base T-Only) |
| A | Active LED |
| B | 100 LAN LED |



2.4.12 Audio Connector: CN15



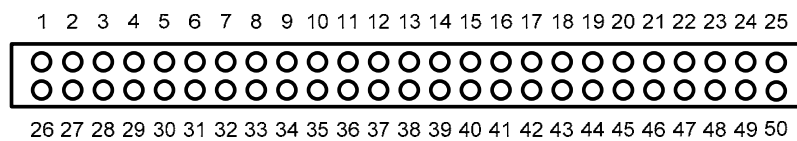
2.4.13 Compact Flash Connector: CN17

The **2801050** is equipped with a Compact Flash disk type-II socket on the solder side and it supports the IDE interface Compact Flash disk card with DMA mode supported. The socket itself is especially designed to prevent any incorrect installation of the Compact Flash disk card.

When installing or removing the Compact Flash disk card, please make sure that the system power is off.

The Compact Flash disk card is defaulted as the C: or D: disk drive in your PC system.

CN17: Compact Flash Socket



2.4.14 DDRII DIMM: DDRII 1/ DDRII 2

The 2801050 supports two 240-pin DDRII for a maximum total memory up to 2GB.

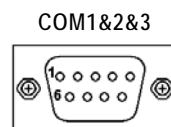
2.4.15 Serial Port Interface: VCOM1(COM1), COM2-3(COM2&COM3), CN16(COM4)

COM1 Port Connector: VCOM1

COM2&COM3 Port Connector: COM2-3

The connector, COM1 COM2 and COM3, is a DB-9 connector, and the following table shows the pin assignments of this connector.

| Pin | Signal Name |
|-----|--------------------------|
| 1 | DCD, Data carrier detect |
| 2 | RXD, Receive data |
| 3 | TXD, Transmit data |
| 4 | DTR, Data terminal ready |
| 5 | GND, ground |
| 6 | DSR, Data set ready |
| 7 | RTS, Request to send |
| 8 | CTS, Clear to send |
| 9 | RI, Ring indicator |



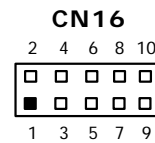
The COM2 RS-422/485 pin assignment

| Pin | Description | |
|-----|-------------|--------------|
| | R2-422 | RS-485 |
| 1 | TX- | DATA- |
| 2 | TX+ | DATA+ |
| 3 | RX+ | No connector |
| 4 | RX- | No connector |

COM4 Port Connectors: CN16

The RS-232 pin assignments are listed on the following table.

| Pin | Description | Pin | Description |
|-----|---------------------------|-----|-----------------------|
| 1 | Data Carrier Detect (DCD) | 2 | Data Set Ready (DSR) |
| 3 | Receive Data (RXD) | 4 | Request to Send (RTS) |
| 5 | Transmit Data (TXD) | 6 | Clear to Send (CTS) |
| 7 | Data Terminal Ready (DTR) | 8 | Ring Indicator (RI) |
| 9 | Ground (GND) | 10 | NC |



2.4.16 VGA Connector: VCOM1

VCOM1 is a standard 15-pin pin header connector commonly used for the CRT VGA display.

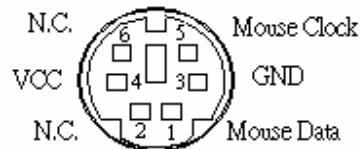
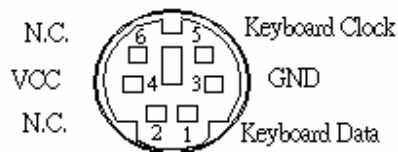
VCOM1: CRT/VGA Connector Pin Assignment

| Pin | Description | Pin | Description | Pin | Description |
|-----|-----------------|-----|---------------|-----|-------------|
| 1 | Red | 2 | Green | 3 | Blue |
| 4 | N/A | 5 | GND | 6 | AGND |
| 7 | AGND | 8 | AGND | 9 | N/A |
| 10 | GND | 11 | N/A | 12 | DDC DAT |
| 13 | Horizontal Sync | 14 | Vertical Sync | 15 | DDC CLK |

2.4.17 6-Pin Mini Dim Keyboard/Mouse Connector: KB1

The **2801050** provides a keyboard and Mouse interface.

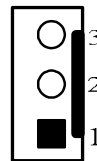
| KB1 | Description |
|-----|---------------------------|
| | Keyboard Connector |
| 1 | Keyboard Data |
| 2 | N.C. |
| 3 | GND |
| 4 | VCC |
| 5 | Keyboard Clock |
| 6 | N.C. |
| | Mouse Connector |
| 1 | Mouse Data |
| 2 | N.C. |
| 3 | GND |
| 4 | VCC |
| 5 | Mouse Clock |
| 6 | N.C. |



2.4.18 CPU FAN 2 Connector: FAN1

FAN1 is a CPU fan connectors. Pentium microprocessors require a fan for heat dispensing. The fan connector on **2801050** provides power to the fan.

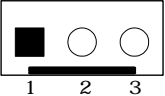
| Pin | Description |
|-----|-------------|
| 1 | GND |
| 2 | +12V |
| 3 | Sensor |



2.4.19 System FAN Connector: FAN2

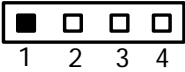
FAN2 is a system fan connectors. Pentium microprocessors require a fan for heat dispensing. The fan connector on **2801050** provides power to the fan.

| Pin | Description |
|-----|-------------|
| 1 | GND |
| 2 | +12V |
| 3 | Sensor |



2.4.20 SPEAK Out Connector: JP12

| Pin | Description |
|-----|-----------------|
| 1 | Speak Out Right |
| 2 | AUDIO GND |
| 3 | AUDIO GND |
| 4 | Speak Out Left |



2.4.21 PCI-Express Extension Slot: J1

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| A1 | PRST# | B1 | +12V |
| A2 | +12V | B2 | +12V |
| A3 | +12V | B3 | RSVD |
| A4 | GND | B4 | GND |
| A5 | JTAG2 | B5 | SMCLK |
| A6 | JTAG3 | B6 | SMDAT |
| A7 | JTAG4 | B7 | GND |
| A8 | JTAG5 | B8 | +3.3V |
| A9 | +3.3V | B9 | JTAG1 |
| A10 | +3.3V | B10 | +3.3VAUX |
| A11 | PERST# | B11 | WAKE# |
| A12 | GND | B12 | RSVD1 |
| A13 | REFCLK+ | B13 | GND |
| A14 | REFCLK- | B14 | PETP0 |

| | | | |
|-----|--------|-----|----------|
| A15 | GND | B15 | PETN0 |
| A16 | PERP0 | B16 | GND |
| A17 | PERN0 | B17 | PRSNT2#1 |
| A18 | GND | B18 | GND |
| A19 | RSVD3 | B19 | PETP1 |
| A20 | GND | B20 | PETN1 |
| A21 | PERP1 | B21 | GND |
| A22 | PERN1 | B22 | GND |
| A23 | GND | B23 | PETP2 |
| A24 | GND | B24 | PETN2 |
| A25 | PERP2 | B25 | GND |
| A26 | PERN2 | B26 | GND |
| A27 | GND | B27 | PETP3 |
| A28 | GND | B28 | PETN3 |
| A29 | PERP3 | B29 | GND |
| A30 | PERN3 | B30 | RSVD2 |
| A31 | GND | B31 | PRSNT2# |
| A32 | RSVD4 | B32 | GND |
| 1 | GUIDE1 | | |
| 2 | GUIDE2 | | |

Chapter 3 Hardware Description

3.1 Microprocessors

The **2801050 Series** supports Intel® Celeron® M and Pentium III CPUs. Systems based on these CPUs can be operated under Windows 2000/XP and Linux environments. The system performance depends on the microprocessor installed onboard. Make sure all settings are correct for the installed microprocessor to prevent any damage to the CPU.

3.2 BIOS

System BIOS used on the **2801050 Series** is Phoenix-Award Plug and Play BIOS. The **2801050 Series** contains a single 4Mbit Flash.

3.3 System Memory

The **2801050 Series** industrial CPU card supports one 200-pin DDR SODIMM socket for a maximum memory of 1GB DDR SDRAMs. The memory module can come in sizes of 64MB, 128MB, 256MB, 512MB and 1GB.

3.4 I/O Port Address Map

The Intel® Pentium III/Celeron® M CPU communicates via I/O ports. It has a total of 1KB port addresses available for assignment to other devices via I/O expansion cards.

| Address | Devices |
|---------|------------------------------------|
| 000-01F | DMA controller #1 |
| 020-03F | Interrupt controller #1 |
| 040-05F | Timer |
| 060-06F | Keyboard controller |
| 070-07F | Real time clock, NMI |
| 080-09F | DMA page register |
| 0A0-0BF | Interrupt controller #2 |
| 0C0-0DF | DMA controller #2 |
| 0F0 | Clear math coprocessor busy signal |
| 0F1 | Reset math coprocessor |
| 0F8-0FF | Math processor |
| 1F0-1F8 | Fixed disk controller |
| 250-25F | HR I/O |
| 300-31F | Prototype card |
| 380-38F | SDLC #2 |
| 3A0-3AF | SDLC #1 |
| 3B0-3BF | MDA video card (including LPT1) |
| 3C0-3CF | EGA card |
| 3D0-3DF | CGA card |
| 3F0-3F7 | Floppy disk controller |
| 3F8-3FF | Serial port #1 (COM1) |
| 3E8-3EF | Serial port #3 (COM3) |
| 2F8-2FF | Serial port #2 (COM2) |
| 2E8-2EF | Serial port #4 (COM4) |
| 3F0-3FF | Super I/O |

3.5 Interrupt Controller

The **2801050 Series** is a 100% PC compatible control board. It consists of 16 interrupt request lines. Four out of the sixteen can either be programmable. The mapping list of the 16 interrupt request lines is shown on the following table.

| NMI | Parity check error |
|------------|---|
| IRQ0 | System timer output |
| IRQ1 | Keyboard |
| IRQ2 | Interrupt rerouting from IRQ8 through IRQ15 |
| IRQ3 | Serial port #2 |
| IRQ4 | Serial port #1 |
| IRQ5 | Reserved |
| IRQ6 | Floppy disk controller |
| IRQ7 | Parallel port #1 |
| IRQ8 | Real time clock |
| IRQ9 | Reserved |
| IRQ10 | Serial port #3 |
| IRQ11 | Serial port #4 |
| IRQ12 | PS/2 Mouse |
| IRQ13 | Math coprocessor |
| IRQ14 | Primary IDE channel |
| IRQ15 | Secondary IDE Channel |

Appendix A Watch Dog Timer

Watchdog Timer Setting

The watchdog timer makes the system auto-reset while it stops to work for a period. The integrated watchdog timer can be setup as system reset mode by program.

- Timeout Value Range
 - 1 to 255
 - Second

- Program Sample

Watchdog timer setup as system reset with 5 second of timeout

| | |
|---------------|------------------------|
| 4E, 87 | |
| 4E, 87 | |
| 4E, 2D | Set WDT Funtion Enable |
| 4F, 20 | |
| 4E, 07 | |
| 4F, 08 | Logical Device 8 |
| 4E, 30 | Activate |
| 4F, 01 | |
| 4E, F5 | Set Second |
| 4F, N | N = 00 or 08 |
| 4E, F6 | Set Value |
| 4F, M | M = 00 ~ FF |

Using the Watchdog Function

Start
↓
Un-Lock WDT :O 4E 87 ; Un-lock super I/O
O 4E 87 ; Un-lock super I/O
↓
Set WDT Funtion :
O 4E 2D
O 4F 20
Select Logic device :
O 4E 07
O 4F 08
↓
Activate WDT :O 4E 30
O 4F 01
Set Second or Minute :
O 4E F5
O 4F N N=00 or 04(See below table)
↓
Set base timer :O 4E F6
O 4F M=M=00,01,02,...FF(Hex) ,Value=0 to 255
↓
WDT counting

re-set timer :O 4E F6
O 4F M ; M=00,01,02,...FF(See below table)
↓
IF No re-set timer :WDT time-out, generate RESET
IF to disable WDT :O 4E 30
O 4F 00 ; Can be disable at any time

N=00

M= 00h: Time-out Disable
01h: Time-out occurs after 1 second
02h: Time-out occurs after 2 second
03h: Time-out occurs after 3 second
.....
FFh: Time-out occurs after 255 second

N=08

M= 00h: Time-out Disable
01h: Time-out occurs after 1 minute
02h: Time-out occurs after 2 minutes
03h: Time-out occurs after 3 minutes
.....
FFh: Time-out occurs after 255 minutes

Appendix B

DIO Setting

- Program Sample

| | |
|---------|----------------|
| GPI | GPO |
| O 4E 87 | O 4E 87 |
| O 4E 87 | O 4E 87 |
| O 4E 29 | O 4E 29 |
| O 4F 01 | O 4F 01 |
| O 4E 07 | O 4E 07 |
| O 4F 07 | O 4F 07 |
| O 4E 30 | O 4E 30 |
| O 4F 01 | O 4F 01 |
| O 4E F0 | O 4E F0 |
| O 4F F0 | O 4F F0 |
| O 4E F1 | O 4E F1 |
| I 4F | O 4F 0M (Note) |

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Out-1 | 2 | In-1 |
| 3 | Out-2 | 4 | In-2 |
| 5 | Out-3 | 6 | In-3 |
| 7 | Out-4 | 8 | In-4 |
| 9 | GND | 10 | GND |

| Digital Input | | | | Digital Output | | | |
|---------------|------|------|------|----------------|-------|-------|-------|
| Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| In-1 | In-2 | In-3 | In-4 | Out-1 | Out-2 | Out-3 | Out-4 |

DIO

Note:

| status | Out-1 | Out-2 | Out-3 | Out-4 |
|--------|-------|-------|-------|-------|
| M=0 | 0 | 0 | 0 | 0 |
| M=1 | 0 | 0 | 0 | 1 |
| M=2 | 0 | 0 | 1 | 0 |
| M=3 | 0 | 0 | 1 | 1 |
| M=4 | 0 | 1 | 0 | 0 |
| M=5 | 0 | 1 | 0 | 1 |
| M=6 | 0 | 1 | 1 | 0 |
| M=7 | 0 | 1 | 1 | 1 |
| M=8 | 1 | 0 | 0 | 0 |
| M=9 | 1 | 0 | 0 | 1 |
| M=A | 1 | 0 | 1 | 0 |
| M=B | 1 | 0 | 1 | 1 |
| M=C | 1 | 1 | 0 | 0 |
| M=D | 1 | 1 | 0 | 1 |
| M=E | 1 | 1 | 1 | 0 |
| M=F | 1 | 1 | 1 | 1 |

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