OPEN (660) 120/140/150 II

12.1" /14.1" /15.1" TFT

Intel® Celeron/Pentium® III
Multimedia Open-frame Panel PC

User's Manual (version 2.1)

Copyright Notice

Trademarks

Unpacking

After unpacking the **OPEN (660)** system carton, check and see if the following items are included and in good condition.

- **OPEN (660) 120/140/150 II main system** x 1
- Accessories
    - Power cord   x 1
    - External FDD cable   x 1
    - External IDE cable   x 1
    - External FDD & HDD power cable   x 1
    - User manual diskette in .pdf   format   x 1
    - Utilities & drivers diskettes   x 6
    - Touchscreen drivers   x 1 set
      or utilities and drivers CD diskette   x 1
      (for touchscreen drivers, please download the updated drivers from the following website
      http://www.microtouch.com   or
      http://www.elotouch.com
    - Mounting kit for system mounting   x 2 sets
    - Screw packet
- Warranty card

Make sure that all of the items listed above are present. If any of the above items is missing, contact your dealer immediately.

Warranty

All products manufactured by the manufacturer are warranted against defective materials for one year starting from the date of delivery to the original purchaser.

Important Safety Precautions

Before getting started, read these instructions and save them for later reference.

1. Turn off the computer before cleaning. Clean with a damp or dry cloth only. Do not spray any liquid cleaner on screen directly.

2. The power outlet socket used to plug in the computer power cord must be located near the system and easily accessible. Do not use outlets on the same circuit of the systems that regularly switched on and off.

3. Make sure the voltage of the power source is correct before connecting the computer to the power outlet.

4. If the computer is sharing an extension cord with other devices, make sure the total ampere rating of the devices plugged into the extension cord does not exceed the cord's ampere rating.

5. Do not expose the power cord, extension cord and power outlet to moisture.

6. Install the computer on a reliable surface to prevent damage caused by dropping.

7. This computer is not equipped with an operating system. An operating system must be loaded first before installing any software into the computer.

8. Disconnect the power cord from the computer before any installation. Make sure both the computer and the external devices are turned off. The sudden surge of power may ruin any sensitive components.   Also make sure the computer is properly grounded.

9. During installation of any internal components, be sure to ground yourself to keep from any static charge. Most electronic components are sensitive to the static electric charge. Use a grounding wrist strap and place all electronic components in any static-shielded devices.

10. The openings on the computer enclosure are for the cabin ventilation to prevent the computer from overheating. DO NOT COVER THE OPENINGS.

11. The brightness of the flat panel display will decrease with use. However, hours of use will vary depending on the application environment.

12. If the computer is equipped with a touch panel, avoid using sharp objects to operate the touch panel. Scratches on the touch panel may cause mal-calibration or non-function to the panel.

13. The LCD panel display is not subject to shock or vibration. When assembling the computer, make sure it is securely installed.

Table of Contents

1. INTRODUCTION

This chapter provides background information and detail specification on the OPEN (660) system. Sections in this chapter include;

◆ General Information
◆ What covers in this Manual
◆ Specification
◆ Dimension
◆ Optional Modules & Accessories

1.1. General Information

The information revolution happened from the mid '90 inaugurated a new competitive era where consumer computing technology was exploited to business operation more quickly than ever before. Many enterprises from our life related industries such as **POS**, **POI**, **KIOSK**, **Banking**, **Medical** to the high-tech **Telecom**, **Aerospace**, **Semiconductor** … etc. all are eager or forced to automate their industries with PCs in order to thrive in this new age. For their industrial automation, there is one thing in common, i.e. space is always a premium and system stability is always a must in their environmental applications.

The **OPEN (660) 120/140/150 II** is a series of 12.1"/14.1"/15.1" open-frame Intel Celeron or Pentium III Panel PCs designed to serve as a friendly human-machine-interface for easy integration into any space-constricted embedded applications. Onboard features include super I/Os, XGA, 12.1"/14.1"/15.1" TFT flat panel, touchscreen, Ethernet and multimedia functions. The full PC functionality coupled with its multi-I/Os stand ready to accommodate a wide range of PC peripherals. Special industrial features not commonly seen in commercial systems such as watchdog timer and water/dust proof front panel make it a best choice for the operation in any hostile environments.

Fully configurable and with its modular design, the OPEN (660) system is an ideal platform for any space-concerned embedded application where customized integration is needed.

1.2. What Covers in this Manual

This handbook contains most information you need to set up and use this computer. You do not need to read everything in this handbook to use the OPEN (660) II system.

For a quick start, see the following chapter summaries;

Chapter 1 (the current chapter) provides background information and detail specification on the OPEN (660) 120/140/150 II. This chapter also details the optional modules and accessories of the OPEN (660) system.

Chapter 2 identifies the system hardware configuration and major components.

Chapter 3 details the step-to-step instructions of various mounting options of the OPEN (660) system.

Chapter 4 provides the installation procedures including CPU, system memory and HDD.

Chapter 5 provides the procedures to connect external devices to the I/O interface.

Chapter 6 provides detail information of the jumper settings and connector signals of the system control board.

Chapter 7 explains the AWARD BIOS setup.

Chapter 8 introduces the Ethernet, XGA and audio drivers.

Chapter 9 details the procedures to install the touchscreen software drivers under DOS and Windows operation

Appendix A details the 12.1″/14.1″/15.1″ LCD specifications.

Appendix B explains how to program the watchdog timer.

Appendix C introduces the DiskOnChip® installation.

Appendix D introduces the system I/O ports.

Appendix E explains the RS-485 programming.

Appendix F explains the first MB memory map.

Appendix G provides the specifications for the built-in power supply.

1.3. Specifications

SYSTEM

Flat Panel

◆ **OPEN (660) 120**: 12.1″ color TFT, 800*600

    Viewing angle   100

    Luminance (cd/m^2)   130 or above, optional high-brightness model

    Simultaneous mode   yes

◆ **OPEN (660) 140**: 14.1″ color TFT, 800*600

    Viewing angle   100

    Luminance (cd/m^2)   150 or above, optional high-brightness model

    Simultaneous mode   yes

◆ **OPEN (660) 150**: 15.1″ color TFT, 800*600

    Viewing angle   100

    Luminance (cd/m^2)   150 or above, optional high-brightness model

    Simultaneous mode   yes

CPU (Socket 370)

◆ Intel Celeron PPGA/FCPGA/66MHz

◆ Intel Pentium® III FCPCA/100MHz

System Memory

◆ 1*168pin DIMM socket supporting SDRAM up to 256MB (PC 100)

L2 Cache

◆ CPU built-in

Standard I/O

◆ Serial Ports*4 with +5V/12V power output on pin 9: 3*RS-232, 1*RS-232/485 (COM2)

◆ Parallel Port*1: supports SPP/EPP/ECP

◆ External FDD Interface*1

◆ External IDE Interface*1

◆ +5V/+12V DC-out*1

◆ PS/2 Keyboard Interface*1

◆ PS/2 Mouse Interface*1

◆ USB Interface*2

◆ VGA Interface*1

◆ Speaker-out, MIC-in, Line in

Ethernet

100/10 Base-T Ethernet with RJ-45 phone jack

Watchdog Timer

◆ 16 time intervals

Display

◆ LCD/XGA controller with 2MB display memory (C&T69000)

◆ Optional LCD/XGA controller with 4MB display memory (C&T69030)

Expansion Slot

◆ ISA or PCI*1 (L*W) 160*120

PERIPHERAL & STORATE DEVICES

Touchscreen (optional, sharing COM3)

◆ 12.1"/14.1"/15.1" analog resistive type with RS-232 controller

◆ 12.1"/14.1"/15.1" capacitive type with RS-232 controller

◆ 12.1"/14.1"/15.1" surface wave type (SAW)

Power Supply

◆ AC 85W, input range: 85~264V_{AC} @47~63Hz

◆ DC 90W, 9~132V_{DC} (optional)

  (NOTE: when OPEN (660) 150 is installed with DC power, due to space limitation, the CD-ROM and floppy disk drive need to use external types)

CD-ROM or DVD-ROM

◆ OPEN (660) 120/140: via external IDE interface

◆ OPEN (660) 150: slim type CD-ROM or via external IDE interface

Floppy Disk Drive

◆ OPEN (660) 120/140: via external FDD interface

◆ OPEN (660) 150: slim type FDD or via external FDD

Hard Disk Drive

◆ OPEN (660) 120/140: 2.5″ HDD (optional)

◆ OPEN (660) 150: 3.5" HDD (optional)

MECHANICAL & ENVIRONMENTAL

Construction

◆ Heavy-duty steel

Dimension (chassis only, unit: mm)

◆ OPEN (660) 120: 340*270*90.3

◆ OPEN (660) 140: 365*295*90.3

◆ OPEN (660) 150: 408*331*100

Front Bezels (unit: mm)

◆ Front panel size (Small bezel)
  OPEN (660) 120S: 340*270
  OPEN (660) 140S: 365*294
  OPEN (660) 150S: 408*331

◆ Front panel size (Big panel)
  OPEN (660) 120B: 380*310
  OPEN (660) 140B: 405*330
  OPEN (660) 150B: 448*371

◆ **Front panel size (Aluminum frame)**
  OPEN (660) 120A: 380*310
  OPEN (660) 140A: 405*330
  OPEN (660) 150A: 448*371

Mounting

◆ Panel mount with mounting kits

◆ To KIOSK enclosure

Specifications are subject to change without notice.

1.4. Dimensions

The OPEN (660) system chassis size is shown below;
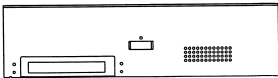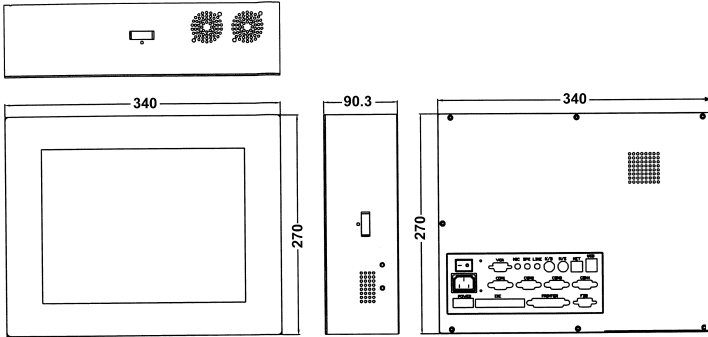
Dimension: OPEN 120 (unit: mm)
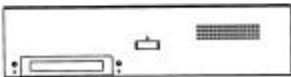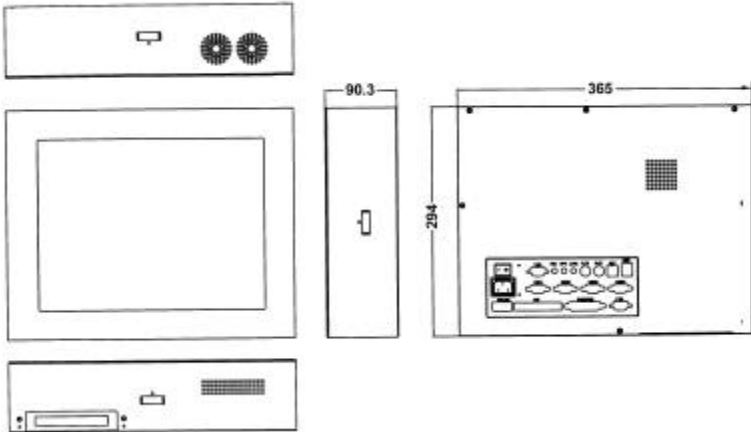
Dimension: OPEN 140 (unit: mm)
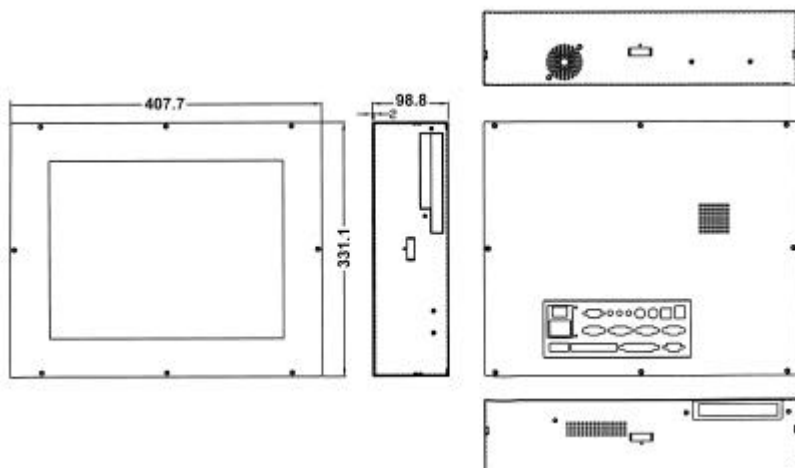
Dimension: OPEN 150 (unit: mm)

1.5. Optional Modules & Accessories

1.5.1. Touchscreen Module

The OPEN (660) system features a touchscreen module for mounting a touchscreen for keyboardless operation. The special designed touchscreen module can firmly hold the touch panel and the LCD panel together to prevent dust and water in. The touchscreen module's mechanism is shown below;
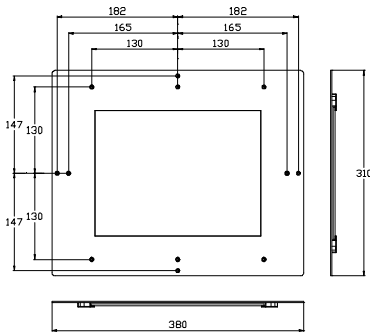
Dimension (unit: mm): OPEN 120 Touchscreen module
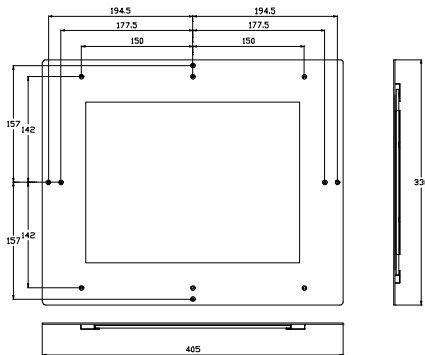
Dimension (unit: mm) : OPEN 140 touchscreen module

OPEN (660) 120/140/150   *1-11*
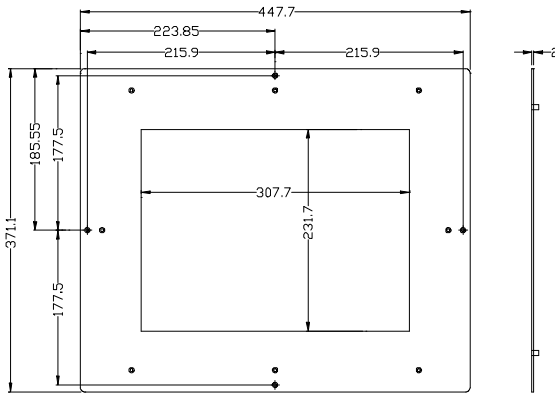
Dimension (unit: mm) : OPEN 150 touchscreen module

Caution: *The connection point of the touchscreen and its cables is very fragile. Do not take the touchscreen by dragging its cable or pull the cables at any time; this may lead inaccurate calibration or non-function to the touchscreen.*

2. IDENTIFYING THE SYSTEM COMPONENTS

Before getting started, take a moment to familiarize yourself with the different parts and the I/O arrangement of the OPEN (660) 120/140/150 I. Sections in this chapter include the system's

◆ Front view
◆ Side Views
◆ I/O outlets

2.1. Front View
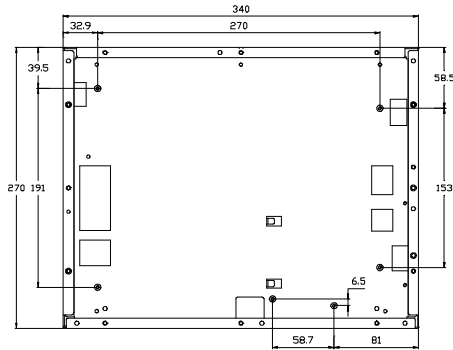
OPEN 120 front view
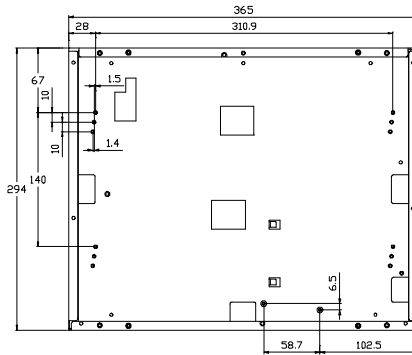
OPEN 140 front view

2.2. Side Views
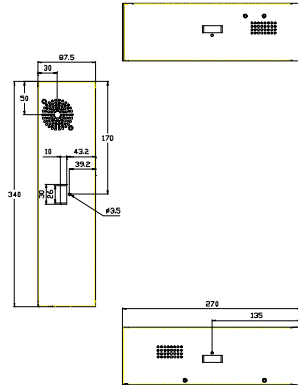
OPEN 120 side view
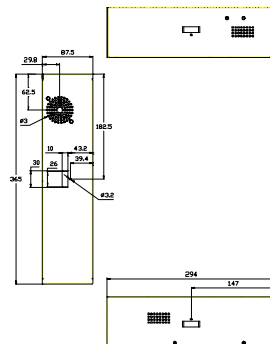
OPEN 140 side view

2.3. I/O Outlets
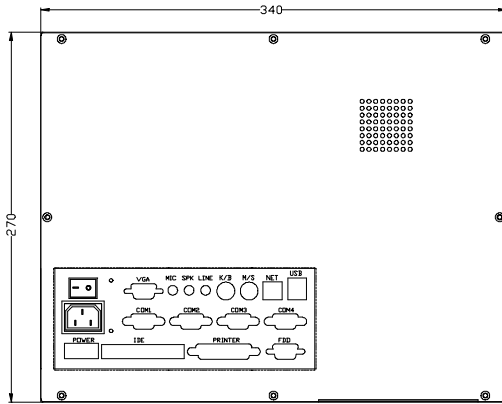
OPEN 120 I/O outlet
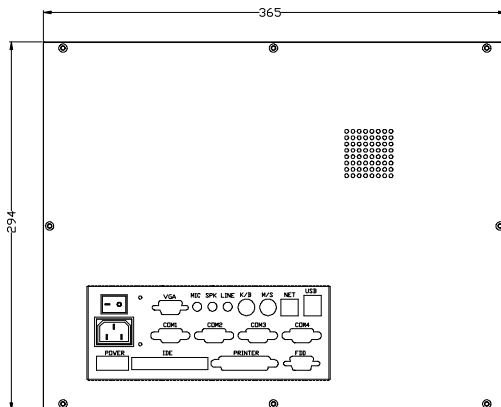
OPEN 140 I/O outlet
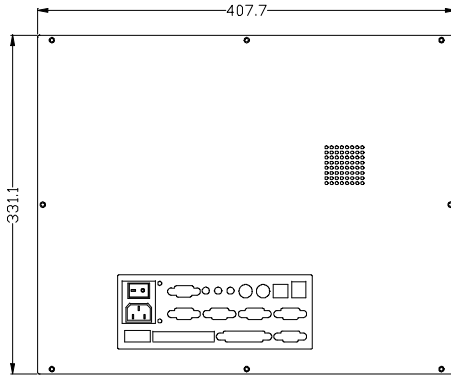
OPEN 150 I/O outlet
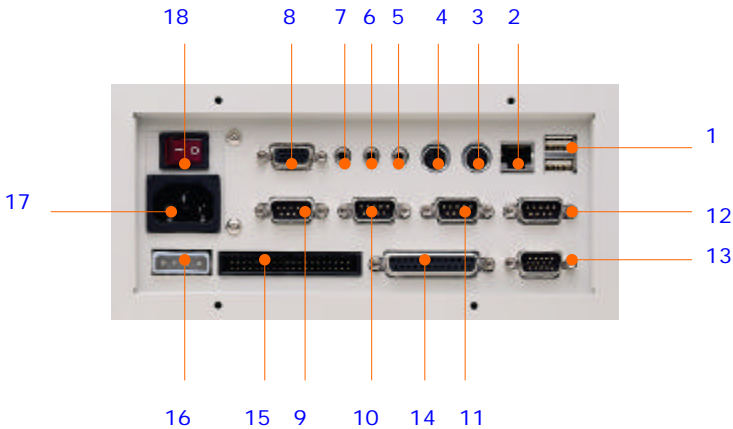
1. USB PORT   2. ETHERNET (RJ-45)   3. PS/2 MOUSE

4. PS/2 KB   5. LINE-IN   6. SPEAKER-OUT

7. MIC-IN   8. VGA PORT   9. COM 1

10. COM 2   11. COM 3   12. COM 4

13. EXTERNAL FDD   14. PRINTER PORT   15. EXTERNAL IDE

16. +5V/12V POWER 17. AC INLET   18. POWER SWITCH

2.4. System Major Parts

The following diagram shows the system major parts that make up the OPEN (660) 120/140/150 II.
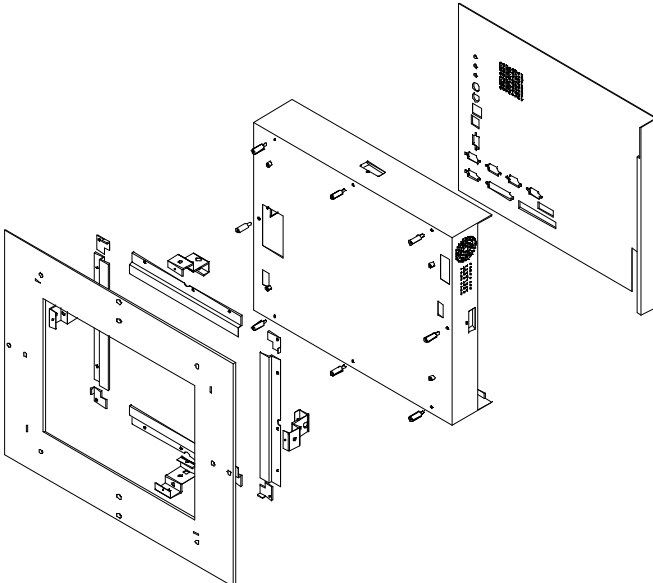
2.5. System Setup for the First-time Use

To set up the OPEN (660) system for the first-time use, you should have the following items ready. The items are either in the accessory box or available in any computer stores.

◆ 110V or 220V power cord

◆ PS/2 or AT keyboard

◆ PS/2 or serial mouse

2.5.1. Installation Procedures

The OPEN (660) system can be powered either by an AC electrical outlet (90 ~ 240V, 50 ~ 60Hz) or by DC power source (9 ~ 132 VDC). If the system is to be powered up by AC power, be sure to use the right power cord (110V or 220V) for connection.

1. Connect the female end of the power cord to the AC inlet located at the rear side of the panel PC.

2. Connect the 3-pin male end of the power cord to an electrical outlet.

3. Connect a PS/2 keyboard or an AT keyboard to keyboard port. If you are using an AT keyboard, you need an adapter (AT to PS/2 KB) for this connection.

4. Connect the PS/2 mouse to the PS/2 mouse port. If you are using a serial mouse, it can be connected to the COM port.

5. Power on the panel PC by switching the power switch located at the rear cover.

2.5.2. Running the BIOS Setup

If you are a commercial user, the OPEN (660) 120/140/150 should have been properly set up and configured by your dealer. You may still find it necessary to change the system configuration information. In this case, you need to run the system's BIOS setup program.

Under the following conditions, the CMOS settings are to be changed;

1. The system is starting for the first time
2. The hardware devices attached to the OPEN (660) system have been changed
3. The CMOS memory has lost power and the configuration information has been erased.

The BIOS setup program is stored in ROM which can be accessed by pressing <DEL> key on the keyboard immediately when the system is powered on.

In order to retain the specified setup information when the system power is turned off, the system setup information is stored in a battery-backed CMOS RAM. The battery is to ensure the settings will not be erased when the computer is turned off or reset. When the computer is powered on again, the system will read the settings stored in the CMOS RAM and compare them to the equipment check conducted during the power on self test (POST). If any error or mismatch occurs, an error message will be shown on the screen and the computer will be prompted to run the setup program.

To change the BIOS setup, please refer to Chapter 7 for more information.

2.5.3. Operating System and Driver Installation

The OPEN (660) system is not equipped with an operating system when delivered from the original manufacturer. If you are a commercial user, the system is likely to have been pre-installed proper operating system and software drivers by your dealer or system integrator.

If the system is not pre-installed with any system OS and drivers or you intend to install your preferred ones, there are several ways to load OS and software into the system.

1. Via the external FDD or internal FDD
2. Via the external CD-ROM or internal CD-ROM
3. Via Ethernet: You can boot up the system via Ethernet bootrom and download system OS or software from the network.

Recent releases of operating systems always include setup program which load automatically and guide you through the installation. You can also refer to your OS user manual for instructions on formatting or partitioning the hard disk drive before any software installation.

The OPEN (660) system provides the following utility drivers which are stored in the CD-ROM diskette or utilities diskettes;

◇   Ethernet utilities
◇   VGA utilities
◇   Audio drivers
◇   Touchscreen drivers

3. MOUNTING OPTIONS

To OPEN (660) system is designed for universal mounting to fit into different system enclosures for various environmental applications. This chapter highlights the steps of different mounting alternatives of the OPEN (660) system. Sections include

◆ Different Front Panels

◆ Metal Fixtures

◆ Front Mounting

◆ Rear Mounting

◆ Panel Mounting

3.1. Different Front Bezels

The standard OPEN (660) systems provide 3 kinds of front bezel for different environmental applications.

3.1.1. OPEN (660) system with Small Bezel

The OPEN (660) 120/140/150 S is OPEN (660) system with small bezel. The front bezel size is identical to the computer's chassis size.

Front bezel size (Small bezel)
OPEN (660) 120S: 340*270 mm
OPEN (660) 140S: 365*294 mm
OPEN (660) 150S: 408*331 mm

This type of frame is mainly designed for KIOSK integration when the KIOSK enclosure is not of flat surface and does not allow a big frame computer. When integrating the OPEN (660) S system into the KIOSK enclosure, the integrator may need to design special metal fixtures per the enclosure's specific mechanism in order to fix the OPEN (660) system to the enclosure.

3.1.2. OPEN (660) system with Big Bezel

The OPEN (660) 120/140/150 B is OPEN (660) system with big bezel. The front bezel size is larger than the computer's chassis size.
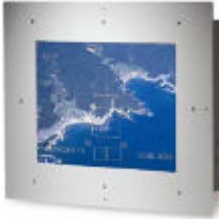
Front bezel size (Big panel)

OPEN (660) 120B: 380*310 mm

OPEN (660) 140B: 405*330 mm

OPEN (660) 150B: 448*371 mm

The type of frame is mainly designed for panel mounting or for KIOSK integration when the KIOSK enclosure is of flat surface and allows the computer to be fixed to the KIOSK enclosure directly.   When integrating the OPEN (660) B system into the KIOSK enclosure, the integrator can either use the provided metal fixture or design special metal fixtures per the enclosure's specific mechanism in order to fix the OPEN (660) system to the enclosure.

3.1.3. Aluminum Alloy Frame

The OPEN (660) 120/140/150 A is OPEN (660) system with an aluminum alloy frame. The aluminum alloy frame is mainly designed for panel mounting. It not only strengthens the system's framework but also beautifies the system outlook when the system is panel mounted.

Front bezel size (Aluminum frame)

OPEN (660) 120A: 380*310 mm

OPEN (660) 140A: 405*330 mm

OPEN (660) 150A: 448*371 mm

3.2. Metal Fixtures

The OPEN (660) system provides 2 sets of metal fixture for system mounting. In most occasions, special metal fixtures need to be designed to mount the OPEN (660) system to different system enclosures.

3.2.1. Metal Fixture A

A set of metal fixture A is provided to fix the system enclosure and the computer chassis together. To use the metal fixtures, follow the instructions below;

1. Use the provided screw to fix the "a" side of the metal fixture to the concave opening of the 4 sides (upper, down, right & left) of the computer chassis.

2. Fix the "b" side of the metal fixture to the frame of the touchscreen module with provided screws. If no touchscreen module is used, then fix it to the system enclosure. The metal fixture comes with fixing holes on all sides to be fixed from all directions.

3.2.2. Metal Fixture B

Another set of metal fixture B is also provided to fix the system enclosure and the computer chassis together. The metal fixture B is mainly used in panel mounting application, i.e. when the touchscreen is mounted outside of the system enclosure while the computer itself is mounted from inside. Use the provided screws to firmly fix the system enclosure between the touchscreen module and the computer chassis with metal fixture B.
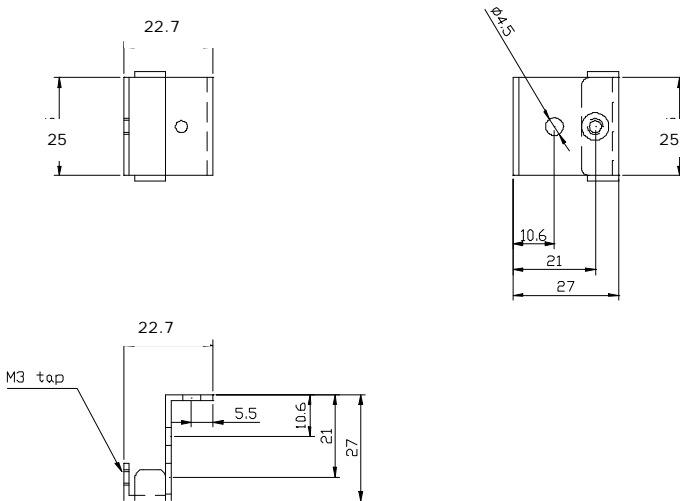
3.3. Front Mounting

The OPEN system can be mounted to the system enclosure from the enclosure's front side. Two conditions are introduced in this section.

3.3.1. Front Mounting with Touchscreen Module

If the OPEN system comes with a touchscreen module, to mount the computer to the system enclosure from the front side, follow the steps below;

1. Cut a window of the same size of the OPEN system's panel display on the system enclosure and make necessary fixed holes on it.

2. Before inserting the OPEN system into the system enclosure, make sure all the hardware jumpers and necessary software are installed.

3. Glue the cut window verge of the system enclosure with close cell tape to prevent dust and water in.

4. Fix the OPEN system to the system enclosure with provided screws. Be sure to align the cut window to the OPEN system's flat panel display.

Note: The front mounting is the easiest mounting methods. However, this mounting method will leave the screws seen on the system enclosure. It is suggested to use plastic covering or paint to doll up the system appearance.

3.3.2. Front Mounting without Touchscreen Module

If the application does not need the installation of the touchscreen module, then there are two methods to mount the OPEN system from the system enclosure's front side.

Method 1 with bronze stick

1. Cut a window of the same size of the OPEN system's flat panel display on the system enclosure and make necessary fixed holes on it.

System enclosure

Bronze stick

2. Before inserting the OPEN system into the system enclosure, make sure all the hardware jumpers and necessary software are installed.

3. Get a glass or acrylic transparent piece of the size slighter larger than the cut window. Glue the transparent piece to the cut window verge of the system enclosure to prevent dust and water in. It is suggested that the crevice between the LCD panel display and transparent piece not to exceed 1mm.

4. Fix the OPEN system to the system enclosure with provided bronze sticks. Be sure to align the cut window to the OPEN system's flat panel display.
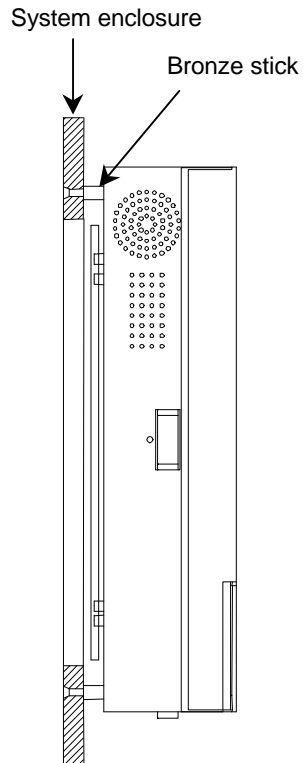
Note: The suggested thickness of the glass or acrylic used for the transparent piece is between 2mm to 5mm depending on the bronze stick height. If the system is to be put in public area, it is suggested to use resilient glass or acrylic to protect the LCD display.

Method 2 with metal fixture A

1. Cut a window of the same size of the OPEN 120/140/150′s flat panel display on the system enclosure and make necessary fixed holes on it.

2. Before inserting the OPEN system into the system enclosure, make sure all the hardware jumpers and necessary software are installed.

3. Get a glass or acrylic transparent piece of the size slighter larger than the cut window. Glue the transparent piece to the cut window verge of the system enclosure to prevent dust and water in. It is suggested that the crevice between the LCD panel display and transparent piece not to exceed 1mm.

4. Fix the OPEN system to the cut window of the system enclosure with the provided metal fixture A (refer to Sec. 1.4.2). Be sure to align the cut window to the OPEN system′s flat panel display.

Note: Method 1 is easier than method 2. If the system is to be exposed in an environment with constant vibration, even slight vibration, then method 2 is recommended.

Fixture on system enclosure

System enclosure

Fixture A

System enclosure

Fixture A

OPEN (660) 120/140/150   3-31
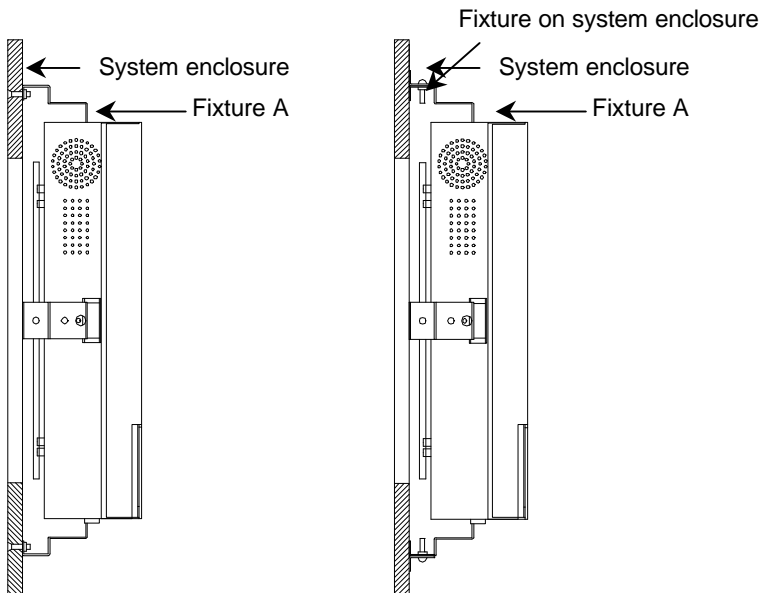
3.4. Rear Mounting

To fit into special environmental applications, the OPEN system can be also mounted to the system enclosure from the enclosure panel's rear side. Two conditions are introduced in this section.

3.4.1. Fixing on the System Enclosure's front panel

Refer to the following figure and follow the steps below.

1. Cut a window of the same size of the OPEN system's panel display on the system enclosure. The system enclosure should come with some brackets. To make the brackets, please refer to the diagram of the dimension and fixing holes of the OPEN system in Sec. 1.4. Fix the brackets on the 4 sides of the enclosure's front panel. The brackets are used to fix the OPEN system and the system enclosure together later. The OPEN system can either be fixed to brackets of the system enclosure by screws or by soldering.

2. Before inserting the OPEN system into the system enclosure, make sure all the hardware jumpers and necessary software are installed.

3. Use metal fixture A to fix the touchscreen module to the OPEN system chassis. If no touchscreen is used, then put a glass or acrylic piece instead. The touchscreen module frame is still needed to fix the transparent piece to the computer.

4. Screw the brackets on the system enclosure and the metal fixture A on the OPEN system chassis together with provided screws.

Note: The suggested thickness of the glass or acrylic used for the transparent piece is between 2mm to 5mm depending on the bronze stick height. If the system is to be put in public area, it is suggested to use resilient glass or acrylic to protect the LCD display.

System enclosure

Bracket on the System enclosure

Fixture A

Touchscreen module

OPEN (660) 120/140/150   *3-33*

3.4.2. **Fixing on the System Enclosure's back panel**

1. Cut a window of the same size of the OPEN system's panel display on the system enclosure. The system enclosure should come with some brackets. To make the brackets, please refer to the diagram of the dimension and fixing holes of the OPEN system in Sec. 1.4. Fix the brackets on the 4 sides of the enclosure's back panel. The brackets are used to fix the OPEN system and the system enclosure together later. The OPEN system can either be fixed to brackets of the system enclosure by screws or by soldering.

2. Before inserting the OPEN system into the system enclosure, make sure all the hardware jumpers and necessary software are installed.

3. Use metal fixture A to fix the touchscreen module to the OPEN system chassis. If no touchscreen is used, then put a glass or acrylic piece instead. The touchscreen module frame is still needed to fix the transparent piece to the computer.

4. Screw the brackets on the system enclosure and the metal fixture A on the OPEN system chassis together with provided screws.

5. **Note**: The suggested thickness of the glass or acrylic used for the transparent piece is between 2mm to 5mm depending on the bronze stick height. If the system is to be put in public area, it is suggested to use resilient glass or acrylic to protect the LCD display.

Touchscreen module

Fixture A

System enclosure

Fixture on the system enclosure
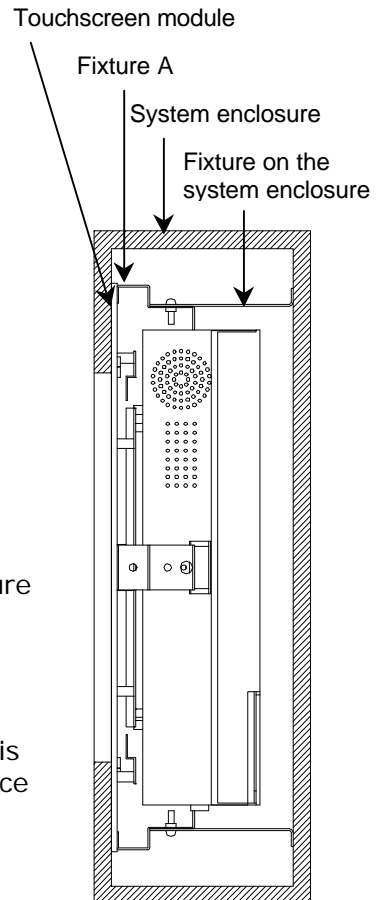
If the system enclosure is not limited in thickness, then to mount the OPEN system on the system enclosure's front panel is recommended for easy installation and maintenance. However, if the system enclosure is limited in space, then it is suggested to mount the OPEN system on the system enclosure's back panel to increase the installation yield rate.

3.5. Panel Mounting

The panel mounting is the easiest method among all mounting alternatives. However, this will expose the aluminum alloy frame or the touchscreen module frame outside of the system enclosure unless a special frame is designed to cover it. Follow the instructions below for panel mounting.

1. Cut a window of the same size of the OPEN system panel display on the system enclosure.

2. Before inserting the OPEN system into the system enclosure, make sure all the hardware jumpers and necessary software are installed.

3. Assemble the aluminum alloy frame or the touchscreen module to the OPEN system first. (The aluminum alloy frame can also be used to fix the touchscreen module.)

4. Insert the OPEN system into to the cut window of the system enclosure from outside. At this moment, the OPEN system is not fixed to the system enclosure yet.

5. Fix the metal fixture B on the 4 sides of the OPEN system chassis (upper, down, right and left).

6. Use the provided screws to firmly fix the system enclosure between the touchscreen module and the computer chassis with metal fixture B.
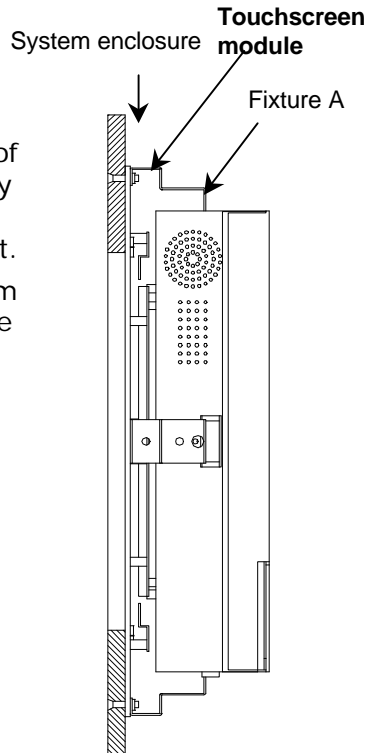
System enclosure

Fixture B

Aluminum alloy frame
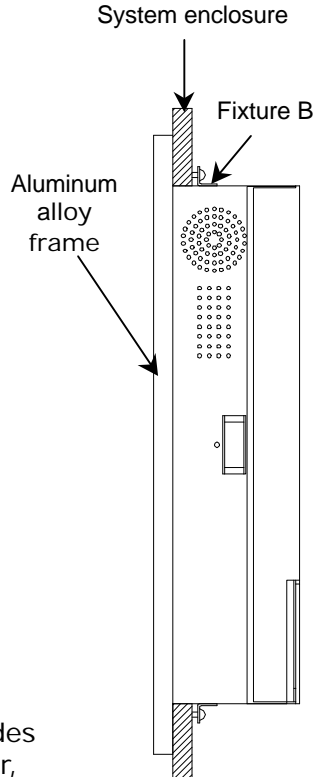
4. SYSTEM HARDWARE INSTALLATION

This chapter overviews the installation of the OPEN (660) II system internal components and devices. Sections include:

◆   Installing the CPU

◆   Installing the SDRAM

◆   Installing the HDD

◆   Installing the FDD

◆   Installing the CD-ROM drive

◆   Expansion slot

The OPEN (660) 120/140/150 II consists of a Celeron/ Pentium® III embedded little board with an adequate CPU and relevant SDRAM on it. The system control board and other internal devices such as expansion card, HDD and power supply are already housed in a plastic rear cover. The system's performance depends on the installed CPU and the capacity of the system memory and hard disk drive. In some circumstances, you might intend to upgrade or maintain the system. By removing the rear cover and the metal covers, the internal components such as CPU, SDRAM, HDD and power supply can be easily accessed for maintenance and upgrade.

4.1. Installing the CPU

The OPEN (660) 120/140/150 II system control board can adapt Intel® Celeron® and Pentium® III CPU. It can support Intel Socket 370 CPU from Celeron® PPGA/FCPGA/66MHzz to Pentium® III FCPGA/100MHz (Intel 440BX).

The system controller provides one 370-pin socket (Socket 370). The CPU must come with a CPU fan to avoid overheating. The Celeron CPU and P III CPU will request different kinds of CPU fans due the difference on the CPUs' mechanism. Wrong fans might lead to overheating for the entire system. To install a CPU or upgrade a new CPU, follow the instructions below.

1. If there is an existing CPU on the socket, remove the CPU first by pulling the lever out a little and raising it, then lifting out the existing CPU from the socket.

2. To insert the CPU into the socket, the notch on the corner of the CPU (the corner with white dot) should point toward the end of the socket lever. If the insertion of the CPU to the socket is not easy, check whether the CPU pins correspond with the holes on the socket.

3. After insert the CPU into the socket, pull the lever down to make sure the CPU is in place.

4. The CPU cooling fan comes with a 3-pin power cable. Connect the power cable to the 3-pin power connector on the motherboard.

5. There are two small white clips on the CPU sockets. Make sure the cooling CPU fan clips click into place.

CPU socket

3-pin CPU fan power connector

FIGURE 5-5
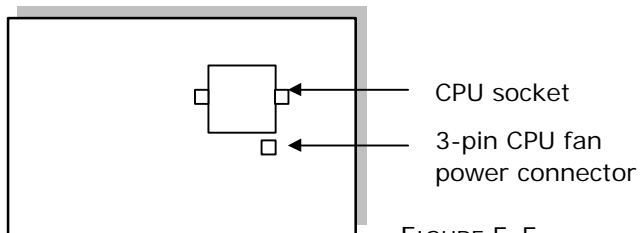
OPEN (660) 120/140/150　　　　　　　　*4-39*

4.2. Installing the SDRAM Memory Module

The OPEN (660) 120/140/150 II system control board provides 1 x 168-pin DIMM socket, able to support SDRAM memory from 32MB up to 256MB. To install the memory module, follow the instructions below;

1. Detach and remove the rear cover.
2. Find the 168 pin DIMM socket on the motherboard
3. There are two white eject levers at each end of the DIMM socket. Push them outward until they separate from the two vertical posts.
4. Holding the memory module with the notch on the upper right corner, then insert the memory module into the DIMM socket at 90° angle.
5. Push the two eject levers toward the vertical posts until they click into place. The memory module is now upright.

The system is able to auto detect the new memory size and there is no need to change the system configuration after installation.

Make sure that the memory module you are using can handle the specified SDRAM MHz. Inadequate memory module will make the computer unable to boot up.

4.3. Installing the HDD

4.3.1. OPEN (660) 120/140 2.5" HDD Installation

The OPEN (660) 120/140 provides enough space to build in a 2.5" hard disk drive in the computer chassis.   If the user intends to attach a 2.5″ hard disk or remove the existing device for repair or for a higher-capacity one, the following figure shows you the way to install an internal HDD.

1. Detach and remove the rear cover. The HDD module is located at the side of the system compartment

2. Remove the whole HDD module from the system compartment.

3. Insert the 4 provided rubber cushions to the HDD bracket first.

4. Glue the mylar insulator to the Hard disk drive

5. Install the 2.5″ HDD to the HDD bracket with screws.

6. Then, insert the whole unit to the system compartment.

7. Use the provided 44-pin IDE cable to connect the hard disk drive to the system IDE connector. Match pin 1 of the hard disk drive and pin 1 of the cable.
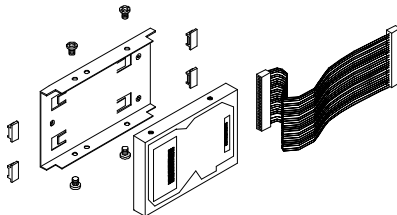
4.3.2. OPEN (660) 150 3.5" HDD Installation

The OPEN (660) 150 provides enough space to build in a 3.5" hard disk drive in the computer chassis.   If the user intends to attach a 3.5″ hard disk or remove the existing device for repair or for a higher-capacity one, the following figure shows you the way to install an internal HDD.

1. Detach and remove the rear cover.
2. Remove the CD-ROM/FDD module.
3. Take out the FDD/IDE board
4. Remove the whole HDD module.
5. Install the 3.5″ HDD to the HDD bracket with screws.
6. Then, insert the whole unit to the system compartment
7. Insert the CD-ROM/FDD/HDD board back again.
8. The are two IDE cables, one 44-44 pin IDE cable and the other 40-40 pin cable. The 44 pin cable is used to connect the 44 pin IDE connector on the IDE/FDD board to the PC 660A2 primary IDE connector. Then, Use the provided 40-pin IDE cable to connect the HDD to the IDE connector on the FDD/IDE board. Match pin 1 of the HDD and pin 1 of the cable.
9. Make sure the CD-ROM cable, 16 pin FDD cable, 4 pin audio cable and 5V power cable is properly connected to all the connectors on the FDD/IDE board (Refer to Sec. 4.2.2 for detailed figure for the FDD/IDE board).

HDD bracket

FDD/IDE board
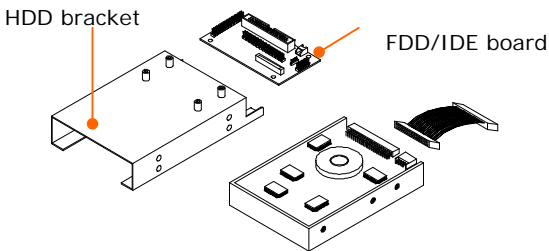
4.4. Installing the FDD

The OPEN (660) 120/140/150 II can connect to an external floppy disk drive.

4.4.1. External FDD connection

1. Use the provided 15-34 pin FDD cable to connect to the system's 15-pin FDD D-sub connector located at the rear side of the cover.

FDD cable

2. Connect the other end of the FDD cable to a standard 3.5″ FDD. Match pin 1 of the floppy disk drive and pin 1 of the cable.

3. Use the provided FDD/IDE power cable to connect the 4 pin FDD power connector to the system 4-pin power connector located at the left bottom side of the chassis.

4.4.2. Internal FDD installation for OPEN 150

Aside from connecting to an external FDD, the OPEN (660) 150 can also accommodate an internal slim type FDD, depending on the system requirement. The floppy disk drive used in the OPEN 150 II is a slim type FDD widely used in notebook computers. To install the floppy disk drive to the OPEN 150, refer to the following steps below:

1. Detach and remove the rear cover.
2. There is an FDD/CD-ROM bracket holding the FDD. Remove the bracket. Place a slim type floppy disk drive on the bracket. Fix the FDD on the bracket with the 4 screws.
3. Use a 26 pin flat FDD cable to connect the FDD to the FDD connector on the FDD/IDE board.
4. Make sure the 16 pin FDD cable, 4 pin audio cable and 5V power cable is properly connected from the OPEN (660) to all the connectors on the FDD/IDE board.

44 pin IDE connector

40 pin HDD connector

2 pin 5V power connector

50 pin CD-ROM connector

4 pin audio power connector

16 pin FDD connector

26 pin FDD connector

FDD/IDE board for OPEN
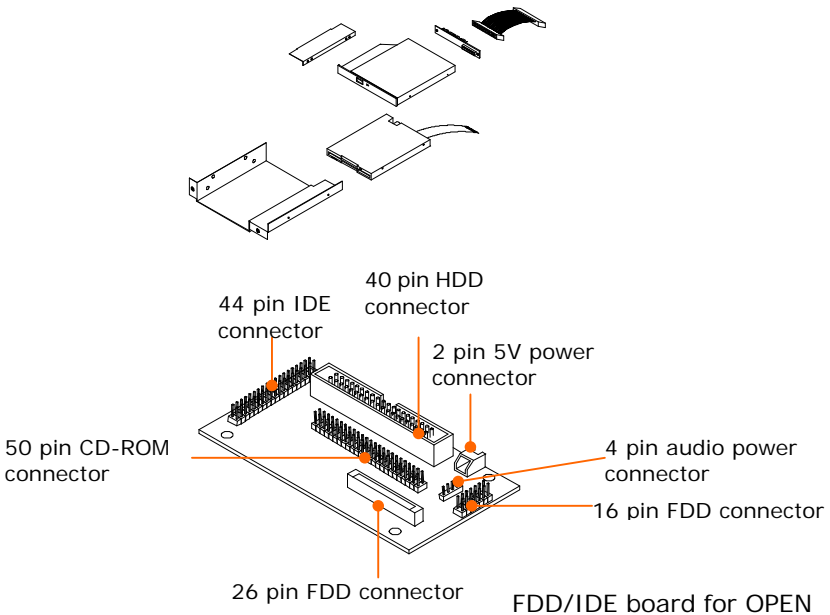
4.5. Installing the CD-ROM drive

The OPEN 120/140/150 II can connect to an external CD-ROM via the system's external IDE connector.

4.5.1. External CD-ROM connection

1. Use the provided 40 pin IDE cable to connect to the system IDE connector located at the rear side of the cover.

2. Connect the other end of the IDE cable to a standard CD-ROM drive

3. Use the provided FDD/IDE power cable to connect the 4 pin IDE power connector to the system 4-pin power connector located at the left bottom side of the chassis.

4.5.2. Installing Internal CD–ROM for OPEN 150

Aside from connecting to an external CD-ROM, the OPEN 150 can also accommodate an internal slim type CD-ROM, depending on the system requirement. The CD-ROM drive used in the OPEN 150 II is not the common 5.25″ CD-ROM drive seen in computer stores. Rather, it is a slim type CD-ROM widely used in notebook computers. To install a compact CD-ROM to the OPEN 150 system, refer to the following figure and follow the steps below:

1. Detach and remove the rear cover.

2. There is an FDD/CD-ROM bracket holding the CD-ROM.

3. Remove the bracket from the system compartment.

4. Fix the slim type CD-ROM drive to the small CD-ROM metal bracket with 2 screws. Please note that the 2 screws need to be incased with 2 plastic washers.

5. Insert the CD-ROM module to FDD/CD-ROM bracket and fix them with 4 screws.

6. Fix the whole unit to the system compartment

7. Use a 50 pin CD-ROM cable to connect the CD-ROM to the 50 pin IDE connector on the FDD/CD-ROM board.

8. Make sure the 4 pin audio cable and 5V power cable is properly connected from the PC 660A2 to all the connectors on the FDD/IDE board (Also refer to the figure on Sec. 4.2.2).

4.6. Expansion Slot

The OPEN system provides a free PCI/ISA expansion slot. Via the specially designed riser card, the system can accommodate either an ISA or PCI expansion device. Due to the space limitation, only one PCI or ISA device can be inserted in the expansion at a given time. Also due to the internal space limitation, only a compact expansion card can be inserted. The expansion card size can not exceed 160*120 mm (L*W). To use the PCI or ISA expansion, follow these instructions below;

1. Unscrew the metal slip located inside the expansion outlet.

2. Plug either an ISA or PCI card into the ISA or PCI slot on the riser card and fix the expansion card by screwing it to the metal front compartment. All the connectors of the expansion card will come out from the expansion outlet on the bottom side of the chassis for further cable connection.

However, for special environmental applications, the number of expansion slots is customizable.

OPEN (660) 120/140/150   *4-47*
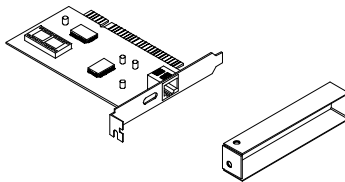
5. I/O CONNECTION

This chapter describes the OPEN (660) system I/O ports and how to use the I/O interface to connect to external devices.

The user can use the I/O interfaces located at the rear side of the chassis to connect external peripheral devices, such as a mouse, a keyboard, a monitor, serial devices or parallel printer...etc.   Before any connection, make sure that the computer and the peripheral devices are turned off.

5.1. VGA Interface

The OPEN (660) 120/140/150 II has a 15-pin analog RGB connector located at the rear side of the chassis. It can support its own LCD display and an expansion CRT or analog monitor at the same time. However, as the LCD panel used in the 14.1″ & 15.1″ system (OPEN (660) 140/150) is of the resolution of 1024 x 768 and in 12.1″ system (OPEN (660) 120) is 800 x 600, therefore, to support a CRT or analog monitor simultaneously, the monitor′s VGA resolution has to be set to 800 x 600 for OPEN (660) 120 and 1024 x 768 for OPEN (660) 140/150. The connection to an analog monitor is an easy plug-in of the VGA D-SUB 15-pin connector to the RGB interface.

There is some application software that is to be executed in 800*600 resolution. When the software is running under OPEN (660) 140/150, only part of the screen will show on the LCD display. If the application has to run in full screen, you need to update the system VGA drivers with an auto expansion utility. However, due to resolution limitation, the text mode will look slightly distorted.

5.2. COM Ports x 4

The OPEN (660) 120/140/150 (+) II features with four onboard COM ports located at the rear side of the chassis, ready to connect to a wide range of serial devices. COM1, COM3 and COM4 are RS-232 and COM2 is RS-232/485, selected via jumper setting.   Each COM port is with +5V/+12V power capabilities on pin 9, providing easy accommodation to a broad range of serial devices.

The COM port 5V/12 power is selected via jumper setting on the I/O board.

Please refer to the following for the 5V/12 power selection.
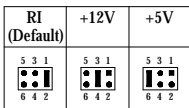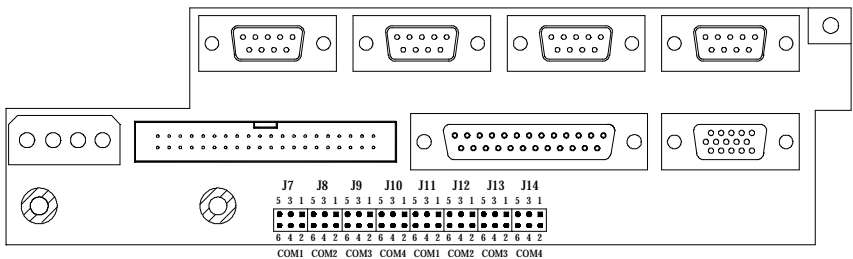
	COM1	COM2	COM3	COM4
Pin 1	J11	J12	J13	J14
Pin 9	J7	J8	J9	J10
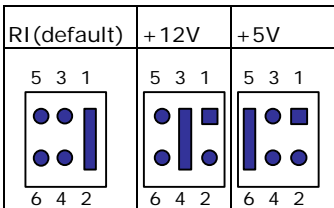
Pin#	COM1	COM2	COM3	COM4
#1	J11	J12	J13	J14
#9	J7	J8	J9	J10

If a touchscreen module is installed, for factory default setting, its controller will occupy COM3.

COM1 to COM4 are all D-SUB 9-pin connectors. To connect to any serial device; follow the procedures below;

1. Turn off the OPEN system and the serial devices.

2. Attach the interface cable of the serial device to the 9-pin D-SUB serial connector. Be sure to fasten the retaining screws.

3. Turn on the computer and the attached serial devices.

4. Refer to the serial device's manual for instruction to configure the operation environment to recognize the new attached devices.

5. If the serial device needs specified IRQ or address, you may need to run the CMOS setup to change the hardware device setup.

If the COM2 is to be set to RS-485 for long distance transmission, the related onboard jumpers have to be set correctly first. Refer to section 6.2.1.2 for the RS-232/485 jumper settings and Appendix D for RS-485 programming.

5.3. Parallel Port

The OPEN (660) system can support the latest EPP and ECP parallel port protocols. It can be used to connect to a wide array of printers, ZIP drive, parallel scanner and any other parallel devices. The printer interface on the OPEN (660) system is a 25-pin female D-SUB connector located on the bottom side. To connect any parallel device, just plug in the male connector of the parallel device to the 25-pin female D-SUB connector.

5.4. 100/10 Base-T Ethernet (RJ-45)

The OPEN (660) system provides an NE2000 compatible Ethernet (RJ-45) interface. For network connection, just plug in one end of cable of a 100/10 Base-T hub to the computer's RJ-45 phone jack. The pin assignment of the RJ-45 is listed as follow;
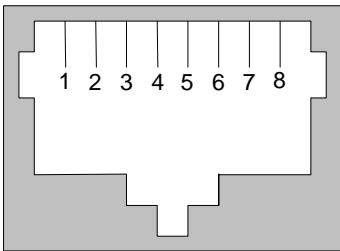
RJ-45

RJ-45 Connector Pin Assignment

Pin	Description
1	Tx+ (data transmission positive)
2	Tx- (data transmission negative)
3	Rx+ (data reception positive)
6	Rx- (data reception negative)
others	No use

5.5. USB Ports

The OPEN (660) system also provides two USB ports to connect to external USB devices. Before connecting to the USB devices, remember to install the device driver first.

5.6. Audio Interface

The audio interface contains three jacks, microphone-in, line-in and speaker-out. The microphone-in jack is used to record sound or voice by connecting to an external microphone. The line-in jack is used to input audio from an external audio device such as a CD player, tape recorder or a radio. The speaker-out jack is to output the audio to external devices such s speakers or earphones. The audio device can be directly attached to the jacks. Please note that the audio driver has to be installed first before connecting to any audio device.

5.7. External FDD (DB-15)

The OPEN (660) 120/140 II does not build in any floppy disk drive into the main system. Rather, it provides a FDD interface located at the rear panel. The OPEN (660) 150 can either use an internal floppy disk drive or to external type. When the OPEN (660) system is using external floppy disk drive, an external FDD cable is provided to connect a standard 3.5" FDD to the system for system O/S and application software installation. Its pin position and pin assignment are listed as follows.

Pin #	Signal	Pin #	Signal
1	DELSEL	9	-WD
2	-INDEX	10	-STEP
3	-MTR1	11	-RD
4	-DVR1	12	-HDSEL
5	-DIR	13	-DSKCHG
6	-WP	14	+5V
7	-TRKO	15	+12V
8	-WG		
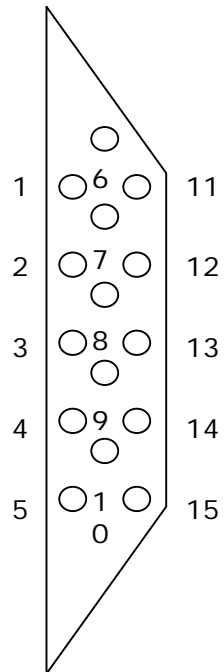
The OPEN (660) system is equipped with a +5V/12V DC-out connector to provide 5V power to drive the external floppy disk drive. Use the provided FDD power cable to connect the floppy drive to the 5V DC-out connector when an external floppy drive is attached to the system.

5.8. +5V/12V DC-Out

The OPEN (660) system provides a +5V/12V DC-out connector. It is used to provide necessary power source for some external devices. For example, if an external floppy disk drive is attached to the system, it will need +5V power source from the system. A power cable for the external floppy disk drive is already provided for this connection. For other devices, you might need to make your own power cable for the connection.

5.9. PS/2 Keyboard interface

The OPEN (660) system provides a standard PS/2 keyboard connector located at the rear panel. If the user would like to use AT keyboard, then an adapter to connect the PS/2 KB to AT KB is needed.

5.10. PS/2 Mouse

The OPEN (660) system has one PS/2 mouse connector located at the right side. A simple plug-in will make the connection.

5.11. AC/DC Inlet/Power Switch

For OPEN (660) system AC system, it can operate in the input range from 90 ~ 240 volts, 50 ~ 60 Hz). For DC system, the input range is from 9 ~ 132VDC.

6. SYSTEM CONTROL BOARD

The system controller used in the OPEN (660) system is a Celeron/Pentium® III multimedia embedded little board, PC 660A3. This chapter provides detail introduction of the system engine.

6.1. Introduction

This section provides background information and detail specification on the OPEN (660) 120/140/150 II system engine, PC 660A3. Sections include:
✧ General Information
✧ Features
✧ Specification
✧ Board placement & Dimension

6.1.1. General Information

The **PC 660A3** is an Intel Celeron/ Pentium® III (Socket 370) multimedia mini board. Compact in size and with its highly integrated multimedia and networking functions, the PC 660A3 is the most powerful PC engine to build any small footprint all-in-one PC system for integration into any space-constricted embedded applications. Highly integrated, the PC 660A3 can adapt Intel® Celeron (66MHz) and P III (100MHz) CPU. Onboard features include super I/Os, XGA, LCD interface, IrDA, 10/100 Base-T Ethernet and audio functions. The full PC functionality coupled with its multi-I/Os stand ready to accommodate a wide range of PC peripherals. Special industrial feature not commonly seen in commercial systems such as watchdog timer makes the PC 660A3 the best choice for the operation in any hostile environments.

Fully configurable and with its modular design, the PC 660A3 is an ideal platform for any consumer computing applications where space is a premium.

6.1.2. Features

◆ Compact profile for small-footprint system

◆ All-in-one design gets rid of compatibility and reliability problem that go with commercial motherboard

◆ Highly integrated design simplifies system integration and reduces system cost

◆ Multi-I/O design for accommodation of many PC peripherals

◆ Highly integrated multimedia functions

◆ High resolution for multimedia application

◆ Full networking and IrDA functions for convenient data transmission

◆ Modular design makes customization easy

◆ Providing PCI/ISA expansion slot for system future expansion

◆ Rugged industrial-grade construction allows system operation in any hostile environment

◆ Long product life cycle

6.1.3. Specifications

PC 660A3: Multimedia Intel Celeron/Pentium® III Embedded Mini Board with XGA, Flat panel, Ethernet & Audio Interface

◆   **CPU**: Intel Celeron/Pentium® III (Socket 370)
  – Intel Celeron® PPGA/FCPGA/66MHzz
  – Intel Pentium® III FCPGA/100MHz

◆ **System Chipset**: Intel 440BX or the equivalent chipset

◆ **System BIOS**: Award PnP Flash BIOS

◆ **System Memory**: Equipped with one DIMM socket to support (32MB, 64MB, 128MB, 256MB) 168-pin 3.3V SDRAM SPD (Special Presence Detect).

◆ **CPU built-in L2 Cache**: Onchip 128KB Pipeline Burst Level 2 cache in the Socket 370 cartridge.

◆ **Flash Disk**: Support M-Systems DiskOnChip® up to 144MB.

◆ **Standard I/O**
  • Serial ports x 4: RS-232 x 3, RS-232/485 x 1 (COM2), jumper selectable
  • Parallel port x 1: Support SPP/EPP/ECP
  • Enhanced IDE Interface x 2: supports up to 4 IDE devices
  • FDD Interface x 1: supports up to 2 floppy disk drives
  • PS/2 Keyboard Interface x 1
  • PS/2 Mouse Interface x 1
  • USB Interface x 2

◆ **TTL Digital I/O:** Input x4, output x4

◆ **Watchdog Timer:** 16 time intervals

◆ **Green Function**: APM 1.1 compliant

◆ **Expansion Bus**: PCI/ISA expansion slot x 1

◆ **Ethernet Interface**
- Ethernet chipset: RTL8139
- 10/100 Base-T Interface auto switch
- NE2000 compatible

◆ **Display**
- LCD/XGA chipset, C&T69000 with built-in 2MB DRAM
- LCD/XGA chipset, C&T69030 with built-in 4MB DRAM (optional)

◆ **Audio Function**
- **Chipset**: ESS ES1938S PnP audio controller
- **Stereo sound**: full-duplex, integrated 3D audio
- **Audio Interface**: Line-In, Speaker-Out, Mic-In and CD audio-in
- **Power**: accepts +12V source for improved audio quality

◆ **Infrared Transceiver:**

Supports IrDA version 1.0 SIR protocol

◆ **Power Requirement**:

Single +5V operation @7A

+12V operation @1A

◆ **Dimensions**: 146 x 203 mm

Specifications are subject to change without notice.

6.1.4. Board Placement & Dimension

The PC 660A3 dimension and layout is shown below;
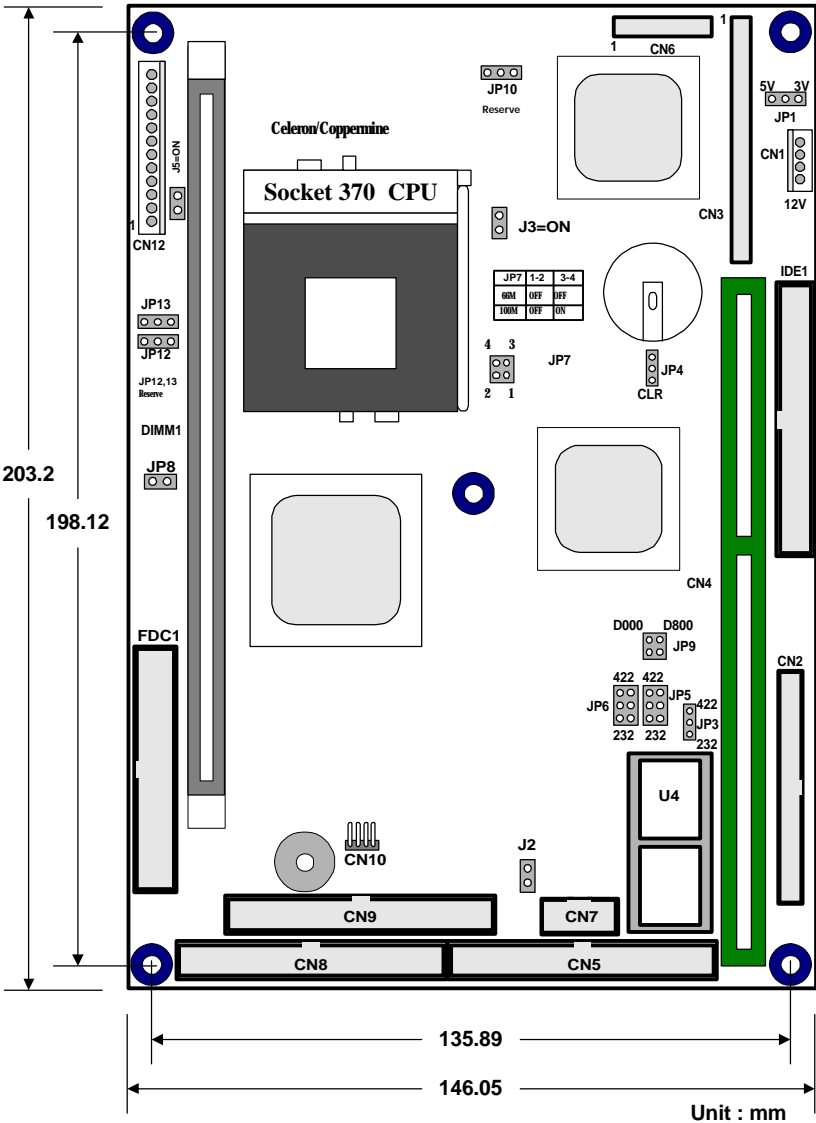
6.2. Locating Jumpers & Connectors

The PC 660A3 is configured to match the needs of specific application by proper jumper settings. The onboard connectors link the PC 660A3 to external devices such as a hard disk, a floppy disk or a printer.   The following figure helps you to locate all jumpers and connectors.

OPEN (660) 120/140/150   *6-63*
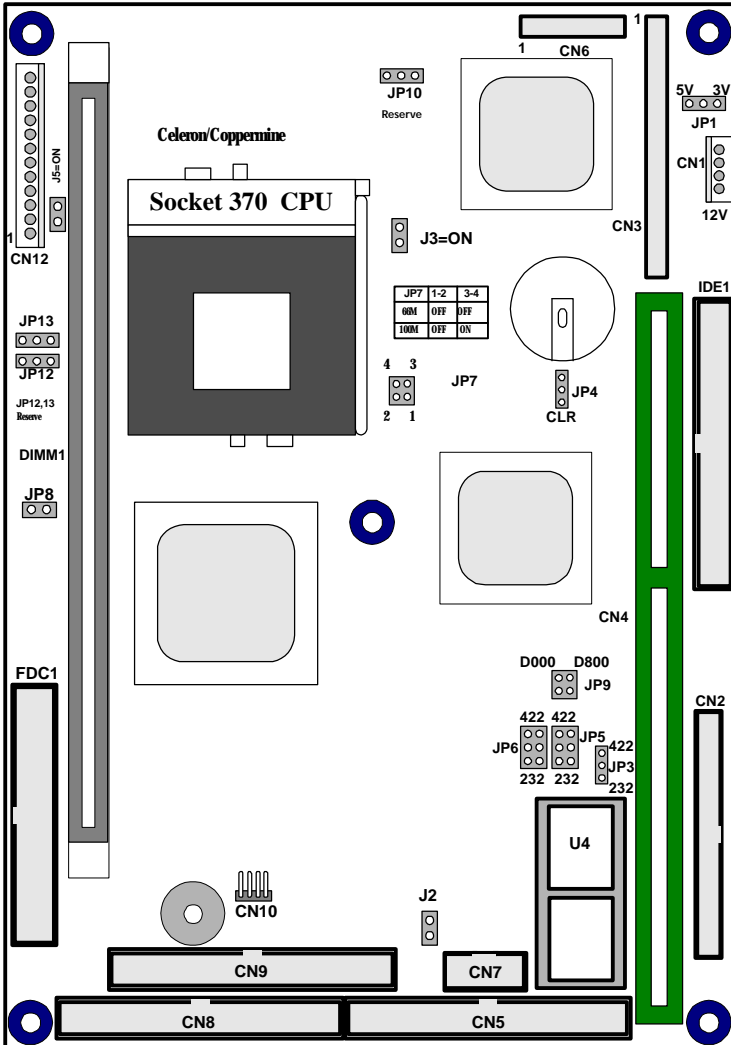
6.2.1. Jumpers & Jumper Setting

The table below lists the function of each jumper. The related jumper settings are shown in the coming sections.

Jumper	Description
JP1	LCD power setting
JP2	Reserved
JP4	CMOS clear
JP3	COM2 RS-232/485 selection
JP5	COM2 RS-232/485 selection
JP6	COM2 RS-232/485 selection
JP7	CPU frequency setting
JP9	DiskOnChip 2000 address setting

6.2.1.1.   DOC 2000 Address Setting (JP9)
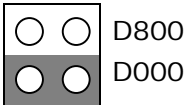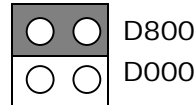
Address D000~D7FF   Address D800~DFFF

6.2.1.2.   COM 2 RS-232/485 Setting (JP3, 5, 6)

The PC 660A3 is a RS-232/485 serial port. JP3, JP5 and JP6 determine the specific port type.
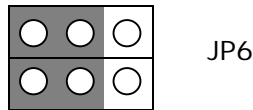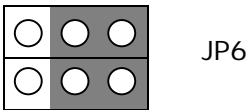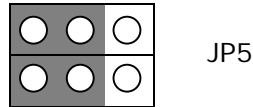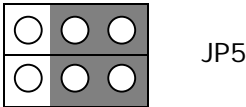
RS-232 mode   RS-485 mode

The RS-485 is software programmable. Please refer to APENDIX for the programming.

6.2.1.3. CMOS Clear Setting (JP4)

Before setting "CMOS Clear", remember to turn off the power supply to avoid damaging the computer board. After the setting, before turning on the power supply, set the jumper back to "3.6V Battery on".

JP4: CMOS Clear Setting

3.6V Battery On   Clear CMOS

 CLR   CLR
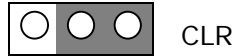
default setting

6.2.1.4. LCD Power Setting (JP1)
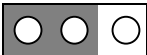
5V   3.3V

default setting

6.2.2. Connectors & Pin Assignment

The table below lists the function of each connector on the PC 660A3. Their corresponding pin assignments will be shown in the following sections.

Connector	Description
CN1	LCD Backlight Connector
CN2	Primary IDE Connector (44 pin)
IDE1	Secondary IDE Connector (40 pin)
CN3	Flat Panel Connector
CN4	PCI/ISA Expansion Slot
CN5	IR and Serial Port Connector
CN6	Video Interface Connector
CN7	Digital I/O Connector
CN8	PS/2 Keyboard, PS/2 Mouse, USB and Parallel Port Connector
CN9	Audio, Ethernet 10/100 Base-T, VGA Connector
CN10	CD-ROM Audio Input Connector
CN11	Reserved
CN12	Main Power Connector
FAN1	FAN Power Connector
FDC1	FDD Connector
JP8	Reserved
J2	Reset Connector

6.2.2.1. CN12: Main Power Connector

CN12 is a main power connector.   Its pin assignments are listed below:

CN12: Main Power Connector

Pin #	Signal
1	GND
2	NC
3	GND
4	+12V
5	GND
6	GND
7	GND
8	+5V
9	+5V
10	+5V
11	+5V
12	NC
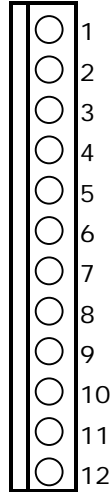
6.2.2.2.   CN2/IDE1: IDE Connector

CN2 is a 44-pin primary IDE connector and IDE1 is a 40-pin secondary IDE connector. Their corresponding pin assignments are listed below;

CN2: Primary IDE

Pin #	Signal	Pin #	Signal
1	RST	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	NC
21	DRQ#	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	CHRDY	28	NC
29	ACK#	30	GND
31	IRQ14	32	N/C
33	A1	34	N/C
35	A0	36	A2
37	CS0#	38	CS1#
39	LED indicator	40	GND
41	Vcc5	42	Vcc5
43	GND	44	NC
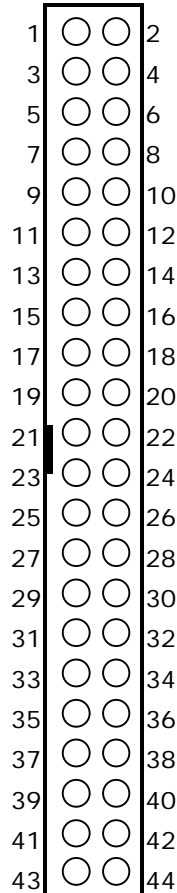
IDE1: Secondary IDE Connector

Pin #	Signal	Pin #	Signal
1	RST	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	NC
21	DRQ#	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	CHRDY	28	NC
29	DACK#	30	GND
31	IRQ15	32	NC
33	A1	34	NC
35	A0	36	A2
37	CS0#	38	CS1#
39	LED indicator	40	GND

OPEN (660) 120/140/150
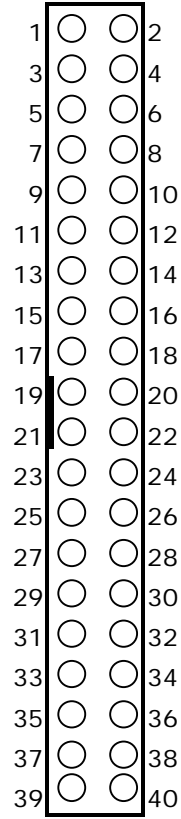
6.2.2.3.   CN3/CN1: Flat Panel Connector

CN3 is a 50-pin flat panel connector and CN1 is a LCD backlight connector. Their pin assignments are listed below.

CN3: Flat Panel Connector

Pin	Signal	Pin	Signal
1	VEESAFE	2	VEESAFE
3	GND	4	GND
5	VDDSAFE	6	VDDSAFE
7	ENAVEE	8	ENABKL
9	LP0	10	LP1
11	LP2	12	LP3
13	LP4	14	LP5
15	LP6	16	LP7
17	LP8	18	LP9
19	LP10	20	LP11
21	LP12	22	LP13
23	LP14	24	LP15
25	LP16	26	LP17
27	LP18	28	LP19
29	LP20	30	LP21
31	LP22	32	LP23
33	GND	34	GND
35	SCLK	36	FLMM
37	MS	38	LPP
39	LP24	40	LP25
41	LP26	42	LP27
43	LP28	44	LP29
45	LP30	46	LP31
47	LP32	48	LP33
49	LP34	50	LP35
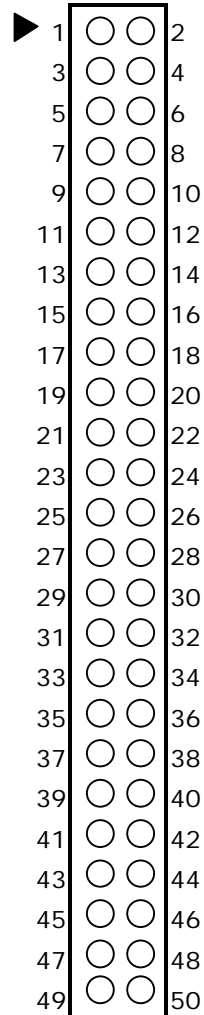
CN1: LCD Backlight Connector

Pin #	Signal
1	GND
2	GND
3	ENABKL
4	VEESAFE
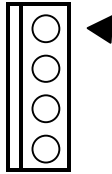
6.2.2.4.   CN5: IR and Serial Ports Connector

The CN5 is a 40-pin IR and serial port connector. The PC 660A3 provides one IR port and four onboard serial ports with their signals mixed in one connector, CN5. The following table shows the related pin signals;

CN5: IR Port and 4 COM Ports

Pin #	Signal	Pin #	Signal
1	DCD1	2	DSR1
3	RX1	4	RTS1
5	TX1	6	CTS1
7	DTR1	8	RI1
9	GND	10	GND
11	DCD2	12	DSR2
13	RX2	14	RTS2
15	TX2	16	CTS2
17	DTR2	18	RI2
19	GND	20	GND
21	DCD3	22	DSR3
23	RX3	24	RTS3
25	TX3	26	CTS3
27	DTR3	28	RI3
29	IRVCC5	30	IRVCC5
31	DCD4	32	DSR4
33	RX4	34	RTS4
35	TX4	36	CTS4
37	DTR4	38	RI4
39	IRTX2	40	IRRX2
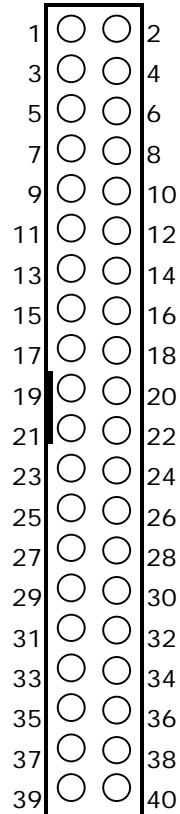
6.2.2.5.   CN7: Digital I/O Connector

The CN7 is a 10 pin digital I/O connector.

CN7: DIO Connector pin assignment

Pin #	Signal	Pin #	Signal
1	OUT DATA0(SD4)	2	IN DATA0(SD0)
3	OUT DATA1(SD5)	4	IN DATA1(SD1)
5	OUT DATA2(SD6)	6	IN DATA2(SD2)
7	OUT DATA3(SD7)	8	IN DATA3(SD3)
9	GND	10	GND

The PC 660A3 DIO can be used for the system's simple automation control needs. The digital I/O can be configured to control the opening of a cash drawer or to sense the warning signal of an Uninterrupted Power System (UPS) or to do the store security control.

The Digital I/O is of TTL interface.   It is controlled via software programming;

Digital I/O Programming

Input/output address: 206H

In_Data 0~3=SD0~SD3

Out_ Data 0~3=SD4~SD7

EXAMPLE:

10   REM Digital I/O example program

20   X = INP (&H206)   REM INPUT Digital I/O port
                                          for 4 bit

30   X = OUT (&H206)   REM OUTPUT Digital I/O port
                                          for 4 bit

60   END

100 Return

Port 206H Definition

6.2.2.6.   CN8: KB, MS, USB & PRT Connector

The PC 660A3 provides one keyboard port, one PS/2 mouse port, two USB ports and one parallel port with their signal mixed in the CN8 connector.

CN8: Keyboard, Mouse, USB & PRT Ports

Pin #	Signal	Pin #	Signal
1	+5V	2	+5V
3	USBDAT0-	4	USBDAT1-
5	USBDAT0+	6	USBDAT1+
7	GND	8	GND
9	+12V	10	+12V
11	GND	12	GND
13	PS2KBDAT	14	PS2MSDAT
15	PS2KBCLK	16	PS2MSCLK
17	+5V	18	+5V
19	NC	20	NC
21	GND	22	GND
23	GND	24	DATA7
25	SLCTIN	26	DATA6
27	INIT	28	DATA5
29	ERROR	30	DATA4
31	AUTOFD	32	DATA3
33	SLCT	34	DATA2
35	PE	36	DATA1
37	BUSY	38	DATA0
39	ACK	40	STORBE
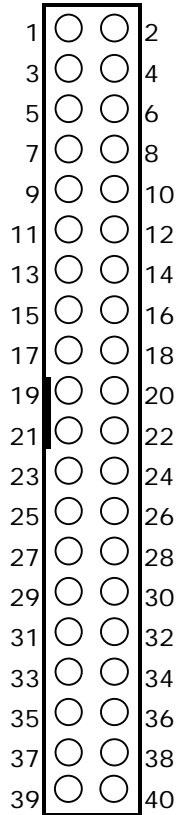
6.2.2.7.   CN10: CD Audio Input Connector

Pin #	Signal
1	AUXL
2	GND
3	GND
4	AUXR
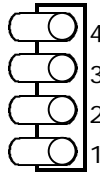
6.2.2.8.   CN9: Audio, Ethernet VGA CRT & LED Connector

The CN9 is a 40-pin, dual-in-line pin header providing signals for audio, VGA CRT, Ethernet and LED.

CN9: Audio, VGA CRT, Ethernet and LED

Pin #	Signal	Pin #	Signal
1	+5V	2	+5V
3	HDDLED	4	RESET
5	SMILED	6	LANLINK-LED
7	GND	8	LAN/RX-LED
9	GND	10	GND
11	GND	12	+5V
13	VSYNC	14	HSYNC
15	RED	16	GRN
17	BLUE	18	VGADDA
19	VGADCK	20	GND
21	CROMA	22	LUMA
23	COMP	24	GND
25	GND	26	GND
27	GND	28	MIC-IN
29	AUDIO-L	30	AUIDO-R
31	LINE IN-L	32	LINE IN-R
33	SPKRDAT	34	+5V
35	LANGND	36	TX+
37	TX-	38	RX+
39	RX-	40	LANGND

OPEN (660) 120/140/150
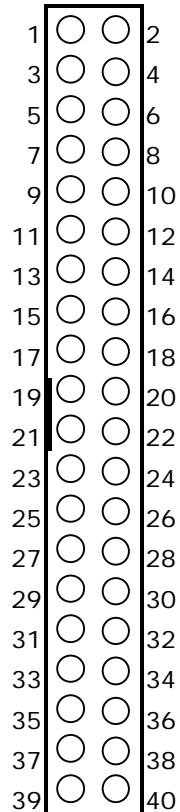
6.2.2.9. CN6: Video Interface Connector

The PC 660A3 provides a video interface connector (CN6) to support multimedia functions. Its pin assignment is listed below;

Pin #	Signal	Pin #	Signal
1	VP0	2	VP1
3	VP2	4	VP3
5	VP4	6	VP5
7	VP6	8	VP7
9	VP8	10	VP9
11	VP10	12	VP11
13	VP12	14	VP13
15	VP14	16	VP15
17	GND	18	HREF
19	VREF	20	VCLK
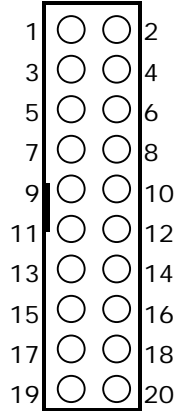
6.2.2.10. FDC1: FDD Connector

The FDC1 is a 34-pin pin header FDD connector. Its pin table is shown below;

FDC1: FDD Connector Pin Assignment

Pin #	Signal	Pin #	Signal
1	GND	2	RWC
3	GND	4	NC
5	GND	6	NC
7	GND	8	INDEX #
9	GND	10	MTRO#
11	GND	12	DRV1#
13	GND	14	DRV0#
15	GND	16	MTR1#
17	GND	18	DIR#
19	GND	20	STEP#
21	GND	22	WD#
23	GND	24	WG#
25	GND	26	TRK0#
27	GND	28	WP#
29	GND	30	RD#
31	GND	32	HDSEL#
33	GND	34	DSKCHG#
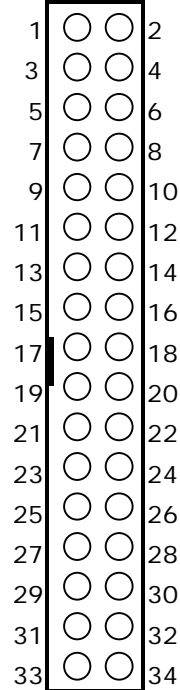
6.2.2.11. FAN1: FAN Connector

FAN1

Pin #	Signal
1	FAN Controller
2	+12V
3	GND
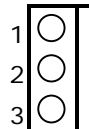
6.2.2.12. CN4: PCI/ISA Expansion Slot

The PC 660A3 provides an ISA/PCI slot for ISA and PCI device expansion.
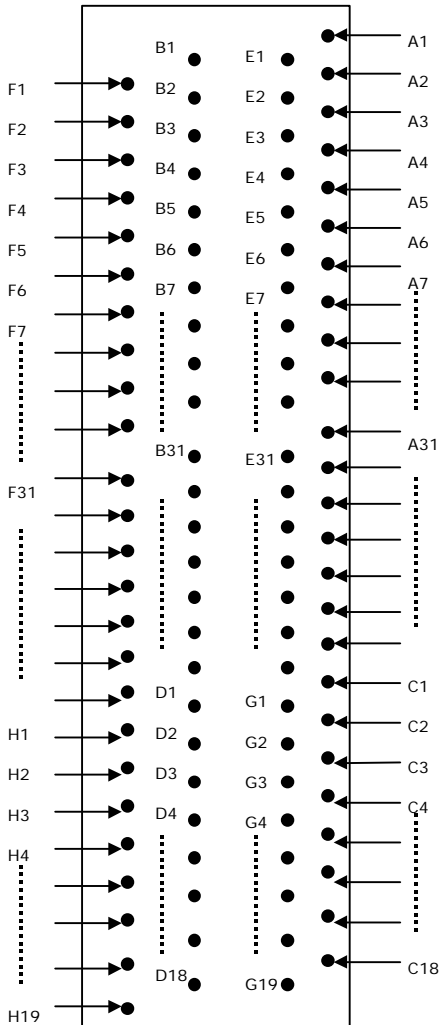
CN4: PCI/ISA Slot Side

CN4: PCI/ISA Slot Connector Pin Assignment

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
F1	GND	B1	GND	E1	GND	A1	IOCHK
F2	GND	B2	ISARST	E2	GND	A2	SD7
F3	INTB	B3	VCC	E3	INTC	A3	SD6
F4	INTA	B4	IRQ9	E4	INTD	A4	SD5
F5	VCC	B5	-5V	E5	VCC	A5	SD4
F6	KEY	B6	DRQ2	E6	KEY	A6	SD3
F7	VCC	B7	-12V	E7	VCC	A7	SD2
F8	PCICLK1	B8	OWS	E8	PCIRST	A8	SD1
F9	GND	B9	+12V	E9	GNT0	A9	SD0
F10	GNT3	B10	GND	E10	REQ0	A10	IORDY
F11	GND	B11	SMEMW	E11	GND	A11	AEN
F12	REQ3	B12	SMEMR	E12	PCILKE2	A12	SA19
F13	AD31	B13	IOW	E13	GND	A13	SA18
F14	AD29	B14	IOR	E14	AD30	A14	SA17
F15	NC	B15	DACK3	E15	NC	A15	SA16
F16	KEY	B16	DRQ3	E16	KEY	A16	SA15
F17	NC	B17	DACK1	E17	NC	A17	SA14
F18	AD27	B18	DRQ1	E18	AD28	A18	SA13
F19	AD25	B19	REF	E19	AD26	A19	SA12
F20	CBE3	B20	ATCLK	E20	AD24	A20	SA11
F21	AD23	B21	IRQ7	E21	AD22	A21	SA10
F22	AD21	B22	IRQ6	E22	AD20	A22	SA9
F23	AD19	B23	IRQ5	E23	AD18	A23	SA8
F24	NC	B24	IRQ4	E24	NC	A24	SA7
F25	KEY	B25	IRQ3	E25	KEY	A25	SA6
F26	NC	B26	DACK2	E26	NC	A26	SA5
F27	AD17	B27	TC	E27	AD16	A27	SA4
F28	IRDY	B28	ALE	E28	FRAME	A28	SA3

To continue…

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
F29	DEVSEL	B29	Vcc	E29	CBE2	A29	SA2
F30	LOCK	B30	OSC	E30	TRDY	A30	SA1
F31	PERR	B31	GND	E31	STOP	A31	SA0
H1	SERR	D1	MEMCS16	G1	NC	C1	SBHE
H2	AD15	D2	IOCS16	G2	NC	C2	LA23
H3	AD14	D3	IRQ10	G3	CBE1	C3	LA22
H4	AD12	D4	IRQ11	G4	PAR	C4	LA21
H5	GND	D5	IRQ12	G5	GND	C5	LA20
H6	KEY	D6	IRQ15	G6	KEY	C6	LA19
H7	GND	D7	IRQ14	G7	GND	C7	LA18
H8	AD10	D8	DACK0	G8	AD13	C8	LA17
H9	AD8	D9	DRQ0	G9	AD11	C9	MEMR
H10	AD7	D10	DACK5	G10	AD9	C10	MEMW
H11	AD5	D11	DRQ5	G11	CBE0	C11	SD8
H12	AD3	D12	DACK6	G12	AD6	C12	SD9
H13	AD1	D13	DRQ6	G13	AD4	C13	SD10
H14	AD0	D14	DACK7	G14	AD2	C14	SD11
H15	KEY	D15	DRQ7	G15	KEY	C15	SD12
H16	Vcc	D16	Vcc	G16	Vcc	C16	SD13
H17	Vcc	D17	MASTER	G17	Vcc	C17	SD14
H18	GND	D18	GND	G18	GND	C18	SD15
H19	GND			G19	GND		

7. AWARD BIOS SETUP

The chapter describes how to set up BIOS configuration.

7.1. Award BIOS

The Award BIOS ROM builds in a setup program, which allows the users to modify the basic system configuration such as the current date and time or the type of peripheral devices attached to the computer.

Under the following conditions, the CMOS settings are to be changed;

4. The system is starting for the first time

5. The hardware devices attached to the systems have been changed

6. The CMOS memory has lost power and the configuration information has been erased.

The BIOS setup program is stored in ROM, which can be accessed by pressing <DEL> key on the keyboard immediately when the system is powered on.

In order to retain the specified setup information when the system power is turned off, the system setup information is stored in a battery-backed CMOS RAM. The battery is to ensure the settings will not be erased when the computer is turned off or reset. When the computer is powered on again, the system will read the settings stored in the CMOS RAM and compare them to the equipment check conducted during the power on self test (POST). If any error or mismatch occurs, an error message will be shown on the screen and the computer will be prompted to run the setup program.

7.2. Control Key Definition

Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item in the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu - Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu - Exit current page and return to Main Menu
PgUp key	Increase the numeric value or make changes
PgDn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Change color from total 16 colors
F3 key	Reserved
F4 key	Reserved
F5 key	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
F6 key	Load the default CMOS value from BIOS default table, only for Option Page Setup Menu
F7 key	Load the default
F8 key	Reserved
F9 key	Reserved
F10 key	Save all the CMOS changes, only for Main Menu

7.3. Getting Help

7.3.1. Main Menu

The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Press <F1> to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <ESC>.

7.4. AWARD BIOS Setup

7.4.1. AWARD BIOS Setup Main Menu

Power on the computer and press <DEL> immediately to run the AWARD BIOS setup. The setup main menu will appear on the screen.

```
            ROM PCI/ISA BIOS (2A69KHE9)
                 CMOS SETUP UTILITY
                AWARD SOFTWARE, INC.
┌─────────────────────────────┬──────────────────────────────┐
│ STANDARD CMOS SETUP         │ INTEGRATED PERIPHERALS        │
│ BIOS FEATURES SETUP         │ PASSWORD SETTING              │
│ CHIPSET FEATURES SETUP      │ IDE HDD AUTO DETECTION        │
│ POWER MANAGEMENT SETUP      │ SAVE & EXIT SETUP             │
│ PNP/PCI CONFIGURATION       │ EXIT WITHOUT SAVING           │
│ LOAD BIOS DEFAULTS          │                              │
│ LOAD SETUP DEFAULTS         │                              │
├─────────────────────────────┴──────────────────────────────┤
│ Esc : Quit              ↑  ↓  →  Select Item                │
│ F10: Save & Exit Setup    (Shift) F2 : Change Color         │
│                                                            │
└────────────────────────────────────────────────────────────┘
```

AWARD Setup program initial screen

Use the arrow keys to move among the items and press <Enter> to enter the sub-menu.

OPEN (660) 120/140/150   *7-87*

◆ **STANDARD CMOS SETUP**: This setup page includes all the items in standard compatible BIOS.

◆ **BIOS FEATURES SETUP**: This setup page includes all the items of Award special enhanced features.

◆ **CHIPSET FEATURES SETUP**: This setup page includes all the items of chipset special features.

◆ **POWER MANAGEMENT SETUP**: This setup page includes all the items of Green function features.

◆ **PNP/PCI CONFIGURATION**: This setup page includes all the configurations of PCI & PnP ISA resources.

◆ **LOAD BIOS DEFAULTS**: BIOS Defaults indicates the most appropriate value of the system parameters that the system would be in safe configuration.

◆ **LOAD SETUP DEFAULTS**: Setup Defaults indicates the value of the system parameters that the system would be in the best performance configuration.

◆ **INTEGRATED PERIPHERALS**: This setup page includes all onboard peripherals.

◆ **PASSWORD**: Change, set, or disable password. It allows you to limit access to the system and Setup, or just to Setup.

◆ **IDE HDD AUTO DETECTION**: Automatically configure hard disk parameters.

◆ **SAVE & EXIT SETUP**: Save CMOS value settings to CMOS and exit setup.

◆ **EXIT WITHOUT SAVING**: Abandon all CMOS value changes and exit setup.

7.4.2. Standard CMOS Setup

If the **STANDARD CMOS SETUP** is selected from the main menu, the screen below will appear. This menu allows the users to configure the system components such as date, time, hard disk drive, floppy disk drive and display type. The system BIOS will automatically detect the memory size; therefore no setting is needed.

ROM PCI/ISA BIOS (2A69K HE9)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

```
Date (mm:dd:yy)  : Tue, Aug 18 1998
Time (hh:mm:ss)  :  8 : 25 : 30
HARD DISKS     TYPE  SIZE CYCS HEAD PRECOMP LANDZ SECTOR MODE

Primary Master   : Auto  0   0    0      0      0      0    ------   Auto
Primary Slave    : Auto  0   0    0      0      0      0    ------   Auto
Secondary Master: Auto   0   0    0      0      0      0    ------   Auto
Secondary Slave : Auto   0   0    0      0      0      0    ------   Auto
Drive A    : 1.44M, 3.5"
Drive B    : None
LCD&CRT    : Both              ┌─────────────────────────────┐
12.1" LCD  : 800x600           │  Base Memory:       0K      │
14.1" LCD  : 1024x768          │  Extended Memory:   0K      │
TV Mode    : Disable           │  Other Memory:      512K    │
Halt On    : All Errors        │  Total Memory:      512K    │
                               └─────────────────────────────┘
ESC  : Quit      ↑  ↓  → : Select Item      PU/PD/+/- : Modify
F1   : Help      (Shift)F2   : Change Color
```

◆ DATE

The date format is <day>, <month> <date> <year>.

day	The day, from Sun to Sat, determined by the BIOS and is display-only
month	The month, Jan. through Dec.
date	The date, from 1 to 31 (or the maximum allowed in the month)
year	The year, from 1994 through 2079

◆ TIME

The times format in <hour> <minute> <second>. The time is calculated base on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

◆ PRIMARY HDDs / SECONDARY HDDs

The category identifies the types of hard disk from drive C to F that has been installed in the computer. There are two types: auto type, and user definable type. User type is user-definable; Auto type which will automatically detect HDD type.

Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category.

If you select User Type, related information will be asked to enter to the following items. Enter the information directly from the keyboard and press <Enter>. Such information should be provided in the documentation form your hard disk vendor or the system manufacturer.

CYLS.	Number of cylinders
HEADS	number of heads
PRECOMP	write precomp
LANDZONE	Landing zone
SECTORS	number of sectors

If a hard disk has not been installed select *NONE* and press <Enter>.

◆ **DRIVE A TYPE / DRIVE B TYPE**

The category identifies the types of floppy disk drive A or drive B that has been installed in the computer.

None	No floppy drive installed
360K, 5.25"	5.25 inch PC-type standard drive; 360K byte
1.2M, 5.25"	5.25 inch AT-type high-density drive; 1.2M byte (3.5 inch when 3 Mode is Enabled).
720K, 3.5"	3.5 inch double-sided drive; 720K byte
1.44M, 3.5"	3.5 inch double-sided drive; 1.44M byte
2.88M, 3.5"	3.5 inch double-sided drive; 2.88M byte

◆ **12.1" LCD/14.1" LCD**

The category indicates the setting of 12.1"/14.1" LCD.

◆ **LCD & CRT**

The category detects the type of adapter used for the primary system monitor that must match your video display card and monitor.

◆ **HALT ON**

The category determines whether the computer will stop if an error is detected during power up.

NO Errors	The system boot will not stop for any error that may be detected
All Errors	Whenever the BIOS detects a non-fatal error the system will be stopped and you will be prompted
All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors

7.4.3. BIOS Features Setup

If the **BIOS FEATURES SETUP** option is selected from the main menu, the screen below will appear. The following sample screen consists of the default values for OPEN (660).

ROM PCI/ISA BIOS (2A69KHE9)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

Virus Warning : Disable	Video BIOS Shadow : Enable
CPU Internal Cache : Enable	C8000-CBFFF Shadow : Disable
External Cache : Enable	CC000-CFFFF Shadow : Disable
Quick Power On Self Test : Enable	D0000-D3FFF Shadow : Disable
Boot From LAN First : Disable	D4000-D7FFF Shadow : Disable
Boot Sequence : C, A,SCSI Disable	D8000-DBFFF Shadow :
Swap Floppy Drive : Disable	DC000-DFFFF Shadow : Disable
Boot Up Floppy Seek : Enable	
Boot Up NumLock Status : ON	
Gate A20 Option : Normal	
Typematic Rate Setting : Disable	
Typematic Rate(Char/sec): 6	
Typematic Delay (Msec) : 250	
Security Option : Setup	
PCI/VGA Palette Snoop : Disable	ESC : Quit ↑ ↓ → Select Item
OS Select For DRAM>64MB :Non-OS2	F1 : Help PU/PD/+/-: Modify
Report no FDD for WIN 95	F5 : Old Value (Shift)F2 : Color
	F6 : Load BIOS Defaults
	F7 : Load Setup Defaults

7.4.4. Chipset Features Setup

If the **CHIPSET FEATURES SETUP** option is selected from the main menu, the screen below will appear. The following sample screen consists of the default values for OPEN (660).

```
              ROM PCI/ISA BIOS (2A69KHE9)
                CHIPSET FEATURES SETUP
                 AWARD SOFTWARE, INC.
```

Auto Configuration : Enabled	Auto Detect DIMM/PCI Clk : Enabled
EDO DRAM Speed Selection : 60ns	Spread Spectrum Modulated: Disabled
EDO CASx# MA Wait State : 2	CPU Host Clock : 66MHz
EDO RASx# Wait State : 2	CPU Warning Temperature : Disabled
SDRAM RAS-to-CAS Delay : 3	Current System Temperature: 24°C/75°F
SDRAM RAS Precharge Time : 3	Current CPUFAN1 Speed : 0 RPM
SDRAM CAS latency Time : 3	Current CPUFAN2 Speed : 0 RPM
SDRAM Precharge Control : Disabled	Current Vdd(V) : 4.94V
DRAM Data Integrity Mode: Non-ECC	Current Vin1(V) : 3.47V
System BIOS Cacheable: Disabled	Current Vin2(V) : 12.66V
Video BIOS Cacheable : Disabled	Current Vin3(V) : 2.20 V
Video RAM Cacheable : Disabled	
8 Bit I/O Recovery Time : 3	
16 Bit I/O Recovery Time : 2	ESC: Quit↑↓→← : Select Item
Memory Hole At 15M-16M: Disabled	F1 : Help PU/PD/+/-: Modify
Passive Release : Enabled	F5 : Old Values (Shift)F2 : Color
Delay Transaction : Disabled	F6 : Load BIOS Defaults
	F7 : Load Setup Defaults

7.4.5. Power Management Setup

If the **POWER MANAGEMENT SETUP** option is selected from the main menu, the screen below will appear. The following sample screen consists of the default values for OPEN (660).

ROM PCI/ISA BIOS (2A69KHE9)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

```
Power Management: Disable          ** Reload Global Timer Events **
PM Control by APM: Yes             IRQ(3-7, 9-15) NMI   : Disabled
Video Off Method : V/H SYNC+Blank  Primary IDE 0        : Disabled
Video Off After   : Standby        Primary IDE 1        : Disabled
MODEM Use IRQ : 3                  Secondary IDE 0      : Disabled
                                   Secondary IDE 1      : Disabled
Doze Mode:           : Disable     Floppy Disk          : Disabled
Standby Mode         : Disable     Serial Port          : Enabled
Suspend Mode:        : Disable     Parallel Port        : Disabled
HDD Power Down       : Disable
Throttle Duty Cycle  : 62.5%
PCI/VGA Active Monitor : Disabled
Soft-Off by PWR-BTTN : Instant-Off
Rower on by Ring     : Disabled    ESC: Quit↑↓→← :  Select Item
IRQ 8 Break Suspend  : Disabled    F1 :  Help PU/PD/+/-: Modify
                                   F5 :  Old Values (Shift )F2 :   Color
                                   F6 :  Load BIOS Defaults
                                   F7 :  Load Setup Defaults
```

7.4.6.PnP/PCI Configuration

If the **PNP/PCI CONFIGURATION** option is selected from the main menu, the screen below will appear. The following sample screen consists of the default values for OPEN (660).

ROM PCI/ISA BIOS (2A69KHE9)
PnP/PCI CONFIGURATION
AWARD SOFTWARE, INC.

PNP OS Installed : Yes Resources Controlled By: Manual Reset Configuration Data: Disabled	Assigned IRQ for VGA : Enabled Used MEM base addr : NA
IRQ-3 assigned to: Legacy ISA IRQ-4 assigned to: Legacy ISA IRQ-5 assigned to: Legacy ISA IRQ-7 assigned to: Legacy ISA IRQ-9 assigned to: PCI/ISA PnP IRQ-10 assigned to: PCI/ISA PnP IRQ-11 assigned to: PCI/ISA PnP IRQ-12 assigned to: PCI/ISA PnP IRQ-14 assigned to: Legacy ISA IRQ-15 assigned to: Legacy ISA DMA-0 assigned to: PCI/ISA PnP DMA-1 assigned to: PCI/ISA PnP DMA-3 assigned to: PCI/ISA PnP DMA-5 assigned to: PCI/ISA PnP DMA-6 assigned to: PCI/ISA PnP DMA-7 assigned to: PCI/ISA PnP	ESC: Quit↑↓→← : Select Item F1 : Help PU/PD/+/-: Modify F5 : Old Values (Shift)F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults

7.4.7. Load BIOS Defaults

The **LOAD BIOS DEFAULTS** loads the default values to the system directly from the ROM. If the stored data generated by the Setup Program is gone, then when the computer is turned on, these default values will automatically load to the system.

```
ROM PCI/ISA BIOS (2A69KHE9)
          CMOS SETUP UTILITY
         AWARD SOFTWARE, INC.
```

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
STANDARD CMOS SETUP	IDE HDD AUTO DETECTION
CHIPSET FEATURES SETUP	SAVE & EXIT SETUP
POWER MANAGEMENT SETUP	EXIT WITHOUT SAVING
PCI CONFIGURATION SETUP	
LOAD BIOS DEFAULTS	

Load BIOS Defaults (Y/N) ? Y

Esc : Quit   ← → ↑ ↓ : Select Item

F10: Save & Exit Setup   (Shift) F2 : Change Color

Time, Date, Hard Disk Type…

7.4.8. Load Setup Defaults

```
                ROM PCI/ISA BIOS (2A69KHE9)
                    CMOS SETUP UTILITY
                   AWARD SOFTWARE, INC.
─────────────────────────────────────────────────────────────

STANDARD CMOS SETUP              INTEGRATED PERIPHERALS

STANDARD CMOS SETUP              IDE HDD AUTO DETECTION

CHIPSET FEATURES SETUP

POWER MANAGEMENT SETUP           SAVE & EXIT SETUP

PCI CONFIGURATION SETUP          EXIT WITHOUT SAVING

LOAD BIOS DEFAULTS      ┌─────────────────────────────────┐
                        │  Load Setup Defaults (Y/N) ? Y   │
                        └─────────────────────────────────┘

─────────────────────────────────────────────────────────────

    Esc : Quit              ← → ↑ ↓ : Select Item

    F10: Save & Exit Setup     (Shift) F2 : Change Color

                Time, Date, Hard Disk Type…
```

7.4.9. Integrated Peripherals Setup

If the **INTEGRATED PERIPHERALS** option is selected from the main menu, the screen below will appear. The following sample screen consists of the default values for OPEN (660).

ROM PCI/ISA BIOS (2A69KHE9)
INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.

```
IDE HDD Block Mode        : Enabled      Onboard Parallel Port : 378/IRQ 7
IDE Primary Master PIO    : Auto         Parallel Port Mode    : ECP+EPP1.9
IDE Primary Slave PIO     : Auto         ECP Mode Use DMA   : 3
IDE Secondary Master PIO  : Auto         Onboard Serial Port 3: 3E8
IDE Secondary Slave PIO   : Auto         Serial Port 3 Use IRQ: IRQ5
IDE Primary Master UDMA   : Auto         Onboard Serial Port 4: Disable
IDE Primary Slave UDMA    : Auto         Onboard Audio Device: Enable
IDE Secondary Master UDMA : Auto
IDE Secondary Slave UDMA  : Auto
On-Chip Primary PCI IDE   : Enabled
On-Chip Secondary PCI IDE : Enabled
USB Keyboard Support      : Disabled
Init Display First        : PCI Slot
                                         ESC: Quit↑↓→← :  Select Item
Onboard FDC Controller    : Enabled      F1 :  Help PU/PD/+/-: Modify
Onboard Serial Port 1     : 3F8/IRQ4     F5 :  Old Values (Shift )F2 : Color
Onboard Serial Port 2     : 2F8/IRQ3     F6 :   Load BIOS Defaults
UART 2 Mode               : Standard     F7 :   Load Setup Defaults
```

7.4.10.   User Password

The **USER PASSWORD** is used to set the password. To change the password, select this option from the main menu and press <Enter>.

If the CMOS does not work properly or the **USER PASSWORD** option is selected for the first time, then a default password is stored in the ROM. The following message will appear on the screen;

Enter Password

Press <Enter>.

If the CMOS is working properly or the **USER PASSWORD** option is selected to change the default password, then the current password (the ROM password or the use-defined password) stored in the ROM needs to be entered first. The following message will appear on the screen;

Confirm Password

Enter the current password and press <Enter>.

After pressing <Enter>, then the new password (8 characters at most) can be entered now. The new password will be stored in the CMOS.

Please note that to enable this option, either **Setup** or **System** is to be selected from the **BIOS FEATRUES SETUP** first.

7.4.11. IDE HDD Auto Detection

The IDE HDD AUTO DETECTION is used to automatically detect the hard disk drives installed to the system.

```
ROM PCI/ISA BIOS (2A69K0000)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
```

HARD DISK TYPE	SIZE	CYCS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
DRIVE C:	(MB) 790	15	65535		789	57	

```
SELECT SECONDARY SLAVE OPTION (N=Skip) : N
```

ESC = SKIP

7.4.12. Save and Exit Setup

If the **SAVE & EXIT SETUP** option is selected, the values entered the setup utilities will be saved in the chipset's CMOS memory. When the system is turned on every time, the CPU will check the CMOS to compare the CMOS data to see whether it matches the system. These data are very important for the system operation.

7.4.13. Exit Without Saving

If the **EXIT WITHOUT SAVING** option is selected and <ENTER> is pressed, you will exit the Setup program without saving any new values. The CMOS will still keep the old values.

OPEN (660) 120/140/150

8. SOFTWARE DRIVERS INTRODUCTIONS

This chapter introduces the OPEN (660)'s Ethernet, VGA and Audio drivers.

8.1. Ethernet Drivers

The OPEN (660) is equipped with a high performance 10/100 Base-T fast Ethernet interface. It provides a low cost solution to implement a PCI networking interface to automatically sense the network speed. It is designed to optimize the 32-bit master PCI bus and giving maximum throughput for the high bandwidth networking applications.

8.1.1. Features

1. Complies with IEEE 802.3u 100-Base-TX and 802.3 10-Base-T standards

2. Supports 32-bit PCI local bus-master for high throughput and low processor utilization

3. Supports full-duplex for both 100Mbps and 10Mbps and Nway auto negotiation for auto speed selection

4. Automatic twisted-pair receives polarity detection and correction of the receive polarity

5. Provides compressive set of software driver suitable for the major network applications such as Novell Netware, TCP/IP, Microsoft Windows and Windows NT.

The OPEN (660) Ethernet drive diskette or CD diskette contains the following drivers;

✧   RTL8139 Ethernet drivers for Windows 95/98/200/NT3.51/NT4.0/ME

8.2. OPEN (660) PCI XGA SETUP

The OPEN (660) builds in C&T69000 or C&T69030, a high-performance XGA/flat panel display accelerator. The C&T69000 is onboard with 2MB display memory and the C&T69030 with 4MB display memory. Both are able to drive CRT display and a wide array of flat panel displays to the maximum resolution up to 1280 x 1024.

The OPEN (660) XGA driver diskettes contain the following drivers;

C&T69000 VGA drivers for

✧   Windows 95

✧   Windows 98/ME

✧   Windows NT 4.0

or

C&T69030 VGA drivers for

✧   Windows 95

✧   Windows 98/ME

✧   Windows NT 4.0

8.3. Audio Setup

The OPEN (660) is equipped with a 16-bit full-duplex 3D audio controller, ESS 1938S. The onboard audio interface provides 20 voice FM synthesizer and 16-bit stereo sound. With the built-in mixer control, it can record and play back voice and sound.

The OPEN (660) audio driver diskette contains the following drivers;

✧ ESS1938S drivers for Windows 95/98/ME

✧ ESS1938S drivers for Windows NT4.0

✧ ESS1938S drivers for Windows 2000

8.4. Driver Installation

To install the Ethernet, VGA and Audio drivers, find the drivers from the correct directory and execute the execution files. All the related drivers are stored in the floppy diskettes or the panel PC tool CD under the following route;

PanelPC & Motherboard/Drivers & Utilities/PC 660

✧ ESS1938S Audio driver for Win95/98/ME
✧ ESS1938S Audio driver for WinNT
✧ ESS1938S Audio driver for Win2000
✧ RTL8139 Ethernet driver for Win95/98/2000/NT3.51/NT4.0/ME
✧ RTL8139 Ethernet driver for Client32/NWClient/NWServer/SCO
✧ C&T69000 (2MB video memory) VGA driver for Win95, Win98/ME, WinNT
✧ C&T69030 (4MB video memory) VGA driver for Win95, Win98/ME, WinNT

Please note that OPEN (660) also has two models; one is OPEN (660) with 2MB video memory and the other is OPEN (660) with 4Mb video memory.

The VGA chipset for OPEN (660) with 2MB video is C&T69000 and for OPEN (660) with 4MB video memory is C&T69030. OPEN (660) with different VGA chipsets need to be installed with different VGA drivers. Wrong drivers will lead mal-function or non-function to the systems.

Find the correct drivers and execute the execution files. Recent releases of operating systems always include setup programs that load automatically and guide you through the installation.

OPEN (660) 120/140/150

9. TOUCHSCREEN

For keyboardless operation, the OPEN (660) 120/140/150 provides an optional touchscreen. The OPEN (660) system can use either MicroTouch capacitive touchscreen or ELO resistive type touchscreen or ELO Intelli touch. This chapter details the procedures to install the software drivers under DOS and Windows operation.

9.1. MicroTouch Touch Driver Installation

9.1.1. Two types of MicroTouch touchscreens

MicroTouch manufactures both capacitive and resistive touchscreens.

- ◇ *Capacitive touchscreen* has a cable harness taped to the edge. The cable exits from the middle of the right side of the screen. This cable connects to the touchscreen controller.

- ◇ Resistive touchscreen has a small cable tail that also exits from the right side of the screen. The touchscreen kit includes an extension cable. One end of the extension cable connects to the touchscreen and the other end connects to the touchscreen controller.

Although the two kinds of touchscreens look slightly different, the process of installing the touchscreen onto OPEN (660) system and to install the software driver are the same.

9.1.2. TouchWare–MicroTouch Software

TouchWare includes the software that lets the MicroTouch touchscreen work with the OPEN (660) system. MicroTouch provides drivers for the following operating systems;

✧ Windows 95 and Windows NT 4.0
✧ Windows NT 3.51
✧ Windows 3.1x and MS-DOS
✧ MS-DOS only
✧ OS/2

Be sure to install the correct version of TouchWare for your operating systems. The following sections will provide more detailed information on installing TouchWare.

> **Note**: When the TouchWare installation is finished, be sure to start the OPEN (660) system to load and activate the touchscreen driver.

Touchscreen Control Panel

You can use the Touchscreen control panel to set your preferences for the touchscreen. For example, the can define the following preferences:

✧ Whether the touch action occurs when you touch the screen or when you lift your fingers (or pen) off the screen
✧ Whether you hear a sound when the screen is touched
✧ How fast you need to touch to produce a double-click

You can also use the Touchscreen control panel to calibrate the touchscreen, to stabilize the cursor, and define where the cursor appears relative to your touch (an offset), and to run diagnostic programs.

Online Help

TouchWare provides online help for setting up and using the touchscreen. These help files use standard Windows Help, complete with hypertext and hypergraphics to create and display available topics.

Online help provides you with information specific to a TouchWare function or option. You can use the online help to find answers to all your TouchWare questions.

TouchWare Uninstall

The uninstall utility automatically deletes all TouchWare components from your computer and removes all TouchWare entries from the system files.

9.1.3. Installing TouchWare

When you install TouchWare, you have two installation options:

✧   Express Install
✧   Custom Install

The *Express* option installs all TouchWare files for either Windows 95 or Windows NT, and automatically places the files in the Program Files\MicroTouch\TouchWare directory. The *Express* option also creates a MicroTouch Touchscreen icon on the Windows Control Panel and a program group called *MicroTouch* with icons for each TouchWware program.

The *Custom* option also creates all TouchWare files; however, you can specify the destination directory for the TouchWare files and the name of the program group for TouchWare programs. Use *Custom* install to configure your system with multiple monitors.

To install TouchWare, follow the procedures below:

1. Make sure the touchscreen is properly connected. The Setup program can not configure the touchscreen without it.
2. Start Windows. Make sure no other applications are open.
3. Insert the TouchWare Disk 1 into a diskette drive.
4. Click the *Start* button on the taskbar.
5. Point to *Settings*, and then click *Control Panel*.
6. Double click *Add/Remove Programs*, and a Add/Remove Programs dialog box will be opened.
7. Choose the *Install/Uninstall* tab.
8. Click *Install*. The system displays a dialog box reminding you to insert the first installation disk.
9. Click *Next*. The system automatically searches your disk drives for an installation program. The MicroTouch installation program is called SETUP.EXE.

10. Click *Finish* to run the SETUP.EXE installation program. The setup program begins to execute and load TouchWare files.

11. Follow the instructions displayed on the screen. Make your selections carefully when answering questions to complete the installation.

Once TouchWare has been installed, you have to restart the OPEN (660) system in order to load the touchscreen driver. TouchWare provides many options for optimizing the performance of the touchscreen. You can adjust settings of the touch mode, touch sounds, double-click speed, double-click area and other cursor options. Use the Touchscreen Control Panel to set your preferences and calibrate to specific screen resolution.

9.1.4. Uninstalling TouchWare

The Uninstall program removes all TouchWare components from the OPEN (660) system. These components include TouchWare files, directories, program folders and other folder items. The Uninstall program also remove all TouchWare entries from the system registry files.

> **Note**: The Uninstall program may not work correctly if the control panel is open. Be sure to close TouchWare before running Uninstall.

To uninstall TouchWare, follow the procedures below:

1. Click *Start* and point to *Programs*, and then point to *MicroTouch.*
2. Click on *TouchWare Uninstall.* The uninstall program begins.
3. Follow the instructions displayed on the screen.

You may receive the following message when the Uninstall is complete:

"Some elements could not be removed. You should manually remove items related to the application."

This is normal because several files will remain in use until you reboot the system. Click on *Details …* to see the remaining files.

> **Note**: Once the Uninstall is complete, you must restart the system. The touchscreen driver is still in use until you restart the system.

9.1.5. Calibrate the MicroTouch Touchscreen

After the touchscreen and TouchWare are installed, you must calibrate the touchscreen.

Calibration serve two purposes:

- ♦ Sets the active area of the touchscreen
- ♦ Aligns the touchscreen's active area to the underlying video

To calibrate the touchscreen, use the *Calibrate* option on the Touchscreen control panel and follow the directions displayed on the screen. For more information, please refer to the online help or MicroTouch website.

> **Note**: Before calibrating the touchscreen, let the display warm up for several minutes and then center the video image within the screen area. Also, always calibrate the touchscreen at the display video resolution that you touch application will use.

9.1.6. Getting More Information

For more information on setting up the MicroTouch touchscreen and installing the TouchWare to the OPEN (660) system, refer to the online help. You can also download MicroTouch touchscreen drivers and user documentation form MicroTouch website or Bulletin Board System (BBS).

✧ MicroTouch website is located at

http://www.microtouch.com

Click the *Customer Info* button and follow the instruction on the screen to download TouchWare software or documentation.

✧ Call 1-978-659-9250 to dial into MicroTouch's BBS. You need a modem and standard communication software to connect to the BBS. Follow the instruction on the screen to download TouchWare software or documentation.

If after consulting the documentation, you still need help with the setup of the MicroTouch to the system, you can either

✧ Call MicroTouch Technical Support at 1-800-MICROTOUCH (1-800-642-7686).

✧ Send an e-mail to Technical Support at @microtouch.com.

9.2. Elo Touchscreen Driver Installation

The Elo resistive touch and Intelli touch will use the same drivers and utilities which are stored in either the CD diskette or floppy disk drive.

9.2.1. System Requirements

The DOS drivers will run on any system with DOS 2.0 or later version. The Windows drivers will run on any system with Windows 3.1 or later versions. The DOS demonstration program requires a VGA color display. The touchscreen calibration program for DOS supports standard and VESA-compatible display modes. Otherwise, all software is video independent. An Elo touchscreen must be installed on the display and connected to a serial or bus controller.

9.2.2. About Elo Software

Software Included

The accompanying DOS and Windows Driver Disk contains the following Elo driver software:

EloDEV Touchscreen driver program for DOS : This program makes all Elo touchscreen controllers, including serial RS-232, PC-Bus, and Micro Channel versions look the same to other driver and application programs.

MonitorMouse for DOS   Mouse emulation driver for DOS : This program combines touch input from EloDEV and mouse input from your mouse driver into a single MOUSE.COM-compatible application interface.

MonitorMouse for Windows   Mouse emulation driver for Microsoft Windows : This program allows all Windows programs to be used with a touchscreen. Your mouse may be used in conjunction with the touchscreen. DOS mouse-driven programs run from Windows may also use the touchscreen.

TouchBack   Keystroke emulation driver for DOS : Applications must be specially written for use with TouchBack. Your application documentation should specify if TouchBack is required.

The DOS and Windows Driver Disk also contains the following software:

EloDEMO   A VGA-graphics program for DOS which demonstrates the capabilities of the touchscreen hardware and many techniques for touchscreen software.

Utility and Diagnostic Programs   An assortment of programs are included to calibrate the touchscreen and verify the operation of serial ports, touchscreen controllers, and driver programs.

9.2.3. Installation

This section details the installation procedures for the software on the DOS and Windows Driver Disk. Four steps are required:

Step 1   Configuring the touchscreen controller

Step 2   Installing the controller

Step 3   Running the INSTALL program

Step 4   Calibrating the touchscreen

STEP 1 - CONFIGURING THE TOUCHSCREEN CONTROLLER

THE MANUFACTURER ships most touchscreen controllers preconfigured for use with Elo software.

STEP 2 - INSTALLING THE CONTROLLER

If you need help when installing the touchscreen controller or making the connections, please contact the Manufacturer's Customer Service department.

STEP 3 - RUNNING THE INSTALL PROGRAM

The DOS and Windows Driver Disk contains an installation program which will automatically transfer all necessary files to the hard disk.

If you intend to install the Windows drivers, make sure that the Windows has been installed and operating properly before proceeding. *You must have a DOS mouse driver (MOUSE.COM) installed for your mouse if you wish to continue using your mouse along with the touchscreen in DOS or Windows.*

If you only want to change the configuration of your touchscreen controller, *see Changing Your Hardware Configuration with SETUP*, page 14, for information on the SETUP utility.

To install the software, insert the DOS and Windows Driver Disk and type:

> A:INSTALL <Enter>

or

> B:INSTALL <Enter>

Respond to the on-screen prompts and instructions. You will be asked to specify the model and configuration of your controller, then select between **DOS Express Installation**, **Windows Express Installation**, **or Selective Installation**. **The touchscreen controller of the OPEN (660) 120/140/150 I is serial type. The model number is E271-2210 AccuTouch. Baud rate of the controller is "9600". The OPEN (660) 120/140/150 I uses onboard COM3 to drive this controller, IRQ is selected by BIOS setting. IRQ10 is the factory default setting for COM3.** The software to be installed and disk space requirements will be displayed for each installation option. You may specify the drive and directory for the files you choose to install, or use the default (C:\TOUCH).

The INSTALL program will modify your AUTOEXEC.BAT file, (and SYSTEM.INI file for Windows installations). Copies of the original files will be saved as AUTOEXEC.OLD and SYSTEM.OLD.

Command Line Flags

Several flags may be specified on the INSTALL command line.

To override the default system language used by INSTALL, specify the -L flag as follows:

> INSTALL -L <x>

Use -Lg or -Ld for German, -Ls for Spanish, -Lf for French, or -Le for English.

To override the path to C:\AUTOEXEC.BAT, use the -a flag as follows:

> INSTALL -a <filename with path>

To skip the VGA graphics sign-on screen, enter:

        INSTALL:

More than one flag may be specified, separated by spaces. Flags may be in upper or lower case.

STEP 4 - CALIBRATING THE TOUCHSCREEN

The final installation step is calibrating the touchscreen. Type "GO" when instructed. Begin the calibration sequence.

You will be prompted to touch three calibration points on the screen. Before you do so, position yourself in front of the screen in normal sitting (or standing) position, with normal height and reach.

Using your finger, touch each of the three points as they appear in the corners of the screen. The program will respond with a "beep" sound as you lift your finger from each point.

Calibration is performed in four common video modes: *80x25 text mode*, *CGA 320x200 graphics*, *VGA 320x200 graphics*, and *VGA 640x480*.

The numerical values for the calibration points for the last video mode are displayed. X or Y-axis inversion is normal.

If the calibration program does not respond to a touch, check the cabling, the switch and/or jumper settings on the controller, and the configuration you selected when installing the software. Run **SETUP** to change the configuration.

Why Calibration is Necessary

Calibration is a necessary step for the touchscreen prior for its operation. Unlike mouse or keyboard applications where the cursor is part of the image, a touchscreen is a physical overlay with an independent coordinate system. Only by knowing the position of the image can the PC software convert touchscreen coordinates into image coordinates. Besides, the differences among touchscreens and controllers, calibration also compensates for the variation in video image among displays. The image is affected by horizontal and vertical adjustments on the monitor and by the physical mounting of the touchscreen.

Additional calibration complications include image blooming, where bright-colored images expand, and the "pin cushion" effect, which causes the corners of the display to be stretched. Poor display linearity can cause similar-size boxes to be larger at the edges of the screen than they are in the middle, or vice-versa. The displayed image can also be tilted. Even changing video modes can affect the screen size.

Perfect calibration cannot be achieved in all circumstances. For example, the user can encounter parallax problems with a change in position, or because the present user is not the same stature as the person who calibrated the screen.

Even the most sophisticated calibration techniques can only partially overcome such variations. Therefore, most touchscreen software uses only a two or three-point calibration sequence and relies instead on well-placed touch zones and appropriate user feedback.

The three-point calibration sequence used by Elo automatically corrects inverted touchscreen installations and backward cable connections. X or Y-axis inversion is normal for most touchscreens.

When Recalibration is Necessary

Once calibrated, the touchscreen will be ready to run automatically each time the system is restarted. Recalibration should only be necessary after moving or resizing the video image, or after changing either the touchscreen, controller, or monitor.

Type "DEMOCAL" or click on "Calibrate" in the Windows Touchscreen Control Panel to re-run the calibration sequence.

UNINSTALLING THE SOFTWARE Demonstration Program

You may wish to delete the demonstration program from your hard disk after you have run it. This will free approximately 1.7 Mbytes of disk space. Delete EloDEMO.EXE, *PIC,*.IMG, and *.BGI, typically found in the \TOUCH directory.

MonitorMouse for Windows

Delete CURSOFF.EXE and Elo.BMP from the \WINDOWS directory. Delete MONMOUSE.DRV, VMMD.386, EloCALW.*, and OEMElo.INF from \WINDOWS\SYSTEM. Delete the lines indicated by comments as added by Elo from your SYSTEM.INI file. Delete the [EloCalW] section from WIN.INI. Run Winodws Setup and re-select your mouse.

All Elo Software

Delete the Elo directory (typically \TOUCH) and then follow the above instructions to delete MonitorMouse for Windows if necessary. Remove any lines for EloDEV, MONMOUSE, NOMOUSE, and TCHBACK from AUTOEXEC.BAT as necessary.

9.2.4. Installing MonitorMouse for Win 95

1. Turn on your computer.
2. Insert the MonitorMouse for Windows 95 disk into drive A.
3. Click the *Start* button, and then click *Run*.
4. Type "a:\setup" in the space provided and press <Enter>.
5. Follow the instructions on the screen.
6. The Touchscreen Setup Wizard will appear. You will need to specify the type of touchscreen controller you are using and how it is connected.

    Control type: serial

    SmartSet: 2xx0

    COM port: COM1
7. Complete the Setup program.
8. Restart Windows 95.
9. Run the Windows 95 Registry Editor by clicking the Start button. Click Run, then type "regedit" and press <Enter>
10. Edit the value of the following registry keys in the following registry key folder to match the number, I/O port Address, and IRQ of the COM port to which the touchscreen is connected:

HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\VxD\MonMouse\

TouchScreen00

\ComPort   (the COM port number)

                        COM 3:   03   00

\ControllerAddress   E8   03

\ControllerIRQ   (hexadecimal)

            IRQ 10:   0A   00

11. Close the Registry Editor by clicking the *Close box*.

12. Restart the computer.

13. Click the Start button, then click Settings, and then click *Control Panel*.

14. Double-click *Elo Touchscreen* to run the Touchscreen Control panel.

15. Click the *Calibrate* button and touch each of the three targets as they appear on the screen. Click *Yes* when the cursor lines up correctly with your finger. Click *OK* to close the Touchscreen Control panel.

NOTES

◇ Full-screen DOS mode is not supported. However, Windowed DOS mode is fully supported. A touch to a full-screen DOS session will cause your system to immediately return to your Windows desktop. A mouse can be used to access programs run in full-screen DOS mode.

◇ Windows 95 may lock up during startup if the resource settings in the Setup dialog of the *Touchscreen Control Panel* do not match the actual controller configuration. Use *Safe Mode* to start Windows 95 and change the resource settings to match the controller configuration, then restart Windows 95.

◇ The touchscreen driver may cause Windows 95 to lock up during Shutdown if the touchscreen is activated after Shutdown is initiated.

Removing the Mouse Pointer

If you wish to eliminate the mouse pointer, you may replace it with the null cursor file, NULL.CUR, supplied with MonitorMouse for Windows 95. Follow the following steps to install the null cursor file;

1. OPEN (660) the *Control Panel* and select *Mouse*.

2. Select the *Pointers* tab.

3. Highlight the *Normal Select* cursor then select *Browse*.

4. Type " null.cur" in the space provided and select *Open*.

5. Select *OK* to select the option.

6. Exit from the *Mouse Control Panel*. You should notice that the arrow cursor has disappeared. Note that all other cursors will still function as before.

MonitorMouse for Windows 95 Uninstall Procedure

1. Close the Windows *Control Panel* if it is open.

2. Delete the following files from your \Windows\System folder: MONMOUSE.VXD, MONMOUSE.HLP, and MONMOUSE.CPL.

3. Start the REGEDIT.EXE program to edit the registry (click the *Start* button, click *Run*, type "regedit" and press <Enter>). Delete the following keys from the registry:

   HKEY_CURRENT_USER\Control Panel\desktop\DoubleClickHeight

   HKEY_CURRENT_USER\Control Panel\desktop\DoubleClickWidth

Delete the following registry key folders and their contents:

   HKEY_LOCAL_MACHINE\System\CurrentControlSet \Services\VxD\

          MonMouse

   HKEY_LOCAL_MACHINE\SOFTWARE\Elo TouchSystems

4. Use Notepad to delete the following line from the [386Enh] section of the SYSTEM.INI file:

   device=monmouse.vxd

5. Delete the directory C:\Elo to remove the touchscreen diagnostic programs and sample Z-axis and calibration programs.

Restart Windows 95.

9.2.5. Installing MonitorMouse for Win NT

1. Start your computer.

2. Insert the MonitorMouse for Windows NT disk into drive A.

3. Click the *Start* button, and then click *Run*.

4. Type "a:\setup" in the space provided and press <Enter>.

5. Follow the directions on the screen.

6. The Touchscreen Setup Wizard will appear. You will need to specify the touchscreen controller on COM3 (IRQ 10). Also specify the language you want to use in the Touchscreen Control Panel.

7. Complete the Setup program.

8. Shutdown and restart Windows NT.

9. Click the *Start* button, then click *Settings*, and then click *Control Panel*.

10. Double-click Elo Touchscreen to run the Touchscreen Control Panel.

11. Click the *Calibrate* button and touch each of the three targets as they appear on the screen. Touch *Yes* when the   cursor lines up correctly with your finger. Touch *OK* to close the Touchscreen Control Panel.

Instruction for Windows NT Auto Boot

Windows NT normally displays the system logon dialog when started. Use the following procedure to disable the display of the logon dialog and automatically startup without user intervention.

1. Run REGEDT32.EXE.

2. Locate the Registry subkey: KEY_LOCAL_MACHINE\SOFTWARE\ Microsoft\Windows NT\CurrentVersion\Winlogon.

3. Establish your domain name, account name, and password (more than likely you will already have the keys "DefaultDomain" and "DefaultUserName" and will want to add a password to that account--"DefaultPassword") using the values you normally type when logging on.

4. To add a "DefaultPassword" value, from the Edit menu choose Add Value. In the *Value name field*, type: "DefaultPassword" (without quotation marks). Select REG_SZ for the Data type. In the *String field*, type your password. Save your changes.

5. From the Edit menu, choose *Add Value*. Enter "AutoAdminLogon" (without quotation marks) in the *Value Name field*. Select REG_SZ for the Data type. Enter 1 in the *String field*. Save your changes.

6. Exit REGEDT32.

7. Reboot your computer. You should log on automatically.

9.2.6. Getting More Information

For more information on installing the Elo software driver to the OPEN (660) system or to download Elo touchscreen drivers, please visit Elo Touchsystem website

http://www.elotouch.com

Click the *Support* button and follow the instruction on the screen to download Elo software or documentation.

If after consulting the documentation, you still need help with the setup of the Elo touch software to the system, you can click the *Technical* button to locate Elo global service points for help.

Appendix

A: LCD Specification

A-1. The LCD for OPEN 120 II

The OPEN 120 can either use normal brightness or high brightness LCD as its display. For standard OPEN 120, the LCD's luminance would be 150 nits or above. For high-brightness OPEN 120, it would be 200 nits or above.

A-1-1. OVERVIEW FOR STANDARD OPEN 120 LCD

The standard display used for the OPEN 120 II is a ADI 12.1" TFT active matrix color liquid display (LCD) module; its model no. is AA121SJ02 or its equivalent. It composes of LCD panel, driver ICs, control circuit and backlight. By applying 6 bit digital data, 800x600, 260K-color images are displayed on the 12.1" diagonal screen. Input power voltage is single 3.3V for LCD driving.

A-1-1-2. SPECIFICATION

Inverter backlight is not included in this LCD module. General specifications are summarized in the following:

ITEM	SPECIFICATION
Display Area (mm)	246.0 (H) x 184.5 (V) (12.106 inch diagonal)
Number of Pixel	800 (H) x 600 (V)
Pixel Pitch (mm)	0.3075 (H) x 0.3075 (V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of Color	262144 colors
Optimum Viewing Angle	6 o'clock
Brightness (cd/m^2)	170 cd/m^2
Power Consumption (W)	3.8
Module Size (mm)	275.0(W) x 199(H) x 5.5(D)
Module Weight (g)	400 g
Backlight Unit	CCFL, 1-tube

A-1-1-3. ABSOLUTE MAXIMUM RATINGS

ITEMS	SYMBOL	MIN.	MAX.	UNIT
Power Supply Voltage for LCD	V_{CC}	0	5.5	V
Input Voltage	V_{IN}	-0.5	V_{CC}+0.5	V
Operating Temperature	T_{op}	0	50	ºC
Storage Temperature	T_{stg}	-20	60	ºC

Note: Humidity <= 85%, non-condensing

A-1-1-4. ELECTRICAL SPECIFICATION

LCD MODULE					
ITEMS	SYMBOL	MIN	TYP.	MAX.	UNIT
Power Supply Voltage	V_{CC}	3.0	3.3	3.6	V
"H" level LVDS signal input	V_{LH}	2.5	-	V_{CC}	V
"L" level LVDS signal input	V_{LL}	0	-	0.6	V
Power supply current	I_{CC}	-	260	350	mA
Ripple voltage	V_{RP}	-	-	100	MV

BACKLIGHT (1 LAMP)				Ta=25+-2 ºC	
ITEMS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Lamp voltage	V_L	-	620	-	V
Lamp current	I_L	-	4.5[*3]	5.0	mA
Startup Voltage	V_S	1100			V

Connector Information of Backlight unit

PIN	SYMBOL	DESCRIPTION
1	CTH	VBLH (High voltage)
2	CTL	VBLL (Low voltage)

Note: VHLH-VBLL=VL

** Backlight side connector. BHR-03VS-1 (JST)

** Invertor side connector: SM02(8.0)B-BHS (JST)

A-1-2. OVERVIEW FOR OPEN 120 HIGH LUMINANACE LCD

If the OPEN 120 is using a high luminance LCD, the display used for the is a IMES 12.1″ TFT active matrix color liquid display (LCD) module; its model no. is M121-53R or its equivalent. It composes of LCD panel, driver ICs, control circuit and backlight. By applying 6 bit digital data, 800x600, 260K-color images are displayed on the 12.1″ diagonal screen.

A-1-2-1. SPECIFICATION

Inverter backlight is not included in this LCD module. General specifications are summarized in the following:

ITEM	SPECIFICATION
Display Area (mm)	246.0 (H) x 184.5 (V) (12.1 inch diagonal)
Pixel Format (H*V)	800 (x3) x 600
Pixel Pitch (mm)	0.3075 (H) x 0.3075 (V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of Color	262144 colors
Contrast Ratio	150 : 1 typ.
Brightness (cd/m^2)	250 cd/m^2 (CFL Discharge Current = 5.0 mA*2)
Viewing Angle (K>=10)	* Horizontal: (R) 40°, (L) 40° * Vertical: (U) 10°, (L) 20°
Optical Rise time /Fall time	20 msec typ.
Power Consumption (W)	3.8
Power Consumption (w/o invertor) (VDD line + 2 lamps input line)	7.05 W typ.
Electrical Interface	Digital video Signals (6-bit for each color R/G/B)
Module Size (mm)	278.0(W) x 205(H) x 12(D)
Module Weight (g)	462 g
Backlight (luminance becomes half or the initial value) (luminance becomes half or the initial value)	2-tube, 30,000 hrs under 25 °C, continuous operation

A-2. THE LCD FOR OPEN 140 II

The OPEN 140 can either use normal brightness or high brightness LCD as its display. For standard OPEN 140, the LCD's luminance would be 150 nits or above. For high-brightness OPEN 140, it would be 200 nits or above.

A-2-1. OVERVIEW FOR STANDARD OPEN 140 LCD

The standard display used for the OPEN 140 II is a Chi Mei 14.1″ TFT active matrix color liquid display (LCD); its model no. is T1407 or its equivalent. It is a LVDS interface LCD panel. It comprises amorphous silicon TFT attached to each signal electrode, a driving circuit and a backlight. This LCD has a built-in backlight with inverter. The 36 cm (14.1″) diagonal display area contains 1024 x 768 pixels and can display 262,144 colors simultaneously.

A-2-1-1. SPECIFICATION

General specifications are summarized in the following tables:

ITEM	SPECIFICATION
Screen Size	14.1″ diagonal
Bezel Opening Area (mm)	288.8 (W) x 217.4 (H)
Effective Display Area (mm)	285.7 (W) x 214.3 (H)
Number of Pixel	1024 x RGB x 768
Pixel Pitch (mm)	0.279 (H) x 0.279 (V)
Color Pixel Arrangement	R.G.B vertical stripe
Display Mode	Normally white
Number of Color	6 bits, 262144 colors
Viewing Angle	* Horizontal: 45° * Vertical: 45°
Surface Treatment	Hard coating (3H), anti-glare
Brightness (cd/m^2)	150 cd/m^2
Module Size (mm)	298.5(W)x227.5(H)x5.8(D)
Module Weight (g)	570 g
Contrast Ratio	200:1

A-2-1-2. ABSOLUTE MAXIMUM RATINGS

ITEMS	SYMBOL	MIN.	MAX.	UNIT
Power Supply Voltage	V_{CC}	-0.3	+4.0	V
Input Voltage	V_{IN}	-0.3	$V_{CC}+0.3$	V
Operating Temperature	T_{st}	0	50	°C
Storage Temperature	T_{op}	-20	60	°C

Note: Humidity (operation)20~90%, relative humidity

Humidity (non-operation)5~85%

A-2-1-3. ELECTRICAL SPECIFICATION

MODULE					
ITEMS	SYMBOL	MIN	TYP.	MAX.	UNIT
Power Supply Voltage	V_{CC}	3.0	3.3	3.6	V
"H" level LVDS signal input	V_{IH}	-	-	100	mV
"L" level LVDS signal input	V_{IL}	-100	-	-	mV
Power supply current	I_{CC}	-	400	500	mA
Ripple voltage	V_{RP}	-	50	-	MV
Terminating resistor	Rt	-	100		Ohm

BACKLIGHT (1 LAMP)				Ta=25+-2°C	
ITEMS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Lamp voltage	V_L	-	700	-	V_{RMS}
Lamp current	I_L	3.0	6.0	7.0	mA
Startup Voltage	Vs	-	860	1030 25°C	V_{RMS}
		-	1075	1300 0°C	V_{RMS}
Operating Frequency	F_L	40	55	70	KHz
Power consumption	P_L	-	4.2	-	W
Lamp Life time	L_{BL}	10000	15000	-	Hrs

Connector Information of Backlight unit

PIN	SYMBOL	DESCRIPTION	REMARK
1	HV	Lamp power unit	White
2	LV	Ground	Black

** Backlight side connector. BHSR-02VS-1 (JST)

** Invertor side connector: SM02B-BHSS-1-TB (JST)

A-2-2. OVERVIEW FOR OPEN 140 HIGH LUMINANACE LCD

If the OPEN 140 is using a high luminance LCD, the display used for the is a IMES 14.1″ TFT active matrix color liquid display (LCD) module; its model no. is M141-X76 or its equivalent. It is a LVDS interface LCD panel. It composes of LCD panel, driver ICs, control circuit and backlight. By applying 6 bit digital data, 1024x768, 260K-color images are displayed on the 14.1″ diagonal screen.

A-2-2-1. SPECIFICATION

Inverter backlight is not included in this LCD module. General specifications are summarized in the following:

ITEM	SPECIFICATION
Display Area (mm)	285.0 (H) x 214.3 (V) (14.1 inch diagonal)
Pixel Format (H*V)	1024 (x3) x 768
Pixel Pitch (mm)	0.279 (H) x 0.279 (V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of Color	262144 colors
Contrast Ratio	250 : 1 typ.
Brightness (cd/m^2)	250 cd/m^2 typ. (center)
Viewing Angle (K>=10)	* Horizontal: (R) 40º, (L) 40º * Vertical: (U) 15º, (L) 30º
Optical Rise time /Fall time	30 msec typ. 50 msec max
Power Consumption (W)	1.4 W typ.
Normal Input Voltage (V$_{DD}$)	3.3 V typ.
Lamp Power Consumption design point: (Icfl=3.5mAx2) design point: (Icfl=6.5mAx2)	2.9 W typ. 7.8 W typ.
Electrical Interface	Digital video Signals (6-bit for each color R/G/B)
Module Size (mm)	298.5(W)*231.7(H)*7.8(D)
Module Weight (g)	
Backlight (luminance becomes half or the initial value)	20,000 hrs under 25 ºC, continuous operation

A-3. THE LCD FOR OPEN 150 II

A-3-1. Overview

The display used for the OPEN 150 is a LG 15.1″ TFT active matrix color liquid display (LCD); its model no. is LM151X2 or its equivalent. It is a TTL interface LCD panel. It comprises amorphous silicon TFT attached to each signal electrode, a driving circuit and a backlight. This LCD has a built-in backlight with inverter. The 38 cm (15.1″) diagonal display area contains 1024 x 768 pixels and can display more than 262,144 colors simultaneously.

A-3-2 SPECIFICATION

General specifications are summarized in the following:

ITEM	SPECIFICATION
Display Mode	Normally white
Number of Color	262144 colors
Viewing Angle	* Horizontal: 60° (typ. Left side, right side)
	* Vertical: 45° (typ. Up side, Down side)
Cross talk	Horizontal: 2.5%
	Vertical: 2.5%
Response time	50ms(typ.)
Brightness (cd/m^2)	200 cd/m^2
Life time	40,000 hrs
Contrast Ratio	200:1

A-3-3. ABSOLUTE MAXIMUM RATINGS

ITEMS	SYMBOL	MIN.	MAX.	UNIT
Power Supply Voltage	V_{DD}	0	+3.6	V_{DC}
Lamp Current	I_{BL}	-	9.0	mArms
Operating Temperature	T_{op}	0	50	°C
Storage Temperature	T_{st}	-20	60	°C

Note: Humidity (operation)20~90%, relative humidity

Humidity (non-operation)5~85%

B: Programming the Watchdog Timer

The OPEN (660) system features a watchdog timer which can generate a system reset if the CPU processing comes to a halt. This feature ensures the system dependability during unattended operation. The watchdog timer is programmable. In order to program the watchdog timer, a program writing I/O port address 443 (hex) needs to be written first. The output data is a value of time interval. The value ranges from 01(hex) to 3F(hex), and the related time interval ranges from 0 to 30 seconds.

Data	Time Interval
00	0 sec.
01	2 sec.
02	4 sec.
03	6 sec.
⋮	⋮
0F	30 sec.

After entering the data, the program has to refresh the watchdog timer by rewriting the I/O port 443 (hex) and setting it at the same time. To disable the watchdog timer, the program should read I/O port 143 (hex).

The following is a sample program illustrating the way to program the watchdog timer in BASIC.

```
10   REM Watchdog timer example program
20   OUT &H443, data REM enable the watchdog timer
30   GOSUB 1000 REM Your application task #1
40   OUT &H443, data REM Reset the timer
50   GOSUB 1000 REM Your application task #1
60   OUT &H443, data REM Reset the timer
70   X=INP (&H143) REM Disable the watchdog timer
80 End
```

```
1000 REM Subroutine #1, your application task
```

```
1090 Return
```

```
2000 REM Subroutine #2, your application task
```

```
2090 Return
```

C: DiskOnChipâ Installation

The OPEN (660) system is equipped with an internal flash disk which can emulate a floppy disk drive by adapting DiskOnChip® memory chips from 2MB to 144MB capacity, and the flash disk is fully compatible with floppy disk format of MS-DOS system. The DOC address setting is listed below;

DOC address setting

Address	1-2	2-1
DC00	OFF	OFF
D800	ON	OFF
D400	OFF	ON
D000	ON	ON

To install a DiskOnChip® memory to the provided socket, follow the instructions below;

1. Make sure the computer is turned off
2. Insert the DiskOnChip® memory device into the onboard socket. Make sure that pin 1 of the DiskOnChip® is aligned with the pin 1 of the socket.
3. Power up the computer
4. During the power up, the DiskOnChip® drivers will be automatically loaded into the system memory.
5. At this time, the DiskOnChip® can be accessed as any disk drive.
6. If it is the only disk in the system, it will appear as the first drive, drive C:.
7. If there are more drives already attached to the system, then by default, the DiskOnChip® will appear as the last drive unless specially programmed.
8. If the DiskOnChip® is to be bootable, then follow the steps below
    a. Use DOS command to copy the operating files into the DiskOnChip®

b. The DiskOnChip® is to be configured as the first drive, drive C: in the system. Use the DUPDATE utility.

DUPDATE D /S: DOC104.EXB /FIRST (set as c:)

DUPDATE C /S: DOC104.EXB (set as d:)

For more information and for the latest software utility and utilities manual on the DiskOnChip®, visit M-System website at www.m-sys.com

D: RS-485 Programming

The RS-485 is software programmable. I order to program the RS-485, a program writing I/O port address 204 (hex) needs to be written first. The output data is a value of RS-485 TX/RX status. The data function definition is listed below:

RS-485

SD0	SD1	TX	RX
0	0	Disable	Enable
0	1	Enable	Enable
1	0	Disable	Disable
1	1	Enable	Enable

Note: data D7~D2 have no bits concern

E: System I/O Ports

Address range (Hex)	Device
000-01F	DMA controller
020-021	Interrupt controller 1, master
022-023	Chipset address
040-05F	8254 timer
060-06F	8024 keyboard controller
070-07F	Real time clock, non-maskable interrupt mask (NMI)
080-09F	DMA page register
0A0-0BF	Interrupt controller 2
0C0-0DF	DMA controller
0F0	Clear math co-processor
0F1	Reset math co-processor
0F8-0FF	Math co-processor
1F0-1F8	Fixed disk
200	Game I/O (not used)
443	Watchdog timer
143	Watchdog timer
206	DIO port
2E8	Serial port #4
2F8-2FF	Serial port #2
300-31F	Prototype card (not used)
360-36F	Reserved
378-37F	Parallel printer port 1 (LPT1)
380-38F	SDLC, bisynchronous 2 (not used)
3A0-3AF	Bisynchronous 1 (not used)
3B0-3BF	Monochrome display and printer adapter (LPT1) (not used)
3C0-3CF	Reserved
3D0-3DF	Color/graphics monitor adapter
3E8	Serial port #3
3F0-3F7	Diskette controller
3F8-3FF	Serial port #1

* MPU-401 select from 300~330H (2 bytes)

F: First MB Memory Map

Address range (Hex)	Device
F000h-FFFFh	System ROM
C800h-EFFFh	Unused
C000h-C7FFh	Expansion ROM
B800h-BFFFh	CGA/EGA/VGA text
B000h-B7FFh	Unused
A000h-AFFFh	EGA/VGA graphics
0000h-9FFFh	Base memory
D000-DFFFH	DiskOnChip®

G: Power Supply

The OPEN (660) 120/140/150 can either accommodate an AC power supply or a DC power supply.

G-1: AC POWER SUPPLY

The AC power supply used in the OPEN (660) system is a 100 watts forced air cooling power supply. It is a dual output switching power supply specially designed for the OPEN (660) system.

G-1-1: INPUT SPECIFICATIONS

◇ **Universal AC input voltage**
   The range of input voltage is from 85VAC to 264VAC.

◇ **Input frequency**
   The range of input frequency is between 47Hz to 63Hz.

◇ **Input current**
   The maximum input current is 3A at 115 VAC or 1.5A at 230 VAC.

◇ **Inrush current**
   The inrush current is less than 30A at 115 VAC or 60A at 230 VAC input, cold start at 25°C.

G-1-2: OUTPUT SPECIFICATIONS

◇ **Load range**

Output	Min. load	Rated load	Max. load	Accuracy range
+5V	2A	12A	16A	+5.05V to +5.15V
+12V	0A	1.0A	1.5A	+11.25V to +12.75V

   a. At the factory, the +5V output is set between 5.00V to 5.10V at 60% rated load, and the +12V output is checked to be within the accuracy range.
   b. The adjustable range for the +5V output is +/-5%.

   Note: +12V output voltage will track the adjustment.

OPEN (660) 120/140/150

✧ **Ripple and noise**
The peak to peak ripple and noise for each output are less than 1% of output voltage at rated load which is measured by a 15MHz bandwidth limited oscilloscope and each output is connected with 0.47µF capacitor.

✧ **Line regulation**
The line regulation is less than +/-1% at rated load with +/-10% change in input voltage.

✧ **Load regulation**
The load regulation for +5V is less than +/-1%, for +12V less than +/-10%, which are measured by changing the output load from 20% to 100% of the rated load and the other output is kept at 60% rated load.

G-1-3: GENERAL FEATURES

✧ **Efficiency**
The efficiency is higher than 70% while measuring at normal line and rated load.

✧ **Hold up time**
The hold up time is longer than 16mS at 115VAC input and rated load

✧ **Protection**
a. **Over voltage protection** : The built-in crowbar circuit will shut down the outputs to avoid damaging the external circuits. This trip point of over voltage protection is around 6.4V to 7.4V. To recover from over voltage protection, cycle the AC line OFF and ON to make it restart.
b. **Short circuit protection** : The power supply will generate a hiccup mode to protect itself against short circuit or over load conditions and will return to normal after wrong conditions are removed.

G-1-4: ENVIRONMENTAL SPECIFICATIONS

◇ **Operating temperature**
0ºC to 50 ºC

◇ **Storage temperature**
-20ºC to 70 ºC

◇ **Humidity**
10% to 90% non-condensing

G-1-5: INTERNATIONAL STANDARD

◇ **Safety standards**
Designed to meet the following standards
UL 1950
CSA 22.2 no. 234
VDE EN 60 950

◇ **EMI standards**
Designed to meet the following limits
FCC docket 20780 curve "B"
EN55022 "B"

◇ **CE standards**
Designed to meet the following standards
IEC-801-2 level 3   8KV air discharge
IEC-801-3 level 3   3V/M
IEC-801-4 level 3   2KV
IEC-801-5 level 3   2KV

G-1-6: MECHANICAL SPECIFICATION

◇ **DC output pin assignment**

Pin#	Signal	Pin#	Signal
1	+5V	6	GND
2	+5V	7	GND
3	+5V	8	+12V
4	GND	9	+12V
5	GND		

◇ **Dimension (unit: mm)**
133.5 x 83.8 x 38.0 (L x W x H)

OPEN (660) 120/140/150

G-2: DC POWER SUPPLY

If the OPEN (660) system can accommodate a DC power supply. The DC used in the OPEN (660) 120/140/150 II system is a 90 watts forced air cooling power supply. With different power module, the input range can be from 9V_DC to 132V_DC.

G-1: INPUT/OUTPUT SPECIFICATIONS AT 50° C

◇ **Input voltage**
The range of input voltage is from

✓ 9V~16V

✓ 18V~36V

✓ 36V~72V

✓ 70V~132V

◇ **Max. Input/Output current**

Rated Load			Max Output		
+5V	+12V	-12V	+5V	+12V	-12V
10A	2.5A	0.5A	12A	4A	1A

G-2: GENERAL SPECIFICATIONS

◇ **Ripple and noise**
Less than 50mV@+5V and less than 100mV@+/-12V

◇ **Line regulation**
The line regulation for each output is less than +/-1%, while measuring at rated loading and +/-10% of input voltage changing

◇ **Load regulation**
Less than +/-1%@+5V and +/-5%@+/-12V

◇ **Over Voltage Protection:**
The trip point is around 5.7V ~ 7V output

◇ **Efficiency:**
Higher than 70%

◇ **Altitude**
0 ~ 10,000ft

⬦ **Safety:**

Designed to meet the following standards

UL 1950

VDE EN60 950

CSA 22.2 No. 234

⬦ **EMI:**

Meets FCC docket 20780 curve "B", EN55022 "B"

⬦ **Dimension (W*H*D)**

89*39*152.4mm

⬦ **DC input connectors:**

2 positions terminal block

⬦ **DC output connectors:**

Molex 5273~07A or equivalent

⬦ **Operating temperature:**

-20° to 70° C

(Derating curve will occur 50° to 70° C)

⬦ **Storage temperature:**

-25° to 85° C

Free Manuals Download Website

http://myh66.com

http://usermanuals.us

http://www.somanuals.com

http://www.4manuals.cc

http://www.manual-lib.com

http://www.404manual.com

http://www.luxmanual.com

http://aubethermostatmanual.com

Golf course search by state

http://golfingnear.com

Email search by domain

http://emailbydomain.com

Auto manuals search

http://auto.somanuals.com

TV manuals search

http://tv.somanuals.com