

**Lucas Control Systems  
Deeco™ Systems  
EM-C061  
14" Flat Panel Display  
Embedded Computer Module  
USER MANUAL**

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Stop Bits:	1
Flow Control:	XON/OFF
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# Warning!!

**Grounding circuit continuity is vital for safe operation of the machine. Never operate the machine with the grounding conductor disconnected. See installation instructions before connecting to the supply.**

**The computer system contains voltages capable of producing a dangerous electrical shock. Only properly trained and authorized personnel should access the computer.**

**CAUTION: DISCONNECT POWER BEFORE SERVICING.**

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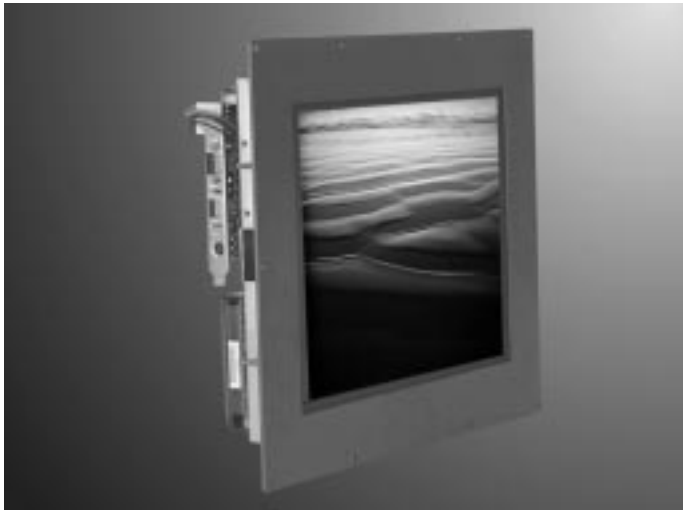
## 1.0 Overview

Lucas Control Systems, Deeco™ Systems offers a complete line of rugged computers, VGA monitors, and terminals. These products are available in sealed standalone enclosures, with panel mount brackets, and as embedded modules. All Deeco Systems products are available with touch systems for a complete user interface. Deeco Systems has manufactured quality flat panel display based products for harsh and industrial applications for more than a decade.

The EM-C061 embedded computer module is an industrial Pentium®-based PC with a color TFT LCD 13.8" flat panel display. The computer can be 19" rack-mounted or easily integrated into panel cut-outs or OEM equipment. The EM-C061 is available with a resistive touch screen system that functions as a touch mouse.

### 1.1 PRODUCT SUMMARY

- 100, 133, 166 or 200 MHz Pentium processor.



- Available with a high resolution resistive touch system. Touch mouse software lets your finger work like a mouse. Performs under the most extreme conditions and responds accurately -- even when the operator is wearing gloves.
- Optional NEMA 4/12 (IP65) sealed bezel available. Optional panel mount frame simplifies NEMA 4/12 (IP65) seal to enclosure.
- Color XGA AM TFT flat panel display
- Optional rugged hard drive up to 3.26GB 3.5" SCSI3 or 2.11GB Ultra SCSI, and 2.0 rugged 2.5" PIO4 (EIDE) -- (SCSI drives require one PCI card slot).
- Optional PC/104 Semiconductor Disk from 2 - 8MB.
- Optional Ethernet - 10 BASE-T and 10 BASE-2.
- Four full size ISA card slots or 2 PCI and 2 ISA card slots available (Note: One PCI slot is needed for SCSI controller if SCSI hard drive is installed.)

## **1.2 INDUSTRIAL COMPUTERS**

Deeco computers are designed for industrial conditions and exposure to harsh environments including extended high and low temperatures, high and low humidity, and severe shock and vibration. The optional sealed front bezel meets NEMA 4/12 (IP65) requirements.

Deeco computers are available with Deeco's Power Assist™ factory automation software, which speeds implementation of the EM-C061 in industrial control applications. Experienced Applications Engineers are available to help customers integrate computers into special situations.

The EM-C061 is available with integrated 13.8" AM color TFT LCD with XGA resolution (1024 x 768) and up to 4K colors.

The systems are available with resistive touch system and touch mouse software. These allow the operator to establish mouse control directly from the display by pointing and dragging a finger over the display. Modified mouse drivers are loaded in the hard disk at the factory. These enable the user's finger to emulate a standard mouse. Available mouse drivers include MS-DOS/Windows™, Windows 95, Windows NT, and OS/2.

## **1.3 SINGLE BOARD COMPUTER**

The EM-C061 uses a Pentium-class 100% PC-AT compatible industrial single board computer (SBC).

The SBC supports up to 64 MB of 72-pin SIMM DRAM, in increments of 4, 8, 16, 32 or 64 MB configurations. The SBC comes with an integrated peripheral controller for floppy disks, up to 4 EIDE hard disks, two external serial ports (one if the touch option is ordered), and a bi-directional parallel port. Also included is an on-board C&T 655xx 32-bit CRT/LCD controller.

All DOS-based software, Windows 3.1, Windows 95, Windows NT, Novell NetWare, UNIX, and OS/2 are supported. Software can be ordered pre-installed.

Power-up self-test diagnostics, a programmable watchdog timer, and Green PC energy management are standard features of the EM-C061.

Detailed information and specifications for the Single Board Computer are in the separate SBC manual.



## 1.4 ORDERING INFORMATION

### Base System Configuration

#### **Select a Computer and Chip Set *\*a***

- 123 Full Size ISA/PCI SBC, 100 MHz Pentium
- 120 Full Size ISA/PCI SBC, 133 MHz Pentium
- 121 Full Size ISA/PCI SBC, 166 MHz Pentium
- 122 Full Size ISA/PCI SBC, 200 MHz Pentium

#### **Select Memory 72-Pin EDO SIMM**

- 211 8MB SIMM
- 212 16MB SIMM
- 213 32MB SIMM
- 214 64MB SIMM

#### **Select a Display**

- 3261 XGA (1024 x 768) up to 4K colors, 13.8", AM Color TFT LCD

### Upgrades and Options

#### **Select a Power Supply *\*b***

- 703 +20-36 VDC
- 704 90-264 VAC, 47-63 Hz

#### **Select Input Device Option (select either or both)**

- 416 14" Sealed Bezel, no touch
- 412 14" Sealed Bezel, resistive touch, controller

#### **Backplane Expansion Option *\*c***

- 1403 4 slot ISA full-size backplane
- 1404 2 PCI and 2 ISA full-size backplane

#### **Mounting Option**

- 1502 Open Frame, Rack Mount
- 1503 Open Frame, Panel Mount

#### **Hard Drives *\*d***

- 518 1.3GB, rugged 2.5" PIO4 (EIDE)
- 520 2.11GB, 3.5" Ultra SCSI (Requires PCI card slot)
- 521 3.26GB, 3.5" SCSI3 (Requires PCI card slot)
- 522 2.0GB, 2.5" rugged PIO4 (EIDE)
- 523 340MB, rugged 2.5" PIO4 (EIDE)

**Floppy Drive**

- 600 Mounted Floppy Drive (Rear Access)

**PC/104 Semiconductor Disks**

- 1010 2MB on PC/104 Card
- 1011 8MB on PC/104 Card

**Ethernet LAN Communications \*e**

- 904 10BASE-T (T-pair) / 10BASE-2

**Software - Operating Systems**

- 800 Microsoft Windows 3.1
- 803 DOS
- 811 Microsoft Windows 95
- 812 Microsoft Windows NT for Workstations

**Software - Touch Drivers**

- 816 DOS/Microsoft Windows 3.1
- 817 Microsoft Windows NT Resistive Touch Mouse
- 818 OS/2 Resistive Touch Mouse
- 820 Microsoft Windows 95 Resistive Touch Mouse

**Software - Process Automation**

- 807 Power Assist Developer Kit, DOS
- 808 Power Assist Run Time Kit, DOS
- 814 Power Assist for Windows-Developer
- 819 Power Assist for Windows-Run Time

**Special Ordering Information**

- \*a Includes video graphics chipset for 14" high resolution display.
- \*b If power supply not ordered user must provide +12VDC and +5VDC.
- \*c Requires option 703 or 704 power supply.
- \*d All disk drives are mounted to maximize shock and vibration requirements. SCSI hard disk drives require a PCI controller card, which means the 1404 backplane option is required.
- \*e Use PC/104 if backplane option is not chosen. ISA or PCI card will be used if backplane option has been selected.

## 1.5 SPECIFICATIONS

<b>CPU</b>	Pentium processor up to 200 MHz	
<b>L2 Cache</b>	512K pipeline burst mode	
<b>Displays</b>	13.8" XGA (1024 x 768), AM Color TFT LCD	
<b>Video Controller</b>	Chips and Technology 65XXX	
<b>Memory</b>	Includes two to four 72-pin SIMM sockets supporting up to 128 MB DRAM	
<b>Connectors</b>	Serial Parallel Network (optional) Keyboard	
<b>Weight</b>	26 lbs (11.82 kg)	
<b>Dimensions (1502)</b>	<b>Standard</b>	<b>With Optional Front Panel</b>
	11.5" H x 14.4" W x 4.0" * D (292 mm x 366 mm x 102 mm)	12.3" H x 15.2" W x 4.0" * D (312 mm x 386 mm x 102 mm)
	<i>*Add 2.2" to depth for optional backplane.</i>	
<b>Temperature</b>	<b>Operating</b> 0°C to +50°C	<b>Non-operating</b> -25°C to +65°C
<b>Shock</b> (MIL-STD-810D) (tested with 2.5" HD)	10G	50G
<b>Vibration</b> (Broadband Spectrum 10-500 Hz per MIL-STD-810D) (tested with 2.5" HD)	1.0G rms	3.0G rms
<b>Humidity</b>	5% to 95% RH, non-condensing	
<b>Power Input</b>	+24 VDC or 100-240 VAC input or +5V, +12V	
<b>MTBF (nominal)</b> (@25°C)	SBC/controller > 80,000 hours Display > 45,000 hours*	

\*AMTFT display backlights are considered field replaceable items and are not included in MTBF figures.

## **1.6 DISPLAY**

The display is color active matrix LCD incorporating amorphous silicon TFT. Graphics and texts can be displayed on the 1024 x 768 color panel. The TFT panel used is a low-reflection and higher-color saturation type.

AMTFT technology is rapidly changing. The EM-C061 uses the latest technology in flat panel displays.

## 2.0 INSTALLATION

Read this section prior to installing the computer. Following these steps will ensure a successful installation of the computer system.

### 2.1 UNPACKING

**Components used in these systems are electrostatic sensitive. Observe proper electrostatic discharge (ESD) procedures when unpacking and handling the computer.**

The shipping configuration of the EM-C061 will vary according to the options ordered. The following configuration is only a general guideline:

AC Power cord, +24VDC power cable, or pigtail for  $\pm 12$  V,  $\pm 5$  V operation.

Serial cable with 2 9-pin DSUB connectors. If touch option is ordered, only one serial connector (com1) is available for external use.

Single Board Computer manual.

Operating system software.

A panel mounting gasket if the panel mount option is ordered.

Touch Driver Diskette if touch option is ordered. The touch manual is on the diskette.

SSD Documentation if the SSD option is ordered

This User Manual.

Remove the computer from the protective wrapping and inspect the unit for any obvious damage incurred during shipping. Contact the shipper if any damage is noted.

## 2.2 MOUNTING

The EM-C061 is designed to be mounted in enclosures, rack-mounted, mounted in walls, and integrated in systems. Other arrangements can be used as long as these standard criteria are met:

- When the unit is safely mounted the installation must be able to support at least five times the unit's weight. The unit must be rigidly fastened so that when the touch screen is used the unit will not move or fall over. The weight of the unit is 26 lbs (11.82 kg).
- The mounting surface should not be a hot wall.
- The unit should be mounted for optimum visibility of the display. Typically, this is at or slightly above eye level. Avoid looking down on AM TFT displays from directly above, as the viewing angle is not as good as in other planes.
- Use the optional bezels or other transparent window to protect the display from impact.

Please refer to cut-out panel in Appendix A.

## 2.3 APPLYING POWER

Prior to applying power to the computer system the user should connect all peripheral equipment including printers, Ethernet, external floppy drives, networks, etc. Refer to the section on I/O ports for location information on peripheral connections. Once all associated equipment has been properly connected, the user can make the power connection.

Once power is applied, the computer will run a series of system self tests. Upon completion of these tests, the computer will open the operating system.

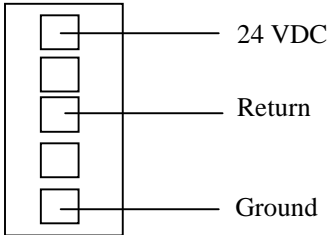
### 2.4 POWER REQUIREMENTS

The following table specifies the electrical requirements and capabilities of the power supplies available for the computer system.

Power Supply Option	Voltage	Current	Frequency	Watts
Option 703	20-36 VDC	6.7 - 3.7 A	DC	100 W
Option 704	100-240 VAC	1.25 - 2.5 A	47-63 Hz	100 W
Customer Supplied ±5, ±12V	+5	8 A	DC	40 W
	-5	1 A	DC	5 W
	+12	4 A	DC	48 W
	-12	1 A	DC	12 W

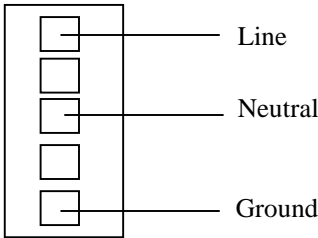
**Option 703 DC Supply:**

Connect 20-36 V input power to the pigtail as shown:



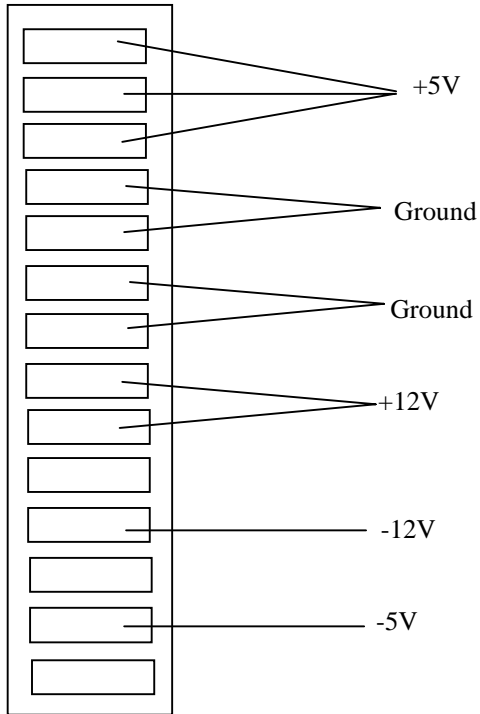
**Option 704 AC Supply:**

Connect 100-240VAC input power to the pigtail as shown.



**Customer Supplied  $\pm 5$ ,  $\pm 12$ V:**

Connect  $\pm 5$ ,  $\pm 12$ V and Ground to the pigtail as shown:





## **3.0 Single Board Computer Operation**

The separate Single Board Computer (SBC) user manual contains setup, operation, and maintenance documentation for the SBC. The SBC is factory configured by Deeco Systems, and modifications are usually unnecessary.



## **4.0 Touch System**

Refer to the manual on the Touch Driver Diskette for information on the optional touch system. Touch drivers are pre-installed at the factory and reside on the mass storage device.



## 5.0 Input/Output Interface Ports

### 5.1 SERIAL COMMUNICATIONS PORT

The computer includes two serial ports, configured as COM1 and COM2. Refer to the SBC manual for configuration information.

The EM-C061 includes a 12" cable with two 9-pin DSUB connectors, so customers can access the two serial ports. COM2 is disconnected from the DSUB connector on the cable and used by the touch screen when the optional touch screen is ordered.

Both serial connectors are PC standard male 9-pin DSUB connectors with the standard PC pin out:

Pin	I/O	Description
1	< I	DCD
2	< I	RX
3	> O	TX
4	> O	DTR
5		Gnd (Signal Ground)
6	< I	DSR
7	> O	RTS
8	< I	CTS
9	< I	RI

### 5.2 PARALLEL COMMUNICATIONS PORT

The SBC provides a fully compatible IBM AT bi-directional printer port.

#### 5.2.1 Port Address Selection

By default, the printer port is configured as **LPT1**. Refer to the separate SBC User Manual for more information.

## 5.2.2 Parallel Port Connector

The parallel port uses a 25-pin IDC style DSUB. The pin out for the connector is:

Pin	Dir	Name/Description		Pin	Dir	Name/Description
1	O	-SROBE		14	O	-AUTOFD
2	I/O	PD0		16	I	-ERROR
3	I/O	PD1		16	O	-INIT
4	I/O	PD2		17	O	-SLCTIN
5	I/O	PD3		18	-	GND
6	I/O	PD4		19	-	GND
7	I/O	PD5		20	-	GND
8	I/O	PD6		21	-	GND
9	I/O	PD7		22	-	GND
10	I	-ACK		23	-	GND
11	I	BUSY		24	-	GND
12	I	PE		25	-	GND
13	I	SLCT				

### 5.3 KEYBOARD PORT

The computer supports an AT style 101 Keyboard.

<b>Keyboard Connector</b>  (Rear View)	<b>Pin</b>	<b>Signal</b>	
	1	KeyClk	
	2	KeyData	
	3	NC	
	4	GND	
	5	VCC	

### 5.4 NETWORK COMMUNICATIONS PORT

Ethernet is the most widely used of all LAN protocols. Typical characteristics of the Ethernet are:

Bandwidth	Protocol	Frame Size	Max. Nodes	Max. Network Span
10 MB/Sec	CSMA/CD	1514 bytes	1024	2.8 Km

There are 3 basic topologies. Characteristics of each are shown below:

Media	Topology	Segment	Cable Connection
10 BASE-T	STAR (Twisted Pair)	100 Meters	24 AWG, 100 ohm, 8 pin, RJ45
10 BASE-2	BUS (Multi-Point)	185 Meters	RG58, BNC 'T'

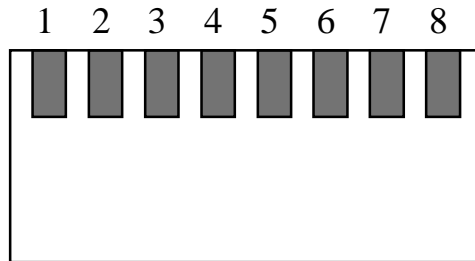
10 BASE-T is most popular because of its low cost and easy installation. Also, UTP's star topology allows the rest of the network to function correctly even if a break occurs in a particular segment. Cable length is limited to 100 m for twisted pair wires.

The EM-C061 can be ordered with 10 BASE-T and 10 BASE-2 connectors. Both connectors are available when the Ethernet option is ordered.

### 5.4.1 10 BASE-T Connector

Ethernet Network Interface

RJ45 Connector Pin-Out



Front View

Pin	Signal
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

### 5.4.2 10 BASE-2 Connector

The 10 BASE-2 connector is a BNC type COAX connector.



## 6.0 Data Storage

### 6.1 HARD DRIVES:

Drive Type
1.3GB, rugged 2.5" PIO4 (EIDE)
2.0GB, rugged 2.5" PIO4 (EIDE)
2.11GB, 3.5" Ultra SCSI (Requires PCI card slot)
3.26GB, 3.5" SCSI3 (Requires PCI card slot)
340MB, rugged 2.5" PIO4 (EIDE)

The hard drive is preconfigured and preloaded with all software options at the factory.

### 6.2 SOLID STATE DISKS:

Refer to the separate SSD documentation shipped with the 2 MB or 8 MB SSD options.

### 6.3 FLOPPY DRIVES

Refer to the separate SBC manual for information on connecting a floppy disk drive.



## 7.0 General Maintenance

The bezel and filter are made of a plastic polymer material, so strong solvents or acids should not be used for cleaning purposes. A soft, lint-free cloth, along with a non-abrasive, non-acidic cleaner can be used to clean the touch screen. Ammonia based cleaners are fine.

### 7.1 EFFECTS OF CHEMICALS ON THE OPTIONAL SEALED BEZEL/FILTER

#### Chemical Resistance

The active area of the touch screen is resistant to the following:

- Acetone
- Butyl Cellosolve
- Cyclohexanone
- Ethyl Acetate
- Hexane
- Isopropyl Alcohol
- MEK
- Methylene Chloride
- Toluene
- Xylene
- 40% NaOH
- Clorox
- Coffee
- Downy
- Fantastik
- Formula 409
- Grape Juice
- Ketchup
- Lemon Juice
- Mineral Spirits
- Mr. Clean
- Mustard
- Spray'N'Wash
- Tea
- Tomato Juice
- Top Job
- Turpentine
- Vinegar
- Wisk



## 8.0 Troubleshooting

Lucas Deeco maintains a repair facility at the factory and at various international locations. Call Technical Support and ask for a RA (return authorization) number before shipping computers needing repairs. Use the telephone number in the front of this manual.

If the computer suddenly ceases to function, disconnect the power, and re-seat all the cables on their connectors. Be careful to re-connect all the cables correctly.

*Sometimes computer problems have simple, easy-to-correct causes. Before doing anything else, carefully check these solutions/tips.*

### Power

- Is your computer connected to a working wall outlet?
- Is the power cord plugged firmly into the wall outlet and into the computer?
- Is your computer turned on? Are the power lights illuminated?

### Cables

- Are all cables connected properly and securely?

### Startup

- Was the diskette drive empty when you started the computer? (If not, eject the diskette and try restarting your computer.)

If all these have been checked and there is still a problem please see if the problem is listed below and then check the appropriate sub-system.

**Problem:** System does not boot, or boots improperly.

### **Sub-System to Check:**

- Fuse
- Single Board Computer (Refer to the accompanying SBC manual)
- BIOS system (Refer to the accompanying SBC manual)
- Power Supply
- Memory Systems

**Problem:** Malfunctioning Display

**Sub-System to Check:**

- Display
- Single Board Computer Motherboard (Refer to the accompanying SBC manual)
- Power Supply

**Problem:** Malfunctioning Memory Systems

**Sub-System to Check:**

- Single Board Computer Motherboard (Refer to the accompanying SBC manual)
- BIOS System (Refer to the accompanying SBC manual)

**Problem:** Mouse pointer unresponsive to touch

**Sub-System to Check:**

- Mouse Drivers
- Touch controller

**Problem:** Serial, Parallel, External Floppy Drive, Keyboard I/O Malfunction

**Sub-System to Check:**

- Single Board Computer (Refer to the accompanying SBC manual)
- BIOS System (Refer to the accompanying SBC manual)
- Cabling

If after following the appropriate troubleshooting guidelines you cannot determine the nature of the problem, contact Deeco technical support.

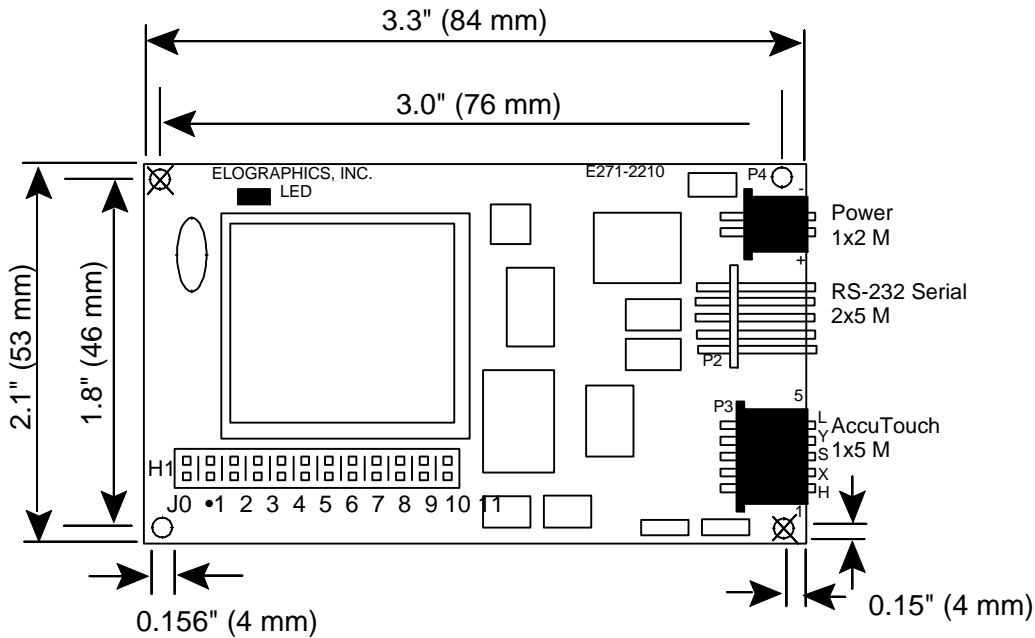
## 8.1 POWER SUPPLY

- **Input Power:**  
Check to see if the input power to the power supply meets the requirement in section 2.4 of this manual. Refer to section 9.1 for power supply test procedures.

If the measured input power is not within the values shown, provide an alternative source of input power to the computer that satisfies the proper input power requirements. If the measured power falls within the values shown, proceed to the next troubleshooting guideline in section 9.1.

- **Output Power:**  
Refer to section 9.1 for procedures for testing the power supply output.

## 8.2 TOUCH INTERFACE



### 8.2.1 Controller Board

- Input Power:**  
 Check to see if the input power to the controller board meets the specifications in the following table.

Pin	Power
-	Ground
+	+5 VDC

If the measured input power is incorrect, refer to section 9.1 to test for possible power supply malfunctions. If you are receiving correct power, move on to the next troubleshooting guideline.

- Touch Frame Cables:**  
 Ensure that the 5-pin touch frame cable is properly seated at header P3. If the touch problem persists, move on to the next troubleshooting guideline.

**SBC Interface Cable:**

Ensure that the SBC Interface cable is properly seated at header J8 of the controller board.



### 8.3 DISPLAY

Verify that the cable is properly connected to the SBC. Replace the cable as a part of test procedure. If display still does not work contact application engineering or otherwise return the unit to the factory.

### 8.4 SINGLE BOARD COMPUTER

**Input Power:**

Using the multi-meter, check to see if the input power to the SBC meets the voltage. Make sure that power pins are not shorted during the measurements. Refer to the SBC manual for power connector pinout.

If the measured input power is incorrect, refer to section 9.1 to test for possible power supply malfunctions. If the motherboard is receiving correct power, move on to the next troubleshooting guideline.

- **SBC Mounting:**  
Make sure that the solder side of the SBC is insulated from making contact with the case of the computer system. Any shorting of the SBC can cause system failure and damage to the SBC.
- **Strapping Fields (Jumper Settings):**  
Refer to the accompanying SBC manual.
- **SIMMs:**  
Check the SIMMs to verify that they are properly installed. Missing or incorrectly aligned SIMMs will prevent the SBC from operating. Refer to section 10.2 and the accompanying SBC manual for details on proper installation procedures.



## 9.0 Component Test Procedure

### 9.1 POWER SUPPLY

This section details the procedures for testing the functionality of the power supply.

**Warning:** *The power supply produces DC voltages that can cause a severe electric shock if handled improperly. Disconnect power before opening.*

- **Input Power:**

Plug the computer into the desired power source. The voltage should fall within this range at the power supply input connector.

Option 703, @ connector J1

Pin	Power
1	Ground
2	- (Return)
3	+20 to +36 VDC

Option 704, @ connector J1

Pin	Power
1	Ground
2	Neutral
3	100-240 VAC at 47-63 Hz

If the measured input voltage is not within the values shown, send the unit back to the factory for power supply replacement/repair.

- **Output Power:**

Using a multi-meter set for DC voltage, measure the potential between ground and the pins in the following table. The voltage should match the values shown when the supply is loaded.

<b>Supplies 703, 704</b>			
<b>Pin</b>	<b>Function</b>	<b>Pin</b>	<b>Function</b>
1	+5 VDC	8	+12 VDC
2	+5 VDC	9	+12 VDC
3	+5 VDC	10	NC
4	Ground	11	-12 VDC
5	Ground	12	KEY
6	Ground	13	-5 VDC
7	Ground	14	Isolated Return

If no output is measured, disconnect the power supply from source voltage and check the fuse on the power supply board.

- **Fuse:**  
Remove the fuse from the power supply. Measure the resistance with an ohmmeter. If the fuse is open, replace the fuse on the power supply.

Power Supply Order Number	Description	Value of F1
703	+24 VDC 100W	A/250 VAC, Fast Blow
704	100-240 VAC 100W	2A/250 VAC, Fast Blow

Different suppliers may qualify as power supply vendors. Always match replacement fuses to original fuses.

**Warning:** *For protection against fire replace the fuse only with the same type and rating of fuse.*



Some power supplies have axial fuse holders. Place a screwdriver on the metal portion of the fuse, and gently lift the fuse from the socket.

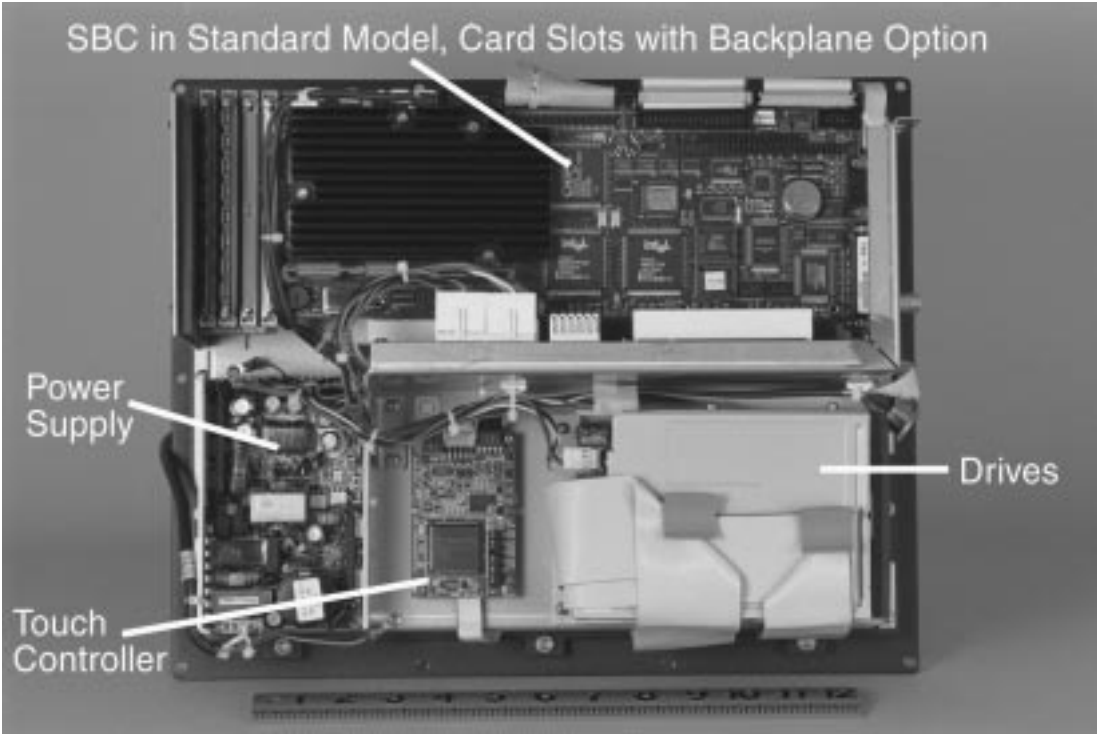
Some power supplies have fuse holders with round caps. These fuse holders are sealed with a silicon RTV type adhesive. Break the silicon seal. Use a flat bladed screwdriver to gently open the top of the fuse holder, then remove the fuse. Apply a suitable adhesive to the fuse holder cap upon re-assembly to preserve the computer's shock and vibration specifications.

*Removing an Axial Power Supply Fuse  
With a Screwdriver*

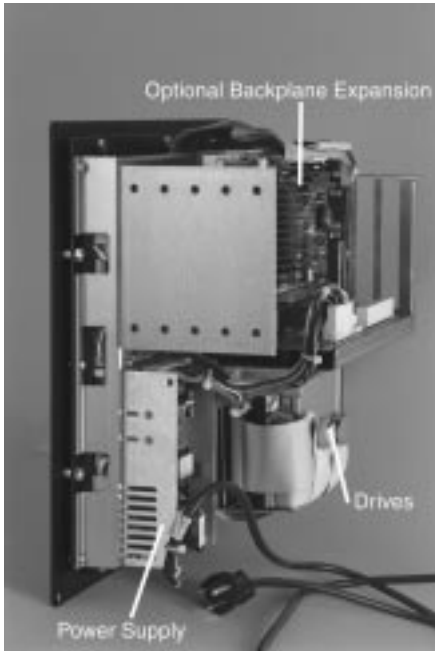
*(Photo used for illustrative purposes only. Models and configurations may vary.)*



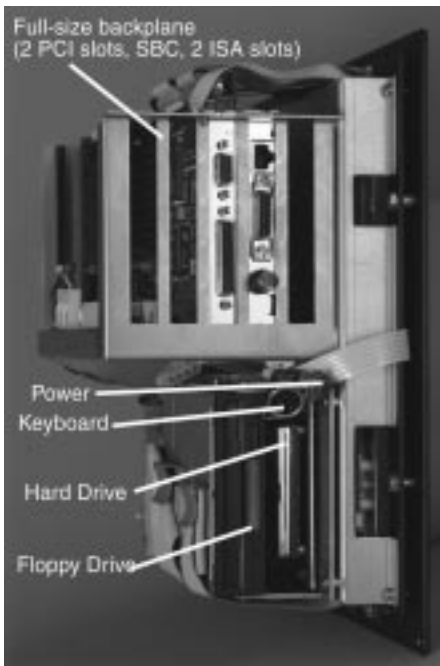
# 10.0 Component Installation and Removal



Rear View



Right Side View  
(Viewed from Front)



Left Side View  
(Viewed from Front)



## **10.1 TOUCH CONTROLLER BOARD**

### **10.1.1 Removal**

- Place the computer face-down on a flat surface.
- Remove the 5-pin touch screen flex cable from P3 on the touch controller.
- Remove the serial interface cable from the P2 header on the controller board.
- Remove the 2-pin power cable.
- Remove the 4 Phillips mounting screws holding the controller board to the side panel on the computer chassis.
- Remove the touch controller from the computer system.

### **10.1.2 Installation**

To install the touch controller, simply reverse the order of the removal procedures specified in the previous sections.

## **10.2 MEMORY REMOVAL AND INSTALLATION**

Refer to the accompanying SBC User Manual for SIMM removal and installation.

### **10.2.1 SIMMs Removal**

- Place the computer face-down on a flat surface.
- Gently press the retaining clips on each end of the SIMM socket outward until the SIMM comes loose from the retaining tabs.

Gently pull the SIMM module out of the socket of the motherboard.

## 10.2.2 SIMMs Installation



*Figure A*

*(Photo used for illustrative purposes only. Models and configurations may vary.)*

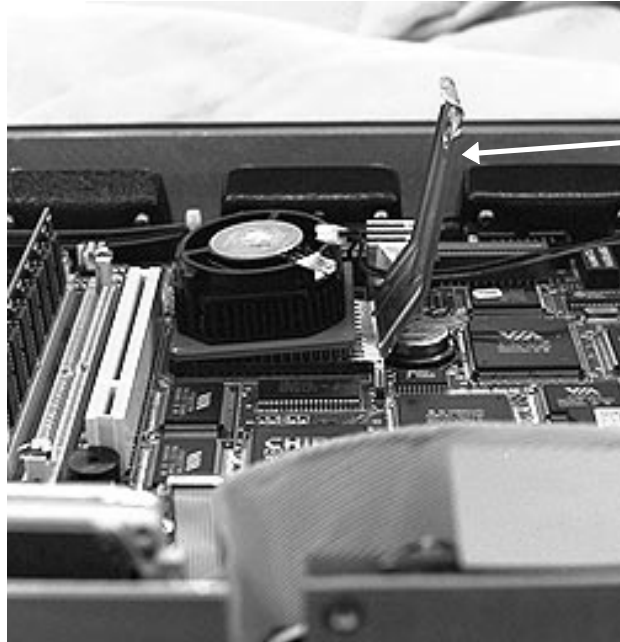


*Figure B*

- Insert the SIMM at an angle as shown in Figure A. The SIMM will not physically fit in the socket unless pin 1 of the SIMM matches pin 1 of the socket.
- Gently press the SIMM into the vertical position. The SIMM will snap easily into place if the connectors are at the correct depth in the socket.

Refer to the SBC manual for memory configuration requirements.

### 10.3 MICROPROCESSOR REMOVAL AND INSTALLATION



Chip Removal Tool

*Removing the microprocessor from the socket*

*(Photo used for illustrative purposes only. Models and configurations may vary.)*

Refer to the accompanying SBC User Manual for microprocessor removal and installation guidelines. Make sure the jumper settings are matching the CPU speed!

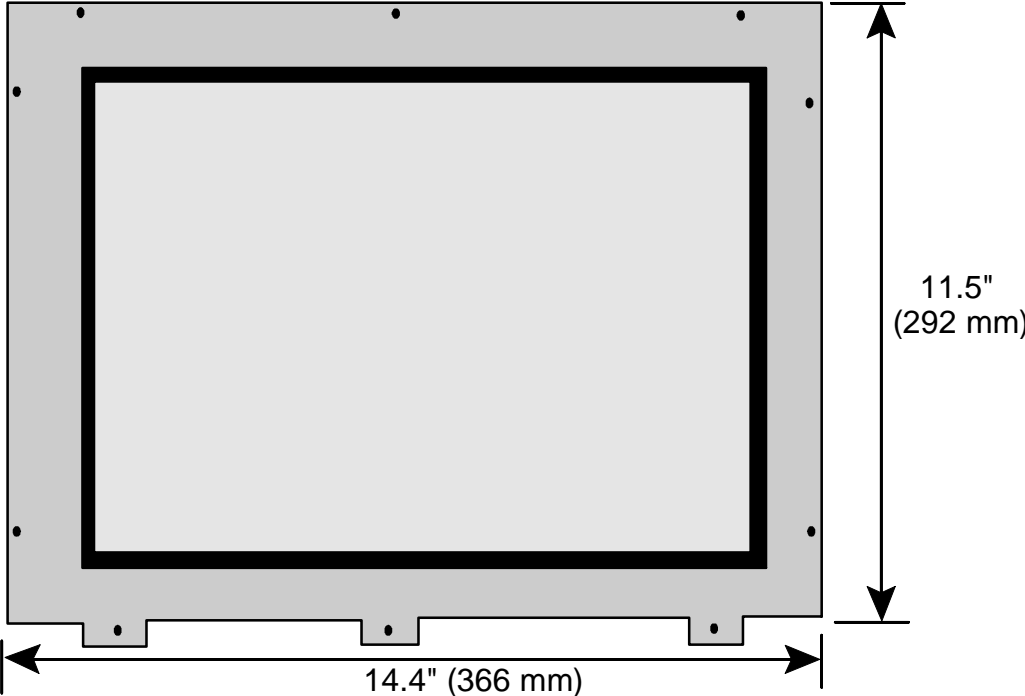
The heatsink is glued to certain microprocessors. Consult the factory for replacement microprocessors with similar heat sinks.

Use a special IC replacement tool to remove the microprocessor from the socket  
When replacing the microprocessor, note the bevel on one corner of the IC. This designates pin 1.



# Appendix A: Mechanical Drawings

## A.1 EM-C061 COMPUTER FRONT VIEW



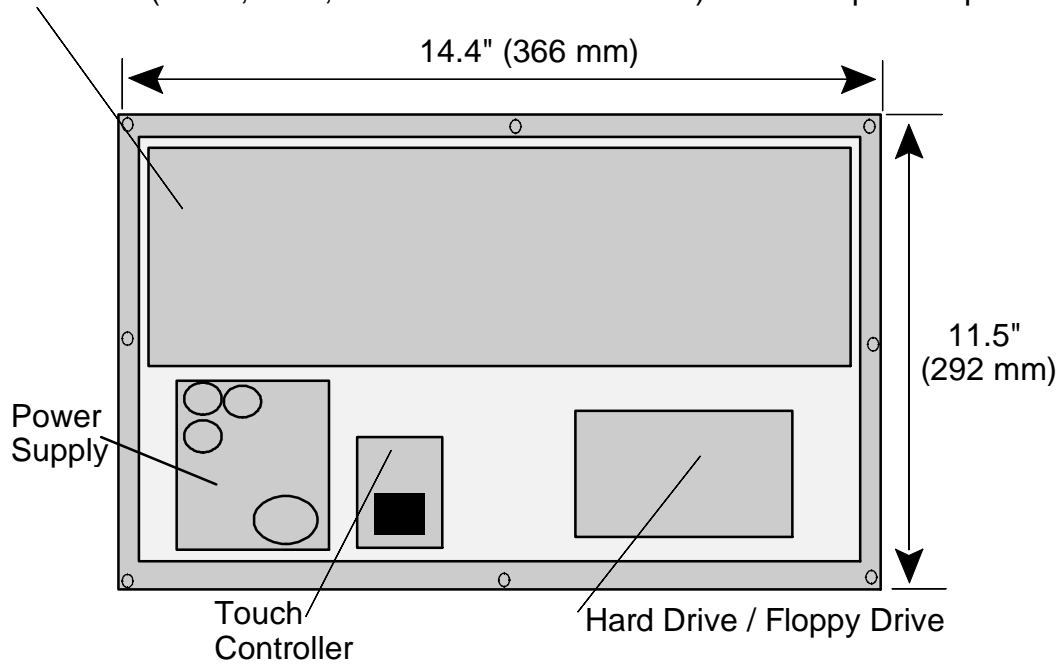
Note: Dimensions shown without optional front panel.  
with front panel are 12.3" H x 15.2" W (312 mm x 386 mm)

Drawing not to scale -- Dimensions are in inches (mm).

## A.2 EM-C061 COMPUTER REAR VIEW

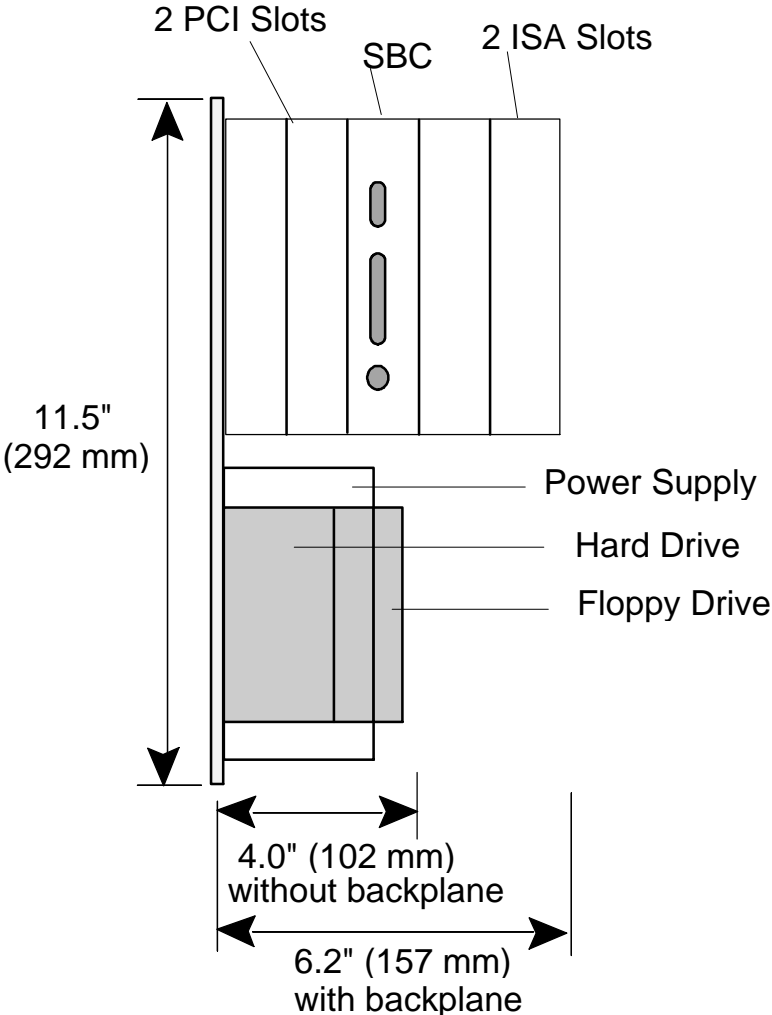
SBC in Standard Model

Card Slots (2 PCI, SBC, 2 ISA slots or 4 ISA slots) with Backplane Option



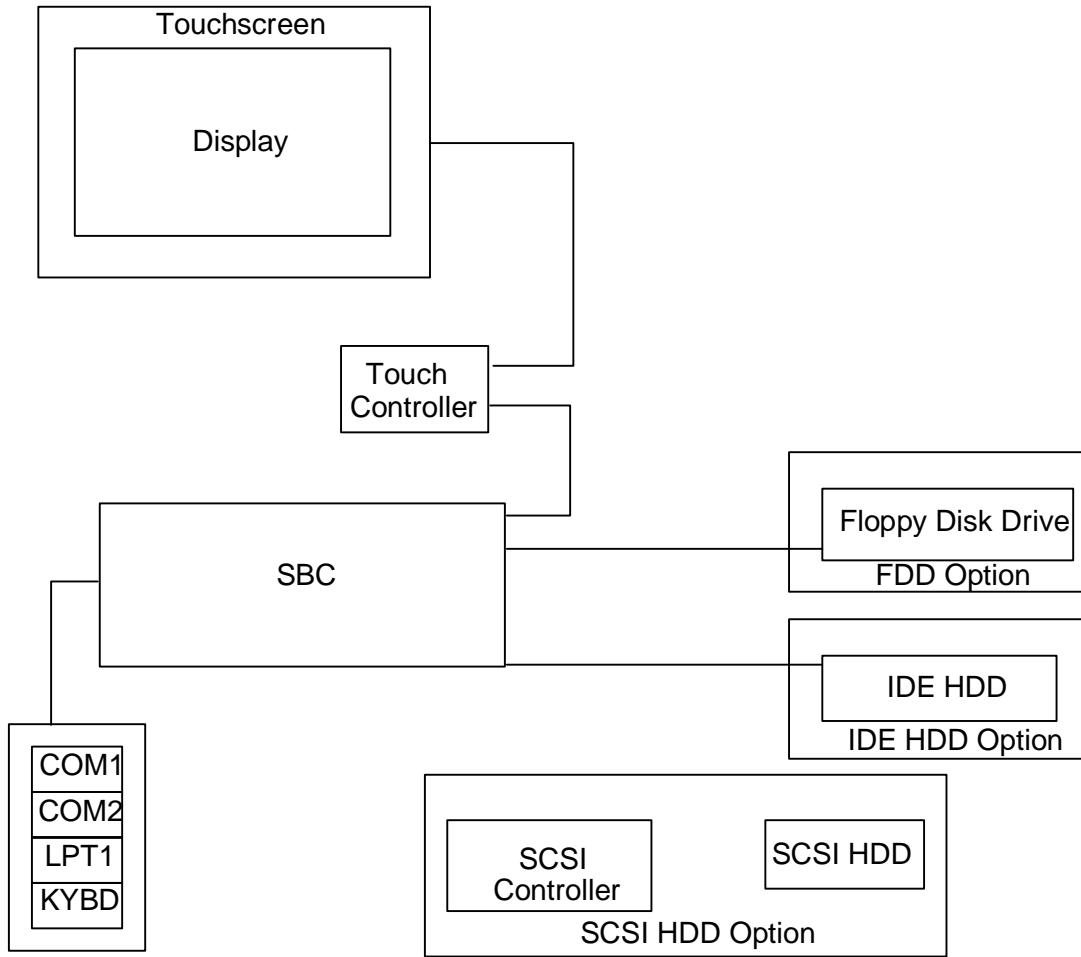
Drawing not to scale -- Dimensions are in inches (mm).

**A.3 EM-C061 SIDE VIEW**



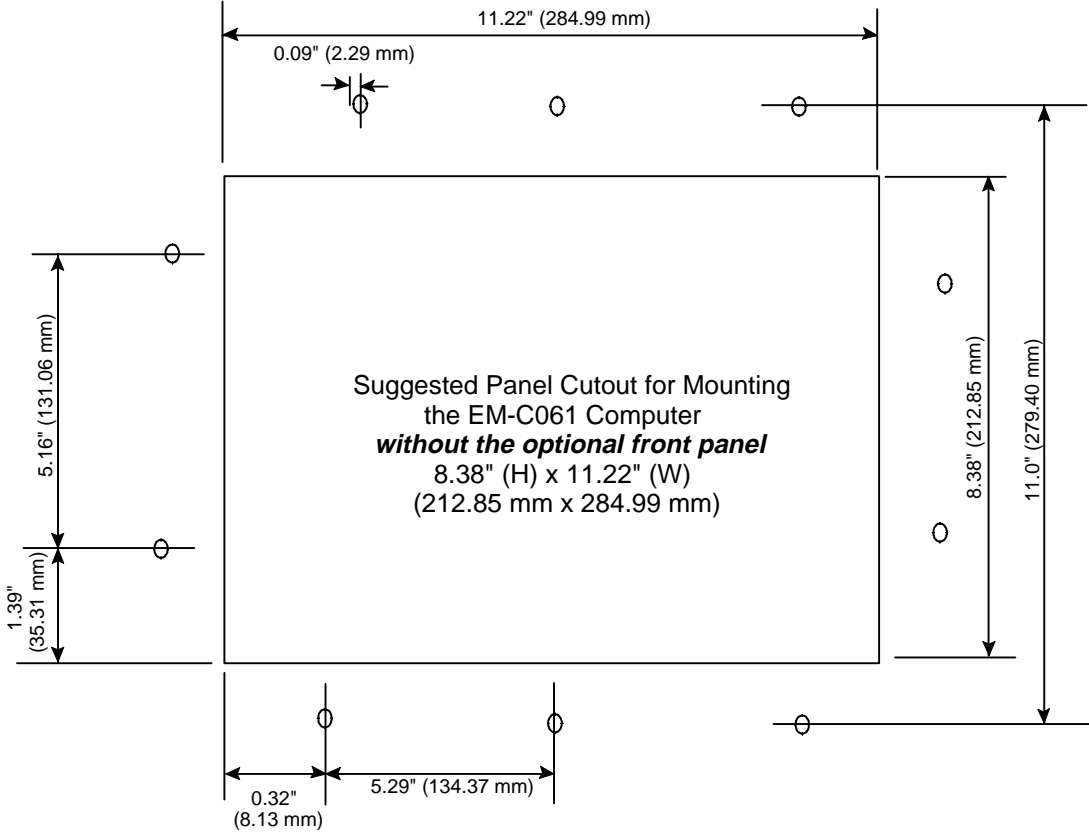
**Drawing not to scale -- Dimensions are in inches (mm).**

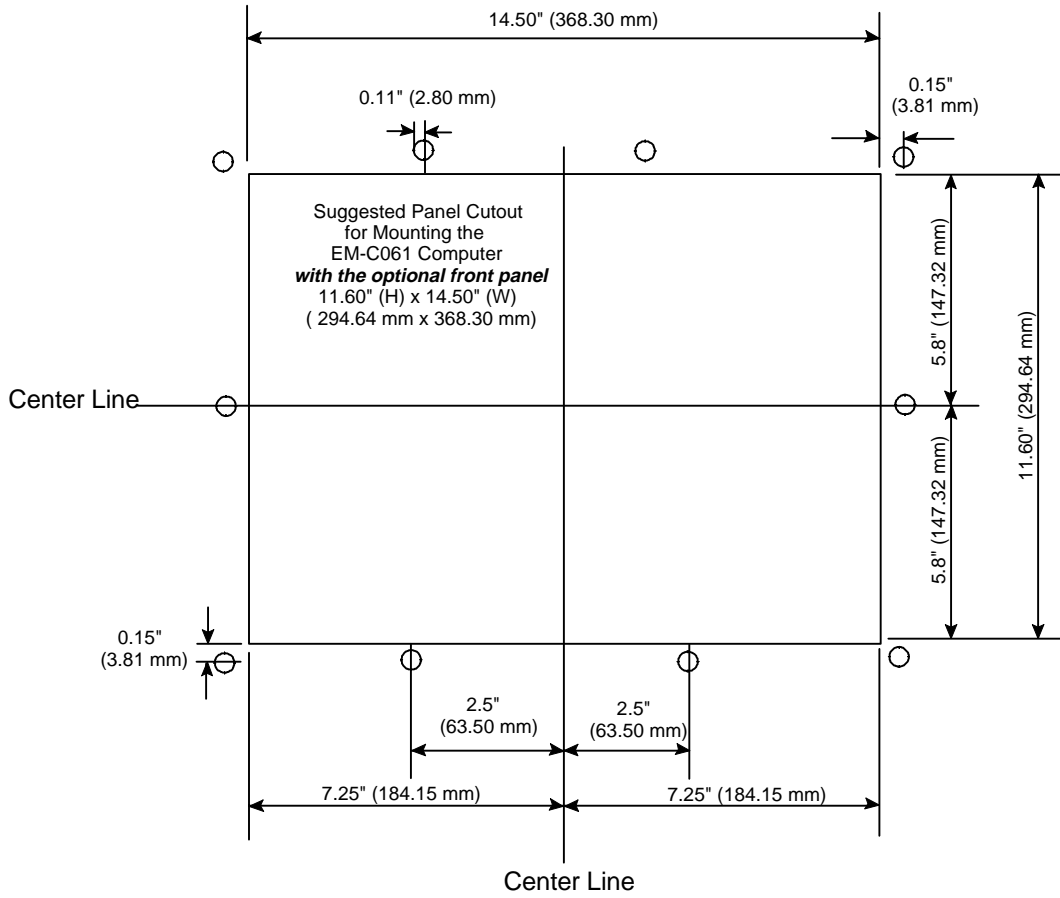
### A.4 EM-C061 CABLING DIAGRAM



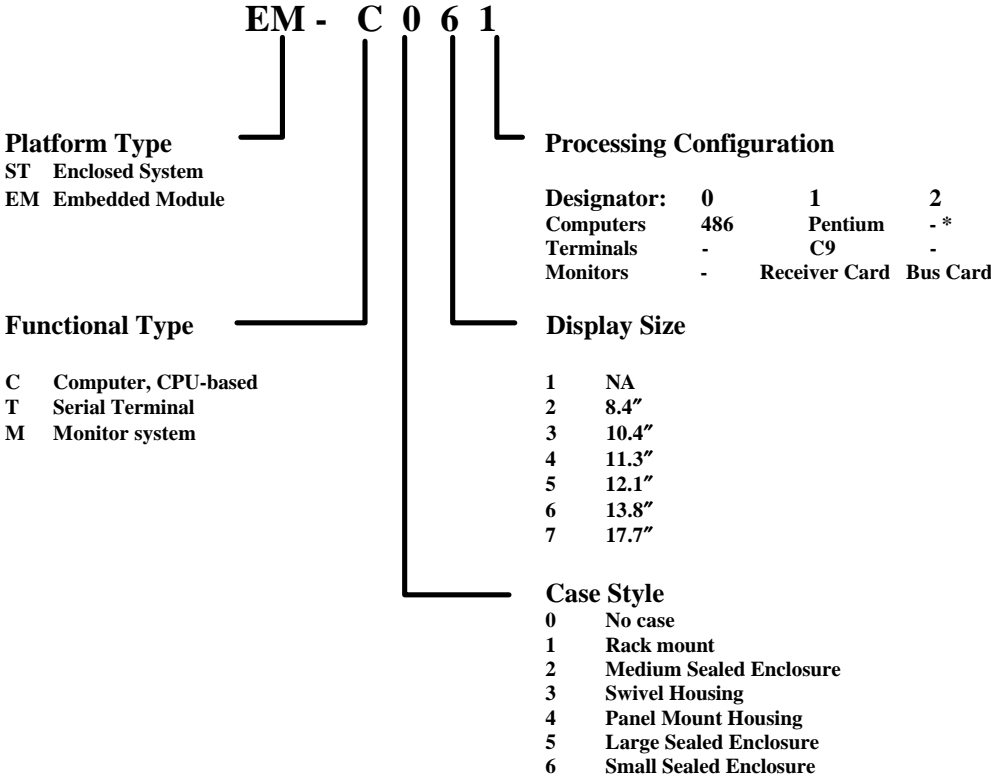


**A.5 EM-C061 PANEL CUT-OUTS AND MOUNTING GUIDE**





# Appendix B: Product Naming Convention



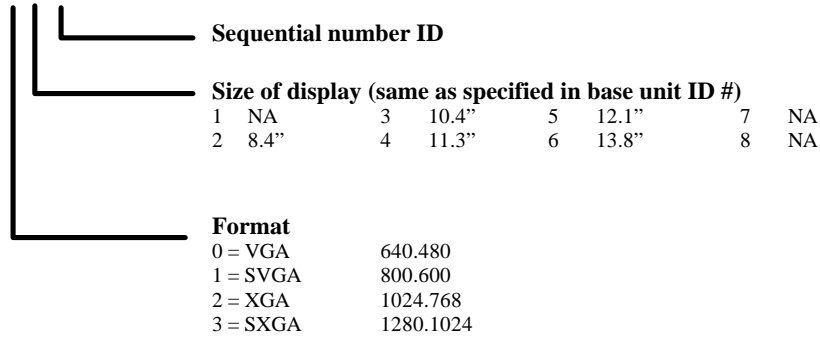
## Examples

ST-C461        Sealed Computer, Medium case, 10.4" display, Pentium SBC  
EM-C031        Embedded computer, 10.4" display, Pentium SBC

\*This refers to the type of CPU that the model was designed for but others CPUs may be substituted.

## Display Nomenclature

### 3 f d s



#### Examples:

3261 = 14" (13.8") 1024.768 XGA display  
 3153 = 12" (12.1") 800.600 SVGA display

## Limited Warranty

Lucas Control Systems warrants this product against defects in materials and workmanship for a period of one year (12 months) from the date of original shipment from the factory with the following exceptions:

- Active Matrix LCD Display. The original equipment manufacturers warranty will apply.
- Electroluminescent Display. The original equipment manufacturers warranty will apply.

During this warranty period, Lucas Control Systems will, at no cost to the buyer, promptly repair or replace defective equipment returned to the factory or other authorized warranty repair center, transportation charges pre-paid by the buyer, and will return such equipment, transportation charges pre-paid. Lucas Control Systems' sole obligation shall be at its option, to repair or replace any goods which have been determined to be defective by Lucas Control Systems.

Equipment returned to the factory shall be accompanied by the following information:

- Returned Material Authorization (RMA) number, obtained from Lucas Control Systems.
- Reason for return, with a comprehensive description of the malfunction.
- The name and telephone number of the person to contact in the event of questions or problems.
- Shipping instructions.

This warranty shall not apply to damage resulting from the improper handling, accident, negligence, loss or damage in transit, or abuse (such as applying the wrong voltage). This warranty shall be voided should the buyer attempt repairs or alterations without prior written permission from Lucas Control Systems.

Lucas Control Systems makes no other warranty, either expressed or implied, and disclaims any warranty or merchantability or fitness for a particular purpose.

Any action by Buyer for any alleged breach of this warranty shall be brought to the attention of Lucas Control Systems by the Buyer within the warranty period.

Repairs and/or replacement under terms of this warranty shall not extend the warranty life of the original equipment supplied.

### **LIMITATIONS OF LIABILITY**

THE BUYER AND LUCAS CONTROL SYSTEMS AGREE THAT THE SOLE AND EXCLUSIVE REMEDIES FOR BREACH OF ANY WARRANTY SHALL BE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS ACCORDING TO THE TERMS DESCRIBED ABOVE. LUCAS CONTROL SYSTEMS SHALL NOT BE LIABLE FOR CONTINGENT OR CONSEQUENTIAL DAMAGES TO PERSONS OR PROPERTY, AND LUCAS CONTROL SYSTEMS' SOLE LIABILITY IS AS SET FORTH ABOVE. THIS STATEMENT OF WARRANTY IS A COMPLETE AND EXCLUSIVE STATEMENT OF ALL WARRANTY AND LIABILITY REPRESENTATIONS OF LUCAS CONTROL SYSTEMS. IT MAY NOT BE VARIED, SUPPLEMENTED, QUALIFIED OR INTERPRETED BY ANY PRIOR DEALINGS BETWEEN THE PARTIES OR BY ANY USAGE OF THE TRADE OR UPON THE FACE OR REVERSE OF ANY FORM TO WHICH THIS IS ATTACHED OR PART OF, NOR MAY IT BE MODIFIED BY ANY AGENT, EMPLOYEE, OR REPRESENTATIVE OF LUCAS CONTROL SYSTEMS.

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