

**Lucas Control Systems Products  
Deeco™ Systems**

**ST-C461  
14" Flat Panel Display  
Rack Mount Computer  
USER MANUAL**

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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 attempt to open the enclosure of the computer.**

**CAUTION: DISCONNECT POWER BEFORE OPENING.**



## 1.0 Overview

Lucas Control Systems Products (LCSP), 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. LCSP, Deeco Systems has manufactured quality flat panel display based products for harsh and industrial applications for more than a decade.

The ST-C461 is an industrial Pentium®-based PC with a color TFT LCD 13.8" flat panel display. The computer is designed for 19" rack mounting. Rugged and user friendly, the ST-C461 is available with a resistive touch screen system with an integrated touch mouse and/or membrane keypad. The systems are integrated into a flexible and easily configurable package.

### 1.1 PRODUCT SUMMARY



- 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 PC/104 Semiconductor disk up to 8MB.
- 3 ISA and 3 PCI card slots available. PCI slots can also be used for PC/104 cards (Note: One PCI slot is needed for SCSI controller if SCSI hard drive is installed.)

- Pentium processor supporting up to 200 MHz processor speeds.
- Two front accessible drive bays, one capable of holding a floppy disk, PCMCIA or CD-ROM drives (3 1/2" or 5 1/2") the other can hold a 3 1/2" drive.
- Available with rugged hard drive 1.3GB or 3.0GB PIO4 (EIDE), 2.11GB Ultra SCSI or 2.26GB SCSI3.
- Optional Ethernet, 10 BASE-T and 10 BASE-2.



## **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 ST-C461 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 ST-C461 in industrial control applications. Experienced Applications Engineers are available to help customers integrate computers into special situations.

The ST-C461 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™ 3.1, Windows NT, Windows 95 and OS/2.

## **1.3 SINGLE BOARD COMPUTER**

The ST-C461 uses a Pentium-class 100% PC-AT compatible industrial full-size single board computer (SBC).

The SBC supports up to 64 MB of 72-pin SIMM DRAM, in increments of 8, 16, 32 or 64 MB configurations. Mass storage options include a 2 MB or 8 MB PC/104 Semiconductor Disks for fast and reliable system boot-up without the optional hard disk or floppy drive. The SBC comes with an integrated peripheral controller for floppy disks, up to 4 EIDE hard disks, two external serial port 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 ST-C461.

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

## 1.4 ORDERING INFORMATION

### **Base System Configuration** \*a

#### Select a Computer and Chip Set

- 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

#### Select Input Device Option

- 412 Resistive Touch
- 417 Keypad

#### Select a Power Supply

- 709 100-240VAC
- 710 +24VDC

### **Upgrades and Options**

#### Hard Drives \*b

- 518 1.3GB, rugged 2.5" PIO4 (EIDE)
- 519 2.0GB, 3.5" PIO4 (EIDE)
- 520 2.11GB, 3.5" Ultra SCSI (Requires 1 card slot)
- 521 3.26GB, 3.5" SCSI3 (Requires 1 card slot)
- 522 2.0GB, 2.5" rugged PIO4 (EIDE)

#### PC/104 Semiconductor Disks

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

#### CD-ROM

- 603 5.5" CD-ROM

#### PC/104 Ethernet LAN Communications

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

#### Enclosure

- 1600 Portable Case

**Software - Operating Systems**

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

**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
- 809 Power Assist Modular Kit, DOS
- 814 Power Assist for Windows-Developer
- 819 Power Assist for Windows-Run Time

**Special Ordering Information**

\*a Allows for 3 ISA card expansion and 3 PCI cards. If all 3 PCI slots are used then no PC/104 cards can be installed on the SBC card. Up to 3 PC/104 cards can be stacked on the SBC but will block the mounting of any PCI cards on the backplane due to space restriction.

\*b All disk drives are mounted to maximize shock and vibration specs.

## 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 128MB DRAM	
<b>Connectors</b>	Serial, Parallel, Keyboard (front and side)	
<b>Weight</b>	15.5 lbs (7.05 kg)	
<b>Dimensions</b>	15.3" H x 19.0" W x 8.0" D (389 mm x 482 mm x 203 mm)	
<b>Temperature</b>	<b>Operating</b> 0°C to +50°C	<b>Non-operating</b> -20°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	
<b>MTBF (nominal)</b> (@25°C)	SBC/controller > 80,000 hours Display > 45,000 hours (not including replaceable backlight)	

## 1.6 DISPLAY

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

AM TFT technology is rapidly changing. Future versions of the ST-C461 will continue to use state of the art flat panel displays.

### 1.6.1 Mechanical Specifications

Parameter	Specifications	Unit
Display size	35 (13.8") Diagonal	cm
Active area	279.6 (H) x 209.7 (V)	mm
Pixel format	1024 (H) x 768 (V) (1 pixel=R+G+B dots)	pixel
Pixel pitch	0.273 (H) x 0.273 (V)	mm
Pixel configuration	R, G, B vertical strip	
Display mode	Normally white	
Mass	1150±20	g
Surface treatment	Anti-glare and hard-coating 2H (Haze value = 25)	

## 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.**

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 ST-C461 is designed to be mounted in enclosures, 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 15.5 lbs (7.05 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.
- The unit is not intended to be opened under normal operating conditions. However, the unit may be opened by authorized service personnel to perform necessary maintenance. This requires access to the screws sealing the enclosure of the computer system. Mount the unit so that these screws can be reached.

### 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 should 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	Power
Option 709	100-240 VAC	2-4 A	47-63 Hz	150 W

### AC Supplies:

Plug the female end of the power cord into to the three prong IEC power connector located at the side of the computer just below the I/O ports. The AC power supplies used by the computer system allow for the use of the following power conditions: Plug the male end of the power cord into a power outlet that conforms to the above power specifications. Once power is applied, the computer is ready to be turned on by pushing the power switch in the drive bay on the left-hand side of the front panel.

## **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**

### **4.1 RESISTIVE TOUCH SCREEN**

Refer to 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. COM2 is internal, and used in the touch system. The default interface on the external COM1 is RS232. RS422 and RS485 are available. Refer to the SBC manual for configuration information.

In multi-drop mode, up to 32 RS485 devices can connect to a single twisted pair shielded line with total cable length of up to one mile (1.6 Km).

For RS485, the transmitter is enabled or disabled through software by controlling RTS as follows:

RTS = High (MCR Bit 0 = 0) Transmitter is Enabled

RTS = Low (MCR Bit 0 = 1) Transmitter is Disabled

#### 5.1.1 Port Address Selection

Use the Award BIOS Setup for selection (see the separate SBC motherboard user manual).

Port	I/O Address	IRQ
COM1	3F8	IRQ 4
COM2	2F8	IRQ 3

#### 5.1.2 RS-232 Pin-Out

Pin	Dir	Name/Description	Pin	Dir	Name/Description
1	I	DCD	6	I	DSR
2	I	RXD	7	O	RTS
3	O	TXD	8	I	CTS
4	O	DTR	9	I	RI
5	-	GND			

### 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.

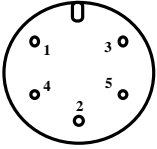
## 5.2.2 Parallel Port Connector

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, and a PS/2 mouse interface. The SBC BIOS supports the PS/2 mouse.

<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 Mbps	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-5	BUS (Multi-Point)	500 Meters	RG11, Precision TAP

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.

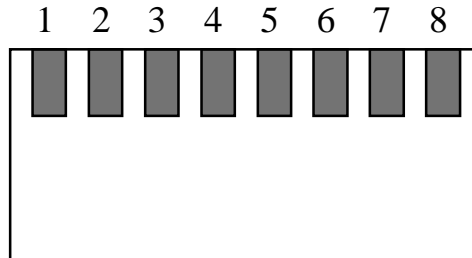
The ST-C461 can be ordered with a 10 BASE-T and 10 BASE-2 connectors on the side of the computer both from the same cord.

## 5.4.1 Ethernet

### 5.4.1.1 10 BASE-T

#### Ethernet Network Interface

#### RJ45 Connector Pin-Out



Front View

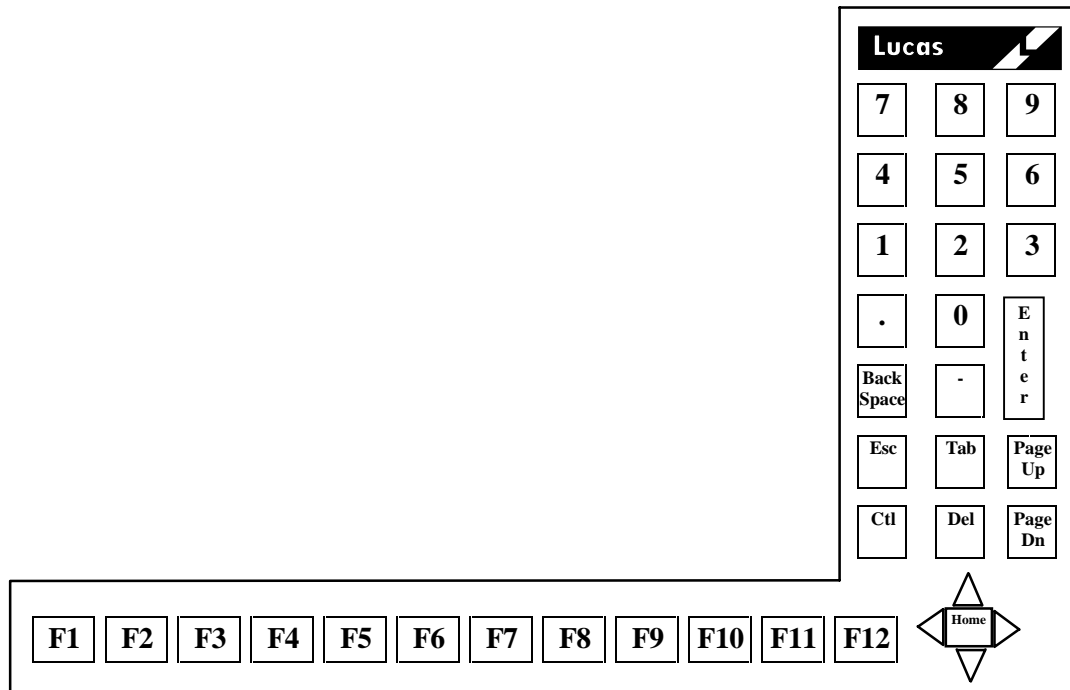
Pin	Signal
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

### 5.4.1.2 10 BASE-2

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

## 5.5 MEMBRANE KEYPAD

The ST-C461 Rack Mount computer is available with a membrane keypad option. This keypad option consists of a built in 37-key membrane keypad interface, and a keyboard controller. The keypad includes ten key functions, page control keys, as well as the standard F1 through F12 keys. All the buttons are tactile. The membrane keypad option can be used in conjunction with a standard AT keyboard, as well as with the touch interface system.



**Membrane Keypad Layout**



## 6.0 Data Storage

### 6.1 HARD DRIVES

Drive Types
1.3 GB, rugged 2.5" PIO4 (EIDE)
2.0 GB, rugged 2.5" PIO4 (EIDE)
2.11 GB, Ultra SCSI
3.26 GB, 3.5" SCSI3

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

The SCSI hard drive is Plug-and-Play.

### 6.2 SOLID STATE DISKS

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



## 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 Opening and Closing Procedures

The following sections provide detailed, step by step procedures for properly opening the enclosure of the computer. Following these procedures will maintain the NEMA 4/12 (IP65) seal.

**Note:** *Anti-static handling procedures must be followed to protect against damage to the system.*

### 8.1 OPENING AND CLOSING THE ST-C461

Prior to opening the enclosure of the ST-C461 computer disconnect the power cable and any peripheral inputs to the system.

The following steps will detail the opening of the rack mount computer system:

- Place the computer screen down on a flat sturdy surface. Remove the screws fastening the back plate to the chassis of the rack mount computer.
- Remove the back plate assembly from the main case of the rack mount computer system. At this point, all the major components of the computer system will be clearly visible except the display.
- A top cover can also be opened by removing screws fastening it to the chassis of the rack mount computer.
- Once the top plate is removed, the SBC can be accessed along with the backplane for adding or removing any plug-in boards.

To close the NEMA 4/12 enclosure of the computer, simply reverse the procedures used to open the enclosure.



## 9.0 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.

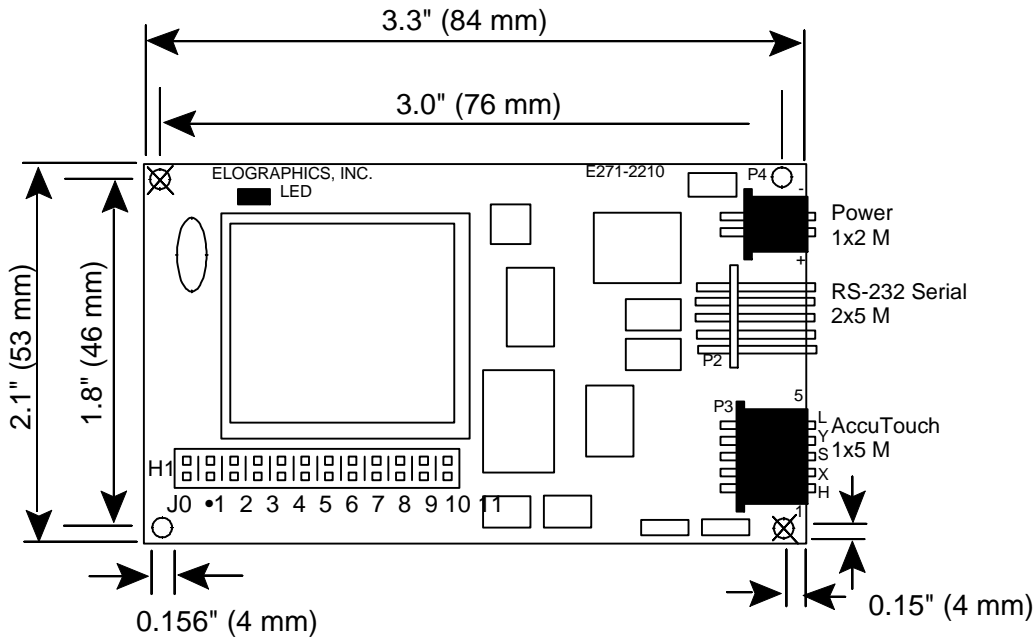
## 9.1 POWER SUPPLY

- **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 10.1 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 10.1.

- **Output Power:**  
Refer to section 10.1 for procedures for testing the power supply output.

## 9.2 TOUCH INTERFACE



### 9.2.1 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.

### 9.3 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.

### 9.4 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 11.2 and the accompanying SBC manual for details on proper installation procedures.



## 10.0 Component Test Procedure

### 10.1 POWER SUPPLY


This section details the procedures for testing the functionality of the power supply. Prior to running any tests on the power supply, open the computer enclosure as described in section 8.

**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 709, @ connector J1

Pin	Power
	Ground
N	Neutral
L	100-240VAC Line

- **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.

Option 709, @ connector J2

Supplies 709			
Pin	Function	Pin	Function
1	+5 VDC	5	-5 VDC
2	+5 VDC	6	-12 VDC
3	Ground	7	Ground
4	Ground	8	+12 VDC

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

If no output is measured, disconnect the power supply 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
709	100-240 VAC 150W	4A/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.*



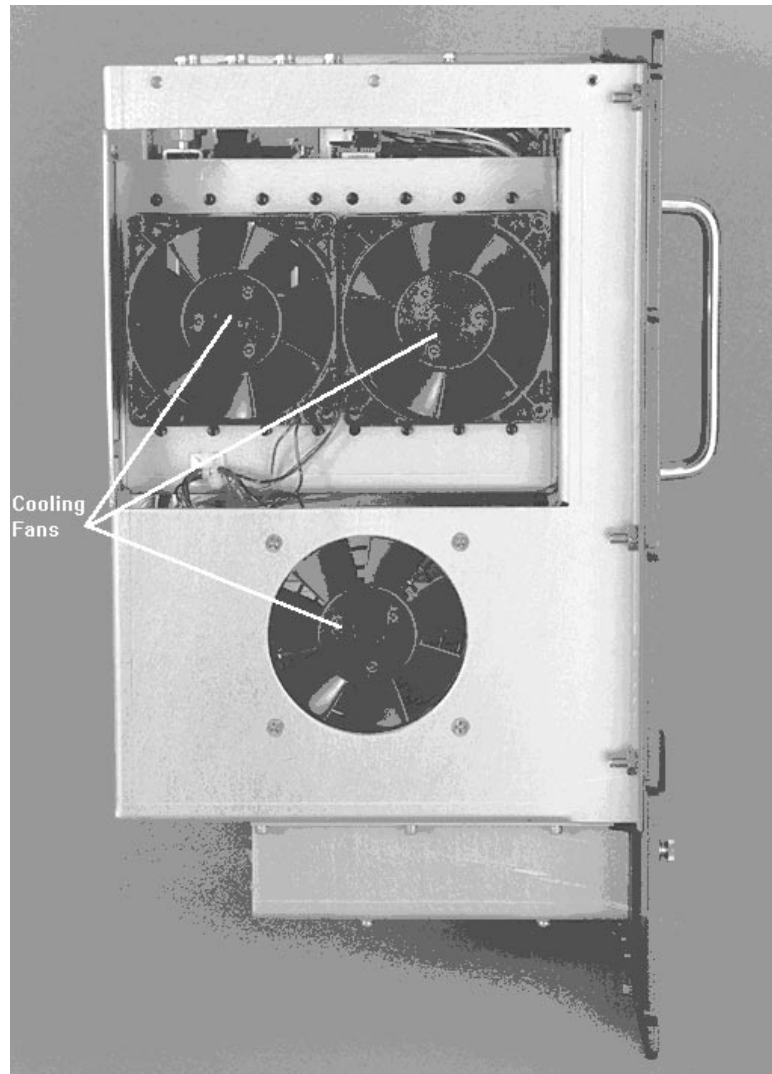
Some power supplies have axial fuse holders. Place a screwdriver on the metal portion of the fuse, and gently lift the fuse from the socket.

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.

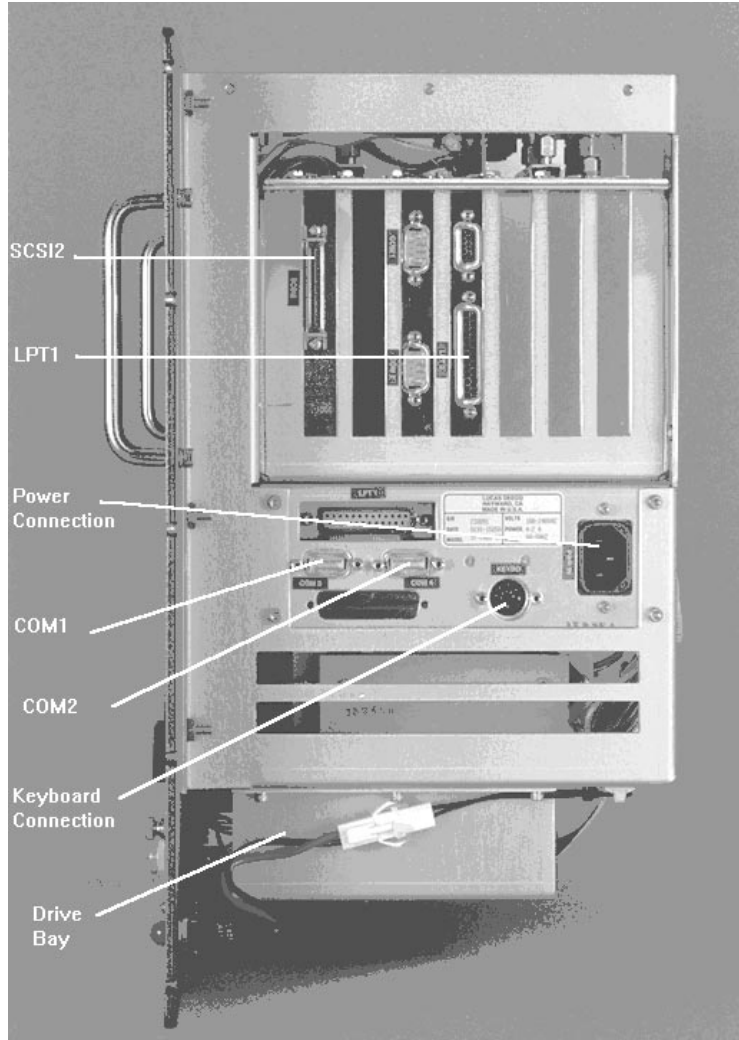
*Removing an Axial Power Supply Fuse  
With a Screwdriver*

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

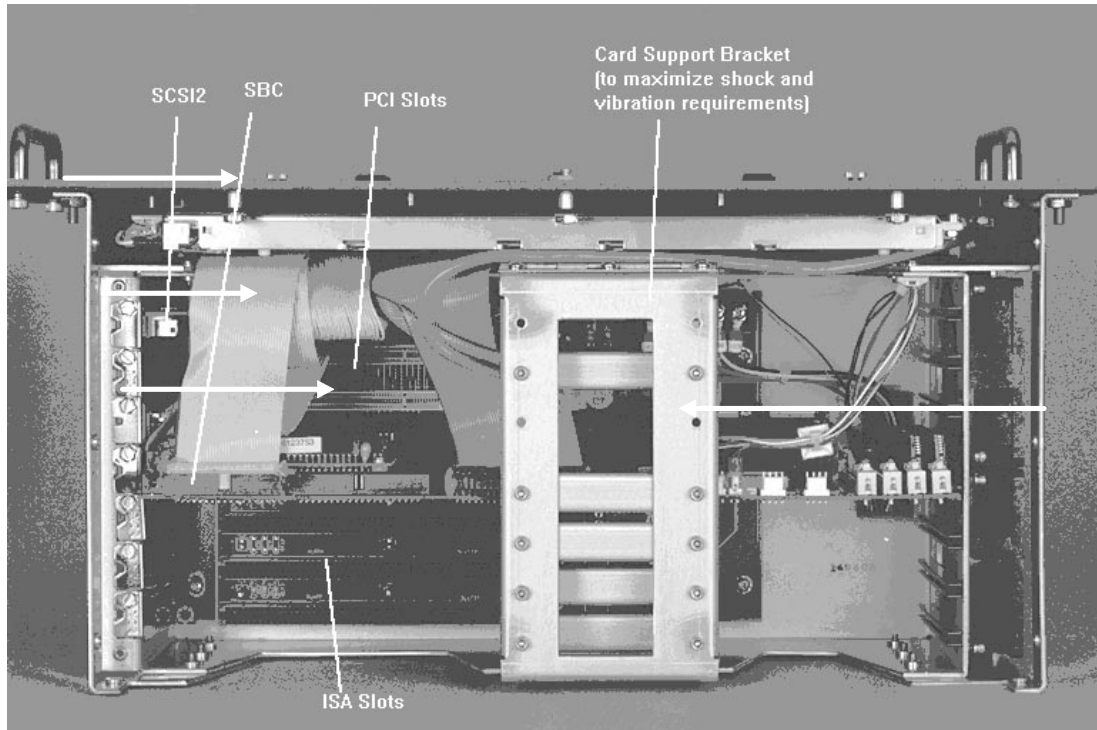
## 11.0 Component Installation and Removal



*Left Side View  
(Viewed from Front)*



*Right Side View of Standard Model -- configurations may vary  
(Viewed from Front)*

*Top View*

## 11.1 TOUCH CONTROLLER BOARD

### 11.1.1 Removal

- Open the back cover of the computer. See section 8.
- 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.

### 11.1.2 Installation

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

## **11.2 MEMORY REMOVAL AND INSTALLATION**

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

### **11.2.1 SIMMs Removal**

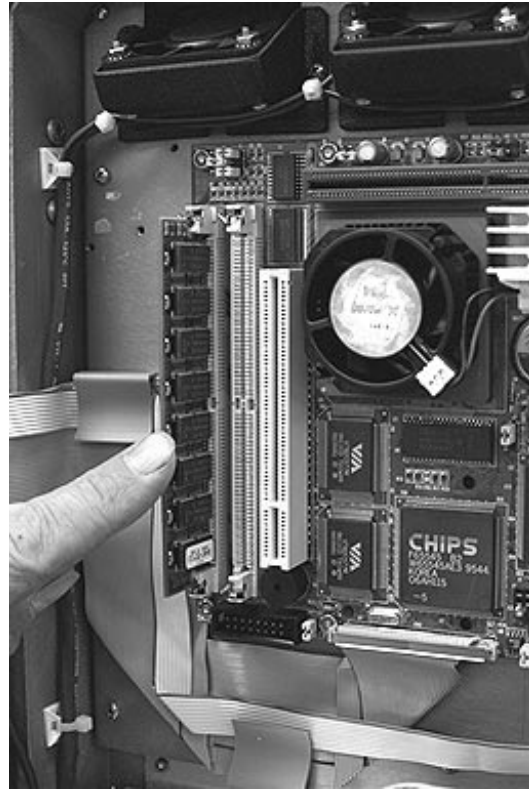
- Open the top cover of the computer system as detailed in section 8.
- Gently press the retaining clips on each end of the SIMM socket outward until the SIMM comes loose from the retaining tabs.

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

## 11.2.2 SIMMs Installation



*Figure A*



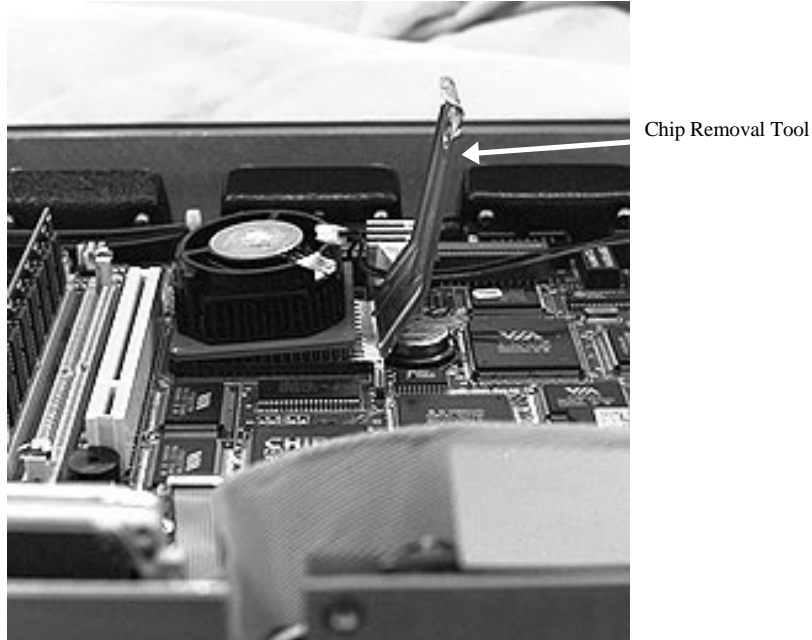
*Figure B*

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

- 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.

### 11.3 MICROPROCESSOR REMOVAL AND INSTALLATION



*Removing the microprocessor from the socket*  
*(Photo used for illustrative purposes only. Models and configurations may vary.)*

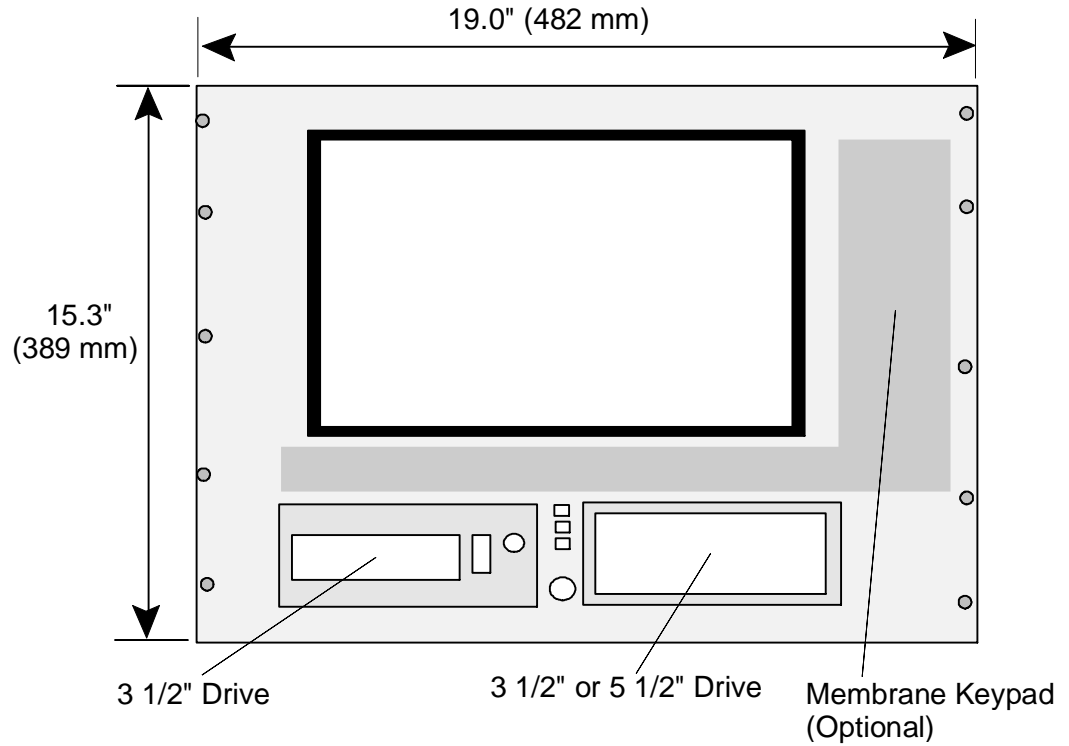
Refer to the accompanying SBC User Manual for microprocessor removal and installation guidelines. Make sure the jumper settings are matching the CPU speed!

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.

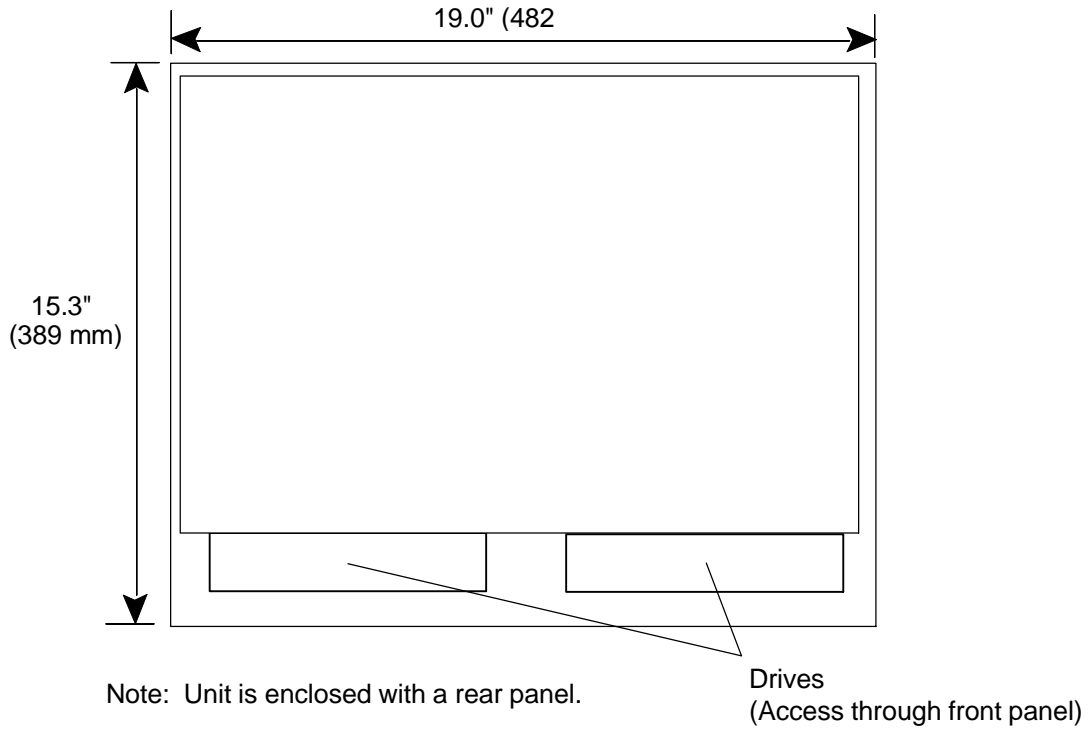
## Appendix A: Mechanical Drawings

### A.1 ST-C461 COMPUTER FRONT VIEW



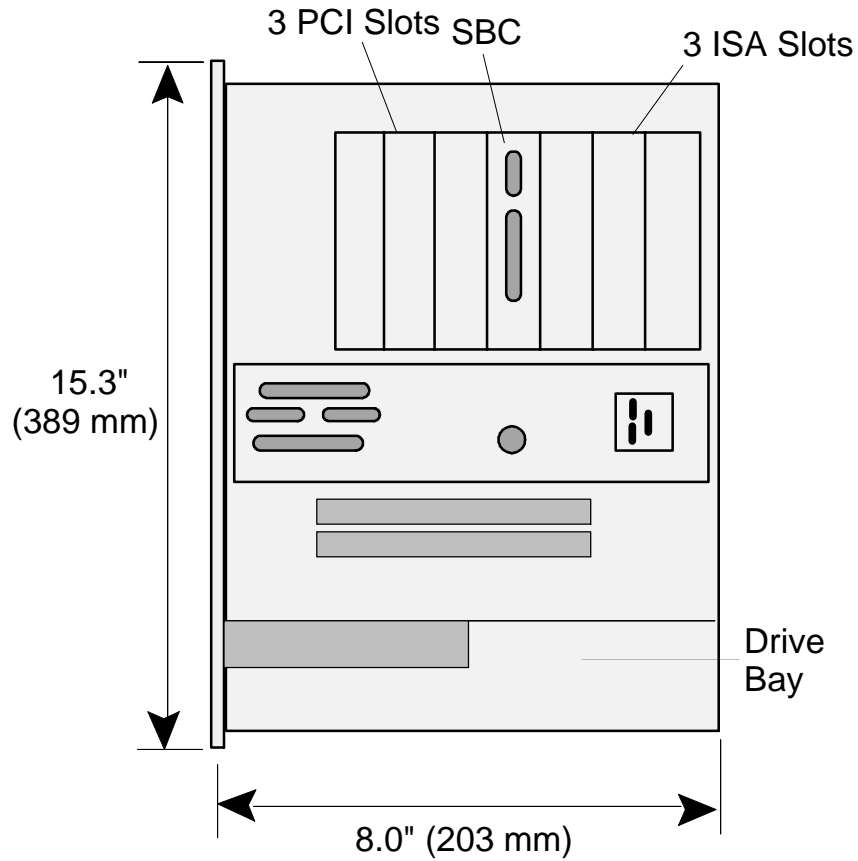
Drawing not to scale -- Dimensions are in inches (mm).

## A.2 ST-C461 COMPUTER REAR VIEW



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

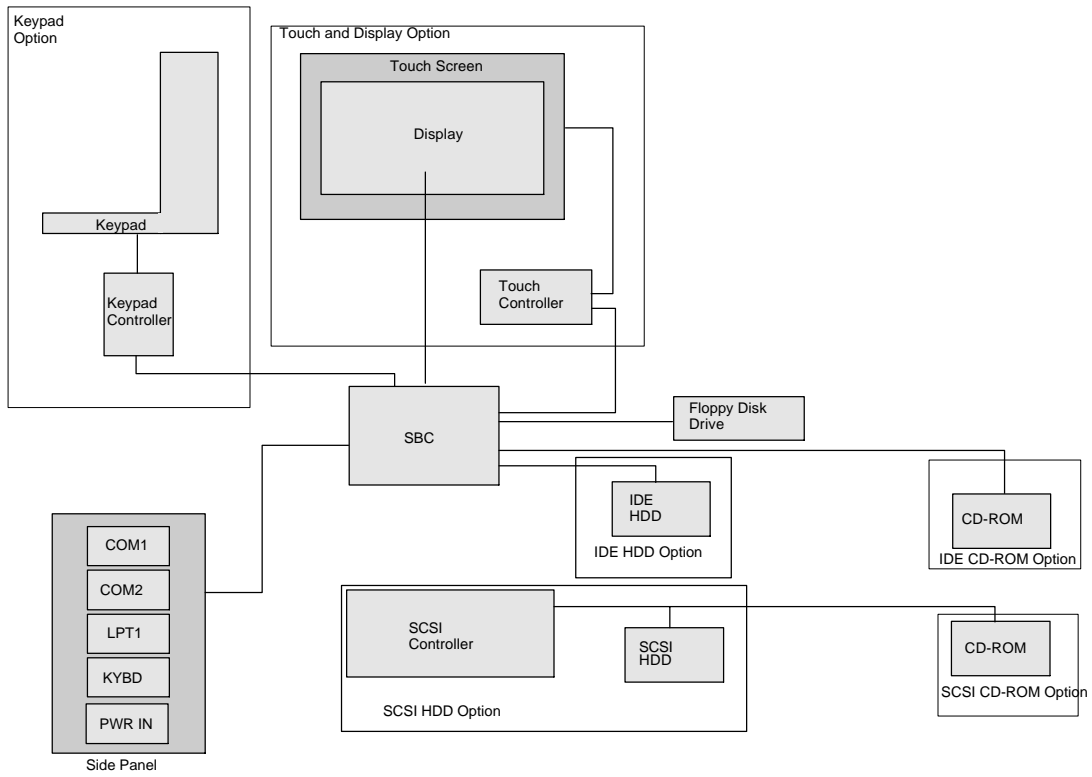
**A.3 ST-C461 COMPUTER SIDE VIEW**



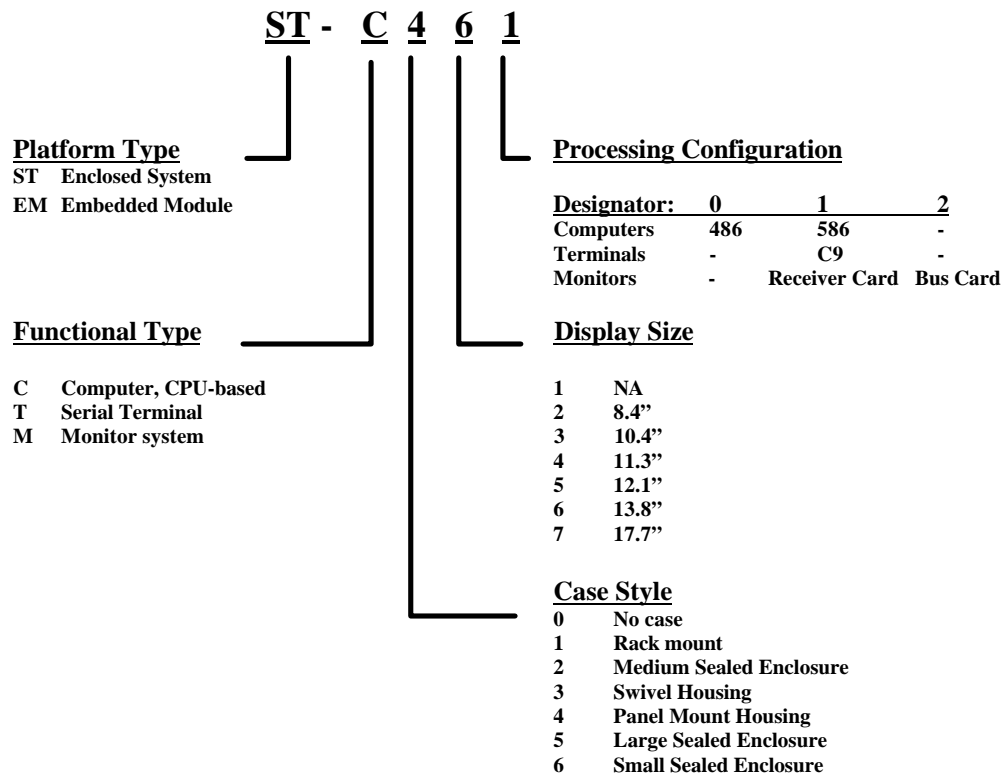
Note: All connectors are accessed on the right hand side (Viewed from the front).

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

## A.4 ST-C461 CABLING DIAGRAM



## Appendix B: Product Naming Convention

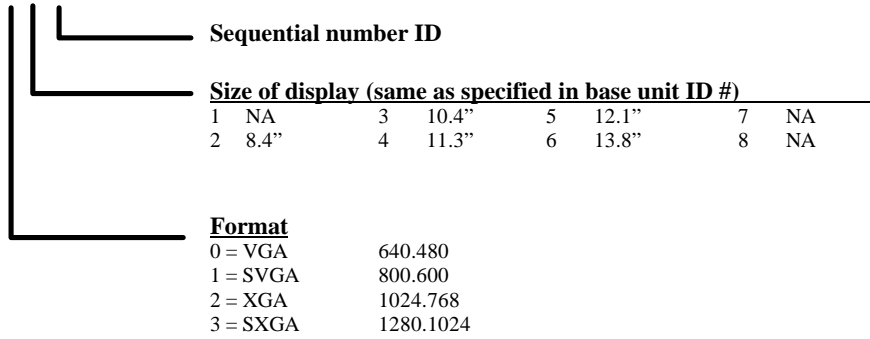


### Examples

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

## 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 Products (LCSP) 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, LCSP 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. LCSP's sole obligation shall be at its option, to repair or replace any goods which have been determined to be defective by LCSP

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

- Returned Material Authorization (RMA) number, obtained from LCSP.
- 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 LCSP.

LCSP 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 LCSP 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.

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