

Deeco Systems
SealTouch[®] 10.4" ST-C231
and 12.1" ST-C241
Compact Computers

USER MANUAL

Manual P/N: 13422 (C)
Manual Revision: 3.0
Manual Revision Date: October 1998

Servicing Warning

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 SealTouch 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 SealTouch computer.

WARNING: DISCONNECT POWER BEFORE OPENING

**CAUTION: USE PROPER ESD PROCEDURES WHEN OPENING
THE ENCLOSURE AND SERVICING THE COMPUTER.**

Static electricity introduced into the electronics is often not immediately fatal, but can cause future reliability problems - like frequent and troublesome failures.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Baud Rate: up to 14400 Baud
Data Bits: 8
Parity: None
Stop Bits: 1
Flow Control: XON/OFF or hardware
Emulation: ANSI

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For Returns - Contact Deeco's customer service for a Return Materials Authorization (RMA) number prior to shipping product to the factory. Freight to the factory is prepaid by the customer. Freight return to the customer is paid by Deeco. Ship product in its original packaging or equivalent to prevent transit damage.

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Printed in the U.S.A.

Explosion Warning

WARNING!!

FOR CLASS I, DIVISION 2 OPERATION:

1. CAUTION - POWER TO THE DEVICE MUST CONFORM TO CLASS I, DIVISION 2 WIRING METHODS AS DEFINED IN ARTICLE 501-4(b) OF THE NATIONAL ELECTRICAL CODE, NFPA70 FOR INSTALLATIONS WITHIN THE UNITED STATES, OR AS SPECIFIED IN SECTION 18-152 OF THE CANADIAN ELECTRICAL CODE FOR INSTALLATIONS WITHIN CANADA.
2. SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY.
3. WARNING -- EXPLOSION HAZARD -- SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.
4. WARNING -- EXPLOSION HAZARD -- DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.
5. WARNING -- EXPLOSION HAZARD -- WHEN IN HAZARDOUS LOCATIONS TURN OFF POWER BEFORE INSERTING OR REPLACING BOARDS.

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1.0 Configuration and Specifications

Deeco Systems offers a complete line of sealed and unsealed standalone computers, panel mount computers, monitors, and serial terminals. All computers are available with touch systems - a rugged and intuitive user interface. Deeco has manufactured flat panel display based products for harsh and industrial applications for more than a decade.

1.1 PRODUCT SUMMARY

The ST-C231 and the ST-C241 industrial computers are built in the same NEMA 4/12 (IP65) aluminum enclosure. The main difference between the units is that the ST-C231 comes with a 10.4" VGA flat panel display while the ST-C241 is designed with a 12.1" SVGA flat panel display.

- Both units are compact and rugged computers that can be mounted in tight places in harsh environments. The enclosure is NEMA 4/12 certified.
- The ST-C231 is available with Class I, Division 2 certification for use in explosive environments. Certain options are certified for use in CID2 environments (see section titled "Ordering Information" for details). Uncertified peripheral equipment like a keyboard, a mouse, an Ethernet connection, or a floppy disk drive should not be used in a CID2 explosive environment. (Class I, Div 2 classification is not yet available for the ST-C241 model.)
- The ST-C231 has the standard Deeco IR touch system that provides an easy to use operator interface. Resistive touch screen is available for the 12.1" ST-C241 unit. A serial mouse can be connected to the computer via the external COM1 serial connector. An external PC/AT keyboard can be connected to the computer via the external 5-pin keyboard connector.
- Proprietary Power Assist™ software simplifies process control development.
- An optional external 10 BASE-T or 10 BASE-2 PC/104 board provides an Ethernet connection.
- The expansion chassis allows one PC/104 card and 2 ISA card slots or 3 PC/104 cards. The base unit without the expansion chassis allows for a single internal PC/104 card. Without the expansion chassis, the single PC/104 card cannot be externally connected except as an Ethernet connection.
- Mass storage options include a PC/104 Semiconductor Disk; or an PIO4 (EIDE) hard drive up to 2.0 GB; and an external 3.5" floppy drive.
- External interface connectors include a 9-pin serial port, a 25-pin parallel port, an external floppy drive connector, a keyboard connector, and an optional 10 BASE-T or 10 BASE-2 Ethernet connector.



1.2 SEALTOUCH® COMPUTERS

SealTouch 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-C231 & ST-C241 are specially designed to perform in extremely wet environments, like food processing; or extremely dusty environments like power plants. They both meet NEMA 4/12 (IP65) requirements.

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

The ST-C231 is available with a choice of integrated color liquid crystal display (LCD) 640 x 480 VGA flat panel displays. A special sunlight readable color active matrix LCD display is available for environments that need high ambient illumination. This units comes with Deeco's proprietary IR touch system.

The ST-C241 is available with an integrated color liquid crystal display (LCD) 800 x 600 SVGA flat panel display. Included with the ST-C241 is a high-resolution resistive touch screen system.

The optional extended case version of the both SealTouch computer includes two ½ length ISA expansion slots and a PC/104 slot or 3 PC/104 slots.

The system includes a touch system and touch mouse software. This allows the operator to establish mouse control directly from the display by pointing and dragging a finger over the display. Touch mouse drivers are loaded in the hard disk at the factory. Available mouse drivers include QNX, SCO UNIX, MS-DOS, Windows™, Windows NT, Windows 95 and OS/2.

1.3 ORDERING INFORMATION

1.3.1 ST-C231 Configurations

Class I, Division 2 Groups A, B, C, D Approved for specific configurations.

SELECT A CPU, MEMORY, DISPLAY, AND POWER SUPPLY.

Ordering Example: ST-C231-128-212-3032-702-518-903

Base System Configurations (select one)

ST-C231 **Standard Base System**
 ST-C231-CID2 **Class I, Div 2 Base System**
 ST-C231-CE **CE Approved Base System**

Select a CPU

127* Intel Pentium MMX / 200 Mhz (non MMX version used in Class I, Div 2)
 128 Intel Pentium MMX / 233 MHz

Select Memory 72-Pin EDO DRAM

211 8 MB SIMM
 212 16 MB SIMM
 213*e 32 MB SIMM
 214 64 MB SIMM

Select a Display

3032*e Color AMTFT LCD 256K colors 120 nits typ.
 3033 *a&e Color AMTFT LCD 256K colors 300 nits typ.
 3036*b&e Color AMTFT LCD 256K colors 750 nits typ.

Select a Power Supply

702 90-264 VAC, 47-63 Hz, 50W (Standard)
 704*e 90-264 VAC, 47-63 Hz, 100W
 703*e +20-36 VDC (regulated), 100W (derated to 70W)

Special Ordering Information:

- *a Includes 3:1 dimming
- *b Includes the expansion chassis that increases depth by 2.0 (51 mm) for heat dissipation. Includes dimming control 30 to 1. Cannot use with option 1101. Requires option 703 or 704 power supply. Allows up to 2 PC/104 cards. (Not applicable with CID2).
- *e The noted options have been CID2 approved. Options 1103 and 1107 are required to meet approval. All software options are available.

Upgrades and Options

Hard Drives

- 518 1.3 GB, rugged 2.5" PIO4 (EIDE)
- 522*e 2.0 GB, rugged 2.5" PIO4 (EIDE)

PC/104 Ethernet LAN Communications

- 902*e 10 BASE-T (T-Pair)
- 903 10 BASE-2 (Coax)

Removable Media

- 602 1.44 MB, 3.5" IDE Drive with Enclosure (not NEMA 4/12 or IP65 rated)

Semiconductor Flash IDE Disk Drive

- 1020 4 MB
- 1021 10 MB

Expansion Chassis and Conduit Covers

- 1101*d Expansion Chassis, 2 card slot (2.5")
- 1102 Conduit Cover for Option 1101
- 1103*e Rear Conduit Cover, NEMA 4/12
- 1107*e Expansion Chassis, CID2, SR (2.0")

Software - Operating Systems

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

Software - Touch Drivers

- 801 OS/2® Touch Mouse
- 802 QNX® Touch Mouse
- 804 DOS and Windows 3.x Touch Mouse
- 806 SCO UNIX Touch Mouse
- 810 Windows™ NT Touch Mouse
- 815 Windows™ 95 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 3.1-Developer
- 819 Power Assist for Windows - Run Time

Special Ordering Information:

*d Option 1101 requires 703 or 704 100W power supply. This option will add 2.5" (63 mm) to the overall unit depth. The expansion chassis allows one PC/104 card and two ISA card slots (handling up to 10" cards) or three PC/104 cards. Cannot use with option 3036.

*e The noted options have been CID2 approved. Options 1103 and 1107 are required to meet approval. All software options are available.

1.3.2 ST-C241 Configurations

SELECT A CPU, MEMORY, DISPLAY, AND POWER SUPPLY.

ST-C241 Base System Configuration

Select a Processor

116 Pentium-based 200 MHz

Select Memory 72-Pin EDO DRAM

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

Select a Display - SVGA, 800 x 600, 12.1" Diagonal

3141 Color AMTFT200 nits typ.

Select a Power Supply

702 90-264VAC, 47-63Hz, 50W
 704 90-264VAC, 47-63Hz, 100W
 703 +20-36VDC (regulated), 100W (derated to 70W)

Touch System

411 Resistive Touch

Upgrades and Options

Hard Drives

518 1.3GB, rugged 2.5" PIO4 (EIDE)
 522 2.0GB, rugged 2.5" PIO4 (EIDE)

PC/104 Ethernet LAN Communications

902 10 BASE-T (T-Pair)
 903 10 BASE-2 (Coax)

Removable Media, External

602 1.44 MB, 3.5" Floppy Disk Drive with Enclosure (not NEMA 4/12 or IP65 rated)

Semiconductor Flash IDE Disk Drive*c

1020 4 Megabytes
 1021 10 Megabytes

Expansion Chassis and Conduit Covers

1101*d Expansion, 2-slot ISA (2.5" added depth)
 1102 Conduit Cover for Option 1101
 1103 Rear Conduit Cover, NEMA 4/12
 1107 Expansion Chassis, SR (2.0" added depth)

*a Includes the expansion chassis that increases depth by 2.0" (51 mm) for heat dissipation. Includes dimming control 200 to 1. Cannot use with option 1101. Requires option 703 or 704 power supply. Allows up to 2 PC/104 cards.

*d Option 1101 requires 703 or 704 power supply. This option will add 2.5" (64 mm) to overall unit depth. The expansion chassis allows one PC/104 card and two ISA card slots (handling up to 10" cards) or three PC/104 cards.

Software - Operating Systems

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

Software - Touch Drivers *b

- 824 OS/2 IR Touch Mouse, 12.1"
- 825 QNX® IR Touch Mouse, 12.1"
- 826 DOS/Windows 3.x IR Touch Mouse, 12.1"
- 827 SCO UNIX IR Touch Mouse, 12.1"
- 828 Windows NT IR Touch Mouse, 12.1"
- 829 Windows 95 IR Touch Mouse, 12.1"
- 816 DOS/Microsoft Windows 3.1 Resistive Touch Mouse
- 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

1.4 SPECIFICATIONS

	ST-C231	ST-C241
Processor	200 MHz Intel MMX Pentium (non MMX for CID2) 233 MHz Intel MMX Pentium	200 MHz Intel Pentium
Display options	640 x 480 VGA 10.4" Flat Panel <ul style="list-style-type: none"> ▪ Color AMTFT Standard LCD 256K colors 120 nits typ. ▪ Color AMTFT High Bright LCD 256K colors 300 nits typ. ▪ Color AMTFT Sunlight Readable LCD 256K colors 750 nits typ. 	600 x 800 SVGA 12.1" Flat Panel <ul style="list-style-type: none"> ▪ Color AMTFT Standard LCD 200 nits typ.
Touch Area	6.2" x 8.3" (157 mm x 210 mm) 80 x 60 touch zones = 4,800 points	9.7" x 7.3" (246 mm x 185 mm)
SBC	Half-size SBC board, L2 pipeline burst mode, 1 MB video RAM. Refer to the accompanying manual for detailed specifications.	
SBC BUS Architecture	Standard Configuration: 1 PC-104 slot with Expansion Chassis: 2 ISA slots and 1 PC-104 slot, or 3 PC-104 slots	
VGA Controller	Chips & Technology 65548/50 VGA with 1 MB DRAM and GUI accelerators	
Parallel Port	One external enhanced bi-directional SPP/EPP/ECP.	
Floppy Disk Interface	One external floppy connector supports up to two floppy disk drives: 3 1/2" (720 KB, 1.44 MB and 2.88 MB) and/or 5 1/4" (360 KB or 1.2 MB) (Special external cable required if connected to 2 floppy disk drives) External floppy drives are not CID2 certified	
Ethernet	Available as PC-104 card (Not CID2 certified)	
Solid State Disk	4 MB to 80 MB IDE.	
External Connectors	Serial	9-pin D-SUB (external)
	Parallel	25-pin D-SUB
	Network	10 BASE-T, 10 BASE-2
	Keyboard	5-pin DIN
	Floppy Disk Drive	37-pin D-SUB
	Power Connector	AC - standard IEC DC - 3-screw barrier strip
COM Ports	Support up to 115 Kbaud data rates.	
Memory	Includes two 72-pin SIMM sockets supporting up to 256MB EDO DRAM.	

Enclosure Dimensions	12.7" H x 13.4" W x 5.0" D 323 mm x 340 mm x 127 mm Add 2.5" to depth of unit for expansion chassis. Add 2.0" to depth for Sunlight Readable Display or CID2 certification.								
System Weight	22 lbs (10 kg) With 2-slot ISA expansion chassis: 30 lbs (13.63 kg)								
Shock (Half Sine)	Half Sine, MIL-STD-810D, Tested with 2.5" HDD: <table border="0" style="margin-left: 20px;"> <tr> <td>Operating:</td> <td>10g, 11mS</td> </tr> <tr> <td>Non-operating:</td> <td>50g, 11mS</td> </tr> </table> Tested without HDD <table border="0" style="margin-left: 20px;"> <tr> <td>Operating:</td> <td>50g, 11mS</td> </tr> <tr> <td>Non-operating:</td> <td>50g, 11mS</td> </tr> </table>	Operating:	10g, 11mS	Non-operating:	50g, 11mS	Operating:	50g, 11mS	Non-operating:	50g, 11mS
Operating:	10g, 11mS								
Non-operating:	50g, 11mS								
Operating:	50g, 11mS								
Non-operating:	50g, 11mS								
Vibration	10-500Hz, swept-sine, Tested with 2.5" HDD: <table border="0" style="margin-left: 20px;"> <tr> <td>Operating:</td> <td>1.5g p-p</td> </tr> <tr> <td>Non-operating:</td> <td>5g p-p</td> </tr> </table> Tested without HDD <table border="0" style="margin-left: 20px;"> <tr> <td>Operating:</td> <td>4g p-p</td> </tr> <tr> <td>Non-operating:</td> <td>5g p-p</td> </tr> </table>	Operating:	1.5g p-p	Non-operating:	5g p-p	Operating:	4g p-p	Non-operating:	5g p-p
Operating:	1.5g p-p								
Non-operating:	5g p-p								
Operating:	4g p-p								
Non-operating:	5g p-p								
Temperature	<table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><u>Operating</u></td> <td style="text-align: center;"><u>Non-Operating</u></td> </tr> <tr> <td style="text-align: center;">0°C to +50°C</td> <td style="text-align: center;">-20°C to +60°C</td> </tr> </table>	<u>Operating</u>	<u>Non-Operating</u>	0°C to +50°C	-20°C to +60°C				
<u>Operating</u>	<u>Non-Operating</u>								
0°C to +50°C	-20°C to +60°C								
Relative Humidity	0% to 100%, non-condensing								
Input Power Requirements	+24 VDC or 100-240 VAC input 50 Watts, standard Models 70 or 100 Watts Expanded Chassis / Sunlight Readable Models See section 2.4, Power Requirements for more information								
Regulatory Compliance Approved for specific ST-C231 configurations only.	<table border="0" style="width: 100%;"> <tr> <td>UL 1950, CE, TUV</td> <td>(Safety)</td> </tr> <tr> <td>CID2 Hazardous Area</td> <td>(Explosive)</td> </tr> <tr> <td>FCC Class A, CISPR Class B</td> <td>(EMI)</td> </tr> </table>	UL 1950, CE, TUV	(Safety)	CID2 Hazardous Area	(Explosive)	FCC Class A, CISPR Class B	(EMI)		
UL 1950, CE, TUV	(Safety)								
CID2 Hazardous Area	(Explosive)								
FCC Class A, CISPR Class B	(EMI)								
MTBF (nominal) (@ 25°C)	SBC > 80,000 hrs Displays > 45,000 hrs * *AMTFT display backlights are considered field replaceable items and are not included in MTBF figures.								

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.

Shipping configuration varies with the options ordered. You may receive some or all of these items:

- Fully tested SealTouch computer
- This Manual
- AC Line Cord
- Mouse Driver Diskette
- SBC manual
- Utility disk with Ethernet drivers
- Utility disks with PCI SVGA utility programs and drivers for Windows 3.1, Windows 95, and OS/2.
- Solid State Disk Operation Manual
- Solid State Disk Utility disks

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

It is wise to test your new computer before performing any upgrades.

2.2 MOUNTING

The ST-C231 & ST-C241 are designed to be mounted in enclosures, racks, walls, and integrated into systems. The computers are **not** designed to be used without mounting. There are external threaded holes for securing the SealTouch computers. There are four of these mounting holes located on the rear of the enclosure, and two more located on the bottom of the enclosure. The threading for these holes is ¼-20 UNC thread.

Refer to the mechanical drawing in the Appendix for mounting hole locations.

Note: To avoid risk of injury, the computer must be firmly secured. Any mounting arrangement must be able to support at least five times the weight of the basic computer, and able to withstand aggressive touch inputs.

The SealTouch computers can be mounted in a wide variety of ways. The two most typical arrangements are:

- Fastened to a horizontal surface and secured by the mounting holes on the bottom of the NEMA 4/12 enclosure.
- Bolted to a vertical wall and secured by the rear mounting holes of the computer.

Other arrangements, such as mounting on swing arms (**swing arms do not meet CID2 explosive environment requirements - rigid conduit is required for electrical connection**) or brackets 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 weights of the unit are:

Standard	22 lbs (10 kg)
With 2 slot ISA Expansion Chassis:	30 lbs (13.63 kg)

- Heat must be dissipated by the cooling fins at the back of the enclosure. Consequently, the units should be installed so that air can flow freely through the fins. If a unit is mounted against a vertical wall, the temperature of the wall will have an impact on cooling. The mounting surface should not be a hot wall.
- The unit should be mounted for optimum visibility of the display. Typically, this is close to eye level. Avoid looking down on AMTFT 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. The front of the enclosure is hinged on the left, and opens from right to left.

2.3 CONNECTING BEFORE APPLYING POWER

WARNING!!

EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

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.

If Operating In An Explosive Environment, Assure That Any Peripheral Equipment Interface Is Intrinsically Safe Or Connected Through A Properly Certified Barrier Strip

The floppy drive connector requires a special floppy drive and cable. Refer to section 7.3. Do not use the floppy drive in an explosive environment.

2.4 POWER REQUIREMENTS

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

Power Supply Option	Voltage	Max. Current	Frequency	Max. Watts
Option 701	20-36 VDC	3.3 - 1.9 A	DC	50
Option 702	90-264 VAC	2.0 A	47-63 Hz	50
Option 703 Used with Display 3036 or Expansion Chassis	20-36 VDC	6 A	DC	100
Option 704 Used with Display 3036E or Expansion Chassis	90-264 VAC	2.5 A	47-63 Hz	100

Note: Current specifications are approximate, and will vary with configuration. Actual requirements will not exceed these parameters.

To preserve UL certification, +24 VDC power should be supplied by a UL Listed Information Technology Equipment Power Supply (UL 1950) and rated 24VDC, 6A.

TERMINAL BLOCK OPERATION ONLY

<p>For Terminal Block Connection: Use Copper conductors Only. Conductor must be 18 AWG or greater.</p>

2.5 APPLYING POWER - WARNING!

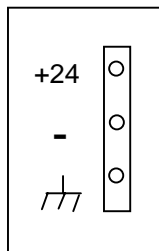
FOR CLASS I, DIVISION 2 OPERATION:

1. **CAUTION - POWER TO THE DEVICE MUST CONFORM TO CLASS I, DIVISION 2 WIRING METHODS AS DEFINED IN ARTICLE 501-4(b) OF THE NATIONAL ELECTRICAL CODE, NFPA70 FOR INSTALLATIONS WITHIN THE UNITED STATES, OR AS SPECIFIED IN SECTION 18-152 OF THE CANADIAN ELECTRICAL CODE FOR INSTALLATIONS WITHIN CANADA.**
2. **SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY.**
3. **WARNING -- EXPLOSION HAZARD -- SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.**
4. **WARNING -- EXPLOSION HAZARD -- DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.**
5. **WARNING -- EXPLOSION HAZARD -- WHEN IN HAZARDOUS LOCATIONS TURN OFF POWER BEFORE INSERTING OR REPLACING BOARDS.**

Once the computer has been properly connected to the host system, the user is ready to apply power to the unit.

For the AC powered models which are used in non hazardous areas, plug the female end of the power cord provided into the three prong IEC power connector located at the rear of the Deeco computer case.

For +24 VDC models, connect to the 3 screw barrier strip according to the labeling on the connector:



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

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, and modifications are usually unnecessary.

4.0 Mass Storage

The SealTouch units are supplied with an optional solid state disk. Refer to the accompanying Semiconductor Flash IDE Disk Drive manual for documentation. Or, an optional 2.5" hard drive is available.

Deeco will provide an optional 3.5" floppy drive with enclosure for use with this system. The floppy drive is not NEMA 4/12 (IP65) rated nor CID2 certified.

5.0 IR Touch System for ST-C231

5.1 INFRARED (IR) TOUCH SYSTEM

The ST-C231 includes an IR (infra red) SealTouch screen.

The SealTouch hardware consists of the touch bezel and the touch controller. The touch bezel reads all touch inputs. The IR touch controller processes this information, then communicates with the host over a RS232 link.

The IR bezel consists of a Touch Frame that houses an array of IR diodes and transistors. These components are positioned to create an 81 x 59 matrix. Once these beams are broken by a finger or a stylus, data is sent to the IR Touch Controller. The IR Touch Controller processes the touch data from the IR bezel, and reports which IR row beam and which IR column beam are interrupted by the touch.

5.2 MOUSE DRIVERS

Mouse drivers come pre-installed when the touch option is ordered.

The computer provides an integrated touch input system that can be used to provide a simple, intuitive operator interface. The touch system can be configured to emulate the standard mouse input. Programs that use the mouse as an input device can use the touch system as well.

Like the standard mouse, the touch mouse provides software drivers to interface applications to the physical device. The drivers process touch reports received from the touch system and perform a translation into a mouse-compatible format for use by applications. The translation is transparent to applications; they need not know that the mouse has been replaced by the touch system. The mouse emulation software drivers consist of the following files:

- | | |
|--------------------------------------|--------------------------------|
| 1) LDTOUCH.COM | (MS-DOS Operating System) |
| 2) LWTOUCH.DRV | (Windows 3.x Operating System) |
| 3) Windows 95 Touch Mouse Minidriver | (Windows 95 Operating System) |
| 4) Deeco Serial Touch Mouse | (Windows NT Operation System) |
| 5) LOS2TM12.SYS | (OS/2 Operating System) |
| 6) MOUSE.QNX | (QNX Operating System) |
| 7) Deeco Touch Mouse | (SCO/UNIX Release 3.0) |

5.2.1 Loading the MS-DOS Mouse Driver

The MS-DOS based driver consists of the Deeco touch driver, LDTOUCH.COM. It must be loaded into the system for proper mouse emulation. LDTOUCH.COM “rides on top of” the Microsoft mouse. Microsoft MOUSE.COM should be run before loading LDTOUCH.COM. The Deeco touch driver, LDTOUCH.COM, should be placed within the AUTOEXEC.BAT file following the path statement. The following software switches provide the Deeco mouse driver with variable functionality.

Mouse Pointer Offset Switch

If the user wishes the DOS mouse pointer, used in graphics mode, to be offset from the touch position, the Deeco touch driver should be specified in the AUTOEXEC.BAT file as described below:

```
LDTOUCH/o
```

Double Touch Switch

If the user wishes the mouse button to be activated only when a double touch is performed, the Deeco touch driver should be specified in the AUTOEXEC.BAT file as described below:

```
LDTOUCH /d
```

Right Mouse Buttons Switch

If the user wishes to disable the right mouse button option of the touch mouse, the Deeco touch driver should be specified in the AUTOEXEC.BAT file as described below. This will allow only the left mouse button function to be active.

```
LDTOUCH /l
```

Partial Screen Dimension Switch

This switch calibrates the touch pointer for text modes that use 400 rows (normal VGA text mode is 720 x 400 rows.) It will compensate for this variance only if the text is centered on the screen with 40 pixel lines above and 40 pixel lines below the text. . To enable this option, specify LDTOUCH.COM in the AUTOEXEC.BAT file as:

```
LDTOUCH /p
```

Full Screen Dimension Switch

When the computer uses the full 640 x 480 resolution (as in 640 x 480 graphic mode), set the Full Screen Dimension switch. To enable this option, LDTOUCH.COM needs to be specified in the AUTOEXEC.BAT file as:

```
LDTOUCH /f
```

5.2.2 Loading the Windows 3.x Mouse Driver

The Windows driver, LWTOUCH.DRV, must be copied to the \SYSTEM sub directory of the Windows directory. To specify the Deeco driver, the Windows initialization file SYSTEM.INI must be modified. The file may be modified by any suitable text editor. The mouse driver is specified by a line in the SYSTEM.INI file as shown here:

```
MOUSE.DRV=LWTOUCH.DRV
```

When Windows is started, the driver will load automatically. If the touch system is not operational, Windows will behave exactly as if the standard mouse driver were loaded without a mouse present. This behavior is characterized by the absence of the mouse cursor. Windows can still be controlled from the keyboard.

5.2.3 Loading the Microsoft Windows 95 Touch Driver

Before beginning installation the user must be familiar with configuring the Microsoft Windows 95 Operating System.

5.2.3.1 Requirements

- A computer system with Microsoft Windows 95 already installed.
- The Deeco Systems Touch Screen.
Note: It is recommended that the physical mouse you are using be connected to COM1. This is because the touch mouse minidriver searches for the touch controller on COM2 first, then COM1.
- The Deeco Systems Touch Mouse Distribution Disk.

5.2.3.2 Reference Documents

Microsoft Windows 95 System Guide.

5.2.3.3 Installation

Installation of the Deeco Windows 95 Touch Mouse Minidriver is as follows:

- Click the Start Button, point to Settings, and then click Control Panel.
- Double-click on the Mouse Icon, this opens the Mouse Properties Sheets.
- Single-click on the General Sheet.
- Single-click on the Change Button.
- Single-click on the Have Disk Button.
- Insert the touch mouse minidriver distribution disk into floppy drive A.
- Single-click the Okay Button.
- The Select Device Dialog Box will show "Windows 95 Touch Mouse Minidriver."
- Single-click the Okay Button.
- The Mouse Properties General Sheet will change to the "Windows 95 Touch Mouse Minidriver," at this point the current mouse pointer will become inactive.
- Press the Enter key to close the Mouse Properties Sheets.
- The Systems Setting Change Dialog Box will appear.
- Disconnect the physical mouse from COM1.
- Press the Enter key to restart the system.

5.2.3.4 Using the IR Touch Driver in Windows 95

Set the Taskbar to Autohide

Setting the taskbar to autohide prevents resizing of the taskbar to the point where the top edge of the taskbar is at the bottom of the screen. If the task bar is resized in such a manner it is very difficult to align the touch mouse on the bottom pixel of the screen to grab and re-size (reopen) the taskbar.

Perform the following steps to enable the autohide mode of the taskbar.

1. Click on the START button
2. Select SETTINGS
3. Select TASKBAR
4. Select AUTOHIDE
5. Select OK

Increase Active Double Touch Area

Another enhancement involves increasing the double touch area on the screen. Increasing the area of the double touch zone allows for ease of program launching in the graphical interface.

Perform the following steps to increase the active double touch area on the screen:

1. Launch the Registration Editor (Regedit.exe).
2. Select and expand HKEY_CURRENT_USER then Control Panel.
3. Highlight Desktop (You should see a series of screen saver and wallpaper settings).
4. Select Edit then New then String value.
5. Type in DoubleClickHeight.
6. Select the new line you've just created (DoubleClickHeight) and type in the desired value in pixels, (for touch mouse we recommend 50) then click OK.
7. Repeat steps 4-6 but replace DoubleClickHeight with DoubleClickWidth.
(If you've misspelled any of the names highlight them and press F2 to correct them.)
8. Select Registry then Exit.
9. Shut down and restart Windows 95 to have these new values take effect.

Border Width of Taskbar

To edit the border width on the taskbar follow these steps.

1. Launch the Registration Editor (Regedit.exe)
2. Select and expand HKEY_CURRENT_USER then Control Panel
3. Select and expand Desktop
4. Select and expand WindowMetrics
5. Double click on BorderWidth
6. Set value and click OK
7. Close the Registration Editor

5.2.4 Loading the Microsoft Windows NT Touch Driver

Before beginning installation the user must be familiar with configuring the Microsoft WINDOWS NT Operating System.

5.2.4.1 REQUIREMENTS

The user must have the following:

- A computer system with Microsoft WINDOWS NT already installed.
- The Deeco Systems Touch Screen.
NOTE: The user needs to know which system communication port (COM PORT) connects to the touch screen. On the Deeco computer systems products the touch screen is connected to communication port 2 (COM2).
- The Deeco Touch Mouse Distribution Disk.

5.2.4.2 REFERENCE DOCUMENTS

Microsoft WINDOWS NT Workstation System Guide.

BEFORE INSTALLING

Set both the mouse double click speed to the slowest speed, and the mouse tracking speed to the highest speed.

Use the **MOUSE CONTROL** for changing the mouse settings. Start by opening the **MAIN GROUP** icon, selecting the **CONTROL PANEL** icon. Select the **MOUSE CONTROL** icon in the **CONTROL PANEL**. Set the double click speed by dragging the **Double Click Speed** slider to the desired speed. Since the time duration for performing the double click on a touch screen is longer than a physical mouse, select the slowest speed. Set the mouse tracking speed by dragging the **Mouse Tracking Speed** slider to the fastest speed. To save the changes choose the **OK** Button, then quit the **CONTROL PANEL**.

The Microsoft WINDOWS NT Workstation System Guide describes how to modify the mouse settings.

In order for the Touch Mouse Driver to detect the presence of the touch screen, connect the touch screen to a COM PORT. The Touch Mouse Driver will support only one pointing device, either a serial mouse or the touch screen. The detection of a pointing device starts with the first communication port (COM1). The communication ports are sequentially tested for a pointing device and the detection process ends when either the detection of a pointing device or the last communication port is unsuccessfully tested. During the loading of WINDOWS NT the Touch Mouse Driver displays a two line product disclaimer. A third line indicates whether a pointing device was detected, or not. In the event that the detection of a pointing device is successful, this line indicates the detected pointing device type, along with the address of the communication port this pointing device uses.

5.2.4.3 INSTALLATION

The installation of the Touch Mouse Driver must be by a user who is logged in on the computer as a member of the Administrators Group. The Microsoft WINDOWS NT Workstation System Guide describes the installation procedure under the section **CHANGING KEYBOARD OR MOUSE DRIVERS**. To install the Touch MouseDriver, start by opening the **MAIN GROUP** icon and then open the **WINDOWS NT SETUP** icon.

- From the **OPTIONS** menu choose **Change Mouse or Keyboard** option.
- In the **Change Mouse or Keyboard** dialog box, open the mouse setting list by clicking the down arrow at the right side of the **Mouse** option.
- If the Touch Mouse Driver is the currently installed mouse driver, select the **No Mouse or Other Pointing Device** option. Choose the **CLOSE** button to activate the selection. The new system settings will take effect when the system is restarted, so the current mouse driver will still be in effect. Reopen the **OPTIONS** menu, choose the **Change Mouse or Keyboard** option, and reopen the mouse setting list. Follow the next step for reinstalling the Touch Mouse drivers.
- If the Touch Mouse Driver is not the currently installed mouse driver, but the Touch Mouse Driver appears in the mouse setting, then select the Touch Mouse Driver setting. Choose the **CLOSE** button to activate the selection. A dialog box will appear explaining that the drivers for the Touch Mouse already exist on the system and it will ask whether to use the existing version or to load a new version. Choose the **NEW** button to install the new version of the drivers. A dialog box will prompt for the full path of the driver files, insert the distribution floppy in the desired floppy drive, indicate the path of the driver files (e.g., enter "A:\") for the A Drive) and choose the **CONTINUE** button.
- If the Touch Mouse Driver is not the currently installed mouse driver and does not appear in the mouse setting list, choose the **OTHER** setting. At the dialog box prompting for the location of the new mouse driver files, insert the distribution floppy in the desired drive, indicate the path of the driver files (e.g., enter "A:\") for the A Drive) and choose the **OKAY** button.
- At the **Select OEM Option** dialog box ensure that the **Deeco Serial Touch Mouse** option is displayed, choose the **OKAY** button.
- In the **Change Mouse or Keyboard** dialog box choose the **CLOSE** button. At the dialog box prompting for the location of the new mouse driver files, insert the distribution floppy in the desired drive, indicate the path of the driver files (e.g., enter "A:\") for the A Drive) and choose the **CONTINUE** button.
- Quit the WINDOWS NT Setup. A message will indicate that the changes to the system settings will not take effect until the computer is restarted.

5.2.5 Loading the OS/2 Mouse Driver

The OS/2 mouse driver, LOS2TM12.SYS, must be copied to the C:\OS2 directory. To specify the mouse driver the OS/2 CONFIG.SYS must be modified as follows:

```
DEVICE = C:\OS2\MOUSE.SYS
      to
DEVICE = C:\OS2\LOS2TM12.SYS
```

5.2.6 Loading the QNX Mouse Driver

This section details the installation procedure for the Deeco Touch Mouse Driver (V1.2) for the QNX Operating System. Refer to the following steps to load the QNX Mouse driver:

- Copy the QNX Mouse driver file MOUSE.QNX to the /BIN directory of the QNX Operating System.
- Type: `MOUSE.QNX [-s] [-z] ltm </dev/serXX & <Carriage Return>`
Where: `XX = 1 (com1)`
`XX = 2 (com2)`
- Use switch `-s` to set baud rate `-s 9600` (baud = 9600, default is 1200)
- Use switch `-z` to set touch scanner sensitivity `-z 10,2` (max touch size = 10, default is 6, min touch size = 2, default is 1)

5.2.7 Loading the SCO UNIX Mouse Driver

This section details the installation procedure for the Deeco Touch Mouse Driver for SCO Open Desktop Release 3.0. The user may find it useful to refer to the following reference guides for more information regarding the SCO UNIX Operating System:

SCO Open Desktop/SCO Open Server Installation and Upgrade Guide.

SCO Open Desktop/SCO Open Server System Administrator's Guide.

SCO Open Desktop/SCO Open Server Graphical Environment Administrator's Guide.

Prior to installation the user must be familiar with the following:

- Installing and configuring SCO Open Desktop Release 3.0.
- Installing and removing additional software products onto the SCO Open Desktop.

5.2.7.1 System Requirements

The user must have the following:

- A computer system with SCO Open Desktop Release 3.0 already installed.
- The Deeco Touch Screen. The RS-232 port COM2 is connected to the touch screen.
- The Deeco Touch Mouse Distribution Disk.

5.2.7.2 Prior to Installation

The SCO Open Desktop System must be operating in Single User Mode before installing the Deeco Touch Mouse Driver. The custom utility will fail to load the touch driver if the system is in multi-user mode, informing the user the reason for the failure.

Note: *The user should exit the Desktop Graphical Environment and “shutdown” the UNIX system. This will allow for a reboot in single user mode. The user can now follow the installation instructions found in the next section.*

If the previous release of the Deeco Touch Mouse is already installed on your system, the user must first use the custom utility to remove it.

The user must know which system communication port is connected to the touch screen. Communication port 1 (COM PORT 1) is associated to the “/dev/tty1a” UNIX driver, while communication port 2 (COM PORT 2) is associated to the “/dev/tty2a” UNIX driver.

The double click duration on a computer can be set graphically by using the scomouse client. Set the mouse double click duration to a longer time if the user wishes to use the double click function of the touch mouse. The user accomplishes this by entering the SCO Open Desktop Graphical Environment and selecting the Control Group. Start the scomouse client by selecting the Mouse Controls in the Control Group. The double click duration is set by dragging the Double Click Speed Slider to the desired speed. The slowest speed is recommended, since the time duration between performing the double click on a touch screen is longer than a physical mouse. To save the changes exit the Mouse Controls by selecting the OK Button.

The SCO Open Desktop/SCO Open Server Graphical Environment Administrator’s Guide describes how to modify the double click duration and other mouse characteristics by editing the appropriate resource file.

5.2.7.3 Installation Procedure

In Single User Mode, start the custom utility at the command prompt and perform the following:

- Select "Install."
- For the "Select a product:" prompt select "A New Product."
- For the "Choose an option:" prompt select "Entire Product."
- Insert the Deeco Distribution Disk into the floppy drive and select "Continue."
- Select "Continue" at the "Insert: Deeco™ Systems Touch Mouse Floppy Volume 1" prompt.

The install script will automatically start the mkdev mouse utility. In order to install the touch mouse driver, the user must first remove the current mouse driver connected to the communication port that the touch screen is connected to, then add the touch mouse driver to the system. The install script will save the current mouse configuration, which will be restored when the custom utility is used to remove the touch driver. The user must perform the following to install the touch driver:

- Select option 3, "Remove a mouse from the system."
- Remove the mouse driver (using the menu selections on the screen), attached to the UNIX driver associated with the communication port that the touch screen is connected to (if applicable). If the touch screen is connected to COM PORT 1, then the mouse driver attached to "/dev/tty1a" must be removed before the touch driver can be installed.
- At the "Mouse Initialization Program" Menu, select option 2, "Add a mouse to the system."
- Select the option associated with the "Serial mouse" mouse device type, that is, if the "Serial mouse" is listed as option 1, then select option 1.
- Select the option associated with the Deeco Touch Mouse Driver.
- The default communication port that the touch screen is attached to is COM PORT 2, so the default configuration is the touch driver being attached to "/dev/tty2a." If the user's system has the touch screen connected to another communication port, then enter "y" at the "Do you want to install this mouse on a different port? (y/n)" prompt. If the user's system has the touch screen connected to COM PORT 2, then enter "n" at the prompt.
- If the user entered "y" at the different port prompt, then enter the device that the touch screen is attached to at the "To which device (e.g. /dev/tty2a) do you want to attach the Deeco Systems Touch Mouse?" prompt.
- Configure the system's terminals and multi-screens that will use the touch mouse.
- The user will be prompted to create a new kernel in order for the touch mouse driver to take effect. **Do not create a new kernel at this time, enter "n" at the prompt.**
- At the "Mouse Initialization Program" Menu enter "q" at the prompt.
- The user will be prompted to re-link the kernel in order to use the touch screen, enter "y" at the prompt. A new kernel will now be created with the touch mouse driver. This will take several minutes.
- Select "Quit" to exit the custom utility.

5.2.7.4 Removing the SCO UNIX Driver

In Single User Mode, start the custom utility at the command prompt and perform the following:

- Select “Remove.”
- For the “Select a product:” prompt select “Deeco Touch Mouse.”
- Select “ALL”, this will remove the entire touch mouse driver package.
- Select “Yes” to continue with the removal process. The system mouse drivers’ configuration will be restored to the original configuration.
- Enter “y” at the re-link the kernel prompt.
- Select “Quit” to exit the custom utility.

5.2.7.5 SCO UNIX Programming Interface

User-level programs can access mouse information through an ioctl (I/O control command) system call. Request 3 is the ioctl request for mouse event data. The program must open the “/dev/lut” device in read only mode, and supply a pointer to an event structure, which is defined in “sys/event.h.” The touch driver fills the event structure with the current touch position, the time of the last event, the accumulated event tag, and the current button state. The ioctl request 3 provides the means by which the user-level program can poll the touch driver for mouse events. The user-level program should use the event macros defined in “sys/event.h” to access the fields in the event structure.

The touch position is expressed in both an X and Y position in absolute global screen coordinates. The time field has one second resolution and represents the time of the last event. The event tag field contains the accumulated events since the last ioctl call, which is **T_ABS_LOCATOR** (numeric value 8 Hex), or **T_BUTTON** (numeric value 2 Hex), or both. The button field represents the current state of the left mouse button, which is either **BUTTON3** (numeric value 4 Hex) or zero. The touch driver only supports a single button mouse, which is the left mouse button. The following table explains how a user-level program can interpret the data in the event structure:

Button Field	Tag Field	Description
4	0A Hex	The stylus has entered the touch screen at the screen position in EV_X(ev) and EV_Y(ev). The button is considered active.
0	08 Hex	The stylus has moved to the screen at the position in EV_X(ev) and EV_Y(ev).
0	02 Hex	The stylus has exited the touch screen. The button is considered inactive.
0	0A Hex	The stylus has entered and exited the screen. The last screen position was at EV_X(ev) and EV_Y(ev). The button is inactive.

The touch driver zeroes the event fields after completing the ioctl system call. The user-level program can determine if a valid event has occurred by checking for a non-zero value in the time field. Since the event tag field is accumulated, the user-level program must keep track of the previous touch states.

Both the open() and close() system calls re-initializes the state of the touch driver.

The following is example code illustrating how to access the touch events through ioctl request 3:

```
.  
. .  
#include <sys/event.h>  
. .  
int fd;  
EVENT ev;  
. .  
/* Open the touch driver */  
if ( ( fd = open( "/dev/lut", O_RDONLY ) ) == -1 )  
{  
/* Failed to open error processing */  
/* do not proceed any further in code */  
}  
. .  
/* Request touch events */  
if ( ioctl( fd, 3, &ev ) == -1 )  
{  
/* failed IOCTL request error processing */  
}  
. .  
/* Close the touch driver */  
if ( close( fd ) == -1 )  
{  
/* failed to close device error processing */
```

5.3 OPERATION OF THE TOUCH MOUSE

The touch mouse drivers emulate a two button mouse. They simulate mouse button actuations and motions. The left mouse button is the default button state. To make the right mouse button the active button, simply touch the upper right corner of the display. The left button is re-activated by touching the upper left corner of the display. The cursor will not move from the current position when changing the active mouse button. Be sure to touch in the corner of the display, and not just the general area.

There are three significant touch “events” used to emulate a mouse. The first event is the “entry” event. An entry event is the first touch by a finger detected by the system. The second event is a “track” event. Track events are changes in the finger position after the entry event. The last event is the “exit” event. An exit event is the removal of the finger from the touch system. When the touch system detects an entry touch event, the mouse position is updated to be identical with the touch position. This is signified by the visible cursor moving to a position beneath the finger.

There are two tracking modes, absolute and relative, with which an application can interface with the mouse. Absolute mode is the recommended mode to use with the mouse. Absolute mode refers to the mouse position being referenced to the screen’s absolute pixel position. When the application references the mouse position, it is only interested in the current position of the mouse. This mode works best with a touch mouse, since the application’s mouse position is dependent on the mouse driver’s position.

Relative mode refers to the mouse positioning being referenced to the last known position during tracking events. When the application references the mouse position, it wants to know the position changes from the last known position. This mode only works well with a touch mouse when the application uses the mouse driver to update and position the actual mouse cursor, or arrow on the screen. This mode does not work well when the application is maintaining the mouse position, and drawing the mouse cursor on the screen, rather than relying on the mouse driver. This mode causes problems because the application’s mouse position is independent of the mouse driver’s mouse position. This difference in mouse pointer positioning may cause an offset between the stylus and the mouse pointer. Typically, the user may “home” the mouse pointer by tracking the pointer into a corner that will allow the mouse pointer to arrive first. This allows the user to coordinate the X and Y coordinates of the applications mouse pointer with those of the touch mouse driver.

A special “double-click” algorithm has been developed to insure that double-click operations, a rapid entry-exit-entry-exit, are cleanly detected and reported.

5.4 MOUSE DRIVER SOFTWARE INTERFACING

For certain OEM applications, it may be necessary to develop custom touch system software. This section outlines the commands required to communicate with the computer's touch controller.

The IR Touch Controller communicates with the host system over COM2. The default UART settings are:

Baud Rate:	1200
Data bits:	7
Stop bits:	2
Parity:	None

COM1 uses IRQ 4. The interrupt vector associated with IRQ 4 is located at 000:0030.

To obtain direct communication with the touch controller, an interrupt handler should be written and coupled to IRQ 4. The mouse driver **should not** be loaded after the new handler is installed.

Host System Protocol and Self Tests

The following information provides self tests and system communication settings.

Host Communication Protocol:

7 Data Bits, No Parity, 2 Stop Bit.

The touch controller requires a total of 10 bits, unused bits should be set high.

XON/XOFF Software Protocol.

Note: ***Modes 0-3 require that the host system sends 10 data bits, including start and stop bits.
Modes 4-7 require that the host system sends 11 data bits, including start and stop bits.
The touch interface may act erratically if framing is not compatible.***

Resetting the Controller Serial Channel:

The touch controller serial channel can be reset to the default values by toggling the RTS/DTR serial lines together, that is, both RTS from low to high, and DTR from high to low for 55 msec. The ability to reset via the RTS/DTR serial lines can be disabled through Command 05H. Before resetting the serial channel, the host and controller should be in an idle state. The touch controller will respond to the serial reset by transmitting the byte<4DH>, 'M', to the host.

Buzzer Tones at Start Up:

Buzzer Tones	Message
1	Normal Operation - Test Passed
2	RAM Test Failure
3	ROM Checksum Error
4	RAM Failure and ROM Checksum Failure
5	Bad IR Beams Detected
6	RAM and IR system errors
7	ROM Checksum and IR system errors

5.4.1 Host Command and Solicited Report List

The following is a list of 1 bit commands used to interface directly with the IR touch controller: In almost all cases this level of interfacing is automatically handled by the touch driver.

8-bit binary values are represented in the following form:

<xxH>, where 'xxH' is the binary value in hexadecimal form.

The following notation is used to represent pre-defined values:

<ESC> is escape character (1BH).

<EOT> is end-of-transmission (04H).

<SOH> is 01H.

Command 00H: Null command, do nothing

Format: <00H>

Response: None

Command 01H: Perform RAM, ROM tests

Format: <01H>

Response: <ESC> S Pr <EOT>

Pr is the result represented as two ASCII encoded decimal bytes:

'00': all tests passed

'01': RAM test failed

'02': ROM test failed

'03': Both RAM and ROM test failed.

'04': IR test failed, bad beams detected.

'05': RAM and IR test failed.

'06': ROM and IR test failed.

'07': RAM, ROM, and IR test failed.

Command 02H: Set Parameter Inter-Character Time Out Period

Format: <02H> Phi Plo

Response: None

Parameters: Phi and Plo are 8-bit binary values used to set the inter-character time out period for commands utilizing parameters. The timer unit is in 0.1 milliseconds, and a value of Phi = 1 and Plo = 1 sets the inter-character time out period to 0.1 milliseconds.

Example: To set a time out period of 10 milliseconds, set Phi to 10 and Plo to 10.

NOTE: The default time out period is 500 milliseconds. Phi should not be set to zero.

Command 03H: Set controller serial port baud rate

Format: <03H> Pbr

Parameters: Pbr is the requested baud rate, 8 bit binary value:

<00H> : 19200

<01H> : 9600

<02H> : 4800

<03H> : 2400

<04H> : 1200

<05H> : 600

<06H> : 300

Response: None

Command 04H: Signal the end of host string

Format: <04H>

Response: None

Command 05H: Enable/Disable the RTS/DTR Serial Reset

Format: <05H> Pset

Parameter: Pset is a 8-bit binary value and enables/disables the ability to reset the controller serial channel via the RTS/DTR serial lines. A non-zero value enables the reset option, a zero value disables the reset option.

Response: None

Command 06H: Set controller serial port mode

Format: <06H> Pmode

Parameters: Pmode is the requested mode, 8 bit binary value.

<00H> : 7 data bit, no parity, 1 stop - DEFAULT

<01H> : 7 data bit, odd parity, 1 stop

<02H> : 7 data bit, even parity, 1 stop

<03H> : 7 data bit, no parity, 2 stops

<04H> : 8 data bit, no parity, 1 stop

<05H> : 8 data bit, odd parity, 1 stop

<06H> : 8 data bit, even parity, 1 stop

<07H> : 8 data bit, no parity, 2 stops

Response: None

NOTE: Modes 0-3 require that the host sends 10 data bits, modes 4-7 require that the host sends 11 data bits, including the start bit.

Command 07H: Set bell tone length
 Format: <07H> Plen
 Parameters: Plen is an eight (8) bit binary value in 65 mS units, representing the length of time that the bell will be 'toned'. A length of zero indicates note to tone the bell.
 Response: None
 Example: To tone the bell for a time duration of 65 mS send the following message:
 <07H> <01H>
 Once the command is sent, touch the screen and the tone will chime.

Command 08H: Set touch scanner sensitivity
 Format: <08H> Pmax Pmin
 Parameters: Both of the parameters are 8 bit binary values.
 Pmax is the max touch size in units of logical beams (between 1 and 30 inclusively, default 6) Pmin is the min touch size in units of logical beams (between 1 and Pmax inclusively, default 1)
 Response: None

Command 09H: Set Bell Mode
 Format: <09H> Pmode
 Parameters: Pmode is an ASCII encoded value with the following values:
 'E' - Tone bell on entry. (Default)
 'X' - Tone bell on exit.
 Note: Bell will only tone when the bell tone length (see Command 07H) is non-zero.

Command 0AH: Set IR Report Mode
 Format: <0AH>Pmode
 Parameters: Pmode is the requested mode, 8-bit binary value, and is a bit mask used to enable/disable touch event reports. Pmode's bits have the following definition.

<u>Bit</u>	<u>Event</u>	<u>Definition</u>
0	Entry	set enables sending of entry reports cleared disables sending of entry reports
1	Track	set enables sending of track reports cleared disables sending of track reports
2	Exit	set enables sending of exit reports cleared disables sending of exit reports
3	Multiple	set enables sending of multiple touch report cleared disables sending of multiple touch report

Note: Pmode default state at power up is <0FH>, i.e., report all touch events
 Response: None
 Example: To enable the reporting of both entry and exit reports, and disable the reporting of both track and multiple reports, send the following message:

<0AH> <05H>

Command 0BH: Echo input data
Format: <0BH> Pdata <EOT>
Parameters: Pdata is the series of bytes to be echoed and the message is terminated by the <EOT> character.
Response: <ESC> F Pdata <EOT>

Command 0CH: Report controller serial port baud rate
Format: <0CH>
Response: <ESC> D Pbr <EOT>
Pbr is the baud rate representation in two ASCII encoded decimal bytes:
'00' : 19200
'01' : 9600
'02' : 4800
'03' : 2400
'04' : 1200
'05' : 600
'06' : 300

Command 0DH: Report Serial Mode
Format: <0DH>
Response: <ESC> N Pmode <EOT>
Pmode is the serial mode represented by two ASCII encoded decimal bytes:
'00' : 7 data bit, no parity, 1 stop
'01' : 7 data bit, odd parity, 1 stop
'02' : 7 data bit, even parity, 1 stop
'03' : 7 data bit, no parity, 2 stops
'04' : 8 data bit, no parity, 1 stop
'05' : 8 data bit, odd parity, 1 stop
'06' : 8 data bit, even parity, 1 stop
'07' : 8 data bit, no parity, 2 stops

Command 0EH: Enable/Disable IR Touch.
Format: <0EH> Pmode
Parameters: Pmode is an 8-bit binary value with the following values:
<00H> - Disable Touch.
<01H> - Enable Touch. - DEFAULT
Response: None.

Command 0FH: Report bad beams

Format: <0FH>

Response: <ESC> B P0..Pn <EOT>

P0..Pn is the ID (bit-encoded) numbers of failed beams.
Transmitted as ASCII encoded hexadecimal numbers, two numbers representing 8-bits (1 byte) of beam table info.

Example: Beams 2 and 51 are bad, the internal bad beam table would be represented as (binary, 0: good, 1: bad):

<u>Internal</u>		<u>Hex Value</u>	<u>Transmitted Character</u>
MSB	LSB		
00000100		(04H)	'0' '4'
00000000		(00H)	'0' '0'
00000000		(00H)	'0' '0'
00000000		(00H)	'0' '0'
00000000		(00H)	'0' '0'
00000000		(00H)	'0' '0'
00000000		(00H)	'0' '0'
00001000		(08H)	'0' '8'
00000000		(00H)	'0' '0'
00000000		(00H)	'0' '0'

So the response would be:

<ESC> 'B' '0' '4' '0' '0' '0' '0' '0' '0' '0' '0'
'0' '0' '0' '0' '8' '0' '0' '0' '0' '0' <EOT>

Command 10H: Set Entry Counter

Format: <10H>Pent

Parameters: Pent is an 8-bit binary value representing the number of 65 mS scans to wait before reporting the entry event.

Note: The value zero (0) has the same effect as the value one (1), i.e., the entry event is reported on the first scan. Default value is zero.

Response: None

Example: To report the entry event on the third 65 mS scan, send the following message:
<10H> <03H>

Command 12H: Report Touch Type

Format: <12H>

Response: <ESC> I Ptype <EOT>

Ptype is the touch type in use and is one of the following:

<49H> Touch type is IR Touch

<52H> Touch type is Resistive Touch

Command 14H: Report number of X and Y beams (not LEDs)

Format: <14H>

Response: <ESC> H Px0 Px1 Py0 Py1 <EOT>

Px0, Px1 is the number of X beams in ASCII (two bytes)

Py0, Py1 is the number of Y beams in ASCII (two bytes)

Example: There are 81 X beams, and 59 Y beams, then the response would be:

<ESC> 'H' '8' '1' '5' '9' <EOT>

Command 15H: Report Power On Self Test (POST) results

Format: <15H>

Response: <ESC> S Pr <EOT>

Pr is the result represented as two ASCII encoded decimal bytes:

'00': all tests passed

'01': RAM test failed

'02': ROM test failed

'03': Both RAM and ROM test failed.

'04': IR test failed, bad beams detected.

'05': RAM and IR test failed.

'06': ROM and IR test failed.

'07': RAM, ROM, and IR test failed.

Command 16H: Report software version

Format: <16H>

Response: <ESC> V Pv Pr Px Py <EOT>

Pv is the version in one byte ASCII encoded decimal.

Pr is the revision in one byte ASCII encoded decimal.

Px is the number of X beams in two byte ASCII encoded decimal.

Py is the number of Y beams in two byte ASCII encoded decimal.

Example: If the current version is version 1 revision 0, and there are 81 X beams and 59 Y beams, the response would be:

<ESC> 'V' '1' '0' '8' '1' '5' '9' <EOT>

Command 17H: Report touch scanner sensitivity

Format: <17H>

Response: <ESC> J Pmax Pmin <EOT>

Pmax is the max touch size in units of logical beams, in two ASCII encoded decimal characters.

Pmin is the min touch size in units of logical beams, in two ASCII encoded decimal characters.

Example: <ESC> 'J' '0' '6' '0' '1' <EOT>

Command 18H: Report IR Report Mode

Format: <18H>

Response: <ESC> R Pmode <EOT>

Parameters: Pmode is the current IR reporting mode, in two ASCII encoded hexadecimal characters, and represents a bit mask where the bits are used to indicate the enabling/disabling of touch event reports. Pmode's bits have the following definition:

<u>Bit</u>	<u>Event</u>	<u>Definition</u>
0	Entry	set enables sending of entry reports cleared disables sending of entry reports
1	Track	set enables sending of track reports cleared disables sending of track reports
2	Exit	set enables sending of exit reports cleared disables sending of exit reports
3	Multiple	set enables sending of multiple touch report cleared disables sending of multiple touch report

Example: <ESC> 'R' '0' '5' <EOT>

Indicates that the entry and exit touch events are enabled, while the track and multiple touch reports are disabled.

Command 19H: Report Entry Counter

Format: <19H> Pent

Response: <ESC> 'Q' Pent <EOT>

Parameters: Pent is the number of 65 mS scans to wait before reporting the entry event in two ASCII encoded decimal characters.

Note: The value zero (0) has the same effect as the value one (1), i.e., the entry event is reported on the first scan.

Example: <ESC> 'Q' '0' '3' <EOT>

Indicates that the entry event will be reported on the third 65 mS scan.

5.4.2 Unsolicited Report List

These are reports sent to the host without host command. These reports represent interaction at the touch bezel.

Entry: New touch detected

Format: <ESC> E Py Px <EOT> <60H> <SOH> <SOH>
Py, Px is the touch coordinate at entry time in ASCII DECIMAL (two bytes each).

Example: Touch detected at coordinate (43, 19)
<ESC> 'E' '1' '9' '4' '3' <EOT> <60H> <SOH> <SOH>

Track: Touch has moved to new position.

Format: <ESC> T Py Px <EOT> <60H> <SOH> <SOH>
Py, Px->new touch coordinate in ASCII encoded decimal (two bytes each).

Example: Touch has moved to coordinate (38, 46)
<ESC> 'T' '4' '6' '3' '8' <EOT> <60H> <SOH> <SOH>

Exit: Touch has exited the bezel.

Format: <ESC> X <EOT> <40H> <SOH> <SOH>

Multiple: Multiple touch coordinates detected.

Format: <ESC> M <EOT>

6.0 Resistive Touch System for the ST-C241

The ST-C241 is available with a resistive touch screen. The hardware consists of the touch bezel and the touch controller. The touch bezel reads all touch inputs. The touch controller processes this information, then communicates with the computer over a RS232 link.

A software touch driver runs on the computer, which processes the RS232 touch point data, and formats the information as if it were coming from a mouse.

Touch drivers are pre-installed at the factory and reside on the mass storage device. The touch screen is factory calibrated, and normally requires no field adjustment. Touch drivers and documentation are sent on a 3 ½" floppy.

More complete documentation is available on the web page at <http://www.elotouch.com>. Here are samples of available information:

Hardware Manual: Request at <http://www.elotouch.com/manuals.html>:

AccuTouch Product Manual - version 3.1a - (Part number 008211).
Installation, specifications, and hardware troubleshooting for AccuTouch systems.

Software Manuals: <http://www.elotouch.com/manuals.html>:

MonitorMouse for Windows 95 - version 1.0 - (Part number 008224-A).

MonitorMouse for Windows NT - version 2.0 - (Part number 008013-A).
Includes English, French, German, Spanish, Italian, Portuguese, and Dutch versions.

DOS and Windows Driver Guide/Disk - version 2.0c - (Part number 008100-A).
For Windows 3.x and DOS. Includes MonitorMouse for Windows 1.6a, MonitorMouse for DOS 1.6a, ELODEV 1.7a,
TouchBack 1.2a and ELODEMO. Includes French, German, Spanish, Italian, Dutch, and Portuguese versions.

MonitorMouse for OS/2 - version 2.1 - (Part number 008010-A).
Includes English, French, German, and Spanish versions.

The most current and complete set of drivers, driver installation instructions, and utilities reside at <http://www.elotouch.com/library.html>. Most files can also be downloaded from the BBS at 510-651-1224 and CompuServe (GO ELOTOUCH)

Here is a list of files in the current library:

Windows 95

MM95_186.EXE (287K) - MonitorMouse for Windows 95, version 1.86. Includes a 32-bit driver and Touchscreen Control Panel. See the README.TXT file after running the self-extracting program.

MMWIN95.EXE (666K) - MonitorMouse for Windows 95, version 1.00. Includes a 32-bit driver and Touchscreen Control Panel, as well as an easy-to-use Windows 95 Setup program. See the !README!.TXT file after running the self-extracting program.

WIN95.TXT (3K) - Instructions for installing the DOS and Windows Driver Disk, version 2.0c (Windows 16-bit 3.x drivers) with Windows 95. These instructions are also included in DWDSK.ZIP and DWENG.ZIP. See the !READ.ME! file. Note: The 16-bit Windows 3.x drivers are only required for Windows 95 if you will be using an old Elo touchscreen controller (models E271-14x, E2x1-280, E281x-400x) or running DOS programs in full screen mode. Otherwise, install MonitorMouse for Windows 95 (32-bit drivers). Do not use a combination of the 16-bit and 32-bit drivers.

Windows NT

MMNT.EXE (641K) - MonitorMouse for Windows NT, version 2.00. See the README.TXT file after running the self-extracting program. Compatible with NT 3.5, 3.51, and 4.0. Includes an updated driver and new multi-language Touchscreen Control Panel, as well as an easy-to-use Setup program. Order disk and printed manual.

DOS and Windows 3.x

DWDSK.ZIP (1011K) - DOS and Windows Driver Disk, version 2.0c with all-in-one INSTALL program. Includes MonitorMouse for Windows 1.6a, MonitorMouse for DOS 1.6a, ELODEV 1.7a, TouchBack 1.2a, and ELODEMO. UnZIP onto a blank 3 1/2" HD floppy with the -d flag: "PKUNZIP -d DWDSK a:", then run A:INSTALL. Order disk and printed manual.

DWENG.ZIP (860K) - Same as DWDSK.ZIP but in English only. UnZIP to blank 3 1/2" HD floppy with -d flag: "PKUNZIP -d DWENG a:", then run A:INSTALL.

MMUPDATE.ZIP (50K) - Updates to ELODEV.EXE (1.7a), MONMOUSE.COM (1.6a), NOMOUSE.COM (1.1), and

ELOCALW.CPL. Does not include INSTALL, demo, or utility programs. Not needed if downloading DWDSK.ZIP or DWENG.ZIP.

MONMICE.ZIP (63K) - Installation instructions for MonitorMice™ for Windows. This new Elo technology (patent applied for) allows multiple touchmonitors and simultaneous users on a single Windows 3.x or Windows 95 PC using multiple video cards, multiport video card(s), or video splitter(s). Also see the MonitorMice press release, MULTIBDS.TXT and POSDEMO.ZIP below. Requires the DOS and Windows Driver Disk, version 2.0c.

MULTIBDS.TXT (1K) - List of companies that manufacture multiport video boards compatible with MonitorMice. Multiple standard PCI video cards may also be used.

POSDEMO.ZIP (110K) - Elo TouchSystems' point-of-sale demo program for Windows. This program can be run on a single touchmonitor or on as many as four touchmonitors with a multiport video card. Four independent users can run simultaneously from the same PC with the new MonitorMice software technology from Elo. See MONMICE.ZIP above.

VBCAL.ZIP(1K) - Visual Basic calibration example. This example program calls an exported function in the Elo TouchSystems Touchscreen Control Panel to calibrate the touchscreen directly from a Visual Basic application (without going through the Control Panel). See page 131 in the DOS and Windows Driver Guide, version 2.0, for more information and an example in C.

ELOCALWJ.HLP (60K) - Japanese version of the Touchscreen Control Panel Help File for Windows 3.x. Rename to ELOCALW.HLP.

COM34.TXT (2K) - Using ELODEV on COM3 and COM4. ASCII text file describing the new support for COM3 and COM4 in ELODEV, MonitorMouse for DOS, and MonitorMouse for Windows 3.x. Also describes the use of UCOMTSR.ASM to allow custom serial port handlers.

ELODEV.EXE (18K) - Pre-release version of ELODEV 1.7b. Fixes "divide-by-zero" message when loading on some 200+ MHz Pentium systems.

DOS

MOUSETST.ZIP (5K) - Example program using the Microsoft Mouse API under DOS (Int 33H). This code is compatible with MonitorMouse for DOS. See the Microsoft Mouse Programmer's Reference book for details (Microsoft Press).

C.ZIP (40K) - Microsoft and Borland C programming examples for ELODEV 1.6 or later. See also TUC.ZIP for examples of Zoned Mode programming.

TUC.ZIP (37K) - Microsoft and Borland C programming examples for ELODEV 1.6 or later in Zoned Mode. Requires TouchUp, sold separately. VESA-compatible SVGA support included in VIEW.C.

PAS.ZIP (27K) - Borland Pascal programming examples for ELODEV 1.6 or later. Includes protected mode support. See also TUPAS.ZIP for examples of Zoned Mode programming.

TUPAS.ZIP (40K) - Borland Pascal programming examples for ELODEV 1.6 or later in Zoned Mode. Requires TouchUp, sold separately. VESA-compatible SVGA support included in VIEW.PAS.

BASIC.ZIP (10K) - BASIC programming examples with ELODEV 1.6 or later. Examples for four compilers included.

ASM.ZIP (7K) - Assembly language programming examples for ELODEV 1.6 or later.

DIAGS.ZIP (44K) - Touchscreen and controller diagnostic tools. Includes BUSSTAT, COMDUMP, INFO, and SAWDUMP (also included on the DOS and Windows Driver Disk). Also includes COMTEST and TSTIMER.

SMARTSET.EXE (60K) - SMARTSET software setup utility for AccuTouch E271-22xx and IntelliTouch E281-2300 controllers; typically not needed if Elo drivers are used.

GRASP.ZIP (11K) - Examples of using MonitorMouse for DOS with GRASP (Paul Mace software). Also includes examples calling ELODEV directly from GRASP 4 and GRASP 5.

MMOTN.TXT (1K) - Notes on using MonitorMouse for DOS with IBM's M-Motion/M-Control under DOS.

OS/2

MMOS2.ZIP (194K) - MonitorMouse for OS/2, version 2.2. Compatible with OS/2 2.x, Warp 3.0 and 4.0. PKUNZIP onto a blank floppy with the -d flag: "PKUNZIP -d MMOS2 a:". See OS2DOC.ZIP for manual. Order disk and printed manual.

MMOS2E.ZIP (111K) - Same as MMOS2.ZIP but English-language Touchscreen Control Panels only.

OS2DOC.ZIP (21K) - MonitorMouse for OS/2 User's Guide, version 2.1 (ASCII text version). See MMOS2.ZIP for software.

Check out the frequently asked questions at: <http://www.elotouch.com/faqs.html>.

Q. Why doesn't the cursor follow my finger properly after changing the display resolution?

A. The touch screen is still calibrated for the old display resolution. You need to re-calibrate the touch driver. (Note: Display resolution is automatically changed when switching from 640 X 480 VGA to 640 X 350 EGA software, or accessing the 720 X 400 DOS screen.)

Instructions for re-calibrating the Resistive touch driver when running Windows 95:

Click on START

Select SETTINGS

Select CONTROL PANEL

Select ELO CALIBRATE

Follow on screen directions.

The Ten Tips for Effective Touchscreen Applications at <http://www.elotouch.com/10tips.html> are reprinted below:

Ten simple pointers that can make the difference between success and failure for your touch-activated application.

1. Run your application full screen—Remove title bars and menu bars so your application can take full advantage of the entire display area.

2. Use bright background colors (no black)—Bright backgrounds in your application will hide fingerprints and reduce glare.

Dithering or other patterned backgrounds (for example, the "crumpled paper look") help the eye focus on the screen image instead of reflections, even in areas where there are no icons or menu choices.

3. Use a simple point-and-click interface with large buttons—Dragging, double-clicks, scroll bars, drop-down menus, multiple windows, or other elements can confuse the typical user and interfere with user-friendliness and efficiency.

4. Turn the cursor off so your user will focus on the entire screen instead of the arrow—A cursor on the screen makes the user think, "How do I get the arrow to do what I want?" Remove the cursor, and the user's thinking and actions become direct instead of indirect—thereby unlocking the true power of touchscreens.

5. Always give your users feedback as soon as they touch the screen—Immediate feedback is critical to reassure the user that a touch has registered. Responses can be visual, like 3-D button effects similar to those found on a standard Windows button. Or you can provide an audio response, such as a "click" or other sound output whenever a user touches the screen. Be sure that the display clears immediately and that the screen shows an hourglass (or similar icon) while the next screen loads.

6. Make your application fun and fast—Users will walk away from a sluggish system, but you can keep their attention with a quick response to touches (refer to the previous tip). Speedy systems also reduce vandalism. Graphics modes offering lots of colors or higher resolution only slow down your system. Using 256 colors is typically more effective than providing resolution greater than 640x480.

7. Try to make the application intuitive, limit choices, and guide the user as much as possible—Test your application on focus groups. If users pause in confusion—even for a moment—you’ve identified the areas than need improvement.

8. Digitized speech (via a sound card) can walk users through your application—Because the human brain can simultaneously process voice while absorbing an image, there is something almost magical about a user interface that provides voice prompts and touch response. The better kiosk applications exploit this knowledge for maximum effect. For example: “Touch the first letter of the company you are looking for.” Click. “Now touch OK.” Click.

9. Make your application part of an attractive package—Animation and large fonts help attract users to kiosk applications. The actual design of the kiosk cabinet should also be attractive (see tip #10 below).

10. Keep the following considerations in mind when designing a kiosk cabinet—Are you using forced air ventilation? Put your fan at the top, near the monitor’s vents. To minimize the airborne dust from footsteps, keep the intake away from the floor. Keep air from entering around the monitor face, too. Remember to point your speakers in the direction of your user’s ears. Finally, choose a finish that does not show fingerprints—avoid polished stainless steel, chrome, or glossy black paint.

Information in this Resistive Touch section is copyrighted by Elo TouchSystems, Inc, and published by permission.

7.0 Input/Output Interface Ports

7.1 SERIAL COMMUNICATIONS PORT

The SealTouch 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

7.1.1 Port Address Selection

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

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

7.2 PARALLEL COMMUNICATIONS PORT

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

7.2.1 Port Address Selection

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

7.2.2 Parallel Port Connector

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

Signal	Pin		Pin	Signal
STRB - Strobe	1	<input type="checkbox"/> <input type="checkbox"/>	2	-AFX - Autofeed
D0	3	<input type="checkbox"/> <input type="checkbox"/>	4	-ERR - Error
D1	5	<input type="checkbox"/> <input type="checkbox"/>	6	-INIT - Initialization
D2	7	<input type="checkbox"/> <input type="checkbox"/>	8	-SLIN - Select In
D3	9	<input type="checkbox"/> <input type="checkbox"/>	10	GND
D4	11	<input type="checkbox"/> <input type="checkbox"/>	12	GND
D5	13	<input type="checkbox"/> <input type="checkbox"/>	14	GND
D6	15	<input type="checkbox"/> <input type="checkbox"/>	16	GND
D7	17	<input type="checkbox"/> <input type="checkbox"/>	18	GND
-ACK - Acknowledge	19	<input type="checkbox"/> <input type="checkbox"/>	20	GND
BUSY - Busy	21	<input type="checkbox"/> <input type="checkbox"/>	22	GND
PE - Paper Empty	23	<input type="checkbox"/> <input type="checkbox"/>	24	GND
SLCT - Select	25	<input type="checkbox"/> <input type="checkbox"/>	26	NC

7.2.2.1 EPP Pin Configuration

EPP Signal	EPP Name	Type	EPP Description
/WRITE	/Write	O	This signal is active low. It denotes a write operation.
PD< 0 : 7>	Address / Data	I/O	Bi-directional EPP byte wide address and data bus.
INTR	Interrupt	I	This signal is active high and positive edge triggered.
WAIT	/Wait	I	This signal is active low. It is driven inactive as a positive acknowledgment from the device that the transfer of data is completed. It is driven active as an indication that the device is ready for the next transfer.
DATASTB	/DataStrobe	O	This signal is active low. It is used to denote data read or write operation.
PE	Paper End	I	Same as SPP mode.
RESET	/Reset	O	This signal is active low. When driven active EPP device is reset to its initial condition.
ADDRSTB	/AddressStro be	O	This signal is active low. It is used to denote address read or write operation.
SLCT	Printer Selected Status	I	Same as Standard PP.
/ERR	Error	I	Same as SPP.
PDIR	Parallel Port Direction	O	This output shows the direction of the data transfer on the parallel port bus. A low means an output/write condition and a high means an input/read condition. This signal is normally a low (output/write) unless an EPP read cycle is in progress.

7.2.2.2 ECP Pin Configuration

Name	Type	Description
/Strobe	O	During write operations, /Strobe registers data or address into the slave on the asserting edge (Handshakes with Busy).
Pdata 7:0	I/O	Contains address or data or RLE data.
/Ack	I	Indicates valid data driven by the peripheral when asserted. This signal handshakes with /AutoFd in reverse.
PeriphAck (Busy)	I	This signal de-asserts to indicate that the peripheral can accept data. This signal handshakes with /Strobe in the forward direction. In the reverse direction this signal indicates whether the data lines contain ECP command information or data. The peripheral uses this signal to flow control in forward direction. It is an interlocked handshake with /Strobe. PeriphAck also provides command information in reverse direction
PEerror (/AckReverse)	I	Used to acknowledge a change in the direction of the transfer (asserted = forward). The peripheral drives this signal low to acknowledge /ReverseRequest. It is an interlocked handshake with /ReverseRequest. The host relies on /AckReverse to determine when it is permitted to drive the data bus.
Select	I	Indicates printer on-line.
/AutoFd (HostAck)	O	Requests a byte of data from the peripheral when asserted, handshaking with /Ack in reverse direction. In the forward direction this signal indicates whether the data lines contain ECP address or data. The host drives this signal to flow control in the reverse direction in an interlocked handshake with /Ack. HostAck also provides command information in forward phase.
/Fault (/Periph Request)	I	Generates an error interrupt when asserted. This signal provides a mechanism for peer-to-peer communication. This signal is valid only in the forward direction. During ECP mode the peripheral is permitted (but not required) to drive this low to request a reverse transfer. The request is merely a hint to the host; the host has ultimate control over the transfer direction. This signal would be typically used to generate an interrupt to host processor.
/Init	O	Sets the transfer direction (0 = reverse, 1 = forward). This pin is driven low to place the channel in the reverse direction. The peripheral is only allowed to drive the bi-directional data bus while in ECP mode and HostAck is low and /SelectIn is high.
/SelectIn	O	Always 1 in ECP mode.

7.3 EXTERNAL FLOPPY DRIVE OPTION

FOR CLASS I, DIVISION 2 OPERATION:

- 1. CAUTION - POWER TO THE DEVICE MUST CONFORM TO CLASS I, DIVISION 2 WIRING METHODS AS DEFINED IN ARTICLE 501-4(b) OF THE NATIONAL ELECTRICAL CODE, NFPA70 FOR INSTALLATIONS WITHIN THE UNITED STATES, OR AS SPECIFIED IN SECTION 18-152 OF THE CANADIAN ELECTRICAL CODE FOR INSTALLATIONS WITHIN CANADA.**
- 2. SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY.**
- 3. WARNING -- EXPLOSION HAZARD -- SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.**
- 4. WARNING -- EXPLOSION HAZARD -- DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.**
- 5. WARNING -- EXPLOSION HAZARD -- WHEN IN HAZARDOUS LOCATIONS TURN OFF POWER BEFORE INSERTING OR REPLACING BOARDS.**

The SealTouch computer system has a 37 pin port for an external floppy drive option. The external floppy drive available from Deeco is a ruggedized 3.5" 1.44 MB disk drive.

7.3.1 Installing an External Floppy Disk Drive

The floppy drive connector requires a special floppy drive and cable, option 602.

Follow these steps to properly install Deeco's special external floppy disk drive:

- Remove all power to the computer system.
- Connect the floppy drive to the computer's 37 pin female D sub port.
- Connect the power supply to the single external jack on the back of the floppy drive.
- Apply power to the computer system and external floppy disk drive.
- Update the BIOS system in the SealTouch computer to include the new floppy drive. Refer to the accompanying SBC manual for BIOS setup instructions.

The BIOS must be informed of the type of diskette drive attached to the system.

7.3.2 External Floppy Driver Interface

The floppy disk drive connector on the SealTouch computer is a 37-pin D-subminiature female connector. The pin assignments for the external disk drive interface are as follows:

PIN	SIGNAL	PIN	SIGNAL
1	Ground	19	Ground
2	Reduce Write Current	20	Step
3	Ground	21	Ground
4	NC	22	Write Data
5	Ground	23	Ground
6	NC	24	Write Enable
7	Ground	25	Ground
8	Index	26	Track 00
9	Ground	27	Ground
10	Motor Enable A	28	Write Protect
11	Ground	29	Ground
12	NC	30	Read Data
13	Ground	31	Ground
14	Drive Select A	32	Select Head 1
15	Ground	33	Ground
16	NC	34	Disk Change
17	Ground	35	VCC
18	Direction	36	VCC
		37	VCC

Note that the connector is **NOT** designed to be wired directly to a 34 pin floppy drive connector.

Caution: Do not connect directly to a floppy disk drive connector.

Connect only to the Deeco Option 602 external floppy disk drive

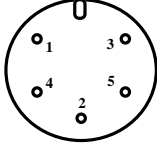
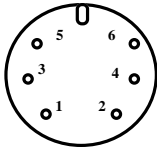
Do NOT operate the Deeco Option 602 external floppy disk drive in a Class I, Division 2 Explosive Environment

WARNING!!

EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

7.4 KEYBOARD PORT

The SealTouch computer supports an AT style 101 Keyboard, and a PS/2 mouse interface. The SBC BIOS supports the PS/2 mouse.

Keyboard Connector (Rear View)	<table border="1"> <thead> <tr> <th><u>Pin</u></th> <th><u>Signal</u></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>KeyClk</td> </tr> <tr> <td>2</td> <td>KeyData</td> </tr> <tr> <td>3</td> <td>NC</td> </tr> <tr> <td>4</td> <td>GND</td> </tr> <tr> <td>5</td> <td>VCC</td> </tr> </tbody> </table>	<u>Pin</u>	<u>Signal</u>	1	KeyClk	2	KeyData	3	NC	4	GND	5	VCC			
<u>Pin</u>	<u>Signal</u>															
1	KeyClk															
2	KeyData															
3	NC															
4	GND															
5	VCC															
PS/2 Mouse Connector (miniDIN) (Rear View)	<table border="1"> <thead> <tr> <th><u>Pin</u></th> <th><u>Signal</u></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>MseData</td> </tr> <tr> <td>2</td> <td>NC</td> </tr> <tr> <td>3</td> <td>GND</td> </tr> <tr> <td>4</td> <td>VCC</td> </tr> <tr> <td>5</td> <td>MseClk</td> </tr> <tr> <td>6</td> <td>NC</td> </tr> </tbody> </table>	<u>Pin</u>	<u>Signal</u>	1	MseData	2	NC	3	GND	4	VCC	5	MseClk	6	NC	
<u>Pin</u>	<u>Signal</u>															
1	MseData															
2	NC															
3	GND															
4	VCC															
5	MseClk															
6	NC															

WARNING!!

EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

Do NOT operate an uncertified keyboard in a Class I, Division 2 Explosive Environment

7.5 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 units can be ordered with a 10 BASE-T connector on the rear of the SealTouch computer, or with a 10 BASE-2 connector.

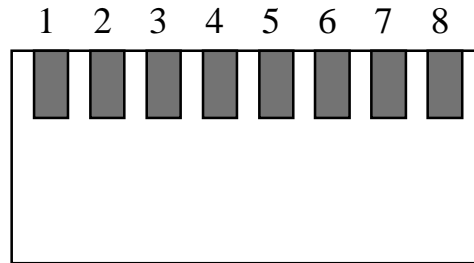
**Do NOT operate an uncertified Ethernet interface in a
Class I, Division 2 Explosive Environment**

Ethernet option is not applicable to Class I, Division 2 Group A, B, C, D hazardous operation locations

7.5.1 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

7.5.2 10 BASE-2 Connector

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

8.0 General Maintenance

8.1 MAINTENANCE OF IR TOUCH SYSTEM

The bezel and filter are made of an acrylic material, so strong solvents 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. Occasionally wipe the touch screen with a soft cloth to prevent dust from interfering with the touch system. Refer to the following section for details regarding suitable cleaning compounds.

8.1.1 Effects of Chemicals on the IR Bezel/Filter

The following table provides a list of chemicals and their effect on acrylic plastic after 7 days immersion at 77° F (25° C).

Class	Name	% Solution	Effect
Acids	Acetic Acid	100	Dissolves
	Chromic Acid	40	Discolors
	Citric Acid	10	Negligible
	Hydrochloric Acid	38	Attacks
	Hydrochloric Acid	10	Negligible
	Nitric Acid	40	Attacks
	Nitric Acid	10	Negligible
	Oleic Acid	Any	Negligible
	Sulfuric Acid	98	Dissolves
	Sulfuric Acid	30	Negligible
Bases	Ammonium Hydroxide	28	Negligible
	Sodium Carbonate	20	Negligible
	Sodium Hydroxide	60	Negligible
Commercial	Cottonseed Oil	Any	Negligible
	Detergent Solution	Any	Negligible
	Kerosene No. 2 D396	Any	Negligible
	Lacquer Thinner	Any	Dissolves
	Mineral Oil	Any	Negligible
	Soap Solution	Any	Negligible
	Transformer Oil D1040	Any	Negligible
	Turpentine D13	Any	Attacks

(Continued on next page)

Class	Name	% Solution	Effect
Inorganic Compounds	Distilled Water	Any	Negligible
	Hydrogen Peroxide	28	Negligible
	Sodium Chloride	10	Negligible
	Sodium Hypochlorite	5	Negligible
Organic Compounds	Carbon Tetrachloride	Any	Attacks
	Dibutyl Sebacate	Any	Negligible
	Diethyl Formimide	Any	Swells
	Acetone	Any	Dissolves
	Aniline	Any	Dissolves
	Benzene	Any	Dissolves
	Ethyl Acetate	Any	Dissolves
	Ethyl Alcohol	95	Dissolves
	Ethyl Dichloride	50	Absorbs 2%
	2-Ethylhexyl Sebacate	Any	Dissolves
	Heptane	Any	Negligible
	Isooctane	Any	Negligible
	Methyl Alcohol	Any	Attacks
	Phenol (Aqueous)	5	Attacks
	Toluene	Any	Dissolves

8.2 MAINTENANCE OF RESISTIVE TOUCH

The following table provides a list of chemicals and their effect on acrylic plastic after 7 days immersion at 77° F (25° C).

Class	Name	% Solution	Effect	
Acids	Acetic Acid	100	Dissolves	
	Chromic Acid	40	Discolors	
	Citric Acid	10	Negligible	
	Hydrochloric Acid	38	Attacks	
	Hydrochloric Acid	10	Negligible	
	Nitric Acid	40	Attacks	
	Nitric Acid	10	Negligible	
	Oleic Acid	Any	Negligible	
	Sulfuric Acid	98	Dissolves	
	Sulfuric Acid	30	Negligible	
	Bases	Ammonium Hydroxide	28	Negligible
		Sodium Carbonate	20	Negligible
Sodium Hydroxide		60	Negligible	
Commercial	Cottonseed Oil	Any	Negligible	
	Detergent Solution	Any	Negligible	
	Kerosene No. 2 D396	Any	Negligible	
	Lacquer Thinner	Any	Dissolves	
	Mineral Oil	Any	Negligible	
	Soap Solution	Any	Negligible	
	Transformer Oil D1040	Any	Negligible	
	Turpentine D13	Any	Attacks	

(Continued on next page)

Class	Name	% Solution	Effect
Inorganic Compounds	Distilled Water	Any	Negligible
	Hydrogen Peroxide	28	Negligible
	Sodium Chloride	10	Negligible
	Sodium Hypochlorite	5	Negligible
Organic Compounds	Carbon Tetrachloride	Any	Attacks
	Dibutyl Sebacate	Any	Negligible
	Diethyl Formimide	Any	Swells
	Acetone	Any	Dissolves
	Aniline	Any	Dissolves
	Benzene	Any	Dissolves
	Ethyl Acetate	Any	Dissolves
	Ethyl Alcohol	95	Dissolves
	Ethyl Dichloride	50	Absorbs 2%
	2-Ethylhexyl Sebacate	Any	Dissolves
	Heptane	Any	Negligible
	Isooctane	Any	Negligible
	Methyl Alcohol	Any	Attacks
	Phenol (Aqueous)	5	Attacks
Toluene	Any	Dissolves	

8.2.1 Cleaning the Resistive Bezel/Filter

Strong solvents should not be used for cleaning purposes. A soft, lint-free cloth, along with a non-abrasive, general purpose cleaner can be used to clean the touch screen.

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

The active area of the touchscreen is resistant to the following chemicals when exposed for a period of one hour at a temperature of 70°F (21°C):

Acetone
Methylene chloride
Methyl ethyl ketone
Isopropyl alcohol
Hexane
Ammonia-based glass cleaner
Mineral spirits
Turpentine

9.0 Opening and Closing Procedures

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS

The following sections provide detailed, step by step procedures for properly opening the enclosure of the SealTouch 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.*

9.1 OPENING AND CLOSING

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

- Place the computer system screen down on a flat, sturdy surface, and remove the 4 #10-32 x ½" socket head screws located at the corners of the back plate of the computer.
- Set the computer enclosure in the vertical position. Carefully open the enclosure. Make sure that the video cable is not subjected to mechanical stress.
- Prior to installing the PC-104 card remove any existing ISA boards. In order to do so, loosen the thumb-screw that holds the ISA bracket. Lift the bracket into upwards position. Remove the ISA boards. Carefully plug the PC-104 card into the socket on the SBC and secure it with appropriate hardware. Replace the ISA cards as they were. Lower the ISA hold-down bracket and tighten the thumb-screw. If there are any jumpers or switches to be set make sure they are set before the board(s) installed.

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

10.0 Troubleshooting and Repair

We believe it is most economical to use the factory's repair service, but we do recognize some customer may prefer to attempt field repairs. These are the basic requirements for field repair:

- 1) A qualified and experienced electronic technician. People without the proper training are likely to make a problem worse!
- 2) An ESD controlled work area. Static electricity introduced into the electronics is often not immediately fatal, but can cause future reliability problems.
- 3) Access to replacement parts.
- 4) A method of driving the computer, monitor, or terminal during diagnostics and repair. Can the same fixture be used for an extended time to assure the repair is complete?

Warning - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off Or The Area Is Known To Be Non-Hazardous

Disconnect Power Before Servicing the Computer!

Observe Static Precautions Whenever Opening the Computer.

ESD damage is not often immediately fatal, but can result in unreliable operation and troublesome repeated failures later in the life of the computer.

Fuse Replacement:

There is a fuse on the power supply. It can be removed and checked with an ohmmeter. Replace it only with the exact type, to avoid a fire hazard.

Oftentimes unreliable operation results if replacement fuse values are not matched exactly. If the fuse is a slow blow type, replace only with a slow blow type fuse. If the fuse is a fast blow type, replace only with a fast blow type fuse, etc.

BIOS System:

If the BIOS system is incorrectly configured, the computer may not operate. Refer to the separate SBC manual for BIOS configuration information.

Cabling and EMI:

If you are experiencing erratic and unreliable operation, consider whether external cables could be picking up electrical noise. If possible, use a shorter external cable as a temporary diagnostic tool. Or, perhaps a shielded cable will help.

Consider routing cables away from sources of electrical noise. Although for mechanical reasons it is tempting to bundle cables together in long parallel runs, this will cause cross-talk between the cables. If you are experiencing glitches, lay out your wiring harness so cables cross at right angles, and avoid parallel runs.

Grounding:

Ground noise can be a troublesome source of unreliable operation in some systems. Pay attention to grounding your systems as well as you can! Usually a star ground topology is preferred - where all the grounds in a system come together at a common point.

The differential mode on an oscilloscope will show ground noise between different parts of the system, and aid in diagnostics.

Virus Detection:

Erratic and troublesome failures can be caused by a virus infection. Run a virus detection software program if you are having problems. It is essential that virus detection software be current to be effective.

Connectors:

If a breakdown occurs after long service in a corrosive environment, it is sometimes worthwhile to check the connectors in the system. Simply removing and re-seating the connectors is sometimes effective. Use extreme care to assure all connectors are replaced exactly as originally installed. More harm comes from misplaced connectors than most other failures!

Display Dimming:

The ST-C231 does have a dimming knob located on the front of the enclosure.

Contacting the Factory:

Contact information is located inside the cover, at the front of this manual. Also, read the Limited Warranty located near the end of this manual for shipping information.

Deeco maintains a complete repair facility, stocked with all the replacement parts necessary to fully repair failed products. Special testing and burn-in equipment assure repaired units are fully functional before they are returned to customers.

In most circumstances customers prefer to return failed units to the factory for service.

It is essential customers contact the factory before returning any unit, and obtain a RMA (return unit authorization) number. Freight to the factory is prepaid by the customer. Freight return to the customer is paid by Deeco. **Ship the product in its original packaging or equivalent to prevent transit damage!**

Repair Information Request

RMA # _____ Model # _____ Serial # _____ Date _____

- 1) When did you discover the problem, and how was the problem found?
- 2) How long was the unit in service before the failure occurred?
- 3) What failure indications are visible on the display?
- 4) Are there any mechanical problems associated with the failure?
- 5) Has the unit received any upgrades since the original date of manufacture?
- 6) Who should we contact if we have technical questions during the repair cycle?

Name: _____

Telephone: _____

Primary Customer Contact: Lois Powers
510-476-2526 (Direct Telephone)
510-471-4700 (Factory Telephone)
510-489-3500 (Fax)
lois.powers@lucasvarity.com

Pin-pointing failures to the Deeco component often seems obvious, yet "No-Problem-Found" is one of our largest failure categories. In some cases an Application Engineer may be able to suggest field tests that could shorten (or even eliminate) the repair cycle. Application Engineering Hotline: 510-476-2551. The email address is ldtechsupport@compuserve.com.

It is now possible for customers to send "Not to Exceed" purchase orders with out-of-warranty repairs. Products are repaired more quickly than otherwise possible, because the waiting period for a purchase order is eliminated.

Please Include a Copy of this Form With the Returned Unit

10.1 DETAILED TROUBLESHOOTING

Deeco maintains a repair facility at the factory and at various international locations. Call Technical Support at and ask for a RMA (return materials 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.

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 Cable
- 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
- IR touch controller
- Cables

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.

10.1.1 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 11.1 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 SealTouch computer that satisfies the proper input power requirements. If the measured power falls within the values shown, proceed to the next troubleshooting guideline.

- **Output Power:**

Refer to section 11.1 for procedures for testing the power supply output.

10.1.2 Touch Interface

10.1.2.1 IR Controller Board

- **Input Power:**

Check to see if the input power to the IR controller Board meets the specifications in the following table.

Pin	Power
1	+12 VDC
2	Ground if E2 is installed, else NC
3	Ground
4	+5 VDC

If the measured input power is incorrect, refer to section 10.1.1 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 20-pin and 40-pin touch frame cables are properly seated at header J1 and J2, respectively. 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 J4 of the controller board.

If none of the above troubleshooting guidelines solves the problem, refer to section 10.1 for the test procedures for the IR Touch System.

10.1.3 Display

10.1.3.1 Active Matrix Display

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

10.1.4 Single Board Computer

WARNING!!

FOR CLASS I, DIVISION 2 OPERATION:

1. **CAUTION - POWER TO THE DEVICE MUST CONFORM TO CLASS I, DIVISION 2 WIRING METHODS AS DEFINED IN ARTICLE 501-4(b) OF THE NATIONAL ELECTRICAL CODE, NFPA70 FOR INSTALLATIONS WITHIN THE UNITED STATES, OR AS SPECIFIED IN SECTION 18-152 OF THE CANADIAN ELECTRICAL CODE FOR INSTALLATIONS WITHIN CANADA.**
2. **SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY.**
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4. **WARNING -- EXPLOSION HAZARD -- DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.**
5. **WARNING -- EXPLOSION HAZARD -- WHEN IN HAZARDOUS LOCATIONS TURN OFF POWER BEFORE INSERTING OR REPLACING BOARDS.**

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 10.1.1 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 12.2 and the accompanying SBC manual for details on proper installation procedures.

11.0 Component Test Procedure

11.1 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 SealTouch Computer enclosure as described in section 9.

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 701, 703, @ connector J1

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

Option 702, 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.

Supplies 701, 702			
Pin	Function	Pin	Function
1	+12 VDC	5	Ground
2	+5 VDC	6	-12 VDC
3	+5 VDC	7	-5 VDC
4	Ground	8	-5 VDC

Supplies 703, 704			
Pin	Function	Pin	Function
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

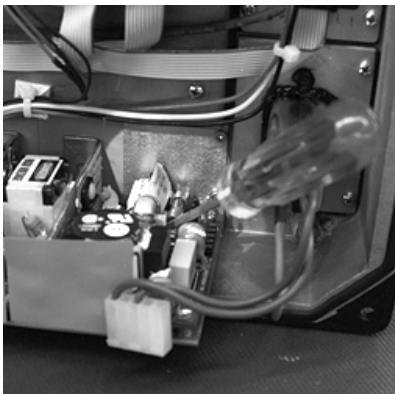
If no output is measured, disconnect the power supply from source voltage and check the fuse on the power supply board.

- **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.

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

WARNING!!
EXPLOSION HAZARD: DO NOT REPLACE FUSE UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

WARNING!!:
FOR PROTECTION AGAINST FIRE REPLACE THE FUSE ONLY WITH THE SAME TYPE AND RATING OF FUSE.



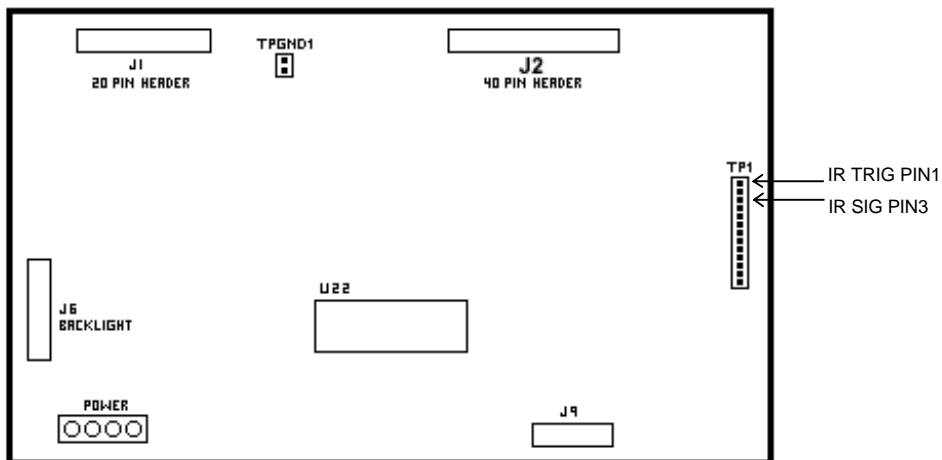
Some power supplies have axial fuse holders. Place a screwdriver on the metal portion of the fuse, and gently lift the fuse from the socket.

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 SealTouch computer's shock and vibration specifications.

Removing a Typical Axial Power Supply Fuse With a Screwdriver

11.2 TOUCH INTERFACE SYSTEM

IR Touch Controller Test Point Pin Locations

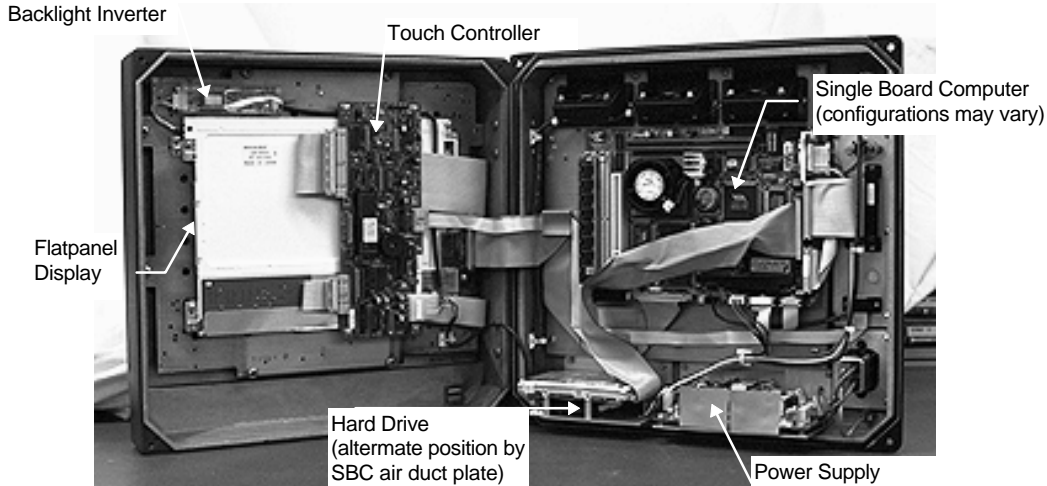


12.0 Component Installation and Removal

WARNING!!

FOR CLASS I, DIVISION 2 OPERATION:

- 1. CAUTION - POWER TO THE DEVICE MUST CONFORM TO CLASS I, DIVISION 2 WIRING METHODS AS DEFINED IN ARTICLE 501-4(b) OF THE NATIONAL ELECTRICAL CODE, NFPA70 FOR INSTALLATIONS WITHIN THE UNITED STATES, OR AS SPECIFIED IN SECTION 18-152 OF THE CANADIAN ELECTRICAL CODE FOR INSTALLATIONS WITHIN CANADA.**
- 2. SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY.**
- 3. WARNING -- EXPLOSION HAZARD -- SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.**
- 4. WARNING -- EXPLOSION HAZARD -- DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.**
- 5. WARNING -- EXPLOSION HAZARD -- WHEN IN HAZARDOUS LOCATIONS TURN OFF POWER BEFORE INSERTING OR REPLACING BOARDS.**



Typical Component Locations

12.1 IR TOUCH CONTROLLER BOARD

12.1.1 Removal

- Open the enclosure of the computer. See section 9.
- Remove the 20-pin and 40-pin touch frame ribbon cables from the J1 and J2 headers on the IR touch controller.
- Remove the IR Interface cable from the J4 header on the controller board.
- Remove the 4-pin power cable.
- Remove the 4 Phillips mounting screws holding the controller board to the clamp plate on the front computer enclosure.
- Remove the IR touch controller from the computer system.

12.1.2 Installation

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

12.2 MEMORY REMOVAL AND INSTALLATION

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

12.2.1 Typical SIMMs Removal

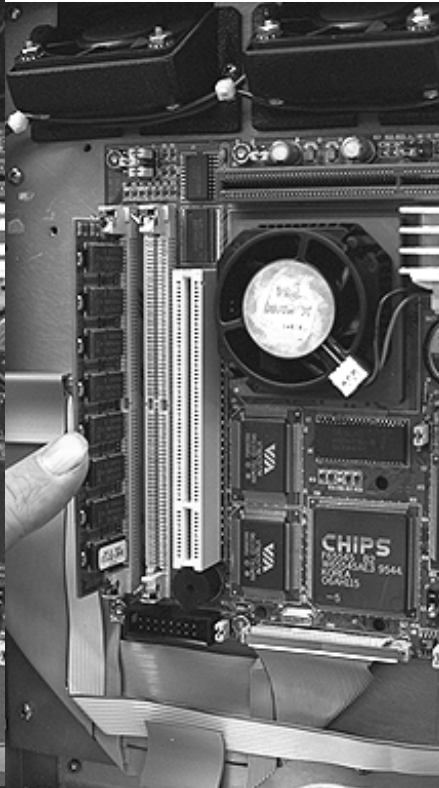
- Open the enclosure of the computer system as detailed in section 9.
- Gently press the retaining clips on each end of the SIMM socket outward until the SIMM comes loose from the retaining tabs.
- Gently pull the SIMM module out of the socket of the motherboard.

12.2.2 Typical SIMMs Installation

Figure A



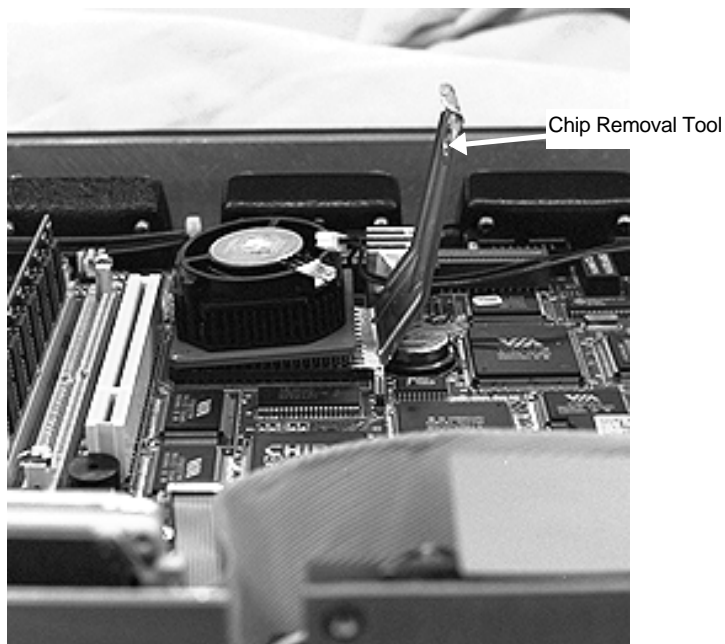
Figure B



- 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.

12.3 MICROPROCESSOR REMOVAL AND INSTALLATION



Removing a Typical Microprocessor From the Socket

Refer to the accompanying SBC User Manual for microprocessor removal and installation guidelines. Make sure the jumper settings match 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.

12.4 CONDUIT COVER (OPTION - EXCEPT FOR CLASS I, DIVISION 2 OPERATION)

The NEMA 4/12 enclosed computer systems have the option of using a conduit cover to insulate the I/O ports and power connections from the outside environment. The following sections provide step by step procedures for the removal and installation of the conduit cover.

12.4.1 Removal

Remove the 8 4-40 ½" socket head screws holding the conduit cover to the rear enclosure of the computer system.

- Remove the conduit cover from the rear enclosure. At this point the I/O ports and external power connection will be revealed. Limited access to the I/O ports can be achieved by removing any one of the 3 screw plugs at the back of the conduit cover.

12.4.2 Installation

To install the conduit cover assembly, simply reverse the order of the removal procedures. It is essential that the gasket used to seal the conduit cover be installed correctly to ensure the integrity of the NEMA 4/12 enclosure.

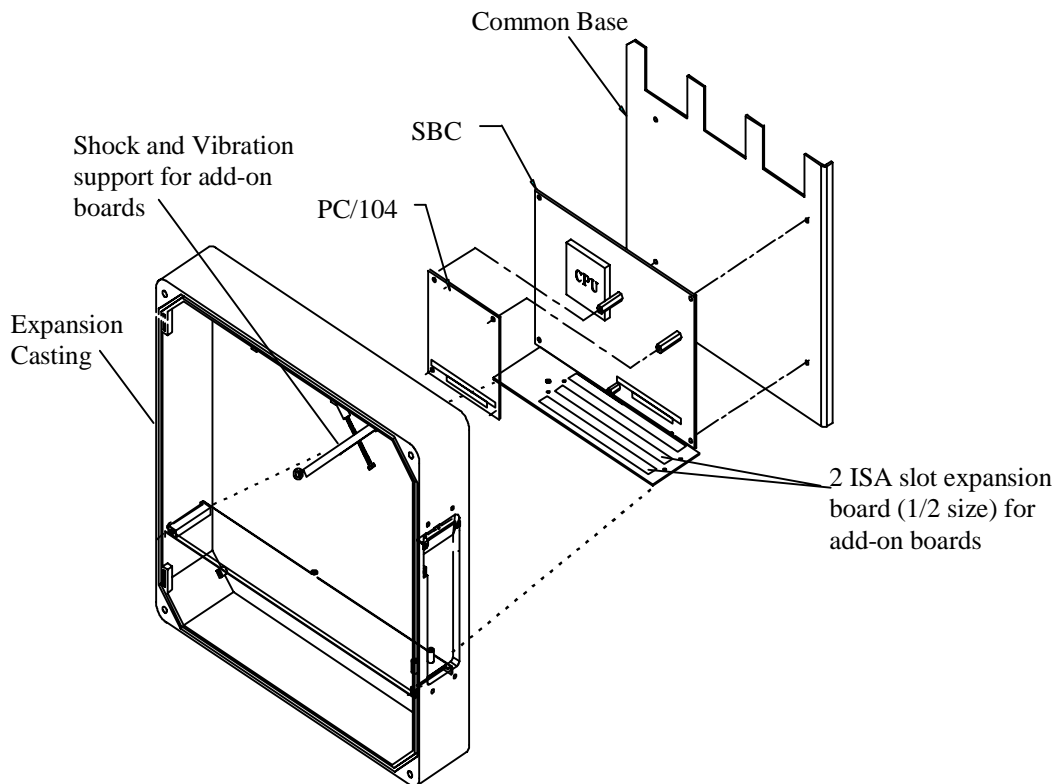
USE RTV ON TEFLON TAPE TO SEAL CONDUITS CONNECTION.

<p style="text-align: center;">Warning - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off Or The Area Is Known To Be Non-Hazardous</p>
--

12.5 2-SLOT EXPANSION CHASSIS (OPTION - EXCEPT FOR CLASS I, DIVISION 2 OPERATION)

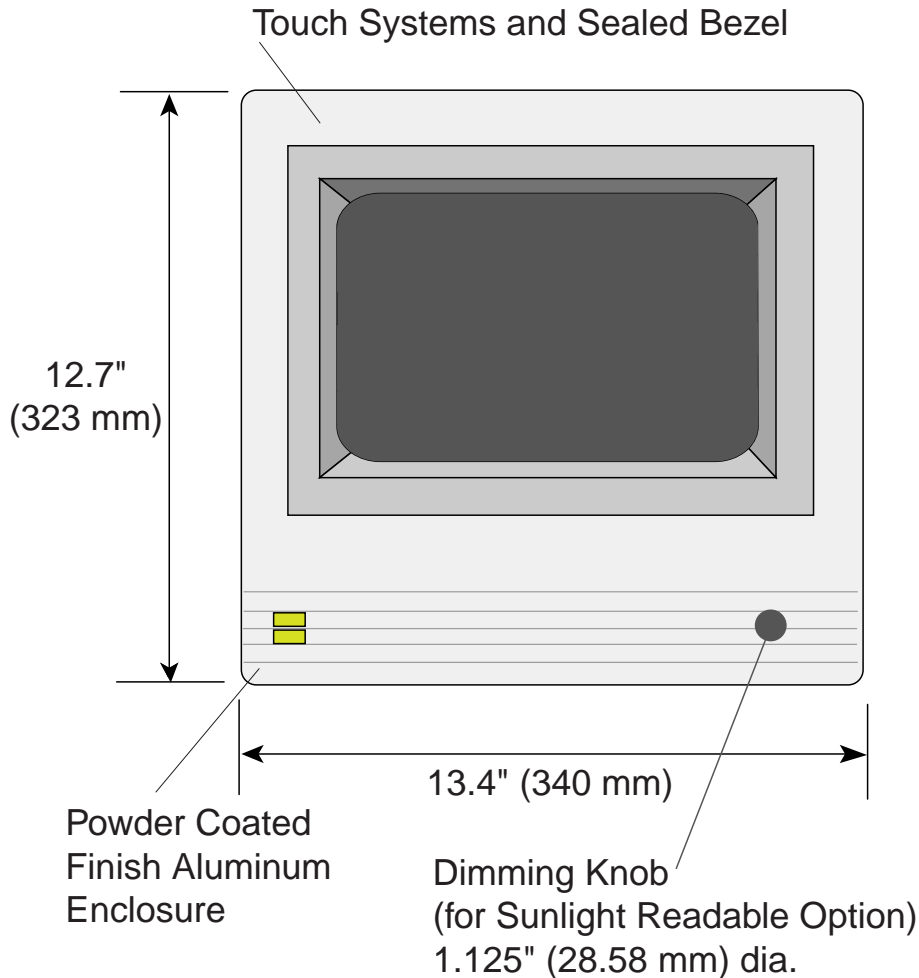
The expansion chassis allows one PC/104 card and 2 ISA card slots or 3 PC/104 cards. The base unit without the expansion chassis allows for a single internal PC/104 card. Without the expansion chassis, the single PC/104 card cannot be externally connected except for an Ethernet connection. The expansion chassis adds 2.5" (63 mm) to the depth of the unit.

The expansion chassis does not require modification of the unit's cabling or hardware so the unit is easily upgradeable for additional card slots. The expansion chassis can be incorporated into existing models.



Appendix A: Mechanical Drawings

A.1 SEALTOUCH COMPUTER FRONT VIEW



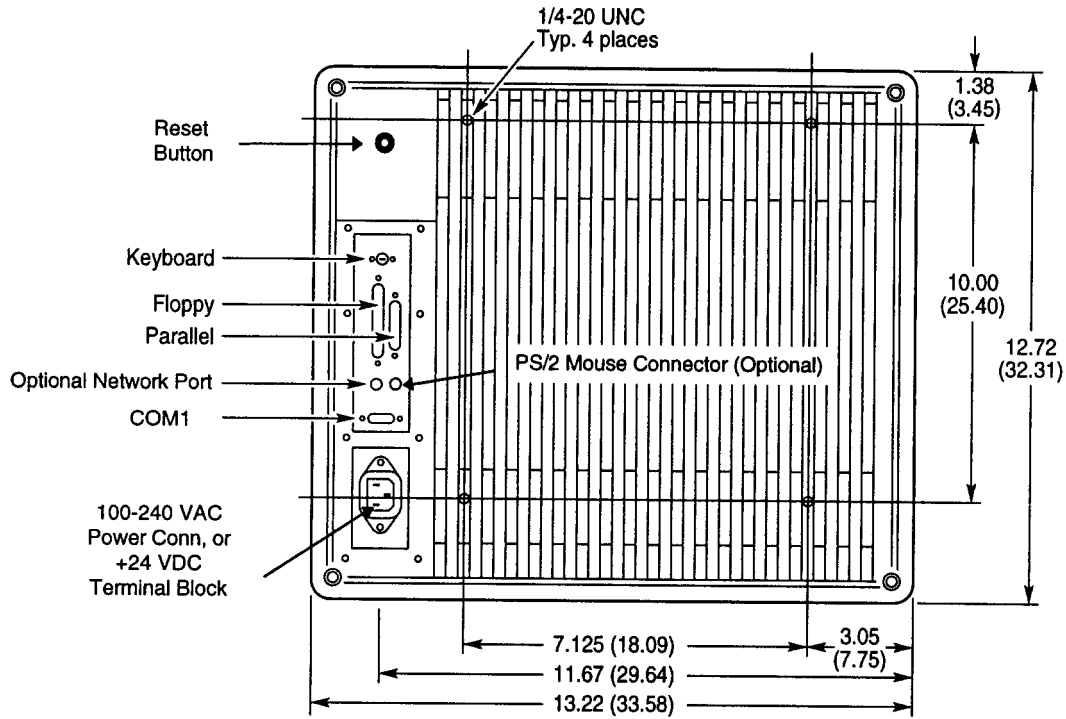
Front View

Note: Internal hinges are on the left side; SealTouch computer opens right to left.

Overall Dimensions are the same for both units. The only outer physical differences is the ST-C241 has a larger display (12.1) than the ST-C231 (10.4).

Drawing not to scale. All dimensions are in inches and (millimeters).

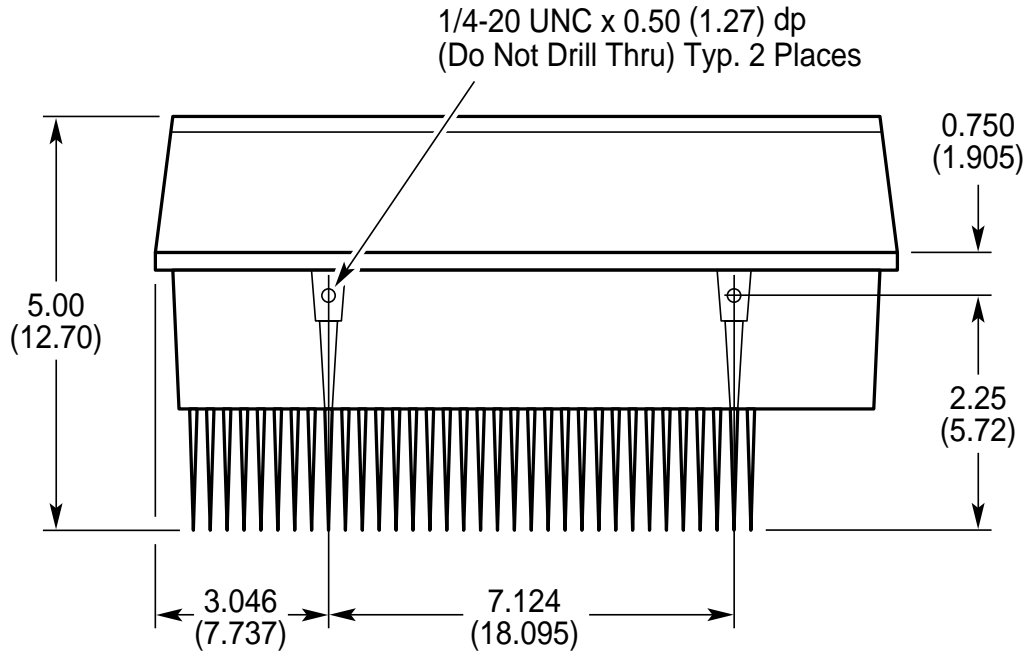
A.2 SEALTOUCH COMPUTER REAR VIEW



Mounting holes are 1/4"-20 UNC 0.5" deep.

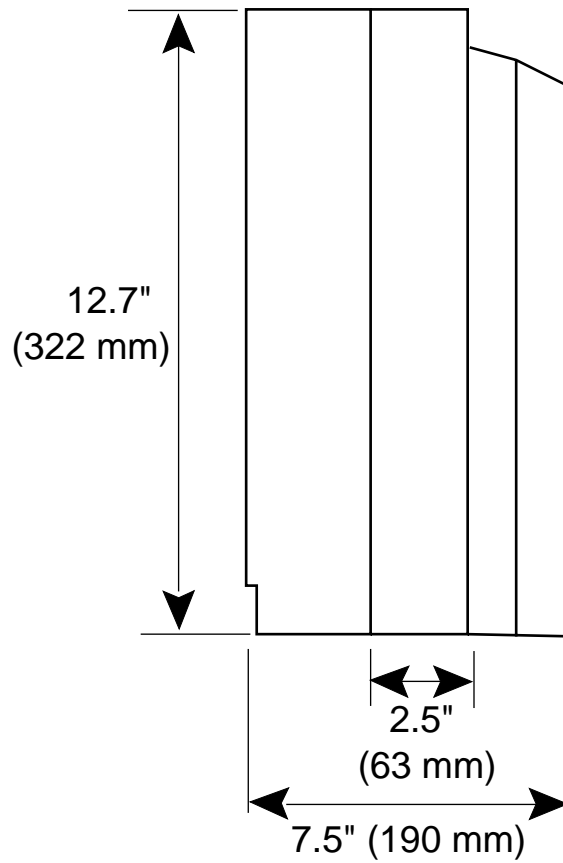
Drawing not to scale -- Dimensions are in inches (cm).

A.3 SEALTOUCH COMPUTER BOTTOM VIEW



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

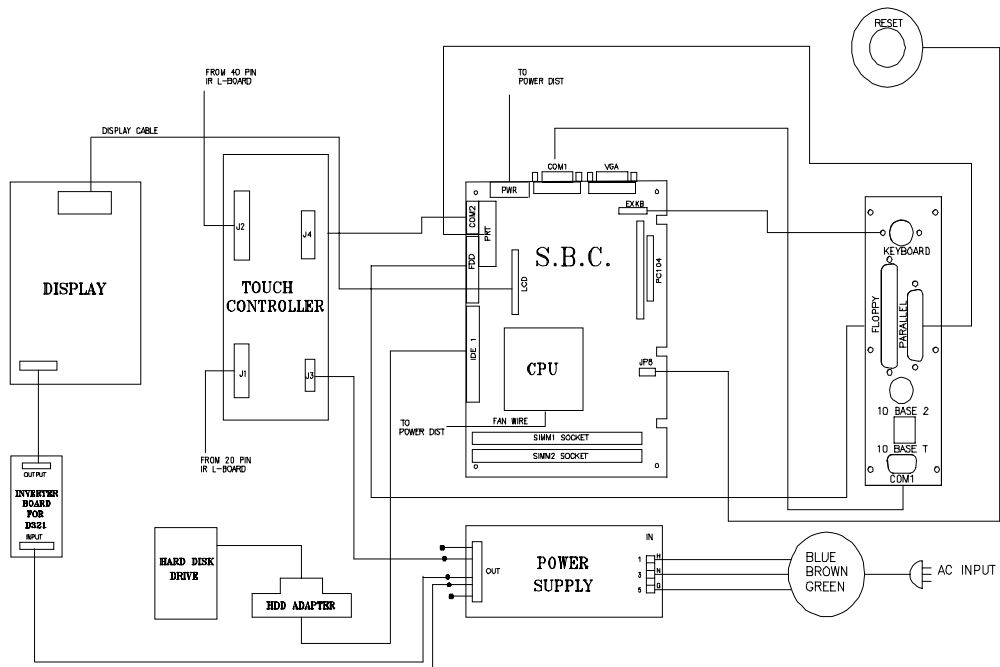
A.4 SIDE VIEW WITH 2 SLOT ISA EXPANSION CHASSIS



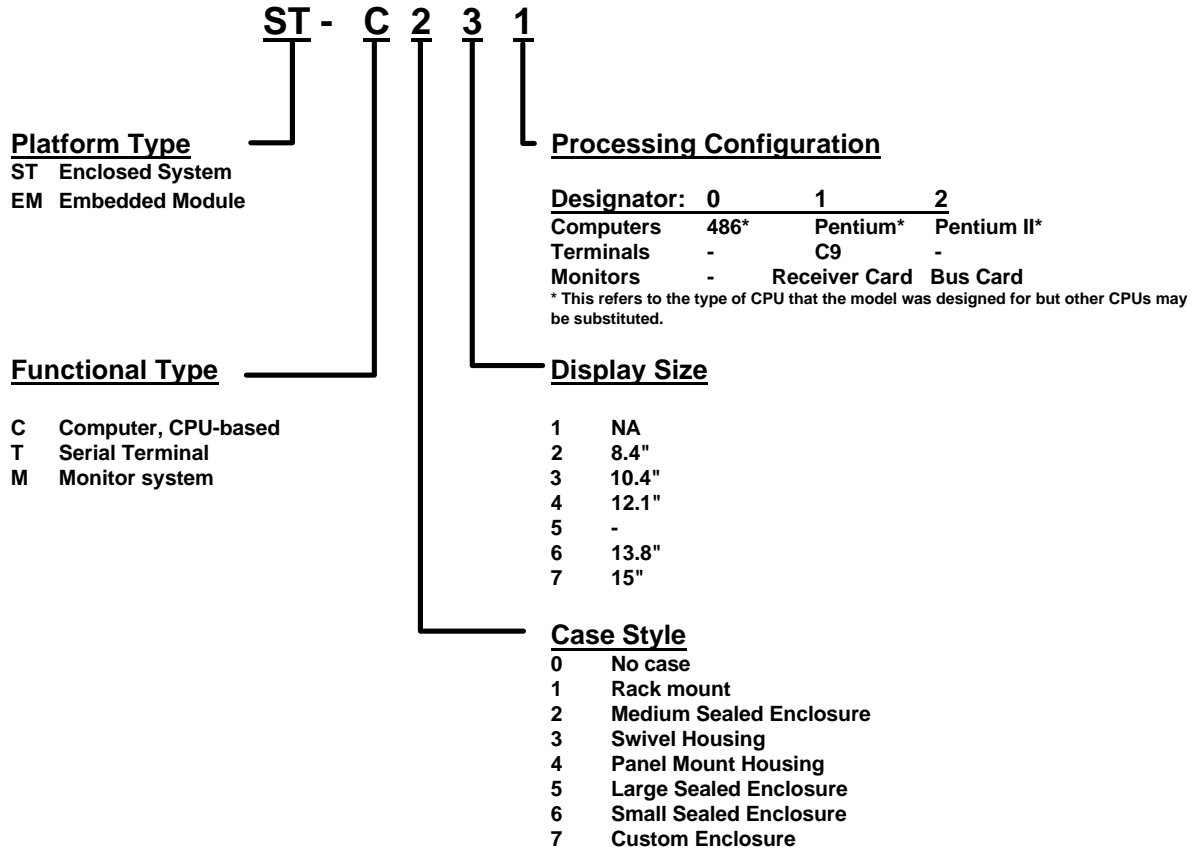
Drawing not to scale -- Dimensions are in inches (mm).

Note: The expansion chassis is 2.0" for the ST-C231 Class I, Div 2 or the units with a Sunlight Readable display.

A.5 SEALTOUCH COMPUTER CABLING DIAGRAM



Appendix B: Product Naming Convention

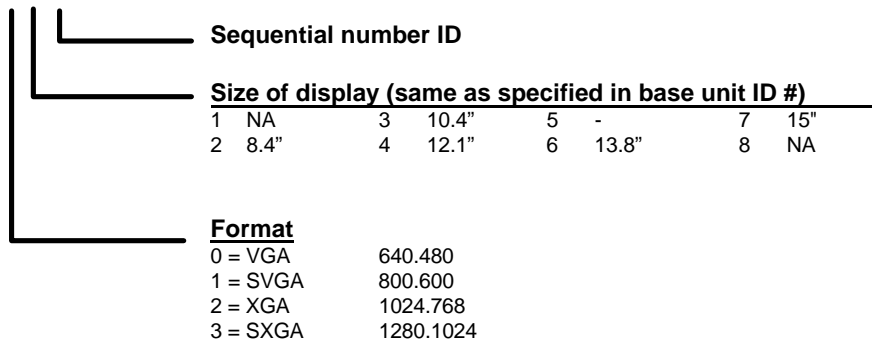


Examples

ST-C231 Sealed Computer, Medium case, 10.4" display, Pentium/SBC
 EM-C031 Embedded computer, Module, 10.4" display, Pentium/SBC

Display Nomenclature

3 f d s



Examples:

3141 = 12.1" 800x600 SVGA display
 3032 = 10.4" 640x480 VGA display

Appendix C: Additional Documentation

Detailed single board computer information is available in the accompanying SBC manual.

Information on the optional Solid State disk is available in the accompanying Semiconductor Disk manual.

Information on the optional PC/104 Ethernet LAN card is available in the accompanying Ethernet manual.

Operating system information is available from the software vendor.

Deeco's Power Assist process automation software is documented in a separate manual.

Deeco Application Note # 066972 "How to Correct Improper Screen Colors or Blank Screens"

Deeco Application Note # 007971 "Display Format, Electrical Interface and Color Resolution"

Deeco Application Note #183972 "Sunlight Readable and High Bright 10.4" Active Matrix TFT LCD Displays"

Deeco Application Note #183973 "Ghost Software Minimizes Installation Times for Operating Systems"

Deeco Application Note #206971 "Colors Displayed on Deeco Computer Screens"

Deeco Application Note #359961 "Cache and EDO RAM for PCs"

Check the Deeco home page at <http://www.deeco.com> for the latest information and application articles.

Limited Warranty

Deeco 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, Deeco 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. Deeco Systems' sole obligation shall be at its option, to repair or replace any goods which have been determined to be defective by Deeco Systems.

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

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

Deeco 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 Deeco 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 DEECO 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. DEECO SYSTEMS SHALL NOT BE LIABLE FOR CONTINGENT OR CONSEQUENTIAL DAMAGES TO PERSONS OR PROPERTY, AND DEECO 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 DEECO 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 DEECO SYSTEMS.

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