9403

Industrial Monitor

P/N 99592-001

Printed in the United States of America
Part Number 99592-001

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Part Number: ***99592-001A***

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WARNING

Dangerous voltages are present within all Xycom Industrial Terminals. These voltages will linger after all electrical power is turned off. Use caution whenever you open the monitor. Avoid touching high-voltage areas within the monitor. Do not work alone.

WARNING

The Cathode Ray Tube (CRT) is exposed when the monitor is opened. oWear safety glasses to protect eyes in case of accidental breakage. The internal coating of the CRT is extremely toxic. If exposed, rinse immediately and consult a physician.

Chapter 1 – General Description

1.1 Introduction

The 9403 Industrial Monitor features a 14-inch, high-resolution SVGA color monitor, protected by an impact resistant Lexan shield.

Some of the features of the 9403 Industrial Monitor include:

- 14" SVGA color monitor
- Impact resistant Lexan shield
- 32 data-entry/control key keypad
- 20 function key keypad
- Rugged front panel seals that meet both NEMA 4/NEMA 12 specifications when panel-mounted
- Rack or panel mounting
- Front panel access port for external IBM keyboards
- Rear access port for external IBM keyboards
- Optional full-size keyboard

1.2 Specifications

Table 1-1 lists the hardware specifications for the 9403.

Table 1-1. 9403 Hardware Specifications

CHARACTERISTIC	SPECIFICATIONS
Mechanical	
Height	12.2"
Width	19"
Depth	16.5"
Weight	40 lbs. (18.1 kg)
Electrical	115/230 VAC 3.3 A/1.65 A typical
Mounting	EIA Standard 19" rack or panel
Monitor	
Compatibility	VGA
CRT size	14" diagonal
Resolution	640 x 480, 800 x 600, (1024 x 768 interlaced)
Dot pitch	0.28 mm

Table 1-2 lists the environmental specifications for the 9403.

Table 1-2. 9403 Environmental Specifications

CHARACTERISTIC	**SPECIFICATIONS**
Temperature	
Operating	0º to 50ºC (32º to 122ºF)
Non-operating	-40º to 60ºC (-40º to 140ºF)
Humidity	10 to 80% RH, non-condensing
Shock	
Operating	15 g peak acceleration, 11 msec duration
Non-operating	30 g peak acceleraton, 11 msec duration
Vibration	5 to 2000 Hz
Operating	.006" peak-to-peak displacement 1.0 g (max.) acceleration
Non-operating	.015" Peak-to-peak displacement 2.5g (max.) acceleration
Altitude	
Operating	Sea level to 10,000 ft. (3048 m)
Non-operating	Sea level to 40,000 ft. (12192 m)

Chapter 2 – Installation

2.1 Front Panel

The 9403 Industrial Monitor is equipped with a NEMA 4/NEMA 12 sealed front panel. The panel protects the system's interior whenever the system is properly panel-mounted. Refer to Appendix A for the mounting instructions. Figure 2-1 illustrates the features visible on the front panel.

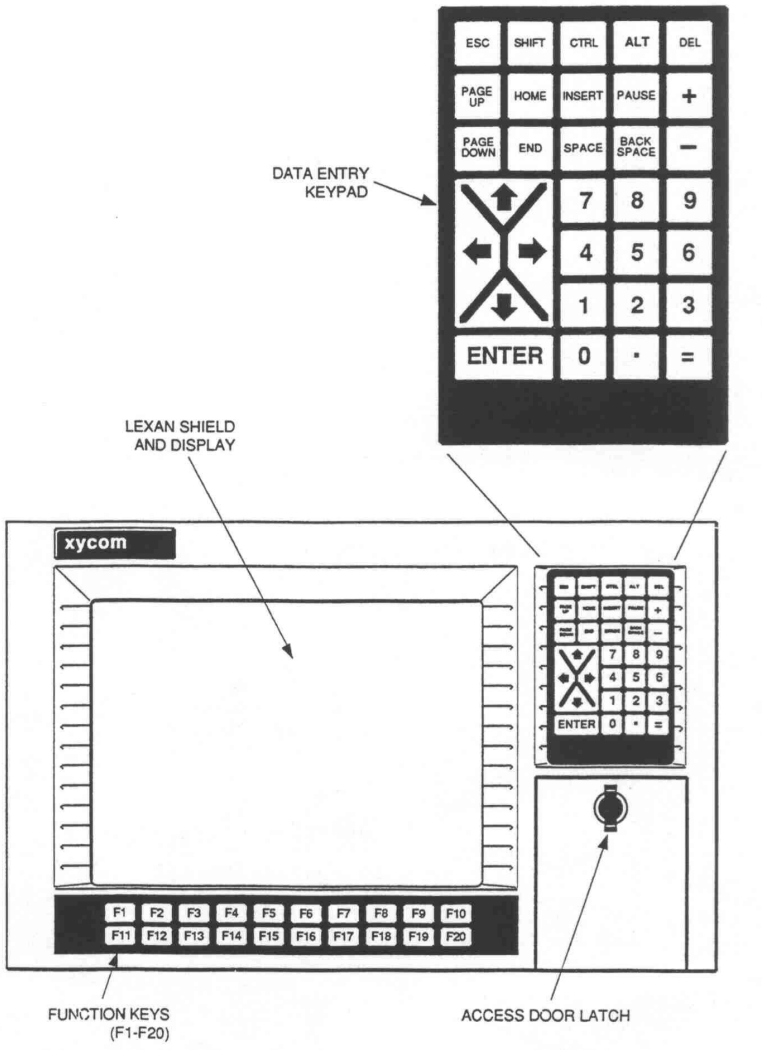

Figure 2-1. 9403 Front Panel

Monitor — The 14" high-resolution SVGA monitor is protected from breakage by an impact resistant Lexan shield.

Function Keys — These twenty sealed keys are located directly below the monitor. They provide the user with easy access to familiar PC routines.

Keyboard Port — Behind the access door latch is a full stroke keyboard input port for a PC keyboard.

Data Entry Pad — This sealed 32-key keypad includes the following keys for data entry: **Shift**, **Control**, **Alt**, **Esc**, **Backspace**, **Space**, **Cursors**, **.** , +, **-**, and **Enter**, as well as **1** through **9**.

2.2 Back Panel

Figure 2-2 illustrates the features on the 9403 back panel.

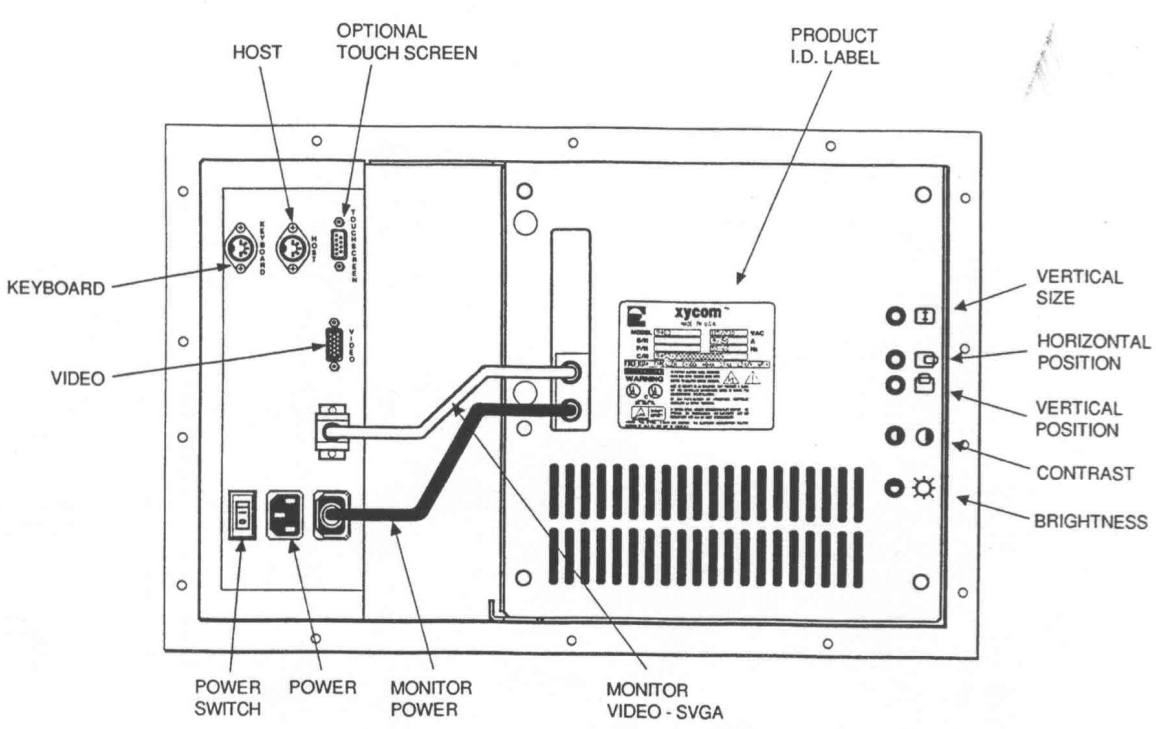

Figure 2-2. 9403 Back Panel

Power Switch This switch should always remain on the OFF (0) position until the system is properly configured and connected to a 115 VAC or 230 VAC power source.

Power Receptacle Located to the right of the Power switch. A **GROUNDED CABLE** must be securely positioned before turning power ON (1).

Video Connector This 15-pin video connector is the connection point for the video cable from the video controller. The pinouts for the connector are given in Appendix B.

Video Controls Turning these knobs left or right will adjust vertical size, horizontal position, vertical position, contrast, and brightness.

2.3 Preparing The 9403 For Use

Note

To make a proper ground, scrape paint off the inside of the enclosure panel around mounting stud holes (in at least two places) at opposing ends of the unit. This insures that a good electrical connection is made between the chassis and the grounded metal panel.

To prepare your 9403 Industrial Monitor for use, follow the steps below.

1. Mount the terminal in a suitable location. The area should conform to the hardware and environmental specifications listed in Table 1-1 and 1-2. Refer to Appendix A for the mounting dimensions.

2. Connect the video cable by attaching the female end of the video cable (included in the documentation package) to the video connector and the male end to the VGA connector on your graphics controller or CPU. Tighten the two screws. (See the manufacturer's manuals for more information on the location of this connector.)

3. Connect the host keyboard cable (included in the documentation package) by attaching one 5-pin DIN connector to the 9403 host connector (located at the upper left of the back panel) to the PC/AT host's keyboard input connector (see your host manual for more information).

4. Connect the grounded power cable to the power receptacle.

5. Switch the Power Switch to ON (1).

6. Adjust the video to preference.

2.4 Keyboard CPU Interface

The 9403 can communicate with a keyboard using PC/AT type signals. The Programmable Keyboard Interface Module (PKIM) can communicate from a PC/XT or AT keyboard and to a PC/AT CPU. The PKIM is set from the factory to receive PC/AT codes from the keyboard port and communicate with a PC/AT type CPU. The codes can be programmed using the PKIM utility menus, which is described in detail in Chapter 3.

Chapter 3 – Programmable Keyboard Interface Module

3.1 Introduction

The Programmable Keyboard Interface Module (PKIM) consists of the actual PKIM located on the interior right hand side of the terminal directly behind the front panel, and a program utility disk. The PKIM utility allows re-defining all keys on the keypads without programming or looking up key codes. The PKIM utility features pull-down menus that allow redefining the keys through the use of macros.

A full stroke PC/XT or PC/AT keyboard is used to address the PKIM utility.

Note

While the Programmable Keyboard Interface Module (PKIM) utility is running, the keypad switch arrays are disabled.

3.2 Loading The PKIM Utility

The PKIM utility can be run from the disk or copied onto your hard drive. To run the utility from the disk, change the directory to the appropriate drive and type PKIM. To load the PKIM utility onto your hard drive, create a subdirectory for the files, and copy all the files on the disk into that subdirectory. Enter the subdirectory and type PKIM.

3.3 Using The PKIM Utility

The PKIM utility uses a menu bar and pull down menu system. All menu bars are displayed across the top of the screen. "Xycom PKIM Utility" and the current menu title are shown at the bottom of the screen (see Figure 3-1).

A full stroke keyboard is needed to enter keystrokes while recording a new key macro, editing an existing macro, and entering utility commands. All keys on the keypads and switch array keyboard are redefinable. While the utility is running, the keypads and switch array keyboard, as well as the touch screen function (if applicable), will be disabled.

Dialog boxes are used for user prompts and to display error and user advice messages.

Two keys can be used to exit from the menus:

- [ESC] moves to the previous menu, or out of the utility from the Main menu
- [F1] returns to the current menu headings in some of the menus where Exit can be chosen to exit this menu

The keys specific to each menu are shown at the bottom of each screen.

3.3.1 Startup

This section describes the startup options for the utility.

PKIM [/r | /t] runs the full PKIM utility

Where:

/r = reduced functionality. Some keyboard controllers will not allow the PKIM utility to have control. In this case, keycodes uploaded from the EEPROM cannot be translated correctly. Starting the utility with the /r switch removes the Upload option from the Main Menu. In this mode, editing must start with macros read in from a file since they cannot be read from EEPROM.

/t = translate. Some systems initialize the keyboard to run in XT mode. In this case, the scan codes read in from the keyboard when in Teach mode will not correct unless the utility is started with the /t switch.

3.3.2Utility Batch Mode

Versions 2.2 and above of the utility include a mode for reprogramming keypads from a batch file. This feature is useful if you wish to reprogram many units with customized keypad macros without having to enter the full PKIM utility for each unit. Once the full utility has been used to create and save keypad macros, the files containing these macros can be included on a disk with the PKIM utility and then used to reprogram other units from a batch file.

PKIM Filename run the PKIM utility batch mode where filename is the file containing the new keypad macros. The filename extension must be included.

Example:
PKIM newdef32.pkm

In a batch file, this will reprogram the default values for the numeric keypad.

You may also specify multiple macro filenames in the PKIM line.

Example:
PKIM newdef32.pkm 20fkuncff.pkm

This will reprogram both the numeric and the function key keypads.

3.4 MAIN MENU

The main menu provides five selections: Exit, Files, Macros, Upload, and Download. The Main Menu is shown in Figure 3-1 below.

Exit	Files	Macros	Upload	Download
Xycom PKIM Utility: MAIN L-Arrow, R-Arrow, Enter				

Figure 3-1. Main Menu

Each of the selections from the Main Menu is described in separate sections below. Choices from the menu are discussed in the order they appear on the screen.

3.4.1 Exit

Selecting Exit closes any open files and exits the utility. [Esc] can also be used for this purpose and for exiting the other menus.

3.4.2Files Menu

Files containing keypad/keyboard macro sets (a macro for each key) may be saved on disk and loaded into memory to be viewed, edited, or downloaded to the PKIM. Some of these files may be included in the utility package for use in reconfiguring the keypads for different software packages and as templates for defining completely new keypad keyboard macro sets.

Note

It is recommended that you save the default keypad and keyboard configurations before programming any changes. To do so, select Save As from the Files menu and enter a file name.

When Files is chosen, a pull down menu is displayed which gives the following choices: Open, Close, Save, Save as, Delete, and Exit.

Open Opens a file that contains a macro set for one of the keypads, or the switch array keyboard, and loads the contents into memory. Any macro set previously in memory is overwritten. Once loaded, the macro set is available for editing, viewing, teaching, and/or downloading to the PKIM. The files available are shown in Table 3-1 below:

Table 3-1. 9403 PKIM Files

File	Default Values
FUDEF20.PKM	20-key function keypad on the 9403
NUDEF35.PKM	35-key numeric keypad on the 9403
KBDEF84.PKM	84-key sealed keyboard

For example, if after editing some of the keys of the 84 key sealed keyboard, and you want to reload the default values, open the file KBDEF84.PKM and then select Download from the Main Menu.

Close Clears the set of macros from memory and closes the file from which they came.

Save Copies the set of macros from memory back into their original file. The original file contents are overwritten.

Save As Creates a new file under the specified name and copies the set of macros from memory into it. For example, to define different sets of codes, save each set under a different name and download the one you wish to use.

Delete Deletes a file.

Exit Returns to Main Menu.

3.4.3Macros Menu

When Macros is selected, a menu bar displays these four choices: Exit, View, Teach, and Edit.

> **Note**
>
> You must have a macro file in memory before the Macros Menu is available. To load a macro file, either Open a file or Upload a file.

Exit Returns to the Main Menu.

View Allows viewing the macro for the selected key without having to worry about an accidental change to the macro. When View is chosen, Exit and the state of the key click are displayed on the menu bar and a graphic representation of the chosen keypad or keyboard is shown. Select Exit from the View Menu to return to the Macros Menu.

To select a key to view, use the arrow keys to position the cursor on the desired key and press [Enter].

The macro is displayed as two lines—ASCII and code. The ASCII line displays each keycode as the keys it represents on the full stroke keyboard. Special labels are used for certain keys (e.g. Spc for space bar, UAr for up arrow, and bk for the break code prefix). The code line is displayed in either Hex or decimal, as explained below. There is a one to one correspondence between the ASCII and code lines to help you interpret the code line.

The menu bar displayed while viewing the macro offers two options: Exit and Hex/Decimal.

Exit Return to View menu

Hex/ Decimal Toggles between displaying the macro in hex or decimal format. When Hex is chosen, the keycodes are displayed as they are in memory—hexadecimal value scan codes. When Decimal is chosen, the keycodes are displayed as the decimal equivalent of the hex codes.

For example, the macro, **abc**, would be displayed as: 1C F0 1C 32 F0 32 21 F0 21in hex, and 28 240 28 50 240 50 33 240 33 in decimal. The default is Hex.

Teach Allows you to record key strokes into a macro. When Teach is selected, a graphic representation of the keypad/keyboard currently in memory is displayed. The menu bar choices are Exit, ASCII/Hex/Decimal, and Key Click ON/OFF.

Exit Returns to Macros menu

ASCII **Hex/Decimal** Chooses the format to display the keystrokes as they are entered. The default is ASCII.

Click ON/OFF Toggles between ON and OFF. If ON is selected, the keypad or keyboard is programmed to emit an audible tone whenever a key is pressed. Keyclick encompasses the entire keypad or keyboard. If ON is selected, any key on that keypad or keyboard will emit a tone.

To select a key to define, use the arrow keys to position the cursor on the desired key, and press [Enter]. After a key is selected, the utility records every key stroke on the external full stroke keyboard into a macro to be assigned to the chosen key. As the keys are entered they are displayed using the chosen format. The [Esc] key is used to stop recording and return to the Teach Menu, and is therefore not a recordable key. However, [Esc] can be included in a macro by using the editor.

Note

The changes made to the macros in the Teach Menu are not programmed until you select Download.

Edit Displays a graphic representation of the keypad/keyboard in memory and a menu bar displaying Exit and Click ON/OFF.

Exit Returns to the Macros Menu

Click ON/OFF Toggle between ON and OFF. If ON is selected, the keypad or keyboard is programmed to emit an audible tone whenever a key is pressed.

To select a key to edit, use the arrow keys to position the cursor on the desired key, and press [Enter].

In edit mode, the macro is displayed as two lines. The top line (the edit line) displays the macro in either hex or decimal format and is the line in which the actual editing takes place. The bottom line (the ASCII line) displays the macro in ASCII format and is not user-configurable. This line helps keep track of which part of the macro you are editing and will be updated by the utility as editing takes place.

For example:

edit line →	12	75	F0	75	F0	12	1C	F0	1C	12	22	F0	22	F0	12	0
ASCII line →	sh	8	bk	8	bk	sh	a	bk	a	sh	X	bk	X	bk	sh	EOM

The insert, delete and cursor control keys are active for editing.

When a key is selected, the menu bar displays the following choices: Exit, Cut, Copy, Paste, Codes, Hex/Decimal, and I/O. The macro for the chosen key is also displayed.

Exit Returns to the Edit Menu.

Cut Deletes a sequence of scan codes from the macro. To select a section to cut:

- Place the cursor on the first character to cut.
- Press [F1] and select Cut.
- Press [Enter]. Cut should still be highlighted, but the cursor will appear on the Edit line.
- Move the cursor on the last character to cut, and press [Enter].

The last character of every macro is the end of the macro (EOM) and cannot be deleted.

Copy Copies a sequence of scan codes from the macro into memory. To select the section to copy:

- Place the cursor on the first character to Copy.
- Press [F1] and select Copy.
- Press [Enter]. Copy should still be highlighted, but the cursor will appear on the Edit line.
- Move the cursor on the last character to copy and press [Enter].

The copied item does not appear on the screen until you select Paste.

Paste Inserts a sequence of scan codes (which were saved in memory using Copy) into the macro. Cut sections cannot be pasted unless they were copied before they were cut. To paste a sequence of scan codes that were previously copied, position the cursor where you want the text to appear and then press [F1]. Select Paste and then press [Enter].

Codes Displays a table of keys and their scan codes in Hex. See Appendix B for a complete code listing.

Hex/Decimal Toggles between displaying the scan codes in Hex and Decimal formats.

Insert The insert key toggles between insert and overtype mode.

3.4.4Upload Menu

The Upload Menu allows choosing which keypad or keyboard macro information to load. The choices in this menu are: Function keypad, Numeric keypad, Keyboard, and Exit.

Function Keypad Commands the PKIM to send its entire macroset for the function key keypad.

Numeric Keypad Commands the PKIM to send its entire macro set for the numeric key keypad.

Keyboard Commands the PKIM to send its entire macro set for the switch array keyboard.

Exit Returns to the Main Menu.

Note

Only one macro set may reside in memory at a time.

A checksum will be calculated during transmission and an error message displayed should an error occur.

3.4.5Download Menu

Note

Any macro set previously programmed is overwritten when you select Download.

Download sends the set of keypad/keyboard macros to the PKIM. The macro set must reside in memory before it can be downloaded. A checksum is calculated during transmission and an error message is displayed if an error occurs.

As the macro is sent, PKIM programs its EEPROM with the new macros which become the new key definitions for the selected keypad/keyboard.

3.4.6Utilities Menu

When Utilities is selected, a menu bar displays four choices: Func Lock ON, Func Lock OFF, Clear EEPROM, and Exit.

Func Lock ON	Turns on the function key interlock feature. The function key interlock disables all function keys as long as one function key is pressed (only one function key can be activated at one time).
Func Lock OFF	Turns off the function key interlock feature, allowing multiple function key presses.
Clear EEPROM	Erases the EEPROM memory. This will clear the entire set of keypad macros, the contrast setting, the backlight timeout setting, and the function key interlock setting. After using this feature, the unit should be turned off and then on. This will initialize the EEPROM with the default settings.
Exit	Returns to the Main Menu.

3.5 Special PKIM Codes

For the 101-key enhanced keyboard, special PKIM codes replace the standard IBM scan codes in the macros for these keys. The special scan codes are listed below:

Table 3-2. Special PKIM Scan Codes

Code	Meaning
E2	Insert
E3	Home
E4	Page Up
E5	Delete
E6	End
E7	Page Down
E8	Up Arrow
E9	Left Arrow
EA	Right Arrow
EB	Down Arrow
EC	Forward Slash
ED	Print Screen/Sys Rq
EE	Pause/Break

Appendix A – Mounting Dimensions

Appendix A

Note

On the front panel, tighten (14) 10-32 nuts onto 10-32 threaded studs to 25 pound inches with a torque wrench.

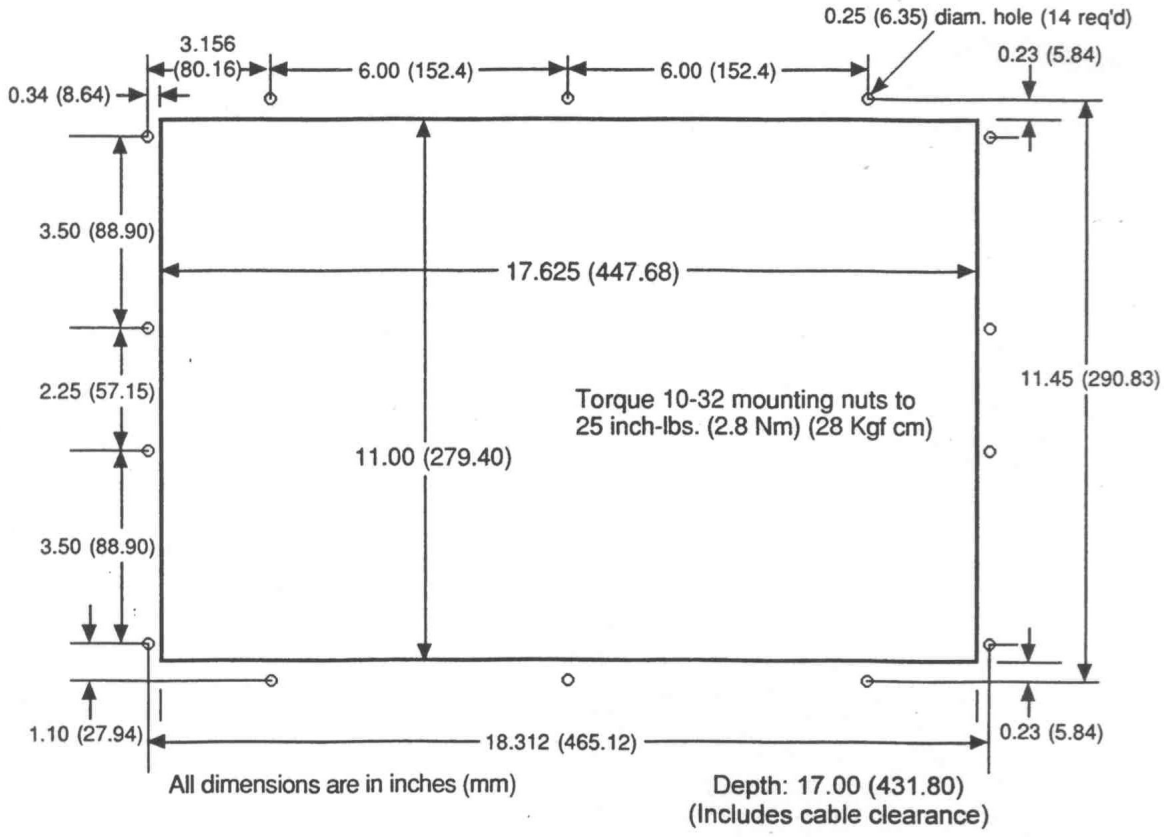

Figure A-1. Mounting Dimensions

Appendix B – Quick Reference Guide

Table B-1. Video Connector

PIN	SIGNAL	PIN	SIGNAL
1	RED	9	N/C
2	GREEN	10	GND
3	BLUE	11	Mon. Sense 1
4	N/C	12	Mon. Sense 2
5	GND	13	HSYNC
6	RGND	14	VSYNC
7	GGND	15	N/C
8	BGND		

Table B-2. Special PKIM Scan Codes

Code	Meaning
E2	Insert
E3	Home
E4	Page Up
E5	Delete
E6	End
E7	Page Down
E8	Up Arrow
E9	Left Arrow
EA	Right Arrow
EB	Down Arrow
EC	Forward Slash
ED	Print Screen/Sys Rq
EE	Pause/Break

Table B-3. Hex Scan Codes

Key	Co	Key	Co
A	1C	[/{	54
B	32	]/}	5B
C	21	;/:	4C
D	23	'/"	52
E	24	,/<	41
F	2B	./>	49
G	34	//?	4A
H	33	`/-	EO
I	43	-/_	4E
J	3b	=/+	55
K	42	\/|	5D
L	4B		
M	3A	F1	05
N	31	F2	06
O	44	F3	04
P	4D	F4	0C
Q	15	F5	03
R	2D	F6	0B
S	1B	F7	83
T	2C	F8	0A
U	3C	F9	01
V	2A	F10	09
W	1D	F11	78
X	22	F12	07
Y	35		
Z	1A	Back Space	66
		Enter	5A
0/)	45	Shift Right	59
1/!	16	Shift Left	12
2/@	1E	Caps Lock	58
3/#	26	Alt Left	11
4/$	25	Ctl Left	14
5/%	2E	Tab	0D
6/^	36	Space	29
7/&	ED	ESC	76
8/*	3E	Num Lock	77
9/(	46	Home/7	6C
		Up Arrow/8	75
+	79	Page Up/9	7D
Ins/0	70	Left Arrow/4	6B
Del/.	71	/5	73
Scroll Lock	7E	Right Arrow/6	74
*	7C	-	7B
Alt r	E0 11	End/1	69
Ctl r	E0 14	Down Arrow/2	72
Ent k	E0 5A	Page Down/3	7A
Break	F0		

Appendix C – Touch Screen

Touch Screen

The Xycom touch screen is based on resistive membrane technology and consists of two thin sheets of polycarbonate with transparent, conductive coatings on the facing sides. Finger or stylus pressure causes the outer sheet to make electrical contact with the inner sheet. Xycom's touch screen complies with the complete environmental specifications and remains operational even after two million touches.

The touch screen interface module circuit impresses a voltage across the conductive coatings and when pressed, converts from analog to x and y digital coordinate positions and passes the x and y codes to the Elographics driver installed in the system. The touch screen data is made to emulate a Microsoft mouse.

Note

Refer to the Elographics manuals for complete installation details. Use E271-2201, Interrupt 5, AccuTouch/DuraTouch when installing default Touch Screen driver.

Mouse Driver

A standard mouse driver has two modes of operation, **absolute**, and **relative**. In absolute mode, the mouse driver returns values of actual pixel positions. In relative mode, the values returned represent the difference from the last position to the current position.

Relative Mode

If a mouse and a touch screen are connected at the same time and the mouse is moved, the monitor mouse driver will not be aware of the movement because it can only send information to the mouse driver and *not* receive information from the driver. You may correct this by disconnecting the mouse. Elographics provides a program called **'patchmse'**, which patches the mouse driver to operate without a mouse connected.

If you do not have the option of disconnecting your mouse, the following steps will get the touch screen and the mouse cursor back into synchronization:

1. Touch the touch screen in the center, and **while still pressing**, slide your finger all the way to the **right side center**, then to the **top center**, then to the **left center**, and finally to the **bottom center**.

2. The cursor should be directly under your finger. If not, try the steps again, moving more slowly across the screen or recalibrate the touch screen by using **'elocalib'**.

Note

This problem occurs with some software packages that use **relative mode**, when using both the mouse and the touch screen.

Cursor Movement

Some software packages may cause cursor movement to become erratic if a location greater than 128 pixels away from the current cursor location is touched. This may occur if the variable that is relied on to hold the delta X value is only 8 bits. This enables movements of only +/- 128 pixels max from the previous position. Please contact your software manufacturer if the cursor moves erratically during touch screen use.

Pinouts

The connector pinouts are shown below.

Table C-1. Serial Pinouts

PIN	SIGNAL
1	not used
2	RXD
3	TXD
4	not used
5	GND
6	DSR
7	not used
8	CTS
9	not used