QLARITY-BASED
TERMINAL HARDWARE
USER'S MANUAL
REVISION 2.40

FOREWORD

The QTERM-G70™, QTERM-G75™, QTERM-G55™ and QTERM-Z60™ terminals are graphic terminals with object-based programming. They feature a robust list of industrial grade hardware features and options.

Chapter 1   **QTERM-G70 Terminal.** This chapter describes the QTERM-G70 terminal, including the standard and optional ports available, major components and instructions for installing the terminal.

Chapter 2   **QTERM-G75 Terminal.** This chapter describes the QTERM-G75 terminal, including the standard and optional ports available, major components and instructions for installing the terminal.

Chapter 3   **QTERM-G55 Terminal.** This chapter describes the QTERM-G55 terminal, including the standard and optional ports available, major components and instructions for installing the terminal.

Chapter 4   **QTERM-Z60 Terminal.** This chapter describes the QTERM-Z60 terminal, including the standard ports, major components and instructions for installing the terminal.

Chapter 5   **Power On Setup.** This chapter provides instructions for starting and using the Power On Setup utility to set up or change the operational settings of the terminals.

MANUAL CONVENTIONS

The following conventions are used to identify selections in this manual.

When instructed to press a specific *touch* key, it is shown in a bold, sans serif typeface surrounded by square brackets: **[Enter]**

When instructed to press a specific *keyboard* key, it is shown in a bold, sans serif typeface surrounded by angle brackets: <**Enter**>

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CHAPTER 1

QTERM-G70 TERMINAL

1.1 Product Description

The QTERM-G70™ terminal is an Ethernet-enabled graphic terminal with object-based programming. It features a robust list of industrial grade hardware features and options.

The QTERM-G70 features a QVGA, 320x240 pixel, LCD display available in STN color (256 colors) or optional grayscale (16 shades) or active-matrix TFT (256 colors). It uses a cold-cathode fluorescent backlight (CCFL). The CCFL provides high contrast and easy readability and is replaceable. On STN and grayscale units, the contrast is software-controlled and compensated for temperature.

The analog-resistive touch screen covers the full viewable area of the display as well as the pre-labeled legend underlay on each side of the display.

The QTERM-G70 comes equipped with one serial port using an EIA-232, EIA-422, or EIA-485 interface. A second serial port, an Ethernet port, and a PS/2 keyboard port are available as options.

Possible input devices include the touch screen and attachable keyboard (with an optional PS/2 connector). Custom configurations of the QTERM-G70 can also support an external keypad, a dual EIA-232 full serial port card or a quad EIA-232 full serial port card (contact QSI Corporation for details). A speaker, which has programmable pitch and duration, comes standard, as does a battery-backed real-time clock. Other options include: an audio decoder for playing audio wave files, a hardware watchdog timer and a 5 V/100 mA output from the auxiliary serial port to power external devices.

The QTERM-G70 terminal stores the firmware and the user application in a compressed format in flash memory and then transfers them to RAM memory when the terminal is powered on. The terminal is equipped with four megabytes of flash memory and sixteen megabytes of RAM memory.

The outer legend can be customized with your logo/name or graphics. The inner legend underlay around the display can be customized with your touch keys and graphics.

The QTERM-G70 terminal requires a DC power source in a range of 8 to 26 V dc. This power is supplied via the main DB9 serial connector. Other options for supplying power to the QTERM-G70 are PoE (Power-over-Ethernet) and five volts from a well-regulated power supply via the main DB9 serial connector. Please contact QSI for more information about this option. The five volt power supply input option is only available on terminals with the TFT display option.

1.1.1 Specifications

The following tables contain the technical specifications for the QTERM-G70.

TERMINAL DISPLAY	
Color (standard)	STN 256 colors
Grayscale (optional)	FSTN 16 shades of gray
Active Matrix (optional)	TFT 256 colors
Enhanced TFT (optional)	Enhanced TFT 256 colors
Pixels	320 x 240
Dot Pitch	0.36 mm
Contrast	Software-controlled, temperature compensated (N/A on TFT units)
Lighting	Cold-cathode fluorescent, brightness is software-controllable
Backlight Brightness	Color 200 nits typical Grayscale 195 nits typical TFT 470 nits typical Enhanced TFT 600 nits typical
TOUCH SCREEN	
Analog-resistive operation	

TOUCH SCREEN	
Transparent touch area over viewable display	
Labeled touch underlay area on each side of display	

INTERFACE	
Standard	EIA-232 serial port with hardware or software handshaking
Baud rates	600 – 115,200 bps
Flow control	None XonXoff (software) RTS/CTS (hardware)
Data formats	7 or 8 data bits 1 or 2 stop bits Even, odd, or no parity (PC Tools support only 8 data bits)
Connector	DB9f (2 with optional second serial port) 8-pin modular (RJ45) with Ethernet option PS/2 keyboard connector (optional)

Options	Primary serial port configurable as
	  EIA-232, EIA-422, or EIA-485
	Secondary serial port available (EIA-232,
	  EIA-422, or EIA-485)
	Ethernet 10/100Base-T with support for
	TCP/IP
	  networking
	PS/2 keyboard port
	Additional dual or quad full EIA-232 serial
	  port cards available

MEMORY	
Standard	4 Mbytes flash and 16 Mbytes SDRAM

SPEAKER	
Standard	Software programmable pitch and duration
Optional	Audio (.wav) decoder

REAL-TIME CLOCK	
Independent processor-based, real-time clock equipped with a battery backup	

PHYSICAL	
Configuration	Panel-mount
Housing	Glass-filled polyester, UL 94V-0 flame rating, accommodates panels from 0 to 7 mm thick with standard screws
Size	215 x 161 x 50 mm

PHYSICAL	
Weight	1.16 kg
Processor	200 MHz Intel® XScale™ core platform

ENVIRONMENTAL	
Sealing	NEMA-4 front panel
Temperature	Operating: -10 to 60 °C Storage: -20 to 70 °C
Humidity	0 to 95%, non-condensing
Vibration	5 to 5000 Hz, 4 g RMS
Shock	20 g, 3 ms, any axis

POWER	
8 to 26 VDC (See section 1.4.5 for current consumption)	
PoE (Power-over-Ethernet)	
Well-regulated 5V supply (contact QSI Corporation)	

SOFTWARE	
Programming language	Qlarity™ (object-based)
Design environment	Qlarity Foundry™ (Windows®)
Command line compiler	Qlarify (Win32® or Linux)

CUSTOMIZING	
Outer legend	Customize with logo/name or graphics
Inner legend	Customize with touch keys and graphics

CERTIFICATION	
FCC Part 15, Class A CE Certification	

1.2 Supported Interfaces

1.2.1   Serial Ports

The QTERM-G70 comes standard with one serial port with DB9f connector. The serial port interface can be EIA-232, EIA-422, or EIA-485. A second serial port is available as an option, as well as two or four additional full EIA-232 serial ports are also optional.

NOTE: The primary and auxiliary serial ports are wired as Data Communications Equipment (DCE).

EIA-232	with proper cables and grounding the terminal can communicate up to five meters at a top speed of 115,200 bps
EIA-422	permits operation at distances up to 2,000 meters
EIA-485	permits multiple terminals to be connected in a multi-drop chain

The figure below shows the serial connector's orientation.

Female DB9 Connector
(Back of unit)

The following table shows the pinouts for each type of serial interface.

Pin	232	422	485
1	—	Tx-	RTx-
2	Tx	Tx+	RTx+
3	Rx	Rx+	—
4	—	—	—
5	Ground	Ground	Ground
6	—	Rx-	—
7	CTS (in)		—
8	RTS (out)		—
9	Power	Power	Power

Power is supplied to the terminal through pin 9 and ground is supplied through pin 5 of the primary serial port connector.

1.2.2   Optional Ethernet Port

The optional Ethernet port has a standard 10/100Base-T interface with an 8-pin (RJ-45) modular jack connector and uses TCP/IP protocol.

The connector orientation and pinout table are shown in the following table.
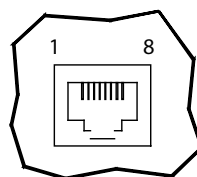
RJ45 Connector
(Back of unit)

Pinout Table	
1	Tx+
2	Tx-
3	Rx+
4	—
5	—
6	Rx-
7	—
8	—

1.2.3   Optional PS/2 Keyboard Interface

The optional PS/2 port can be used to connect a standard PS/2 keyboard to the QTERM-G70 terminal. The connector orientation and pinout table are shown below.
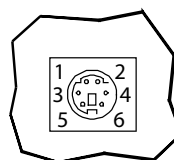
Female Mini-DIN Connector
(Back of unit)

Pinout Table	
1	+Keyboard Data
2	—
3	Ground
4	+5 Volts
5	Clock
6	—

NOTE: PS/2 keyboard interface is not available in the terminals with the PoE option.

1.2.4   Optional 5 Volt Power Supply on Secondary Serial Port

The secondary serial port interface (if included) can optionally be configured to provide a 5 volt DC power supply. The supply can provide up to 100 mA current to a serial peripheral device (such as a barcode reader) connected to COM2. The 5 volt supply is provided on pin 9 and returns to ground on pin 5.

1.2.5   Optional Dual and Quad EIA-232 Serial Port Card

An additional two or four EIA-232 serial ports can be added to the QTERM-G70. **These serial ports have all necessary signals for EIA-232 serial communications and are wired as Data Terminal Equipment (DTE).**

The additional serial port option will add approximately 10 mA to the total current draw of the terminal plus 15 mA per connected serial cable.

The following table shows the pinouts for the additional serial port option.

Additional EIA-232 Serial Port Pinouts	
1	DCD (in)
2	Rx (in)
3	Tx (out)
4	DTR (out)
5	GND
6	DSR (in)
7	RTS (out)
8	CTS (in)
9	RI (in)

1.2.6   Optional Power-over-Ethernet Module

The optional Power-over-Ethernet module allows the user to provide power and communications to the QTERM-G70. The power can be provided from an IEEE 802.3af compliant hub or switch as well as from a standard power supply.

1.2.6.1   Power Requirements

The optimal power supplied to the QTERM-G70 through the PoE port is 48 V dc, although the unit will operate with a power input as low as 36 V dc, or as high as 57 V dc (see IEEE 802.3af specification). The power required to operate the terminal without any additional options is listed below.

Current Consumption	
Terminal	48VDC
G70 STN Idle	120 mA
G70 TFT Idle	190 mA
Active Add	+15 mA

1.2.6.2   Pinouts

In accordance with the PoE standard (IEEE 802.3af), the PoE port is insensitive to polarity of the power supply and can receive power in either mode A (superimposed on the transmit and receive twisted pair conductors) or mode B (using the additional twisted pair conductors). This yields four possible ways to apply power to the PoE port as shown in the following table. The table also shows the conductor assignment for the transmit and receive lines as reference.

Port Pin Assignment		
Conductor	Mode A	Mode B
1	Tx+/V+	Tx+
2	Tx-/V+	Tx-
3	Rx+/V-	Rx+
4		V+
5		V+
6	Rx-/V-	Rx-
7		V-
8		V-

1.3   Terminal Components

1.3.1   Touch Screen

The QTERM-G70 touch screen provides user input through any number of touch keys located on or around the display. The standard key legend shown in the figure below provides areas for five soft keys down each side of the display. A custom legend underlay can be ordered to personalize the terminal for your application.
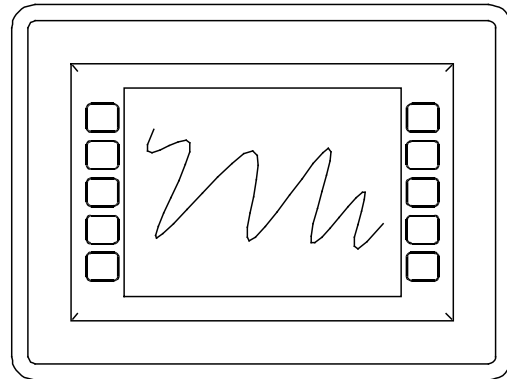
Touch keys can also be defined in your user applications at any location on or around the display. Touch keys may be any size.

1.3.2   Keyboard

Using the optional PS/2 port, a standard PC keyboard may be used in addition to, or in place of, the touch screen.

Power On Setup, the terminal setup utility, recognizes both touch keys and keyboard keys.

1.3.3 Keypad

The QTERM-G70 terminal can optionally include electronics for attaching an external keypad with up to 8 columns by 8 rows and up to 6 keypad LEDs. Contact QSI Corporation for more information.

The keypad option will add 10 mA to the total current draw of the terminal plus the current driven out the LED outputs pins. The LED outputs are five-volt open-collector signals with a 1000 Ohm series resistor. This results in an approximate maximum output current drive of 5 mA on those pins. There are two connectors on the keypad module to facilitate connecting different sized keypads. The pinouts for those connectors are as follows:

Connector J1 - 0.1 Inch Pitch 16-pin Single-row Connector			
1	GND	9	Row 5
2	LED 1	10	Row 6
3	Row 1	11	Col 1
4	Row 2	12	Col 2
5	Row 3	13	Col 3
6	Row 4	14	Col 4
7	GND	15	Col 5
8	LED 2	16	Col 6
Connector J2 - 0.1 Inch Pitch 24-pin Dual-row Connector			
1	Row 1	13	Col 1
2	5 V or 3.3 V	14	LED 4
3	Row 2	15	Col 2
4	GND	16	LED 3
5	Row 3	17	Col 3
6	LED 6	18	LED 2
7	Row 4	19	Col 4
8	LED 5	20	LED 1
9	Row 5	21	Col 5
10	Row 8	22	Col 6

Connector J2 - 0.1 Inch Pitch 24-pin Dual-row Connector			
11	Row 6	23	Col 8
12	Row 7	24	Col 7

1.3.4 Speaker

A speaker is built into the QTERM-G70 terminal and faces to the back of the unit. Audio can be linked to events or actions (e.g., screen press, timer, etc.). Pitch and duration of a sound are controlled by API functions called from the user application. Refer to "Controlling the Speaker" section in the *Qlarity-based Terminal Programmer's Reference Manual*.

Optionally, an audio (.wav) decoder can be added to the QTERM-G70 to allow the speaker to play audio files. The audio decoder supports wave files meeting the following criteria:

- Sample rate of 8 kHz, 11.025 kHz, 16 kHz or 22.050 kHz
- Resolution of 8 or 16 bits per sample.

The audio decoder circuit amplifies the signal to 0.5 W rms at the speaker.

1.3.5 Real-Time Clock

The QTERM-G70 terminal is equipped with a battery-backed, real-time clock. The real-time clock can be used to time/date stamp messages or for timed polling and program execution.

WARNING	There may be danger of leakage if the battery is incorrectly replaced, creating a potential health hazard. Replace the battery only with the same (Duracell CR1220) or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

1.3.6 System Memory

The QTERM-G70 terminal stores the firmware and user applications in a compressed format in flash memory and then transfers them to RAM memory when the terminal is powered on. Four megabytes of flash memory and sixteen megabytes of RAM memory are standard.

For information on using resources efficiently to conserve memory when creating a user application, refer to "Edit Resources" section in the *Qlarity Foundry User's Manual*.

For information on downloading new firmware, downloading a user application, and determining the size of a user application, refer to the *Qlarity Foundry User's Manual*.

1.3.7   Watchdog Timer

A watchdog timer can be optionally added to enforce proper operation of the QTERM-G70. The watchdog timer will reset the terminal if there is a problem that causes the firmware to lock up. This does not apply to software deadlocks in the Qlarity code. If that is required, then the Qlarity watchdog timer should be used, using the WatchdogEnable and WatchdogReset APIs.

1.4 Installing the QTERM-G70 Terminal to NEMA-4 Specifications

A QTERM-G70 terminal uses a rugged, glass-filled polyester (UL 94V-0) case designed to mount into a panel or drywall. When properly installed in a NEMA-4 rated panel, the QTERM-G70 meets all NEMA-4 specifications including hose-down, icing, and salt spray.

A QTERM-G70 terminal can be installed in either a landscape or portrait orientation. When installing a terminal, you generally take the following steps.

- Decide whether you want to mount and use the terminal in a portrait or landscape orientation. "Portrait" means that the longest dimension is vertical; "landscape" means that the longest dimension is horizontal.

- Cut a hole in the panel or drywall. See section 1.4.1, "Cutout for Panel Mount Configuration" or section 1.4.3, "Cutout for Drywall Mount Configuration" for specifications.

- Install the QTERM-G70 terminal in the panel or drywall. See section 1.4.2, "Installing the Panel Mount Terminal" or section 1.4.4, "Installing the Drywall Mount Terminal" for instructions.

- Connect cables to the terminal. Verify that the thumb screws are tight or the locks snapped into place for each cable used.

Apply DC power to the QTERM-G70 terminal See section 1.4.5, "Applying Power" for information.

1.4.1   Cutout for Panel Mount Configuration

The QTERM-G70 terminal can be mounted in panels from 0 to 7 mm thick. No screw holes need to be drilled to install the terminal in the panel.

Make a rectangular hole in the panel using the following dimensions.

Landscape:
Horizontal	199 ± 1 mm
Vertical	145 ± 1 mm

Portrait:
Horizontal	145 ± 1 mm
Vertical	199 ± 1 mm

Following is a diagram of the landscape cutout:
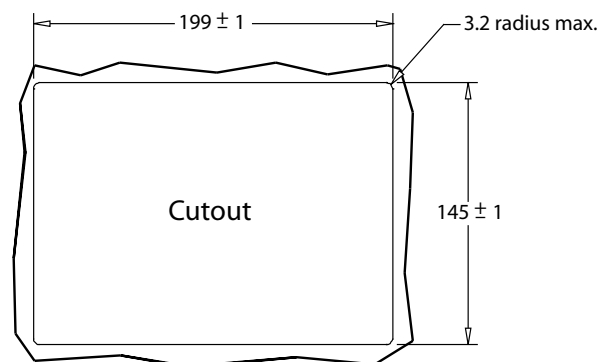
File any rough edges smooth, especially on the face of the panel.

1.4.2   Installing the Panel Mount Terminal

NOTE: Use of an anti-static strap is recommended when performing installation and maintenance.

Take the following steps to install the terminal. Refer to the illustrations on the next page.

1. Verify that the panel surface around the cutout is clean and free of rough edges. A gasket built into the terminal will seal against this surface. Dirt or imperfections on the panel may prevent a proper seal.

2. Place the terminal into the panel cutout and verify that the terminal is oriented correctly. The touch screen legend may indicate the orientation. If not, you can deter-

mine which side should be at the top by the position of the serial port on the back panel as follows:

Landscape: when looking at the front of the unit, the back panel serial port(s) should be on the bottom of the terminal.

Portrait: when looking at the front of the unit, the back panel serial port(s) should be on the left side of the terminal.

3. On the back of the panel, place the terminal mounting bracket against the back of the terminal, and align it with the back panel.

4. Fasten the six screws (supplied with the terminal).

1.4.3   Cutout for Drywall Mount Configuration

The QTERM-G70 terminal with the drywall mount configuration will accommodate drywall thicknesses of 7 mm to 18 mm. The panel may be cut by using the template supplied with the unit or by using the dimensions given below. To use the template, simply identify where the unit is to be placed on the wall and tape the template up into position. Next cut along the indicated line. The cutout dimensions with appropriate tolerances are as follows:

Landscape:

Horizontal	199 ± 1 mm
Vertical	145 ± 1 mm

Portrait:

Horizontal	145 ± 1 mm
Vertical	199 ± 1 m

NOTE: Care must be taken to not to make the cutout oversize.

1.4.4   Installing the Drywall Mount Terminal

NOTE: Use of an anti-static strap is recommended when performing installation and maintenance.

Take the following steps to install the terminal. Refer to the illustration below.

Front View

Back View

Right Side View
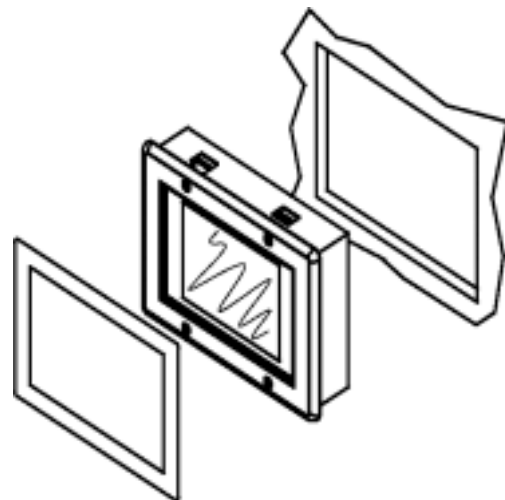
1. Verify that the unit is in the correct orientation. The touchscreen legend may indicate the orientation. If not, the top side may be identified by the position of the serial port(s) on the back panel as follows:

    Landscape: when looking at the front of the unit, the back panel serial port(s) should be on the bottom of the terminal.

    Portrait: when looking at the front of the unit, the back panel serial port(s) should be on the left side of the terminal.

2. Connect all necessary cables to their correct places on the back panel.

3. Insert the terminal into the cutout in the wall. If the unit will not fit into the opening, check to make sure that the cam locks on the top and bottom are not protruding from the case.

4. Tighten all four screws on the front panel until the unit seats firmly in the cutout. The screws should be tightened approximately 2-3 full turns after a slight resistance is felt.

NOTE: Do not over tighten the screws
Doing so will damage the cam locks and the unit will no longer mount securely into the wall.

5. Using the supplied legend, remove the adhesive back and install on the front of the unit over the top of the four screws as indicated in the figure.

1.4.4.1   Removing the Drywall Mount Terminal

Removal of the G70 terminal requires the replacement of the outer legend. Replacements may be ordered from QSI.

1. Remove the outer legend on the front of the unit to expose the four mounting screws.

2. Turn the screws counterclockwise until they begin to back out of the unit.

3. Gently pull the terminal from the wall cutout.

1.4.5   Applying Power

Power is supplied to the QTERM-G70 terminal via the primary serial port connector. Refer to section 1.2.1, "Serial Ports" for the pin assignments for power and ground. DC power must be in the range of 8 to 26 volts (the current will vary depending on the input voltage; see table below

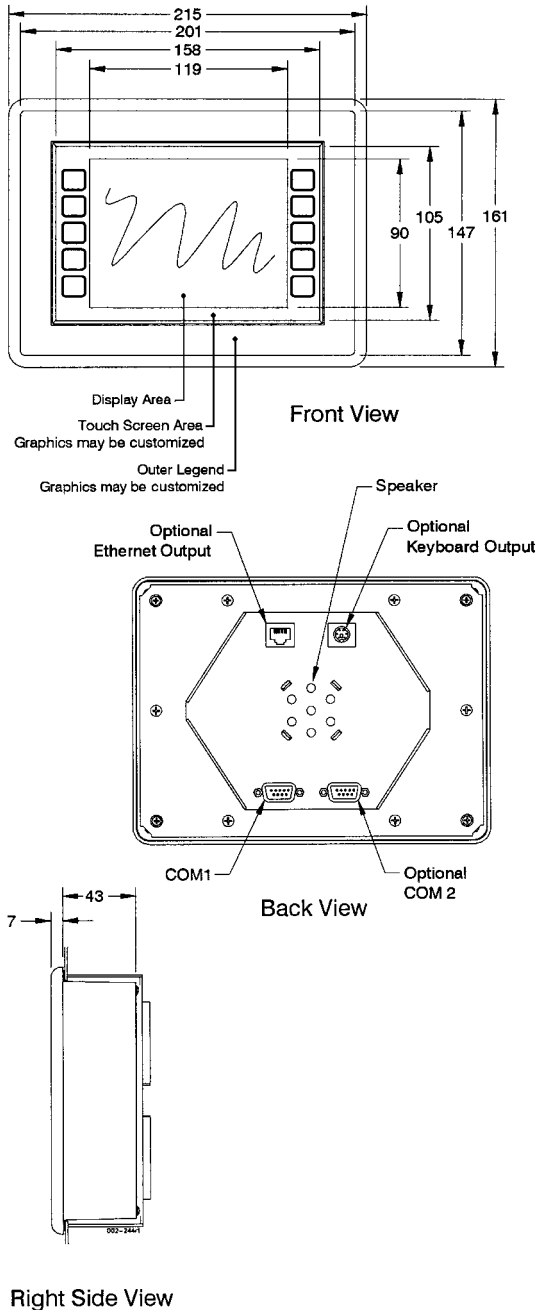| **CAUTION** ⚠	QTERM-G70 power must come from an SELV (Safety Extra Low Voltage) power source and should have a current limit on its output of 5 Amperes. It must provide a minimum of 8 volts DC power and be limited to a maximum of 26 volts DC. Limiting may be inherent to the supply or may be provided by supplementary overcurrent devices. If the QTERM-G70 does not respond or exhibits abnormal behavior on power up, disconnect power and contact QSI for technical support.

Current Consumption			
Terminal	**12 VDC**	**24 VDC**	**PoE**
Standard unit (color, no options, idle)	400 mA	240 mA	120 mA
Standard TFT unit (TFT, no options, idle)	675 mA	350 mA	190 mA
Standard unit, active	add 90 mA	add 40 mA	add 15 mA
Standard TFT unit, active	add 90 mA	add 50 mA	add 15 mA
With keyboard option and keyboard attached	add 70 mA	add 35 mA	N/A
With Ethernet option and connection	add 40 mA	add 20 mA	N/A

1.4.6   Powering On the Terminal for the First Time

When you connect power to the QTERM-G70 terminal, it automatically loads the application saved in flash memory into RAM memory and displays the application. If no application is present, the terminal display may be blank but the backlighting verifies it is powered on.

When you power on the terminal for the first time, a demo program (or a special application custom designed for your company) loads. The demo program will help you verify that the terminal is operating properly. Follow the on-screen prompts or any documentation accompanying the program to guide you through tests or demonstrations designed to verify terminal operation.

Once you have verified that the terminal is functioning properly, refer to Chapter 5, "Power On Setup" for information on configuring your terminal. The Power On Setup utility includes functions to do the following:

- Change orientation of the terminal (portrait or landscape)
- Download a new user application to the terminal
- Select the application mode
- Set up communications settings for the terminal
- Adjust display contrast or backlight
- Enter network (Ethernet) settings
- Enter/change password (if used)
- Set the real time clock

CHAPTER 2

QTERM-G75 TERMINAL

2.1 Product Description

The QTERM-G75™ terminal is a large display Ethernet-enabled graphic terminal with object-based programming. It features a robust list of industrial grade hardware features and options.

The QTERM-G75 features a VGA, 640x480 pixel, active-matrix TFT LCD display (256 colors). It uses a dual lamp cold-cathode fluorescent backlight (CCFL). The CCFL provides high contrast and easy readability and is replaceable.

The analog-resistive touch screen covers the full viewable area of the display as well as the pre-labeled legend underlay on each side of the display.

The QTERM-G75 comes equipped with one serial port using an EIA-232, EIA-422, or EIA-485 interface. A second serial port, an Ethernet port, and a PS/2 keyboard port are available as options.

Possible input devices include the touch screen and attachable keyboard (with an optional PS/2 connector). Custom configurations of the QTERM-G75 can also support an external keypad, a dual EIA-232 full serial port card or a quad EIA-232 full serial port card (contact QSI Corporation for details). A speaker, which has programmable pitch and duration, comes standard, as does a battery-backed real-time clock. Other options include: an audio decoder for playing audio wave files, a hardware watchdog timer and a 5 V/100 mA output from the auxiliary serial port to power external devices.

The QTERM-G75 terminal stores the firmware and the user application in a compressed format in flash memory and then transfers them to RAM memory when the terminal is powered on. The terminal is equipped with eight megabytes of flash memory and 32 megabytes of RAM memory. The Power-over-Ethernet units is equipped with four megabytes of flash memory and sixteen megabytes of RAM.

The outer legend can be customized with your logo/name or graphics. The inner legend underlay around the display can be customized with your touch keys and graphics.

The QTERM-G75 terminal requires a DC power source in a range of 8 to 26 V dc. This power is supplied via the main DB9 serial connector. Other options for supplying power to the QTERM-G75 are PoE (Power-over-Ethernet) or five volts from a well-regulated power supply via the main DB9 serial connector. Please contact QSI for more information about this option.

2.1.1 Specifications

The following tables contain the technical specifications for the QTERM-G75

TERMINAL DISPLAY	
Active Matrix (standard)	TFT 256 colors
Enhanced TFT (optional)	Enhanced TFT 256 colors
Pixels	640x480
Dot Pitch	0.33 mm
Lighting	Dual lamp cold-cathode fluorescent, brightness is software-controllable
Backlight Brightness	TFT 550 nits typical Enhanced TFT 800 nits typical
TOUCH SCREEN	
Analog-resistive operation	
Transparent touch area over viewable display	
Labeled touch underlay area on each side of display	
INTERFACE	
Standard	EIA-232 serial port with hardware or software handshaking
Baud rates	600 – 115,200 bps
Flow control	None XonXoff (software) RTS/CTS (hardware)

INTERFACE	
Data formats	7 or 8 data bits 1 or 2 stop bits Even, odd, or no parity (PC Tools support only 8 data bits)
Connector	DB9f (2 with optional second serial port) 8-pin modular (RJ45) with Ethernet option PS/2 keyboard connector (optional)

Options	Primary serial port configurable as
	  EIA-232, EIA-422, or EIA-485
	Secondary serial port available (EIA-232,
	  EIA-422, or EIA-485)
	Ethernet 10/100Base-T with support for
	TCP/IP
	  networking
	PS/2 keyboard port
	Additional dual or quad full EIA-232 serial
	  port cards available

MEMORY	
Standard	8 Mbytes flash and 32 Mbytes SDRAM
PoE	4 Mbytes flash and 16 Mbytes SDRAM

SPEAKER	
Standard	Software programmable pitch and duration
Optional	Audio (.wav) decoder

REAL-TIME CLOCK
Independent processor-based, real-time clock equipped with a battery backup

PHYSICAL	
Configuration	Panel-mount
Housing	Aluminum, accommodates panels from 0 to 12 mm thick with standard screws
Size	330 x 260 x 55.3 mm
Weight	2.9 kg
Processor	400 MHz Intel® XScale™ core (standard)
	200 MHz Intel® XScale™ core (PoE)

ENVIRONMENTAL	
Sealing	NEMA-4 front panel
Temperature	Operating: -10 to 60 °C Storage: -20 to 70 °C

ENVIRONMENTAL	
Humidity	0 to 95%, non-condensing
Vibration	5 to 5000 Hz, 4 g RMS
Shock	20 g, 3 ms, any axis

POWER
8 to 26 VDC (See section 2.4.3 for current consumption)
PoE (Power-over-Ethernet)

SOFTWARE	
Programming language	Qlarity™ (object-based)
Design environment	Qlarity Foundry™ (Windows®)
Command line compiler	Qlarify (Win32® or Linux)

CUSTOMIZING	
Outer legend	Customize with logo/name or graphics
Inner legend	Customize with touch keys and graphics

CERTIFICATION
FCC Part 15, Class A CE Certification

2.2 Supported Interfaces

2.2.1   Serial Ports

The QTERM-G75 comes standard with one serial port with DB9f connector. The serial port interface can be EIA-232, EIA-422, or EIA-485. A second serial port is available as an option, as well as two or four additional full EIA-232 serial ports are also optional.

NOTE: The primary and auxiliary serial ports are wired as Data Communications Equipment (DCE).

EIA-232	with proper cables and grounding the terminal can communicate up to five meters at a top speed of 115,200 bps
EIA-422	permits operation at distances up to 2,000 meters
EIA-485	permits multiple terminals to be connected in a multi-drop chain

The figure below shows the serial connector's orientation.

Female DB9 Connector
(Back of unit)

The following table shows the pinouts for each type of serial interface.

Pin	232	422	485
1	—	Tx-	RTx-
2	Tx	Tx+	RTx+
3	Rx	Rx+	—
4	—	—	—
5	Ground	Ground	Ground
6	—	Rx-	—
7	CTS (in)		—
8	RTS (out)		—
9	Power	Power	Power

Power is supplied to the terminal through pin 9 and ground is supplied through pin 5 of the primary serial port connector.

2.2.2 Optional Ethernet Port

The optional Ethernet port has a standard 10/100Base-T interface with an 8-pin (RJ-45) modular jack connector and uses TCP/IP protocol.

The connector orientation and pinout table are shown in the following table.
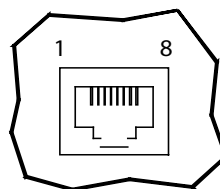
RJ45 Connector
(Back of unit)

Pinout Table	
1	Tx+
2	Tx-
3	Rx+
4	—
5	—
6	Rx-
7	—
8	—

2.2.3 Optional PS/2 Keyboard Interface

The optional PS/2 port can be used to connect a standard PS/2 keyboard to the QTERM-G75 terminal. The connector orientation and pinout table are shown in the table that follows.
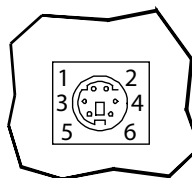
Female Mini-DIN Connector
(Back of unit)

Pinout Table	
1	+Keyboard Data
2	—
3	Ground
4	+5 Volts
5	Clock
6	—

2.2.4 Optional 5 Volt Power Supply on Secondary Serial Port

The secondary serial port interface (if included) can optionally be configured to provide a 5 volt DC power supply. The supply can provide up to 100 mA current to a serial peripheral device (such as a barcode reader) connected to COM2. The 5 volt supply is provided on pin 9 and returns to ground on pin 5.

2.2.5 Optional Dual and Quad EIA-232 Serial Port Card

An additional two or four EIA-232 serial ports can be added to the QTERM-G75. **These serial ports have all necessary signals for EIA-232 serial communications and are wired as Data Terminal Equipment (DTE).**

The additional serial port option will add approximately 10 mA to the total current draw of the terminal plus 15 mA per connected serial cable.

The following table shows the pinouts for the additional serial port option.

Additional EIA-232 Serial Port Pinouts	
1	DCD (in)
2	Rx (in)
3	Tx (out)
4	DTR (out)
5	GND
6	DSR (in)
7	RTS (out)
8	CTS (in)
9	RI (in)

2.2.6 Optional Power-over-Ethernet Module

The optional Power-over-Ethernet module allows the user to provide power and communications to the QTERM-G75. The power can be provided from an IEEE 802.3af compliant hub or switch as well as from a standard power supply.

2.3 Terminal Components

2.3.1 Touch Screen

The QTERM-G75 touch screen provides user input through any number of touch keys located on or around the display. The standard key legend shown in the figure below provides areas for five soft keys down each side of the display. A custom legend underlay can be ordered to personalize the terminal for your application.

Front View
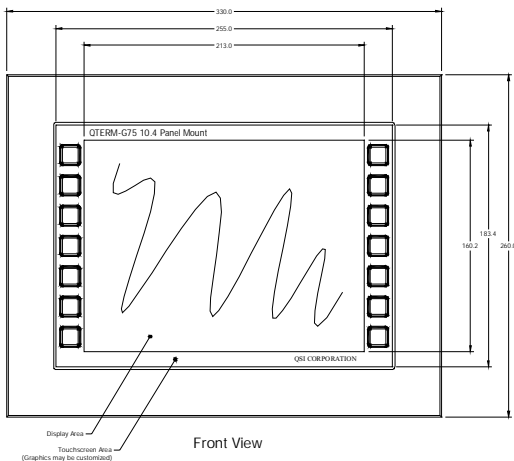
Touch keys can also be defined in your user applications at any location on or around the display. Touch keys may be any size.

2.3.2 Keyboard

Using the optional PS/2 port, a standard PC keyboard may be used in addition to, or in place of, the touch screen. Power On Setup, the terminal setup utility, recognizes both touch keys and keyboard keys.

2.3.3 Keypad

The QTERM-G75 terminal can optionally include electronics for attaching an external keypad with up to 8 columns by 8 rows and up to 6 keypad LEDs. Contact QSI Corporation for more information.

The keypad option will add 10 mA to the total current draw of the terminal plus the current driven out the LED outputs pins. The LED outputs are five-volt open-collector signals with a 1000 Ohm series resistor. This results in an approximate maximum output current drive of 5 mA on those pins. There are two connectors on the keypad module to facilitate connecting different sized keypads. The pinouts for those connectors are shown in the following table:

Connector J1 - 0.1 Inch Pitch 16-pin Single-row Connector			
1	GND	9	Row 5
2	LED 1	10	Row 6
3	Row 1	11	Col 1
4	Row 2	12	Col 2
5	Row 3	13	Col 3
6	Row 4	14	Col 4
7	GND	15	Col 5
8	LED 2	16	Col 6

Connector J2 - 0.1 Inch Pitch 24-pin Dual-row Connector			
1	Row 1	13	Col 1
2	5 V or 3.3 V	14	LED 4
3	Row 2	15	Col 2
4	GND	16	LED 3
5	Row 3	17	Col 3
6	LED 6	18	LED 2
7	Row 4	19	Col 4
8	LED 5	20	LED 1
9	Row 5	21	Col 5
10	Row 8	22	Col 6
11	Row 6	23	Col 8
12	Row 7	24	Col 7

2.3.4   Speaker

A speaker is built into the QTERM-G75 terminals and faces to the back of the unit. Audio can be linked to events or actions (e.g., screen press, timer, etc.). Pitch and duration of a sound are controlled by API functions called from the user application. Refer to "Controlling the Speaker" section in the *Qlarity-based Terminal Programmer's Reference Manual*.

Optionally, an audio (.wav) decoder can be added to the QTERM-G75 to allow the speaker to play audio files. The audio decoder supports wave files meeting the following criteria:

- Sample rate of 8 kHz, 11.025 kHz, 16 kHz or 22.050 kHz
- Resolution of 8 or 16 bits per sample.

The audio decoder circuit amplifies the signal to 0.5 W rms at the speaker.

2.3.5   Real-Time Clock

The QTERM-G75 terminal is equipped with a battery-backed, real-time clock. The real-time clock can be used to time/date stamp messages or for timed polling and program execution.

WARNING	There may be danger of leakage if the battery is incorrectly replaced, creating a potential health hazard. Replace the battery only with the same (Duracell CR1220) or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

2.3.6   System Memory

The QTERM-G75 terminal stores the firmware and user applications in a compressed format in flash memory and then transfers them to RAM memory when the terminal is powered on. Eight megabytes of flash memory and 32 megabytes of RAM memory are included on the standard unit. The PoE unit has four megabytes of flash memory and sixteen megabytes of RAM memory.

For information on using resources efficiently to conserve memory when creating a user application, refer to "Edit Resources" section in the *Qlarity Foundry User's Manual*.

For information on downloading new firmware, downloading a user application, and determining the size of a user application, refer to the *Qlarity Foundry User's Manual*.

2.3.7   Watchdog Timer

A watchdog timer can be optionally added to enforce proper operation of the QTERM-G75. The watchdog timer will reset the terminal if there is a problem causing the firmware to lock up. This does not apply to software deadlocks in the Qlarity code. If that is required, then the Qlarity watchdog timer should be used, using the WatchdogEnable and WatchdogReset APIs.

2.4 Installing the QTERM-G75 Terminal to NEMA-4 Specifications

A QTERM-G75 terminal uses a rugged aluminum case designed to mount into a panel. When properly installed in a NEMA-4 rated panel, the QTERM-G75 meets all NEMA-4 specifications including hose-down, icing, and salt spray.

A QTERM-G75 terminal can be installed in either a landscape or portrait orientation. When installing a terminal, you generally take the following steps.

- Decide whether you want to mount and use the terminal in a portrait or landscape orientation. "Portrait" means that the longest dimension is vertical; "landscape" means that the longest dimension is horizontal.

- Cut a hole in the panel and drill the mounting holes. See section 2.4.1, "Cutting Out the Panel" for specifications.

- Install the QTERM-G75 terminal in the panel. See section 2.4.2, "Installing the Terminal" for instructions.

- Connect cables to the terminal. Verify that the thumb screws are tight or the locks snapped into place for each cable used.

- Apply DC power to the QTERM-G75 terminal See section 2.4.3, "Applying Power" for information.

2.4.1 Cutting Out the Panel

The QTERM-G75 terminal can be mounted in panels from 0 to 12 mm thick. Fourteen screw holes need to be drilled to install the terminal in the panel. The mounting holes should be 4.6 mm in diameter and drilled as shown in the figure below.

Make a rectangular hole in the panel using the following dimensions.

Landscape:

Horizontal	291 ± 1 mm
Vertical	221 ± 1 mm

Portrait:

Horizontal	221 ± 1 mm
Vertical	291 ± 1 mm

Following is a diagram of the landscape cutout:

Panel Cutout Dimensions
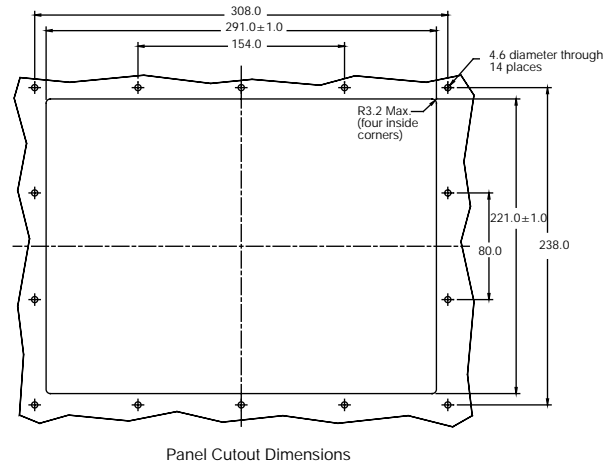
File any rough edges smooth, especially on the face of the panel.

2.4.2 Installing the Terminal

Take the following steps to install the terminal. Refer to the illustrations on the next page.

1. Verify that the panel surface around the cutout and mounting holes is clean and free of rough edges. A gasket built into the terminal will seal against this surface. Dirt or imperfections on the panel may prevent a proper seal.

2. Place the terminal into the panel cutout (inserting the studs into the mounting holes) and verify that the terminal is oriented correctly. The touch screen legend may indicate the orientation. If not, you can determine which side should be at the top by the position of the serial port on the back panel as follows:

   Landscape: when looking at the front of the unit, the back panel serial port(s) should be near the top of the terminal.

Portrait: when looking at the front of the unit, the back panel serial port(s) should be on the right side of the terminal.

Front View

Back View

Right Side View
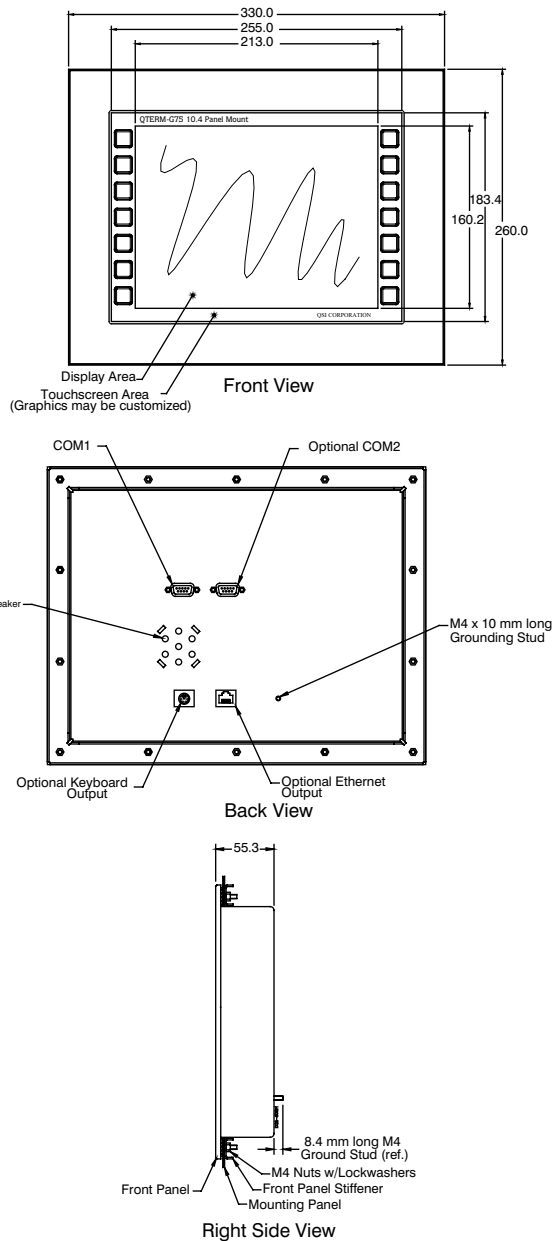
3. On the back of the panel, align the terminal mounting bracket holes with the mounting studs and place the bracket against the back of the panel.

4. Attachments with lockwashers (supplied with the terminal) onto each of the fourteen mounting studs.

Tighten all nuts to create the seal between the terminal gasket and the panel. Avoid overtightening the nuts.

2.4.3 Applying Power

Power is supplied to the QTERM-G75 terminal via the primary serial port connector. Refer to section 2.2.1, "Serial Ports" for the pin assignments for power and ground. DC power must be in the range of 8 to 26 volts (the current will vary depending on the input voltage; see table below).

CAUTION ⚠	QTERM-G75 power must come from an SELV (Safety Extra Low Voltage) power source and should have a current limit on its output of 5 Amperes. It must provide a minimum of 8 volts DC power and be limited to a maximum of 26 volts DC. Limiting may be inherent to the supply or may be provided by supplementary overcurrent devices. If the QTERM-G75 does not respond or exhibits abnormal behavior on power up, disconnect power and contact QSI for technical support.

Current Consumption		
Terminal	**12 VDC**	**24 VDC**
Standard unit idle	950 mA	475 mA
Enhanced unit idle	1.0 A	500 mA
Standard unit, active	add 100 mA	add 60 mA
Enhanced unit, active	add 100 mA	add 60 mA
With keyboard option and keyboard attached	add 70 mA	add 35 mA
With Ethernet option and connection	add 40 mA	add 20 mA

2.4.4 Powering On the Terminal for the First Time

When you connect power to the QTERM-G75 terminal, it automatically loads the application saved in flash memory into RAM memory and displays the application. If no application is present, the terminal display is blank but the back-lighting verifies that it is powered on.

When you power on the terminal for the first time, a demo program (or a special application custom designed for your company) loads. The demo program will help you verify that the terminal is operating properly. Follow the on-screen prompts or any documentation accompanying the program

to guide you through tests or demonstrations designed to verify terminal operation.

Once you have verified that the terminal is functioning properly, refer to Chapter 5, "Power On Setup" for information on configuring your terminal. The Power On Setup utility includes functions to do the following:

- Change orientation of the terminal (portrait or landscape)

- Download a new user application to the terminal

- Select the application mode

- Set up communications settings for the terminal

- Adjust display contrast or backlight

- Enter network (Ethernet) settings

- Enter/change password (if used)

- Set the real time clock

QTERM-G55 TERMINAL

3.1 Product Description

The QTERM-G55 is a rugged, handheld or panel-mount Ethernet-enabled graphic terminal with object-based programming. It features a robust list of industrial grade hardware features and options.

The QTERM-G55 features a QVGA, 320x240 pixel, LCD transflective FSTN, grayscale (16 shades) display or optional active-matrix TFT (256 colors) display. Both displays use a light emitting diode (LED) backlight. The LED provides reasonable contrast at low power consumption and easy readability. The FSTN contrast is software-controlled and compensated for temperature. The transflective display provides excellent contrast in sunlight and high ambient light environments.

The QTERM-G55 comes equipped with one serial port using an EIA-232, EIA-422, or EIA-485 interface. A second serial port or an Ethernet or Power-over-Ethernet port are available as options. Units with the emergency stop (E-stop) option may be equipped with a single serial port, Ethernet or Power-over-Ethernet.

User input occurs through a rugged 24-key or 40-key membrane keypad with steel snap domes. The top row of keys are commonly used as soft keys to navigate through a set of changing menus at the bottom of the display. The standard keypad comes with four or five LEDs under the soft keys that can be used as status or alarm indicators. Power and shift buttons with LEDs are included on both keypad configurations. The power button puts the terminal into a sleep mode for low power consumption and provides instant-on function with no loss of program state.

The 40-key keypad allows for function / softkeys, eight-way directional control and numeric entry in the unshifted mode and alphanumeric data entry in the shifted mode. Keys can perform alternate functions when the shift key is enabled. Both the power and shift functions can be enabled or disabled in software.

The keypad legend can be customized with your logo/name and custom keys.

The QTERM-G55 terminal stores the firmware and the user application in a compressed format in flash memory and then transfers them to RAM memory when the terminal is powered on. The terminal is equipped with two megabytes of flash memory and sixteen megabytes of RAM memory.

The QTERM-G55 terminal includes a switching power supply with a wide input voltage range of 8 to 32 V dc. Typically, power is supplied through the 12-pin circular connector or integral cable (handheld) or the primary serial port (panel-mount). If the Power-over-Ethernet (PoE) option is selected, power is supplied through the Ethernet cable and your PoE-compliant hub.

3.1.1 Specifications

The following tables contain the technical specifications for the QTERM-G55.

TERMINAL DISPLAY	
Grayscale (standard)	FSTN 16 shades of gray
Active Matrix Color (optional)	TFT 256 colors
Pixels	320 x 240
Dot Pitch	FSTN 0.24 mm TFT 0.227 mm
FSTN Contrast	Software-controlled, temperature compensated
Lighting	Light emitting diode brightness is software-controllable
Backlight Brightness	FSTN 10 nits typical TFT 200 nits typical
KEYPAD	
24- or 40-keys	
Steel snap domes in membrane	
Lighted keypad with electroluminescent lighting (optional)	
Optional emergency stop switch (2-pole, normally closed)	

INTERFACE	
Standard	EIA-232 serial port with hardware or software handshaking
Baud rates	600 – 115,200 bps
Flow control	None XonXoff (software) RTS/CTS (hardware)
Data formats	7 or 8 data bits 1 or 2 stop bits Even, odd, or no parity (PC Tools support only 8 data bits)
Connector	Handheld - 12-pin round (Hirose HR30-8R-12SC) Integral cable with DB15f
	Panel-mount - DB9f (2 with optional second serial port) 8-pin modular (RJ45) with Ethernet option
Options	Primary serial port configurable as EIA-232, EIA-422, or EIA-485 Secondary serial port available (EIA-232, EIA-422, or EIA-485) Ethernet 10Base-T with support for TCP/IP networking Power-over-Ethernet

MEMORY	
Standard	2 Mbytes flash and 16 Mbytes SDRAM

SPEAKER	
Standard	Software programmable pitch and duration
Optional	Audio (.wav) decoder

REAL-TIME CLOCK	
Optional	Independent processor-based, real-time clock equipped with a battery backup

PHYSICAL		
Configuration	Panel-mount	
	Handheld	
Housing	Handheld - ABS/bicarbonate case with molded rubber boot	
	Panel-mount - ABS/poly carbonate case with rubber overmold trim	
Size	Handheld - 129 x 234 x 43 mm	
	Panel-mount - 127 x 228.6 x 95.6 mm	

PHYSICAL		
Mass	Handheld - 520 g	
	Panel-mount - 700 g	
Processor	ARM720T 77 Mhz	

ENVIRONMENTAL		
Sealing	Handheld - NEMA-12 (Standard) NEMA-4 (optional) Panel-mount - NEMA-4	
Temperature	Operating: -20 to 60 °C Storage: -40 to 85 °C	
Humidity	0 to 95%, non-condensing	
Vibration	5 to 2000 Hz, 4 g RMS	
Shock	20 g, 3 ms, any axis	

POWER	
8 to 32 VDC (See section 3.4.3 for current consumption)	
PoE (Power-over-Ethernet)	

SOFTWARE	
Programming language	Qlarity™ (object-based)
Design environment	Qlarity Foundry™ (Windows®)
Command line compiler	Qlarify (Win32® or Linux)

CUSTOMIZING	
Keypad legend	Customize with logo/name or graphics

CERTIFICATION	
FCC Part 15, Class B (Class A with Ethernet or PoE option) CE Certification	

3.2 Supported Interfaces

3.2.1 Handheld Connector Interface

The QTERM-G55 handheld terminal comes standard with one serial port through a 12-pin round connector (Hirose HR30-8R-12SC) or integral cable with strain relief, terminated with a DB15f connector. The serial port interface can be EIA-232, EIA-422 or EIA-485. A second serial port is available as on option on non-E-stop units.

	EIA-232	with proper cables and grounding the terminal can communicate up to five meters at a top speed of 115,200 bps
EIA-232		with proper cables and grounding the terminal can communicate up to five meters at a top speed of 115,200 bps
EIA-422		permits operation at distances up to 2,000 meters
EIA-485		permits multiple terminals to be connected in a multi-drop chain

The following figure shows the handheld unit connector orientation:
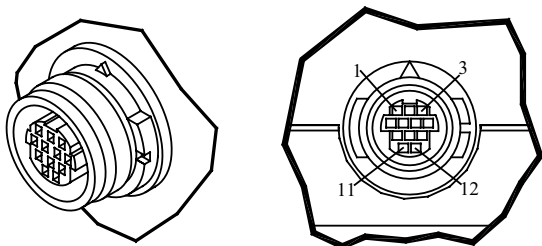
3.2.1.1   Power Interface

The following table shows the pinout for each type of power interface.

Pin	Regulated (standard)	5 Volt Unregulated	Power-over-Ethernet
1	8 - 32 VDC	4.5 - 5.5 VDC	No connect
2	Ground	Ground	Ground
11	No connect	No connect	PoE V+
12	No connect	No connect	PoE V-

The Power-over-Ethernet voltage difference [(PoE V+) - (PoE V-)] is typically 48 VDC. See the IEEE 802.3af specification for details.

3.2.1.2   Primary Serial Interface

The following table shows the power supply pinout for each type of primary serial interface:

Pin	EIA-232	EIA-422	EIA-485
3	Tx	Tx+	RTx+
4	RTS (out)	Tx-	RTx-
5	Rx	Rx+	No connect
6	CTS (in)	Rx-	No connect

3.2.1.3   Secondary Serial Interface or Network Interface

The following table shows the power supply pinout for each type of secondary serial interface or network interface:

Pin	EIA-232	EIA-422	EIA-485	Ethernet (including PoE)
7	Tx	Tx+	RTx+	Tx+
8	RTS (out)	Tx-	RTx-	Tx-
9	Rx	Rx+	No connect	Rx+
10	CTS (in)	Rx-	No connect	Rx-

3.2.1.4   E-stop Option

If the terminal is equipped with the E-stop option, the pinout changes to accommodate the switch signals, as shown below. Note that a secondary serial interface is not available if the E-stop option is selected.

3.2.1.4.1 Power Interface with E-stop Option

The following table shows the pinout for each type of power interface when the E-stop option is selected.

Pin	Regulated (standard)	5 Volt Unregulated	Power-over-Ethernet
1	8 - 32 VDC	4.5 - 5.5 VDC	No connect
2	Ground	Ground	Ground
3	No connect	No connect	PoE V+
4	No connect	No connect	PoE V-

3.2.1.4.2 Serial or Network Interface with E-stop Option

The following table shows the pinout for each type of serial or network interface.

Pin	EIA-232	EIA-422	EIA-485	Ethernet (including PoE)
7	Tx	Tx+	RTx+	Tx+
8	RTS (out)	Tx-	RTx-	Tx-
9	Rx	Rx+	No connect	Rx+
10	CTS (in)	Rx-	No connect	Rx-

3.2.1.4.3 E-stop Switch Interface

The following table shows the pinout for the two-pole normally closed E-stop switch. The conductors for each pole (Pole 1 and Pole 2) of the switch are shorted until the switch is activated. After activation, each pole is an open circuit until the switch is reset.

Pin	E-stop Switch
5	Pole 1
6	Pole 1
11	Pole 2
12	Pole 2

3.2.1.5   Accessory Cable Wire Color Code

The following table shows the wire color code for the 12-pin round connector to blank accessory cable. The cable contains fifteen conductors; however, only twelve conductors are connected to pins on the round connector. Six of the fifteen conductors in the cable are wired as 100 ohm twisted pairs, as shown in the table. One of the fifteen conductors is a non-insulated drain wire which is shorted to the foil shielding in the cable. This drain wire is not connected to the round connector.

Round Connector Pin	Wire Color	Twisted Pairs
1	Brown	
2	Red with Black Stripe	
3	Orange	
4	Yellow	
5	Green with Black Stripe	
6	Blue	
7	Black	Pair #1
8	White	Pair #1
9	Red	Pair #2
10	Green	Pair #2
11	Violet	
12	Gray	
No Connect	White with Red Stripe	Pair #3
No Connect	White with Green Stripe	Pair #3
No Connect	Drain	

3.2.1.6   Integral Cable

The handheld QTERM-G55 can be optionally equipped with an integral cable (instead of the 12-pin round connector). This cable is terminated with a DB15f connector. The following figure shows the integral cable connector orientation:
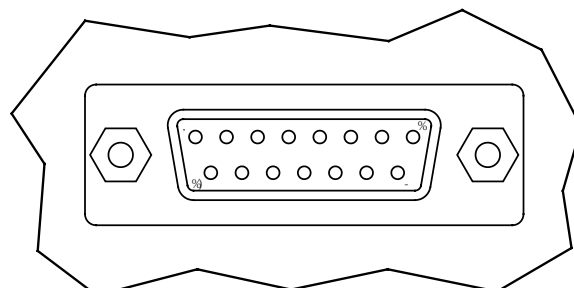
3.2.1.6.1 Power Interface with Integral Cable

The following table shows the pinout for each type of power interface when the integral cable option is selected.

DB15f Pin	Regulated (standard)	5 Volt Unregulated	Power-over-Ethernet
9	8 - 32 VDC	4.5 - 5.5 VDC	No connect
1	Ground	Ground	Ground
15	No connect	No connect	PoE V+
8	No connect	No connect	PoE V-

3.2.1.6.2 Primary Serial Interface with Integral Cable

The following table shows the pinout for each type of serial interface.

DB15f Pin	EIA-232	EIA-422	EIA-485
11	Tx	Tx+	RTx+
5	RTS (out)	Tx-	RTx-
12	Rx	Rx+	No connect
4	CTS (in)	Rx-	No connect

3.2.1.6.3 Secondary Serial Interface or Network Interface with Integral Cable

The following table shows the pinout for each type of secondary serial interface or network interface.

DB15f Pin	EIA-232	EIA-422	EIA-485	Ethernet (including PoE)
7	Tx	Tx+	RTx+	Tx+
14	RTS (out)	Tx-	RTx-	Tx-
6	Rx	Rx+	No connect	Rx+
13	CTS (in)	Rx-	No connect	Rx-

3.2.1.7 E-stop Option with Integral Cable

If the terminal is equipped with the E-stop option and integral cable, the DB15f pinout changes to accommodate the switch signals, as shown below. Note that a secondary serial interface is not available if the E-stop option is selected.

3.2.1.7.1 Power Interface with E-stop Option and Integral Cable

The following table shows the pinout for each type of power interface when the E-stop option and integral cable are selected.

DB15f Pin	Regulated (standard)	5 Volt Unregulated	Power-over-Ethernet
9	8 - 32 VDC	4.5 - 5.5 VDC	No connect
1	Ground	Ground	Ground
11	No connect	No connect	PoE V+
5	No connect	No connect	PoE V-

3.2.1.7.2 Serial or Network Interface with E-stop Option and Integral Cable

The following table shows the pinout for each type of serial or network interface.

DB15f Pin	EIA-232	EIA-422	EIA-485	Ethernet (including PoE)
7	Tx	Tx+	RTx+	Tx+
14	RTS (out)	Tx-	RTx-	Tx-
6	Rx	Rx+	No connect	Rx+
13	CTS (in)	Rx-	No connect	Rx-

3.2.1.7.3 E-stop Switch Interface with Integral Cable

The following table shows the pinout for the two-pole normally closed E-stop switch when the integral cable option is selected. The conductors for each pole (Pole 1 and Pole 2) of the switch are shorted until the switch is activated. After activation, each pole is an open circuit until the switch is reset.

DB15f Pin	E-stop Switch
4	Pole 1
12	Pole 1
8	Pole 2
15	Pole 2

3.2.1.8 Integral Cable Wire Color Code

The following table shows the wire color code for the DB15f connector on the integral cable; this information is provided to facilitate removal of the DB15f if desired. Six of the fifteen conductors in the cable are wired as 100 ohm twisted pairs, as shown in the table. One of the fifteen conductors is a non-insulated drain wire which is shorted to the foil shielding in the cable.

DB15f Pin	Wire Color	Twisted Pairs
1	Red with Black Stripe	
2	White with Red Stripe	Pair #3
3	White with Green Stripe	Pair #3
4	Blue	
5	Yellow	
6	Red	Pair #2
7	Black	Pair #1
8	Gray	
9	Brown	
10	Drain	
11	Orange	
12	Green with Black Stripe	
13	Green	Pair #2
No 14	White	Pair #1
15	Violet	

3.2.2 Panel-mount Connector Interface

The panel-mount QTERM-G55 comes standard with one serial port with DB9f connector. The serial port interface can be EIA-232, EIA-422, or EIA-485. A second serial port is available as an option.

NOTE: The primary panel-mount and auxiliary serial ports are wired as Data Communications Equipment (DCE).

EIA-232	with proper cables and grounding the terminal can communicate to five meters at a top speed of 115,200 bps
EIA-422	permits operation at distances up to 2,000 meters
EIA-485	permits multiple terminals to be connected in a multi-drop chain

The following figure shows the panel-mount unit serial connector orientation:
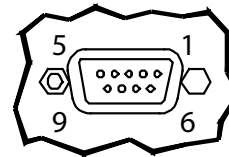
Female DB9 Connector
(Back of unit)

The following tables show the pinouts for each type of serial interface.

Pin	232	422	485
1	—	Tx-	RTx-
2	Tx	Tx+	RTx+
3	Rx	Rx+	—
4	—	—	—
5	Ground	Ground	Ground
6	—	Rx-	—
7	CTS (in)		—
8	RTS (out)		—
9	Power	Power	Power

Power is supplied to the terminal through pin 9 and ground is supplied through pin 5 of the primary serial port connector. System ground is also connected to pin 5 of the secondary serial port connector.

3.2.2.1 Optional Ethernet Port (Panel-mount)

The optional Ethernet port has a standard 10Base-T interface with an 8-pin (RJ-45) modular jack connector and uses TCP/IP protocol.

The connector orientation and pinout table are shown in the following table.

RJ45 Connector
(Back of unit)

Pinout Table

1	Tx+
2	Tx-
3	Rx+
4	—
5	—
6	Rx-
7	—
8	—

3.2.3   Optional Power-over-Ethernet Module

The optional Power-over-Ethernet module allows the user to provide power and communications to the QTERM-G55. The power can be provided from an IEEE 802.3af compliant hub or switch as well as from a standard power supply.

3.2.3.1   Power Requirements

The optimal power supplied to the QTERM-G55 through the PoE port is 48 V dc, although the unit will operate with a power input as low as 36 V dc, or as high as 57 V dc (see IEEE 802.3af specification). The power required to operate the terminal with out any additional options is listed below.

Current Consumption	
Terminal	48VDC
G55 STN Idle	70 mA
Active Add	+10 mA

3.2.3.2   Pinouts (Panel-mount)

In accordance with the PoE standard (IEEE 802.3af), the PoE port is insensitive to polarity of the power supply and can receive power in either mode A (superimposed on the transmit and receive twisted pair conductors) or mode B (using the additional twisted pair conductors). This yeilds four possible ways to apply power to the PoE port as shown in the following table. The table also shows the conductor assignment for the transmit and receive lines as a reference.

Port Pin Assignment	
Conductor	Data
1	Tx+
2	Tx-
3	Rx+
4	PoE V+
5	
6	Rx-
7	PoE V-
8	

NOTE: The pinouts for the PoE option on the hand-held terminal are shown in section 3.2.1, "Handheld Connector Interface".

3.3   Terminal Components

3.3.1   Display

The standard QTERM-G55 features a QVGA, 320x240 pixel, LCD transflective FSTN, grayscale (16 shades) display. It uses a light emitting diode (LED) backlight. The LED provides reasonable contrast at low power consumption and easy readability. The contrast is software-controlled and compensated for temperature. The transflective display provides excellent contrast in sunlight and high ambient light environments.
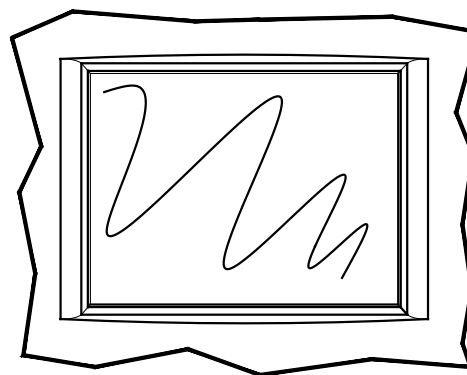
The QTERM-G55 may be optionally equipped with a color QVGA, 320x240 pixel, active-matrix TFT LCD (256 colors). It also uses a light emitting diode (LED) backlight, with a typical brightness of 200 nits.

3.3.2   Keypad

User input occurs through a rugged 24-key or 40-key membrane keypad with steel snap domes. The top row of keys a commonly used as soft keys to navigate through a set of changing menus at the bottom of the display. The standard keypad comes with four or five LEDs under the soft keys that can be used as status or alarm indicators. Power and shift buttons with LEDs are included on both keypad configurations. The power button puts the terminal into a sleep mode for low power consumption and provides instant-on function with no loss of program state.

The 40-key keypad allows for function / softkeys, eight-way directional control and numeric entry in the unshifted mode and alphanumeric data entry in the shifted mode. Keys can perform alternate functions when the shift key is enabled. The power and shift functions can be enabled or disabled in software.

The keypad legend can be customized with your logo/name and custom keys.

3.3.3   Speaker

A speaker is built into the QTERM-G55 terminal and faces to the back of the unit. Audio can be linked to events or actions (e.g., screen press, timer, etc.). Pitch and duration of a sound are controlled by API functions called from the user application. Refer to "Controlling the Speaker" section in the *Qlarity-based Terminal Programmer's Reference Manual*. Newer models also include a course volume control that is accessible via software.

Optionally, an audio (.wav) decoder can be added to the QTERM-G55 to allow the speaker to play audio files. The audio decoder supports wave files meeting the following criteria:

- Sample rate of 8 kHz, 11.025 kHz, 16 kHz or 22.050 kHz

- Resolution of 8 or 16 bits per sample.

The audio decoder circuit amplifies the signal to 0.5 W rms at the speaker.

3.3.4   Real-Time Clock

The QTERM-G55 terminal can be optionally equipped with a battery-backed, real-time clock. The real-time clock can be used to time/date stamp messages or for timed polling and program execution.

WARNING	There may be danger of leakage if the battery is incorrectly replaced, creating a potential health hazard. Replace the battery only with the same (Duracell CR1220) or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

3.3.5   System Memory

The QTERM-G55 terminal stores the firmware and user applications in a compressed format in flash memory and then transfers them to RAM memory when the terminal is powered on. Two megabytes of flash memory and sixteen megabytes of RAM memory are standard.

For information on using resources efficiently to conserve memory when creating a user application, refer to "Edit Resources" section in the *Qlarity Foundry User's Manual*.

For information on downloading new firmware, downloading a user application, and determining the size of a user application, refer to the *Qlarity Foundry User's Manual*.

3.4 Installing the QTERM-G55 Panel Mount Terminal to NEMA-4 Specifications

A QTERM-G55 terminal uses a rugged ABS poly carbonate with rubber overmold case designed to mount into a panel. When properly installed in a NEMA-4 rated panel, the QTERM-G55 meets all NEMA-4 specifications including hose-down, icing, and salt spray.

A QTERM-G55 terminal can be installed in either a landscape or portrait orientation. When installing a terminal, you generally take the following steps.

- Decide whether you want to mount and use the terminal in a portrait or landscape orientation. "Portrait" means that the longest dimension is vertical; "landscape" means that the longest dimension is horizontal.

- Cut a hole in the panel. See section 3.4.1, "Cutout for Panel Mount Configuration" for specifications.

- Install the QTERM-G55 terminal in the panel. See section 3.4.2, "Installing the Panel Mount Terminal" for instructions.

- Connect cables to the terminal. Verify that the thumb screws are tight or the locks snapped into place for each cable used.

Apply DC power to the QTERM-G55 terminal See section 3.4.3, "Applying Power" for information.

### 3.4.1 Cutout for Panel Mount Configuration

The QTERM-G55 terminal can be mounted in panels from 0 to 7 mm thick. No screw holes need to be drilled to install the terminal in the panel.

Make a rectangular hole in the panel using the following dimensions.

Horizontal	117.2 ± 1 mm
Vertical	212.6 ± 1 mm

File any rough edges smooth, especially on the face of the panel.

Following is a diagram of the panel mount cutout:
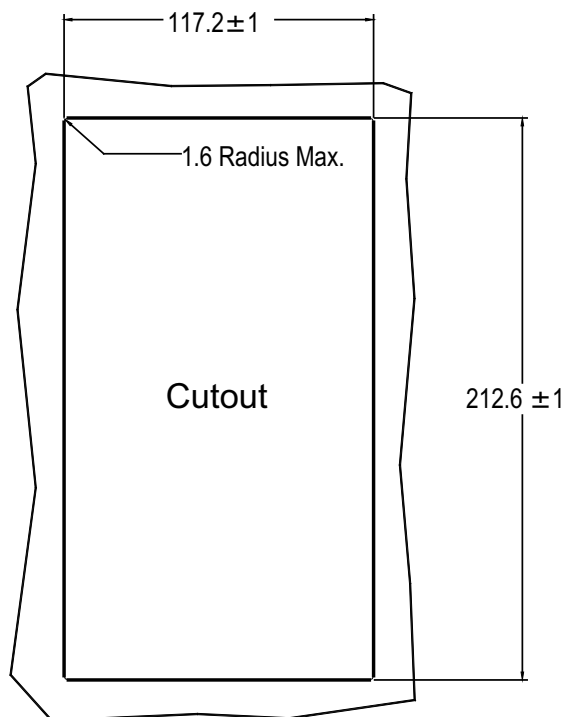
3.4.2 Installing the Panel Mount Terminal

NOTE: Use of an anti-static strap is recommended when performing installation and maintenance.

Take the following steps to install the terminal. Refer to the illustrations on the next page.

1. Verify that the panel surface around the cutout is clean and free of rough edges. A gasket built into the terminal will seal against this surface. Dirt or imperfections on the panel may prevent a proper seal.

2. Place the terminal into the panel cutout and verify that the terminal is oriented correctly.

3. On the back of the panel, place the terminal mount in bracket against the back of the terminal, and align it with the back panel.

4. Fasten the six screws (supplied with the terminal).

3.4.3 Applying Power

Power is supplied to the QTERM-G55 terminal via the 12-pin round connector (handheld) or the primary serial port connector (panel-mount). Refer to section 3.2.1, "Handheld Connector Interface" or section , "The handheld QTERM-G55 can be optionally equipped with an integral cable (instead of the 12-pin round connector). This cable is terminated with a DB15f connector. The following figure shows the integral cable connector orientation:" for the pin assignments for power and ground. DC power must be in the range of 8 to 32 volts (the current will vary depending on the input voltage; see following table).

CAUTION ⚠️	QTERM-G55 power must come from an SELV (Safety Extra Low Voltage) power source and should have a current limit on its output of 5 Amperes. It must provide a minimum of 8 volts DC power and be limited to a maximum of 32 volts DC. Limiting may be inherent to the supply or may be provided by supplementary overcurrent devices. If the QTERM-G55 does not respond or exhibits abnormal behavior on power up, disconnect power and contact QSI for technical support.

Current Consumption			
Terminal	**12 VDC**	**24 VDC**	**PoE**
Standard unit (gray-scale, no options), idle	120 mA	70 mA	70 mA
Standard TFT unit (color), idle	170 mA	92 mA	TBD
Standard unit, active	add 90 mA	add 40 mA	add 10 mA
Standard TFT unit (TFT, no options), active	add 90 mA	add 40 mA	TBD
With Ethernet option and connection	add 50 mA	add 20 mA	N/A
Standard unit, sleep mode	12 mA	7 mA	TBD
Standard TFT unit, sleep mode	60 mA	35 mA	TBD

3.4.4   Powering On the Terminal for the First Time

When you connect power to the QTERM-G55 terminal, it automatically loads the application saved in flash memory into RAM memory and displays the application. If no application is present, the terminal display may be blank but the backlighting verifies it is powered on.

When you power on the terminal for the first time, a demo program (or a special application custom designed for your company) loads. The demo program will help you verify that the terminal is operating properly. Follow the on-screen prompts or any documentation accompanying the program to guide you through tests or demonstrations designed to verify terminal operation.

Once you have verified that the terminal is functioning properly, refer to Chapter 5, "Power On Setup" for information on configuring your terminal. The Power On Setup utility includes functions to do the following:

- Change orientation of the terminal (portrait or landscape)
- Download a new user application to the terminal
- Select the application mode
- Set up communications settings for the terminal
- Adjust display contrast or backlight
- Enter network (Ethernet) settings
- Enter/change password (if used)
- Set the real time clock (if available)

CHAPTER 4

QTERM-Z60 TERMINAL

4.1 Product Description

The QTERM-Z60™ terminal is an economical graphic terminal with object-based programming. Two different models of the QTERM-Z60 exist to suit any environment and budget. In general, the Z60/H version is NEMA-4 rated and has a user-selectable serial port while the Z60/L is NEMA-12 rated, has one EIA-232 serial port and a slightly different display.

The QTERM-Z60 features a QVGA, 320x240 pixel, 256 color STN color LCD display. It uses a cold-cathode fluorescent backlight (CCFL). The CCFL provides high contrast and easy readability and is replaceable. The contrast is software controlled and temperature compensated. The analog-resistive touch screen covers the full viewable area of the display as well as the pre-labeled legend underlay around the display.

The QTERM-Z60/H is equipped with one user-selectable serial port (EIA-232, EIA-422, or EIA-485). The interface is selected using DIP switches. The QTERM-Z60/L is equipped with one EIA-232 serial port.

A speaker, which has programmable pitch and duration, comes standard as does a 5 VDC 200 mA output from the interface connector to power external devices. An external reset signal also comes standard to allow other devices to reset the QTERM-Z60.

The QTERM-Z60 terminal stores firmware and user applications in a compressed format in flash memory and then transfers them to RAM memory when the terminal is powered on. The terminal is equipped with two megabytes of flash memory and sixteen megabytes of RAM memory.

The QTERM-Z60 terminal requires a DC power source ranging from 8 to 32 VDC. This power is supplied via the main interface connector.

4.1.1 Specifications

The following tables contain the technical specifications for the QTERM-Z60.

TERMINAL DISPLAY	
Standard	STN 256 colors
Pixels	320 x 240
Dot Pitch	0.36 mm
Contrast	Software controlled, temperature compensated
Lighting	Cold-cathode fluorescent, brightness is software-controllable
Backlight Brightness	200 nits typical
TOUCH SCREEN	
Analog-resistive operation	
Transparent touch area over viewable display	
Labeled touch underlay area on each side of display	
INTERFACE	
Z60/H	EIA-232, -422 or -485 serial port
Z60/L	EIA-232 serial port
Baud rates	600 – 115,200 bps
Data formats	7 or 8 data bits 1 or 2 stop bits Even, odd, or no parity (PC Tools support only 8 data bits)
Connector	Molex 43045-1218
Mating Connector	Molex 43025-1200
Mating Connector Pins	Molex 43030-0001
MEMORY	
Standard	2 Mbytes flash and 16 Mbytes SDRAM
SPEAKER	
Standard	Software programmable pitch and duration

PHYSICAL	
Configuration	Panel-mount
Housing	Glass-filled polyester, UL 94V-0 flame rating, accommodates panels from 0 to 7 mm thick with standard screws
Size	215 x 161 x 50 mm
Weight	0.98 kg
Processor	ARM 720T 77 MHz
ENVIRONMENTAL	
QTERM-Z60/H Sealing	NEMA-4 front panel
QTERM-Z60/L Sealing	NEMA-12/13 front panel
Temperature	Operating: 0 to 50 °C Storage: -10 to 60 °C
Humidity	0 to 95%, non-condensing
Vibration	5 to 5000 Hz, 4 g RMS
Shock	20 g, 3 ms, any axis
POWER	
8 to 32 VDC (See section 4.4.3 for current consumption)	
SOFTWARE	
Programming language	Qlarity™ (object-based)
Design environment	Qlarity Foundry™ (Windows®)
Command line compiler	Qlarify (Win32® or Linux)
CERTIFICATION	
FCC Part 15, Class A CE Certification	

4.2 Supported Interfaces

4.2.1   Serial Ports

The QTERM-Z60/H comes standard with one user-selectable serial port. The serial port interface can be selected via dip switches (EIA-232, EIA-422 or EIA-485). The QTERM-Z60/L is equipped with one EIA-232 serial port.

NOTE: The serial port is wired as Data Communications Equipment (DCE)

The interface is selected using DIP switches. The following table shows the dip switch settings.

Dip Switch Settings								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
EIA-232	off	off	off	off	off	**on**	off	off
EIA-422	off	off	off	off	**on**	off	off	off
EIA-485	**on**	**on**	**on**	**on**	**on**	off	off	off

The figure below shows the serial connector's orientation

.
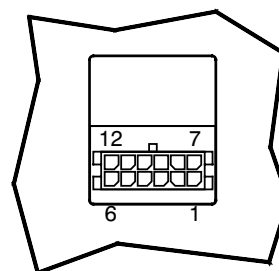
Connector Detail
(Back of Unit)

.h

EIA-232	with proper cables and grounding the terminal can communicate up to five meters at a top speed of 115,200 bps
EIA-422	permits operation at distances up to 2,000 meters
EIA-485	permits multiple terminals to be connected in a multi-drop chain

The following table shows the pinouts for the interface connector.

Pin	Function
1	Power In
2	RS-232 TX (out)
3	EIA-422 TX+ (out)
4	EIA-422 RX+ (in), or EIA-485 RTX+
5	5 VDC output
6	No Connect
7	Ground
8	RS-232 RX (in)
9	EIA-422 TX- (out)
10	EIA-422 RX- (in), or EIA-485 RTX-
11	External Reset (in)
12	No Connect

4.2.2 Five Volt Power Supply Output

Pin 5 of the interface connector is a 5 VDC power supply and can supply up to 200 mA current to a serial peripheral device (such as a barcode reader). The ground return for the supply is on pin 7 of the interface connector.

4.2.3 External Reset Input

Pin 11 of the interface connector is a reset signal compatible with 5 VDC and 3.3 VDC logic signals. By applying a 3.3 VDC or 5 VDC pulse to this input, the terminal will perform a complete hardware reset.

4.3 Terminal Components

4.3.1 Touch Screen

The QTERM-Z60 touch screen provides user input through any number of touch keys located on or around the display. The standard key legend shown in the figure below provides areas for five soft keys down each side of the display. A custom legend underlay can be ordered to personalize the ter-

minal for your application for shipments of over one hundred.
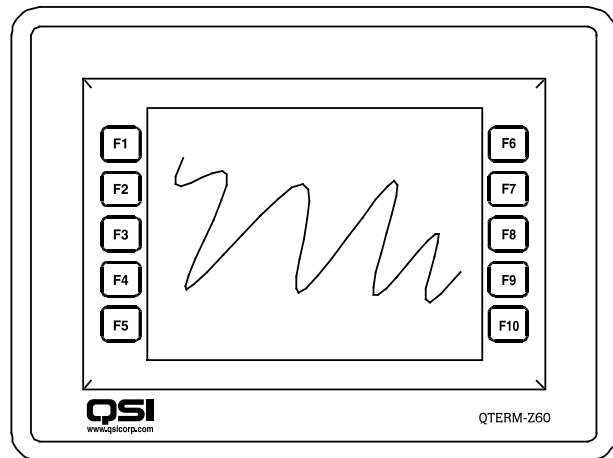
Touch keys can also be defined in your user applications at any location on or around the display. Touch keys may be any size.

4.3.2 Speaker

A speaker is built into the QTERM-Z60 terminal and faces to the back of the unit. Audio can be linked to events or actions (e.g., screen press, timer, etc.). Pitch and duration are controlled by API functions called from the user application. Refer to "Controlling the Speaker" section in the *Qlarity-based Terminal Programmer's Reference Manual*.

4.3.3 System Memory

The QTERM-Z60 terminal stores the firmware and user applications in a compressed format in flash memory and then transfers them to RAM memory when the terminal is powered on. Two megabytes of flash memory and sixteen megabytes of RAM memory are standard.

For information on using resources efficiently to conserve memory when creating a user application, refer to "Edit Resources" section in the *Qlarity Foundry User's Manual*.

For information on downloading new firmware, downloading a user application, and determining the size of a user application, refer to the *Qlarity Foundry User's Manual*.

4.4 Installing the QTERM-Z60 Terminal to NEMA-4 Specifications

A QTERM-Z60 terminal uses a rugged, glass-filled polyester (UL 94V-0) case designed to mount into a panel. When properly installed in a NEMA-4 rated panel, the QTERM-Z60 meets all NEMA-4 specifications including hose-down, icing, and salt spray.

A QTERM-Z60 terminal can be installed in either a landscape or portrait orientation. When installing a terminal, you generally take the following steps.

- Decide whether you want to mount and use the terminal in a portrait or landscape orientation. "Portrait" means that the longest dimension is vertical; "landscape" means that the longest dimension is horizontal.

- Cut a hole in the panel See section 4.4.1, "Cutting Out the Panel" for specifications.

- Install the QTERM-Z60 terminal in the panel. See section 4.4.2, "Installing the Terminal" for instructions.

- Connect cables to the terminal. Verify that the thumb screws are tight or the locks snapped into place for each cable used.

Apply DC power to the QTERM-Z60 terminal See section 4.4.3, "Applying Power" for information.

4.4.1 Cutting Out the Panel

The QTERM-Z60 terminal can be mounted in panels from 0 to 7 mm thick. No screw holes need to be drilled to install the terminal in the panel.

Make a rectangular hole in the panel using the following dimensions.

Landscape:
Horizontal	199 ± 1 mm
Vertical	145 ± 1 mm

Portrait:
Horizontal	145 ± 1 mm
Vertical	199 ± 1 mm

Following is a diagram of the landscape cutout:
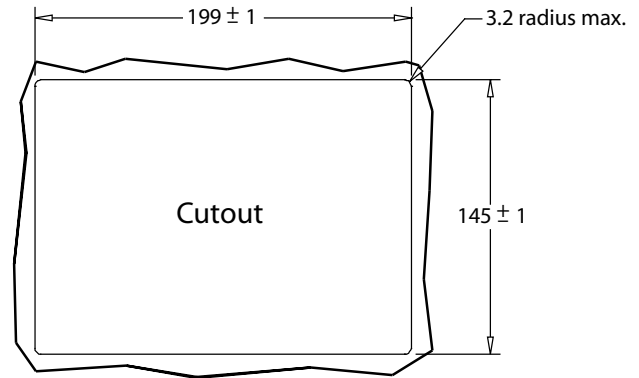
File any rough edges smooth, especially on the face of the panel.

4.4.2 Installing the Terminal

NOTE: Use of an anti-static strap is recommended when performing installation and maintenance.

Take the following steps to install the terminal. Refer to the illustrations on the next page.

1. Verify that the panel surface around the cutout is clean and free of rough edges. A gasket built into the terminal will seal against this surface. Dirt or imperfections on the panel may prevent a proper seal.

2. Place the terminal into the panel cutout and verify that the terminal is oriented correctly. The touch screen legend may indicate the orientation. If not, you can determine which side should be at the top by the position of the serial port on the back panel as follows:

   Landscape: when looking at the front of the unit, the back panel serial port should be on the top of the terminal.

   Portrait: when looking at the front of the unit, the back panel serial port should be on the right side of the terminal.

3. On the back of the panel, place the terminal mounting bracket against the back of the terminal, and align it with the back panel.

4. Fasten the six screws (supplied with the terminal).

Display Area
Touch Screen Area
Outer Legend

Speaker
Serial Output DIP Switch
Output Connector
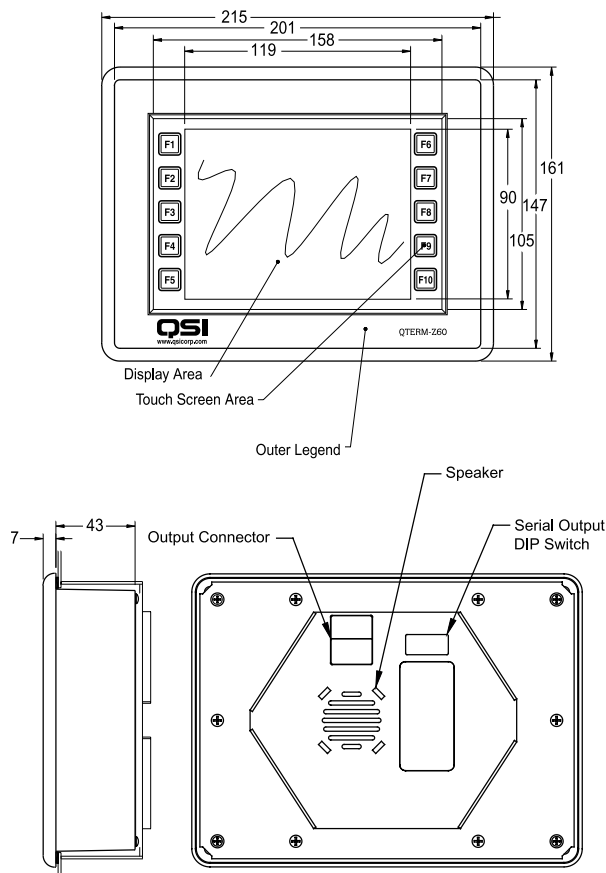
QTERM-Z60/H / Z60/L Current Consumption		
Terminal	**12 VDC**	**24 VDC**
Standard unit, idle	390 mA	200 mA
Standard unit, active	add 40 mA	add 20 mA
Standard unit, 200 mA load on 5 VDC supply	add 140 mA	add 70 mA

4.4.4   Powering On the Terminal for the First Time

When you connect power to the QTERM-Z60 terminal, it automatically loads the application saved in flash memory into RAM memory and displays the application. If no application is present, the terminal display may be blank but the backlighting verifies it is powered on.

When you power on the terminal for the first time, a demo program (or a special application custom designed for your company) loads. The demo program will help you verify that the terminal is operating properly. Follow the on-screen prompts or any documentation accompanying the program to guide you through tests or demonstrations designed to verify terminal operation.

Once you have verified that the terminal is functioning properly, refer to Chapter 5, "Power On Setup" for information on configuring your terminal. The Power On Setup utility includes functions to do the following:

- Change orientation of the terminal (portrait or landscape)
- Download a new user application to the terminal
- Select the application mode
- Set up communications settings for the terminal
- Adjust display contrast or backlight
- Enter/change password (if used)

4.4.3   Applying Power

Power is supplied to the QTERM-Z60 terminal via the interface connector. Refer to section 4.2.1, "Serial Ports" for the pin assignments for power and ground. DC power must be in the range of 8 to 32 volts (the current will vary depending on the input voltage; see table that follows.

CAUTION ⚠️	QTERM-Z60 power must come from an SELV (Safety Extra Low Voltage) power source and should have a current limit on its output of 5 Amperes. It must provide a minimum of 8 volts DC power and be limited to a maximum of 32 volts DC. Limiting may be inherent to the supply or may be provided by supplementary overcurrent devices. If the QTERM-Z60 does not respond or exhibits abnormal behavior on power up, disconnect power and contact QSI for technical support.

The Power On Setup utility is used to set up or change the operation settings of the terminal. Power On Setup includes functions to do the following:

- Download new firmware to the terminal

- Download user applications to the terminal

- Select the application mode

- Set communications settings for the terminal

- Adjust display settings (contrast, backlight, orientation)

- Enter network (Ethernet) settings

- Enter/change password (if used)

- Perform touch screen calibration (touch screen-based terminals only)

- Set the real time clock

The method of entering the Power On Setup utility varies depending on whether you use a touch screen, a keypad or a keyboard. Instructions are provided for each type of input device in the following sections.

5.1 Using a Touch Screen

The touch areas used to enter the Power On Setup utility and calibrate the touch screen are not shown on the screen. (However, after you enter the Power On Setup utility, the touch keys used to perform the functions are shown on the screen.)

The **[Setup]** touch area on a screen in landscape orientation is the left quarter of the touch screen, and the **[Calibration]** touch area is the right quarter of the touch screen. If the terminal screen is in portrait orientation, the **[Setup]** touch area is the top quarter of the touch screen, and the **[Calibration]** touch area is the bottom quarter of the touch screen. This means that you can touch the upper left corner to

access the Power On Setup utility and the lower right corner to perform calibration in either orientation.

The following illustrations identify the touch areas in each orientation.
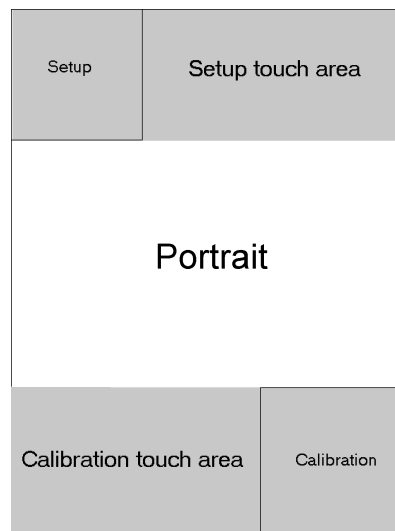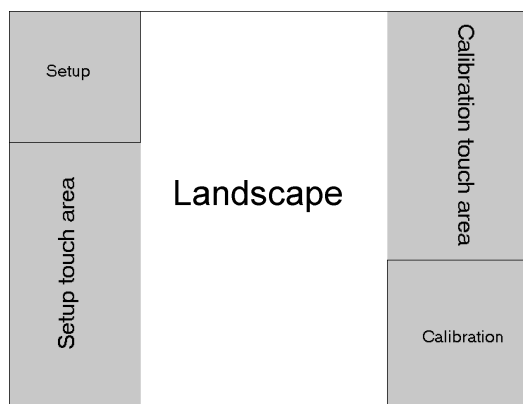
NOTE: **touch screen not working properly**
If your touch screen is not working properly, it may need calibration. Refer to section 5.5 for instructions.

Do the following to start Power On Setup using a touch screen:

1. Turn off power to the terminal.

2. Press and hold the **[Setup]** touch area (see figures on previous page) as you power on the terminal.

3. Continue pressing until "Power On Setup" appears on the screen, then release the touch area.

4. If a password is required, the prompt, "Enter password," is displayed. Press the arrow touch keys on the screen ($\uparrow$ $\downarrow \longleftrightarrow$) to enter the password, and then press **[Select]**. After the password is entered, Power On Setup starts.

    If you enter the password incorrectly, you must power the terminal off and back on and start over if you want to access all Power On Setup functions.

    If a password is required but not entered or entered incorrectly, Power On Setup starts and some limited functions are available including Display, Calibration, and Done.

Use the touch keys described below to select functions and options in Power On Setup.

To move from category to category:
Press **[Next]** to move forward from one category of functions (e.g., Flash Memory, Display, Calibration, etc.) to another. A heading is highlighted when you move to it. Continue to press **[Next]** to move to the next page. Press **[Back]** to move backwards through the categories.

To move within a category:
When the heading of the category you want to edit is highlighted, press **[Select]** to move to the first function. Press **[Next]** and **[Back]** to move from function to function in the category. To go back to the category heading, go to the topmost function in the category and press **[Back]**; or go to the bottommost function and press **[Next]**. **[Next]** and **[Back]** then move from category to category again.

To change a function:
When at a function that you want to edit, press **[Select]** to move to the available options. Press **[Next]** or **[Back]** to toggle through the options (e.g., "off" and "on"). When the option you want is displayed, press **[Select]** to select the option and move back to the function name.

To save and exit:
When you are ready to exit Power On Setup, press either **[Next]** or **[Back]** (with a category heading highlighted) to move to **DONE** on the last page, and press **[Select]**. **Save and Exit** is highlighted. Press **[Select]** to save your changes and exit Power On Setup. To exit without saving the changes, press **[Next]** to move to **Exit w/o Save** and then press **[Select]**.

Refer to section 5.4 for information on specific functions.

5.2 Using a Keypad

You will use the left most three keys on the top row of the keypad to navigate in Power On Setup. On the QSI standard legends, these keys are labeled F1, F2 and F3. Key assignments are as follows:

F1	**[Back]**	move between categories, functions and options
F2	**[Select]**	select a category, function or option
F3	**[Next]**	move between categories, functions and options

Do the following to start Power On Setup using a keypad:

1. Turn off power to the terminal. You will need to remove power from the terminal or unplug it to turn off the power.

2. Press and hold any three keys (other than the Power key) as you power on the terminal. If the terminal is in Development Mode (see below), press and hold any single key (other than the Power key) as you apply power to the terminal

3. Continue to hold these keys until the words "Power On Setup" appear on the screen, then release the keys.

4. If a password is required, the prompt, "Enter password", is displayed. Press the password key sequence on the keypad to enter the password, then press the **[Select]** key. After the password is entered, Power On Setup starts.

    If you enter the password incorrectly, you must power the terminal off and back on and start over if you want to access all Power On Setup functions.

If a password is required but not entered or entered incorrectly, Power On Setup starts and some limited functions are available including Display, Calibration, and Done.

Use the keypad keys described below to select functions and options in Power On Setup.

To move from category to category:
Press **[F3]** to move forward from one category of functions (e.g., Flash Memory, Display, Calibration, etc.) to another. A heading is highlighted when you move to it. Continue to press **[F3]** to move to the next page. Press **[F1]** to move backwards through the categories.

To move within a category:
When the category heading you want to edit is highlighted, press **[F2]** to move to the first function. Press **[F1]** and **[F3]** to move from function to function in the category. To go back to the category heading, go to the topmost function and press **[F1]**; or go to the bottommost function and press **[F3]**. **[F1]** and **[F3]** then move from category to category again.

To change a function:
When at a function that you want to edit, press **[F2]** to move to the available options. Press **[F1]** and **[F3]** to toggle through the options (e.g., "off" and "on"). When the option you want is displayed, press **[F2]** to select the option and move back to the function name.

Saving and Exiting:
When you are ready to exit Power On Setup, press either **[F1]** or **[F3]** (with a category heading highlighted) to move to **DONE** on the last page, and press **[F2]**. **Save and Exit** is highlighted. Press **[F2]** to save your changes and exit Power On Setup. To exit without saving the changes, press **[F3]** to move to **Exit w/o Save** and press **[F2]**.

Refer to section 5.4 for information on specific functions.

5.3 Using a Keyboard

You will use the following keyboard keys in Power On Setup:

<**P**>   start Power On Setup

←—→   move between categories, functions, and options

<**Enter**>   select a category, function, or option

Do the following to start Power On Setup using a keyboard:

1. Turn off power to the terminal.

2. Press and hold the <**P**> key as you power on the terminal.

3. Continue to hold <**P**> until the words "Power On Setup" appear on the screen, then release the key.

4. If a password is required, the prompt, "Enter password," is displayed. Press the arrow keys (↑ ↓ ←→) on the keyboard (not the number key pad) to enter the password, and then press **<Enter>**. After the password is entered, Power On Setup starts.

    If you enter the password incorrectly, you must power the terminal off and back on and start over if you want to access all Power On Setup functions.

    If a password is required but not entered or entered incorrectly, Power On Setup starts and some limited functions are available including Display, Calibration, and Done.

Use the keyboard keys described below to select functions and options in Power On Setup.

To move from category to category:
Press →to move forward from one category of functions (e.g., Flash Memory, Display, Calibration, etc.) to another. A heading is highlighted when you move to it. Continue to press →to move to the next page. Press ←to move backwards through the categories.

To move within a category:
When the category heading you want to edit is highlighted, press **<Enter>** to move to the first function. Press →and ← to move from function to function in the category. To go back to the category heading, go to the topmost function and press ←; or go to the bottommost function and press → →and ←then move from category to category again.

To change a function:
When at a function that you want to edit, press **<Enter>** to move to the available options. Press → and ←to toggle through the options (e.g., "off" and "on"). When the option you want is displayed, press **<Enter>** to select the option and move back to the function name.

Saving and Exiting:
When you are ready to exit Power On Setup, press either →
or ← (with a category heading highlighted) to move to
DONE on the last page, and press **<Enter>**. **Save and Exit** is
highlighted. Press **<Enter>** to save your changes and exit
Power On Setup. To exit without saving the changes, press
→ to move to **Exit w/o Save** and then press **[Enter]**.

Refer to section 5.4 for information on specific functions.

5.4 Power On Setup Functions

This section describes the functions in the Power On Setup
utility by category. The categories are:

- Flash Memory

- Display

- Calibration

- Network (with optional Ethernet port only)

- COM1 (and any additional installed serial ports)

- Keypad (optional)

- Keyboard (optional)

- Sound

- Feedback

- Miscellaneous

- Diagnostics (with keyboard/keypad only)

- Done

NOTE: touch keys/keyboard keys/keypad keys
The following descriptions provide instructions for using
the touch keys on a touch screen. If you are using a key-
board, the corresponding keyboard keys are as follows:

Touch key	Keyboard key	Keypad key
[Select]	<Enter>	[F2]
[Back]	←	[F1]
[Next]	→	[F3]

5.4.1 Flash Memory

The Flash Memory functions are used to place the terminal
in the proper mode to download new firmware or a user
application, place the terminal in the proper mode for devel-
oping a new user application or normal operation, and erase
the flash file system.

5.4.1.1 App Mode

Download:
Select this option to place a terminal with either a serial port
or the optional Ethernet port in the mode to download new
firmware or a new user application that you want saved in
flash memory. (Use "App Mode: Develop" if you do not
want to save the user application to flash memory.) The ter-
minal waits for the download and detects the type of file
(firmware or user application) as it is sent.

NOTE: verify Ethernet network settings.
If using an Ethernet port, make sure you have selected the
proper network settings (see section 5.4.4).

Press **[Next]** or **[Back]** to move to **FLASH MEMORY**. Press
[Select] to move to App Mode, and press **[Select]** again to
move to the options. Press **[Next]** or **[Back]** to select
"Download", then press **[Select]** to return to the function
name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and
select **Save and Exit**. The terminal is ready to receive a
download.

Download the firmware or a user application using the
"Download Application" or "Upgrade Firmware" function
in Qlarity Foundry (refer to the *Qlarity Foundry User's
Manual* for instructions). When the unit is reset, it will auto-
matically go into the Run App mode.

Press **[Next]** or **[Back]** to move to the **DONE** section, and
select **Save and Exit** to exit Power On Setup.

Develop:
Select this option to set the terminal to the "Develop" appli-
cation mode, normally only used when you are developing a
new user application and want to download it to the termi-
nal without saving it in flash memory. Press **[Next]** or
[Back] to move to **FLASH MEMORY**. Press **[Select]** and
then **[Next]** to move to App Mode, and press **[Select]** again
to move to the options. Press **[Next]** or **[Back]** to select
"Develop", then press **[Select]** to return to the function
name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and
select **Save and Exit**. The terminal is ready for the user
application to be downloaded.

Download the application through the serial or Ethernet port
interface using the "Download Application" function in

Qlarity Foundry (refer to the *Qlarity Foundry User's Manual* for instructions). (If you use an Ethernet port, make sure you have selected the proper network settings; see section 5.4.4.)

While the terminal is in "Develop" mode, a user application downloaded to the terminal is not saved in flash memory. This saves unnecessary wear on the flash memory and speeds up download time while testing an application in development. However, the application is removed when the terminal is powered off.

If you previously downloaded an application using the "App Mode: Download" function, that application remains in flash memory (it is not overwritten by an application downloaded while in develop mode). This makes it possible to test a new application without copying over an existing application.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

Run App:
Select this option to set the terminal to the "Run App" operational mode. If the terminal is in "Run App" mode and a user application was saved in flash memory, the application runs when the terminal is powered on.

Press **[Next]** or **[Back]** to move to **FLASH MEMORY**. Press **[Select]** and then **[Next]** to move to App Mode, and press **[Select]** again to move to the options. Press **[Next]** or **[Back]** to select "Run App", then press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

Run Default:
Select this option to set the terminal to the "Run Default" operational mode. If the terminal is in "Run Default" mode, the default application associated with the firmware runs when the terminal is powered on. Not all firmware builds have a default application. Press **[Next]** or **[Back]** to move to **FLASH MEMORY**. Press **[Select]** and then [Next] to move to App Mode, and press **[Select]** again to move to the options. Press **[Next]** or **[Back]** to select "Run Default", then press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.1.2   Erase FFS

Use this function to erase the flash file system. The flash file system is used to store data collected by the application. The data is saved to flash memory so that it is available even after the terminal has been powered off and back on.

NOTE: alternate method
The flash file system can also be erased using an API function (see the *Qlarity-based Terminal Programmer's Reference Manual*).

Press **[Next]** or **[Back]** to move to **FLASH MEMORY**. Press **[Select]** and then **[Next]** to move to **Erase FFS**, and press **[Select]** again to move to the options. Press **[Next]** or **[Back]** to select **Yes**. **The flash file system is erased when you press [Select] to return to the function name.**

If you do not want to erase the flash file system, select **No**, and press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.2   Display

The Display functions are used to adjust the terminal display's contrast setting, adjust the brightness of the display's backlighting, change the orientation of the display (portrait or landscape), and use of draw caching.

5.4.2.1   Contrast

Use this function to adjust the contrast setting of the terminal display. It will not appear on TFT units.

Press **[Next]** or **[Back]** to move to **DISPLAY**. Press **[Select]** to move to **Contrast**, and press **[Select]** again to move to the options. The label, "(adjust)" is displayed on the right. Press **[Next]** or **[Back]** until the contrast is at the desired level. Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

NOTE: alternate method
The contrast can also be adjusted using an API function (see the *Qlarity-based Terminal Programmer's Reference Manual*.).

5.4.2.2   Backlight

Use this function to adjust the brightness of the display.

Press **[Next]** or **[Back]** to move to **DISPLAY**. Press **[Select]** and then **[Next]** to move to **Backlight**, and press **[Select]** again. The label, "(adjust)" is displayed on the right. Press **[Next]** or **[Back]** until the backlight is at the desired level. Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

NOTE: alternate method
The backlight can also be adjusted using an API function (see the *Qlarity-based Terminal Programmer's Reference Manual*).

5.4.2.3   Orient

Use this function to change the orientation of the terminal display to match the physical terminal orientation. If the terminal is turned so that the longest dimension is vertical, select "portrait"; if the longest dimension is horizontal, select "landscape."

Press **[Next]** or **[Back]** to move to **DISPLAY**. Press **[Select]** and **[Next]** to move to **Orient**, and press **[Select]** again to move to the options. Press **[Next]** or **[Back]** to select **Portrait** or **Landscape**. Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.2.4   DCache

In applications where many objects are layered on top of each other, you may see a small latency when the screen updates. Draw caching stores objects in memory to improve display performance but does require more RAM to function.

There are currently four different levels of drawcaching supported (listed in order of amount of memory used):

Off - no objects are cached

Effective Enabled - only objects that are enabled and whose parents are enabled back to root are cached

Enabled - all enabled objects are cached

All - all objects are cached

Press **[Next]** or **[Back]** to move to **DISPLAY**. Press **[Select]** and **[Next]** to move to DCache, and press [Select] again to move to the options. Using **[Next]** and **[Back]**, select the level of draw caching desired. Press **[Select]** to return to the function name.

5.4.3   Calibration

The Calibration functions are used to calibrate the terminal to the air temperature and to calibrate the touch screen if it is not working properly.

5.4.3.1   Temp

A default temperature is set at the factory. If there is more than a 5° Celsius difference between the default temperature shown and the surrounding air temperature, you may want to change this setting. This parameter is used in the terminal to help with display contrast compensation.

Press **[Next]** or **[Back]** to move to **CALIBRATION**. Press **[Select]** to move to **Temp**, and press **[Select]** again. Press **[Next]** or **[Back]** until the correct temperature is displayed, then press **[Select]** to return to the function name.

NOTE: QTERM-G55 temperature sensor
The temperature sensor in the QTERM-G55 does not require calibration. Therefore, the current temperature is shown, but it cannot be modified with the **[Next]** or **[Back]** key.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.3.2   Date

This function is used to set or change the real-time clock's date (if the real-time clock is available).

Press **[Next]** or **[Back]** to move to **CALIBRATION**, and press **[Select]** to move to **Date**. Then change the day, date, month, and year, as follows:

Press **[Select]** again to move to the "day of the week" field, and press **[Next]** or **[Back]** to change the day.

The date is entered in a two-digit field (01, 02, 10, etc.). Press **[Select]** to move to the first digit in the "date" field, and press **[Next]** or **[Back]** to change the digit. Press

[Select] to move to the second digit in the "date" field, and press **[Next]** or **[Back]** to change the digit.

Press **[Select]** to move to the "month" field, and press **[Next]** or **[Back]** to change the month.

The year is entered in a two-digit field. Press **[Select]** to move to the first digit in the "year" field, and press **[Next]** or **[Back]** to change the digit. Press **[Select]** to move to the second digit in the "year" field, and press **[Next]** or **[Back]** to change the digit.

Press **[Select]** at the last digit to return to the function name. The date is immediately changed.

NOTE: keyboard option
If you are using a keyboard, you can use the number keys (0–9) to enter the digits.

NOTE: keypad option
If you are using a terminal with a keypad (24 or 40 key with standard QSI legend), you can use the number keys (0-9) to enter the digits.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.3.3   Time

This function is used to set or change the real-time clock's time. Press **[Next]** or **[Back]** to move to **CALIBRATION**, and press **[Select]** to move to **Time**. Then enter the hour, minutes, and seconds in 24-hour (or military) time (e.g., 13:10:25 for 1:10:25 p.m.) as follows:

Press **[Select]** to move to the first digit in the "hour" field, and press **[Next]** or **[Back]** to change the digit. Press **[Select]** to move to the second digit in the "hour" field, and press **[Next]** or **[Back]** to change the digit.

Press **[Select]** to move to each digit in the "minutes" field, and press **[Next]** or **[Back]** to change the digits.

Press **[Select]** to move to each digit in the "seconds" field, and press **[Next]** or **[Back]** to change the digits.

Press **[Select]** at the last digit to return to the function name. The time is immediately changed.

NOTE: keyboard option
If you are using a keyboard, you can use the number keys (0–9) to enter the digits.

NOTE: keypad option
If you are using a terminal with a keypad (24 or 40 key with standard QSI legend), you can use the number keys (0-9) to enter the digits.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.3.4   Touchscreen

You will only see this function if you are using a touch screen-based terminal. If the touch screen is not working properly, you can use this function to calibrate it.

NOTE: alternate method
You can also calibrate the touch screen without entering the Power On Setup utility (see section 5.5).

Press **[Next]** or **[Back]** to move to **CALIBRATION**. Press **[Select]** and **[Next]** to move to **Touchscreen**, and press **[Select]** again. The message, "TOUCHSCREEN CALIBRATION, Please press center of cross" is displayed, and a "+" symbol appears on the screen.

Press the "+" symbol. The symbol moves to the bottom of the display. Press the "+" symbol in its new location. This completes calibration. When finished, the terminal returns to Power On Setup.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.4   Network

This function is only seen if your terminal has the optional Ethernet communications port. Use this function to enter network addresses for the Ethernet port. If you do not know the network addresses, consult your network administrator.

Press **[Next]** or **[Back]** to move to **NETWORK**. Press **[Select]** and **[Next]** to move to each address field. Press **[Select]** at an address field to move to the first digit in the address. Press **[Next]** or **[Back]** to change the digit's value. Press **[Select]** to move to the next digit and press **[Next]** or **[Back]** to change it. Continue to press **[Select]** and change each digit in the address as required. Press **[Select]** at the last digit to return to the function name.

NOTE: keyboard option
If you are using a keyboard, you can use the number keys (0–9) to enter the digits.

NOTE: keypad option
If you are using a terminal with a keypad (24 or 40 key with standard QSI legend), you can use the number keys (0-9) to enter the digits.

IP: xxx.xxx.xxx.xxx
Enter the terminal's IP address.

Sub: xxx.xxx.xxx.xxx
Enter the subnet mask.

Gate: xxx.xxx.xxx.xxx
Enter the IP address of the gateway (default route).

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.5   COM1 and Any Additional Installed Serial Ports

NOTE: optional secondary port
If you have an optional secondary serial port, you will also see the "COM2" category. You should configure both COM1 and COM2 as described in this section.

Some custom terminals may be configured with up to 10 serial ports. On these units, sections for COM1 through COM10 will appear in the menu. All serial ports are configured in a similar manner.

Use the following functions to configure your serial communications port(s).

Press **[Next]** or **[Back]** to move to **COM1** or **COM2** (or the desired port). Press **[Select]** and **[Next]** to move to each field. Press **[Select]** at each field to move to the field entry. Press **[Next]** or **[Back]** to select the appropriate entry at each field. Press **[Select]** to return to the function name.

Baud Rate:
Select the baud rate (600 – 115,200 bps).

Data Bits:
Select the number of data bits, **7** or **8**.

NOTE: downloading data
The serial port must be set to 8 data bits to support user application downloads or firmware upgrades.

Parity:
Select the parity setting, **N** (none), **O** (odd), or **E** (even).

Stop bits:
Select the number of stop bits, **1** or **2**.

Flow Ctrl:
Select the type of flow control, **None**, **SW** (XonXoff, software), or **RTS/CTS** (hardware). If using hardware flow control (HW), refer to the pinout table in "Serial Ports" section for the appropriate terminal. Some terminals may also support **DTR/DSR** (hardware) flow control.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

TX Timeout:
Select the maximum amount of time to wait to send, if flow control is being used, before a transmission error occurs (and thus terminates the transmission). This setting helps to keep the unit from hanging indefinitely while waiting to transmit if communication between the unit and its counterpart breaks down. The timeout is specified in the number of 20 ms ticks to wait.

Press **[Next]** or **[Back]** to move to the appropriate COM. Press **[Select]** and **[Next]** to move to the TX Timeout field. Press **[Select]** again to move to the first digit in the field. Press **[Next]** or **[Back]** to change the digit's value. Press **[Select]** to move to the next digit and press **[Next]** or **[Back]** to change it. Continue to press **[Select]** and change each digit in the TX Timeout as required. Press [Select] at the last digit to return to the Port field.

NOTE: keyboard option
If you are using a keyboard, you can use the number keys (0-9) to enter the digits.

NOTE: keypad option
If you are using a terminal with a keypad (24 or 40 key with standard QSI legend), you can use the number keys (0-9) to enter the digits.

5.4.6   Keypad

You will only see this category if your terminal is set up to use a keypad. The Keypad functions are used to turn the keyclick, key repeat and auto shift features on or off. The default state of the keypad backlight (if available) is also set in this section.

5.4.6.1 Keyclick

Use this function to turn the audible keyclick on or off. If "on," you will hear a click when a key on the keypad is pressed.

Press **[Next]** or **[Back]** to move to **KEYPAD**. Press **[Select]** to move to **Keyclick**, and press **[Select]** again to move to the options. Press **[Next]** or **[Back]** to select **On** or **Off**, then press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.6.2 Key Repeat

Use this function to turn the key repeat feature on or off. If "on," a key entry repeats if you hold down the key on the keypad.

Press **[Next]** or **[Back]** to move to **KEYPAD**. Press **[Select]** and then **[Next]** to move to **Key Repeat**, and press **[Select]** again to move to the options. Press **[Next]** or **[Back]** to select **On** or **Off**. Press **[Select]** to return to the function name.

If you selected **On**, you will see two additional functions, as described in the following sections.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.6.3 Rpt Delay

You will only see this function if you selected **On** at the "Key Repeat" field (see section 5.4.6.2 above). Use this function to select the delay time that you want between when a key is pressed and when it begins to repeat automatically.

Press **[Next]** to move to **Rpt Delay**, and press **[Select]** to move to the options. Press **[Next]** or **[Back]** to select the key repeat delay time in milliseconds. The time increments or decrements by 20 ms each time you press **[Next]** or **[Back].** Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.6.4 Rpt Rate

You will only see this function if you selected **On** at the "Key Repeat" field (see section 5.4.6.2 above). Use this function to select the time that you want between each repeat when a key begins to repeat automatically.

Press **[Next]** to move to **Rpt Rate**, and press **[Select]** to move to the options. Press **[Next]** or **[Back]** to select the key repeat rate in milliseconds. The rate increments or decrements by 20 ms each time you press **[Next]** or **[Back].** Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.6.5 AutoShift

When AutoShift is enabled, the system software will automatically handle the Shift function of the keypad, i.e. when the Shift key is pressed, the Shift LED is lit and subsequent key presses will return shifted key codes to the Qlarity application. Set AutoShift to **Off** to disable this automatic shift behavior. When AutoShift is disabled, pressing the Shift key will generate normal key messages, and the Shift LED may be manipulated using the SetLED API.

Press **[Next]** to move to **AutoShift,** then press **[Select]** to move to the options. Press **[Next]** or **[Back]** to select **On** or **Off**. Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.6.6 AutoPower

When AutoPower is enabled, the terminal will enter a low power sleep mode when the Power key on the keypad is pressed. If asleep, pressing the Power key awakens the terminal and resumes program execution. Set AutoPower to **Off** to disable this behavior. When AutoPower is disabled, pressing the Power key will generate normal key messages, and the Power LED may be manipulated using the SetLED API.

Press **[Next]** to move to **AutoPower,** then press **[Select]** to move to the options. Press **[Next]** or **[Back]** to select **On** or **Off**. Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.6.7   Keypad Backlight

This section will only appear if your terminal includes a keypad backlight. Use this function to set the default state of the keypad backlight (at power on). Select **On** to turn the keypad backlight on when the power is applied to the unit, or select **Off** to turn the keypad backlight off when the power is applied.

Press **[Next]** to move to **BACKLIGHT** in the **KEYPAD** section**,** then press **[Select]** to move to the options. Press **[Next]** or **[Back]** to select **On** or **Off**. Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.7   Keyboard

You will only see this category if you have a keyboard connected to the terminal. The Keyboard functions are used to set the key repeat delay time and rate.

5.4.7.1   Rpt Delay

Use this function to select the delay time that you want between when a key is pressed and when it begins to repeat automatically.

Press **[Next]** to move to **Rpt Delay**, and press **[Select]** to move to the options. Press **[Next]** or **[Back]** to select the key repeat delay time. The choices are: 250, 500, 750, or 1000 milliseconds. Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.7.2   Rpt Rate

Use this function to select the time that you want between each repeat when a key begins to repeat automatically.

Press **[Next]** to move to **Rpt Rate**, and press **[Select]** to move to the options. Press **[Next]** or **[Back]** to select the key repeat rate. The choices range from 2.0 to 30.0 characters per second (cps). The default is 6 cps. Press **[Select]** to return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.8   Sound

This section only appears if the audio decoder option has been installed.

5.4.8.1   Volume

Set the master volume of speaker. This affects volume of sounds played by the PlaySound API as well as that of the PlayNote API. (Exception: on QTERM-G55 terminals, only the PlayNote API is affected by the volume setting.)

Press **[Next]** or **[Back]** to move to **SOUND**. Press **[Select]** and then press **[Select]** again to move to the Volume setting. Press **[Next]** or **[Back]** until the volume is at the desired level. A tone will be played with each press to indicate the current volume.

5.4.8.2   Note Amplitude

Set the volume of beeps played by calls to PlayNote on units that include the optional audio decoder.

Press **[Next]** or **[Back]** to move to **SOUND**. Press **[Select]** and then press **[Next]** again to move to the Note Amp setting. Press **[Select]** again to start setting the note amplitude. Press **[Next]** or **[Back]** until the volume is at the desired level. A tone will be played with each press to indicate the current volume.

5.4.9   Feedback

The feedback functionality controls how the unit reports development information and fatal errors.

5.4.9.1   Type

Use this function to select the method of feedback that the unit uses to report development information and fatal errors. Any combination of COM1, Display, and UDP (ethernet, if available) can be selected.

Press [**Next]** or **[Back]** to move to **FEEDBACK**. Press **[Select]** to move to Type, and press **[Select]** again to change the type of feedback. Use the **[Next]** and/or **[Back]** keys to choose the desired method of feedback. Press **[Select]** to return to the Type field. Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.9.2   UDP

Use this function to set the IP address to send UDP packets to for feedback.

Press **[Next]** or **[Back]** to move to **FEEDBACK**. Press **[Select]** and **[Next]** to move to the UDP field. Press **[Select]** again to move to the first digit in the UDP field. Press **[Next]** or **[Back]** to change the digit's value.

Press **[Select]** to move to the next digit and press **[Next]** or **[Back]** to change it. Continue to press **[Select]** and change each digit in the address as required. Press **[Select]** at the last digit to return to the UDP field.

NOTE: keyboard option
If you are using a keyboard, you can use the number keys (0-9) to enter the digits.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.9.3   Port Number

Use this function to set the port number to send UDP feedback packets to.

Press **[Next]** or **[Back]** to move to **FEEDBACK**. Press **[Select]** and **[Next]** to move to the Port field. Press **[Select]** again to move to the first digit in the Port field. Press **[Next]** or **[Back]** to change the digit's value. Press **[Select]** to move to the next digit and press **[Next]** or **[Back]** to change it. Continue to press **[Select]** and change each digit in the Port number as required. Press **[Select]** at the last digit to return to the Port field.

NOTE: keyboard option
If you are using a keyboard, you can use the number keys (0-9) to enter the digits.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.10 Miscellaneous

The Miscellaneous functions include the setting up of a password for Power On Setup, and also a unit information display screen.

5.4.10.1 Information

Use this function to determine the current version of firmware, current BFF version, minimum BFF version, amount of RAM, amount of flash memory, the current flash file system size, and ethernet MAC address of the unit.

Press **[Next]** or **[Back]** to move to **MISCELLANEOUS.** Press **[Select]** to move to **Information**, and press **[Select]** again to view this data.

Press any key to exit this screen and return to the function name.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.10.2 Use Password

Use this function to determine whether or not a password is required to access the Power On Setup utility.

Press **[Next]** or **[Back]** to move to **MISCELLANEOUS.** Press **[Select]** to move to **Use Password**, and press **[Select]** again to move to the options. Press **[Next]** or **[Back]** to select **Yes** or **No**, then press **[Select]** to return to the function name.

If you selected **Yes**, the "Change Password" function appears for you to define the password, as described in the following section.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.10.3 Change Password

You will only see this function if you selected **Yes** at the "Use Password" field. Use this function to set up or change the Power On Setup password (see section 5.4.10.2 above).

Press **[Next]** to move to **Change Password**, and press **[Select]**. The "Enter Password" prompt and the arrow keys ($\uparrow$ $\downarrow$ $\leftarrow\rightarrow$) with the **[Select]** key in the center are displayed.

Press a series of arrow keys in the order they must be entered as the password (e.g., $\uparrow$ $\uparrow$ $\rightarrow\rightarrow$). An asterisk (*) appears in the "Enter Password" prompt for each arrow you press. When you have finished entering the password, press

[Select] (in the center of the display). The "Confirm New Password" box is displayed.

Enter the password a second time to confirm it. The message, "Password will be changed on exit with save" is displayed.

Press **[Next]** or **[Back]** to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup. The next time you access Power On Setup, the new password will be required.

5.4.11 Diagnostics

You will only see this category if your terminal is set up to use a keypad or keyboard. Use the Diagnostics functions to verify that a keypad or keyboard key is working properly.

NOTE: cannot test <Enter> key
Because the **<Enter>** key is required to exit Diagnostics, you cannot test it. All other keys may be tested.

5.4.11.1 Keypad Key

Use this function to verify that keypad keys are mapped correctly on the terminal.

Press →or ←to move to **DIAGNOSTICS.** Press **<Enter>** to move to **Keypad Key**, and press **<Enter>** again. Press the key on the keypad that you want to test. The location (row and column) of the key that you pressed is displayed so that you can verify that it is correct. Press each key that you want to test. Press **<Enter>** to end diagnostics.

Press →or ←to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.11.2 Keybrd Key

You will only see this function if you have a keyboard connected to your terminal. Use this function to verify that keyboard keys are mapped correctly on the terminal.

Press →or ←to move to **DIAGNOSTICS.** Press **<Enter>** to move to **Keybrd Key**, and press **<Enter>** again. Press the key on the keyboard that you want to test. The character that is mapped to the key you pressed is displayed, along with the decimal scan code in parenthesis. Press each key that you want to test. To test mapping of key combinations, press **<Shift>**, **<Ctrl>**, or **<Alt>** (as applicable) with the appropriate key.

Press **<Enter>** to end diagnostics and return to the function name.

Press →or ←to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.11.3 Transmit Key

Use this function to send the results of the "Keypad or Keyboard Key" test through the COM1 port.

Press →or ←to move to **DIAGNOSTICS.** Press **<Enter>** and then →to move to **Transmit Key**, and press **<Enter>** to move to the options. Press →or ←to select **Yes** or **No**, then press **<Enter>** to return to the function name.

Press →or ←to move to the **DONE** section, and select **Save and Exit** to exit Power On Setup.

5.4.11.4 SDRAM Test

Some Qlarity-based terminals include the ability to do a comprehensive, non-destructive test on the synchronous DRAM memory. The contents of memory and the processor state are unharmed by the test.

Press **[Next]** to move to **SDRAM TEST.** Press **[Select]** to execute the test. A small dialog will appear indicating that the test is in process. When the test is completed (typically a few seconds) the dialog will change to indicate success or failure. Contact the Service Department at QSI if you terminal reports a failure.

5.4.12 Done

Use the Done functions to exit Power On Setup with or without saving your changes.

5.4.12.1 Save and Exit

Press **[Next]** or **[Back]** to move to **DONE.** Press **[Select]** to move to **Save and Exit**, and press **[Select]** again to save your changes and exit Power On Setup. All changes that were made while in the Power On Setup utility are saved and reflected the next time the terminal is powered on.

NOTE: exceptions
Changes performed to the settings for "Erase FFS", "Time", and "Date" take effect immediately.

5.4.12.2 Exit w/o Save

Press **[Next]** or **[Back]** to move to **DONE.** Press **[Select]** and then **[Next]** to move to **Exit w/o Save**, and press **[Select]** again **[Select]** to exit Power On Setup without saving the changes.

5.5 Touch Screen Calibration

If the touch screen is not working properly (e.g., if the touch keys do not work), it probably needs calibration. If you cannot navigate with the touch keys in the Power On Setup utility, do the following to switch the terminal to calibration mode and calibrate the touch screen without entering Power On Setup:

1. Turn off power to the terminal.

2. Press and hold the **[Calibrate]** touch area (see the illustrations in section 5.1, "Using a Touch Screen" for touch area locations) as you power on the terminal.

3. Continue pressing until the message, "TOUCH-SCREEN CALIBRATION, Please press center of cross" is displayed and a "+" symbol appears on the screen.

4. Press the "+" symbol. The symbol moves to the bottom of the display.

5. Press the "+" symbol in its new location.

This completes calibration.

NOTE: alternate method

You can also calibrate the touch screen using the "Touch-screen" function in Power On Setup (see section 5.4.3.4).