QTERM®-A7 TERMINAL
HARDWARE MANUAL

FCC Compliance Information

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

Additionally, the QTERM-A7 may contain the following FCC module-certified components depending on product configuration: QOQWT12 or Q72WLC300GRS.

Notes

CONTENTS

Contents

Notes

CHAPTER 1

INTRODUCTION

The QTERM®-A7 is a rugged graphic human-machine interface terminal for use in a wide range of commercial and industrial applications. It has been designed with a robust set of industrial-grade features and options.

- Windows® Embedded CE 6.0 operating system

- Marvell® PXA300 processor (ARMV5TE) with Intel XScale™ technology running at 624 MHz

- 4 Gbytes non-volatile storage

- 128 Mbytes of DDR SDRAM

- Bright 177 mm (7") TFT color WVGA (800 x 480) display with 500 nit LED backlight

- Analog-resistive touch screen

- Built-in speaker (behind panel)

- Tough industrial grade polymer housing

- Two USB 2.0 full speed host ports

- Support for standard USB keyboards, mice and memory devices

- Two serial ports: one EIA-232/422/485 (software configurable) and one EIA-232 serial port

- 10/100Base-T wired Ethernet

- Terminal strip for power input (alternate power input on COM1 DB9)

- Wide operating temperature of -30 to 70 °C, storage temperature of -40 to 85 °C

- 10 to 32 VDC input voltage range

- Built-in protection from power transients and spikes, reverse voltage and overvoltage

- Optional Power-over-Ethernet (PoE) interface

- Optional Controller Area Network (CAN) interface

- Support for application development with industry standard tools such as Microsoft® Visual Studio 2005 and 2008

CHAPTER 2

SAFETY SUMMARY

The terminal is certified to operate in a Class I, Division 2, Group A, B, C and D hazardous environment. The terminal must be installed and operated as described in this document to meet this certification.

All safety related regulations, local codes and instructions that appear in this manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the QTERM-A7 to directly command motors, valves or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the controller.

CAUTION

For Class I, Division 2 installations:
The USB ports are for operational maintenance only. Do not leave USB devices permanently connected unless the area is known to be non-hazardous.

CAUTION

For Class I, Division 2 installations:
Do not connect or separate any connection (power, Ethernet, USB, COM1, COM2, CAN1, or CAN2) unless area is known to be non-hazardous.

CAUTION

EXPLOSION HAZARD
Substitution of components may impair suitability for Class I, Division 2.

CAUTION: Risk of danger.
Read complete instructions prior to installation and operation of the terminal.

CAUTION: Risk of electric shock.

Notes

CHAPTER 3

APPLYING POWER

CAUTION

⚠️

For Class I, Division 2 installations:
Do not connect or disconnect cables while power is applied unless the area is known to be non-hazardous.

Power is supplied to the QTERM-A7 terminal via the COM1 serial port connector or the 3-pin power terminal strip for input power, return and chassis ground. The QTERM-A7 may also be equipped with an optional Power-over-Ethernet (PoE) interface. When powered by the 3-pin power terminal strip or the COM1 serial port, the QTERM-A7 has a 10- to 32-volt DC input range and can be powered directly from a 12- or 24-volt DC power supply (the current will vary depending on the input voltage; see table below).

Power Consumption			
Terminal	**12 VDC**	**24 VDC**	**PoE (48 VDC)**
Standby[1]	1.32 W	1.60 W	2.3 W
Typical[2]	6.24 W	6.72 W	7.6 W
Estimated Maximum[3]	7.80 W	8.40 W	9.1 W

1. Standby power consumption is measured when the display has been powered down and the operating system has entered system idle mode.
2. Typical power consumption is measured when the display is at full brightness and a polygon drawing application is running.
3. Estimated maximum power consumption is measured with serial, USB and Ethernet communications active. In addition, several applications are running including video with full volume and two USB mass storage loads are being powered.

The following table shows the additional power consumption from the optional CAN interface.

Optional CAN Interface Power Consumption			
Terminal Input Voltage	12V	24V	PoE (48 VDC)
CAN Power Consumption	2 W	2.4 W	2.3 W

3.1 Connecting to Earth Ground

NOTE ☞ *The chassis ground connection of the QTERM-A7 is electrically connected to the exposed conductive parts of the QTERM-A7 for safety purposes. The chassis ground connection MUST be connected to an external protective earthing system.*

The QTERM-A7 has a chassis ground terminal and a chassis ground connection on the 3-pin power terminal strip on the back of the terminal. (See Figure 10 on page 25 for the location of the chassis ground terminal and the 3-pin power terminal strip.) The terminal should be connected to earth ground (protective earth). The chassis ground is not connected to signal common of the terminal. Maintaining isolation between earth ground and signal common is not required to operate the terminal; however, other equipment connected to the terminal may require isolation between signal common and earth ground. To maintain isolation between signal common and earth ground, care must be taken when connections are made to the terminal. For example, a power supply with isolation between its signal common and earth ground must be used. Also, plugging in a serial cable or a USB cable may connect signal common and earth ground.

The serial cable's or the USB's shield may be connected to earth ground at the host. The serial cable's or the USB's shield, in turn, may also be connected to signal common.

3.2 Primary Serial Port Connector for Power Input

WARNING

⚠️

Although the terminal includes protection circuitry to prevent power supply contention, power should not be connected to the 3-pin terminal strip or the RJ45 PoE interface while power is applied to the DB9 connector.

Power can be supplied to the terminal through pin 9 and ground return through pin 5 of the COM1 serial port connector.

3.3 Terminal Strip for Power Input

The 3-pin terminal strip is used to provide input voltage and ground to the terminal. The terminal strip provides a chassis ground connection. The chassis ground pin is isolated from the system ground of the terminal. Torque wire termination screws to 5 to 7 inch pounds.

WARNING

⚠️

Although the terminal includes protection circuitry to prevent power supply contention, power should not be connected to the DB9 connector or the RJ45 PoE interface while power is applied to the 3-pin terminal strip.

WARNING ⚠	QTERM-A7 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 10 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-A7 does not respond or exhibits abnormal behavior on power up, disconnect power and contact Beijer Electronics for technical support.

3.4 Optional Power-over-Ethernet Interface

WARNING ⚠	Although the terminal includes protection circuitry to prevent power supply contention, power should not be connected to the 3-pin terminal strip or the DB9 connector while power is applied to the RJ45 PoE interface.

The QTERM-A7 may be equipped with an optional Power-over-Ethernet (PoE) interface. This interface may be used to power the terminal by connecting a PoE equipped Power Sourcing Equipment (PSE) to the RJ45 connector on the rear of the terminal.

The QTERM-A7 PoE interface is functional with both IEEE 802.3af-2003 and 802.3at-2009 standards. If the terminal is connected to an IEEE 802.3af-2003 compliant network connection the terminal will operate as a Type 1 Class 4 PoE device in a low-power condition not exceeding 13 Watts average power consumption. The terminal will automatically disable both USB ports while operating as a Type 1 Powered Device (PD) to ensure that the total average power consumption remains lower than 13 Watts.

If the QTERM-A7 is connected to an IEEE 802.3at-2009 compliant network connection all included features will be operational. In this mode, the terminal will complete 2-event classification as specified by IEEE 802.3at-2009 and operate as a Type 2 Class 4 PoE Powered Device (PD).

The QTERM-A7 will also operate from a non-compliant (simple Power-over-Ethernet with no classification) PSE source if the source can supply up to 600 mA and maintain between 37.0 and 57.0 volts measured at the RJ45 connector on the terminal.

The QTERM-A7 will accept either Mode A or Mode B power connections as specified by IEEE 802.3at-2009. The following table provides pinout information for both of these modes. The polarity may be reversed in either mode.

NOTE ☞ *The chassis ground connection MUST be connected to an external protective earthing system. See section 3.1, "Connecting to Earth Ground" for more information.*

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-

3.5 Powering On the Terminal for the First Time

When you connect power to the QTERM-A7 terminal, the operating system is automatically loaded. The QTERM-A7 takes 10 to 20 seconds to boot. During that time the backlight of the display will come on to indicate that the terminal is booting.

CHAPTER 4

HARDWARE DESCRIPTION AND ARCHITECTURE

4.1 User Interface

Display
The QTERM-A7 features a TFT color WVGA (800 x 480 pixels) LCD display, 177 mm (7") diagonal size. The display's high brightness (500 nit) LED backlight offers good daylight readability.

Touch Screen
A clear analog-resistive touch screen covers the entire display area for user input.

External Peripherals
Two full-speed USB ports are available on the back of the QTERM-A7. These ports can be used to add many other devices, such as a keyboard, mouse or additional mass storage.

4.2 Processor

The processor in the QTERM-A7 is the Marvell PXA300 processor (ARMV5TE), incorporating Intel XScale technology running at 624 MHz.

4.3 System and Application Memory

DRAM
The QTERM-A7 includes 128 Mbytes of DDR SDRAM volatile memory with a maximum bandwidth of 520 Mbytes per second.

Flash
The QTERM-A7 uses an internal 4 Gbyte NAND flash device to hold the main Windows CE image and provide non-volatile storage for user applications and data.

4.4 Serial Communications

CAUTION

⚠️

For Class I, Division 2 installations:
Do not connect or disconnect cables while power is applied unless the area is known to be non-hazardous.

The QTERM-A7 has two serial ports, designated COM1 and COM2, that can communicate up to 3.6 MBaud. Refer to Chapter 7, "Mechanical" for serial port pinout data.

The COM1 serial port can be configured in software to your choice of EIA-232 with hardware flow control (supporting RX, TX, RTS and CTS), EIA-422 or EIA-485. COM2 is an EIA-232 port with hardware flow control. The serial ports are accessed through female DB9 connectors on the back of the unit.

The QTERM-A7 also has two powered (500 mA per port) full-speed USB host ports that are USB 2.0 compliant. The ports are accessed through USB type A connectors on the back of the unit. The connectors are right-angle facing the bottom of the unit to facilitate mounting in shallow panels.

4.5 Network

CAUTION

⚠️

For Class I, Division 2 installations:
Do not connect or disconnect cables while power is applied unless the area is known to be non-hazardous.

The QTERM-A7 has an internal 10/100Base-T wired Ethernet adapter for network communications. The network interface is accessed through a standard RJ45 socket located on the back of the unit.

4.6 Speaker

The QTERM-A7 includes an internally mounted speaker, providing the ability to play a variety of audio, including audible feedback, warnings, messages and media clips. The QTERM-A7 is also designed with software programmable volume control.

NOTE ☞ *The QTERM-A7 speaker is intentionally over-driven at full volume, and certain media files may sound distorted during playback. Some find that this gives better results after the unit has been mounted into a panel. Volume should be adjusted to give optimal results for the media files used in your application.*

4.7 Power Supply

CAUTION

⚠️

For Class I, Division 2 installations:
Do not connect or disconnect cables while power is applied unless the area is known to be non-hazardous.

The QTERM-A7 has a 10- to 32-volt DC input range and can be powered directly from a 12- or 24-volt DC power supply. The terminal includes circuitry to protect against normal variations such as transients and spikes (EN55024 compliant), as well as reverse voltage and over-voltage protection.

Power is applied through a 3-terminal strip with removable plug located on the back of the unit. The 3-terminal strip has a power connection, ground and chassis ground (isolated from the system). Alternatively, power may be applied through pin 9 of the COM1 DB9. In this case, pin 5 is the power ground return.

If equipped with optional Power-over-Ethernet (PoE) the QTERM-A7 will operate from power supplied over an Ethernet cable. For details about the PoE interface, refer to section 3.4, "Optional Power-over-Ethernet Interface".

4.8 Housing

Two models of the QTERM-A7 are available: panel-mount and modular. The housing for both models is made of industrial grade polymer that is designed to withstand everyday use in industrial environments.

Refer to Chapter 5, "Installation" for instructions on installing the unit in a panel.

4.9 Optional CAN Interface

The optional CAN interface provides two individual CAN ports, CAN1 and CAN2. Each CAN port features galvanic isolation from the terminal and from the other CAN port. The following table shows the supported baud rates and maximum cable lengths.

Baud Rate	Max Length
500k, 800k, 1M	40 m
100k, 125k, 250k	100 m
50k	500 m
10k, 20k	1000 m

The CAN interface is equipped with optional 120 Ohm terminations for each CAN port (CAN1 and CAN2). By default, the termination for both CAN ports is disabled.

To configure the CAN port terminations, unscrew the four screws holding the CAN module to the terminal. Turn the module over to the right covering the speaker. Do not remove the CAN interface cable connector from the terminal connector for this procedure.

If the CAN interface is the first or last CAN device on the bus, enable the 120 Ohm termination for that port by toggling all four switches. Note that a properly configured port will have the switches either all ON for 120 Ohm termination or all OFF for NO termination (see Figure 1 below).
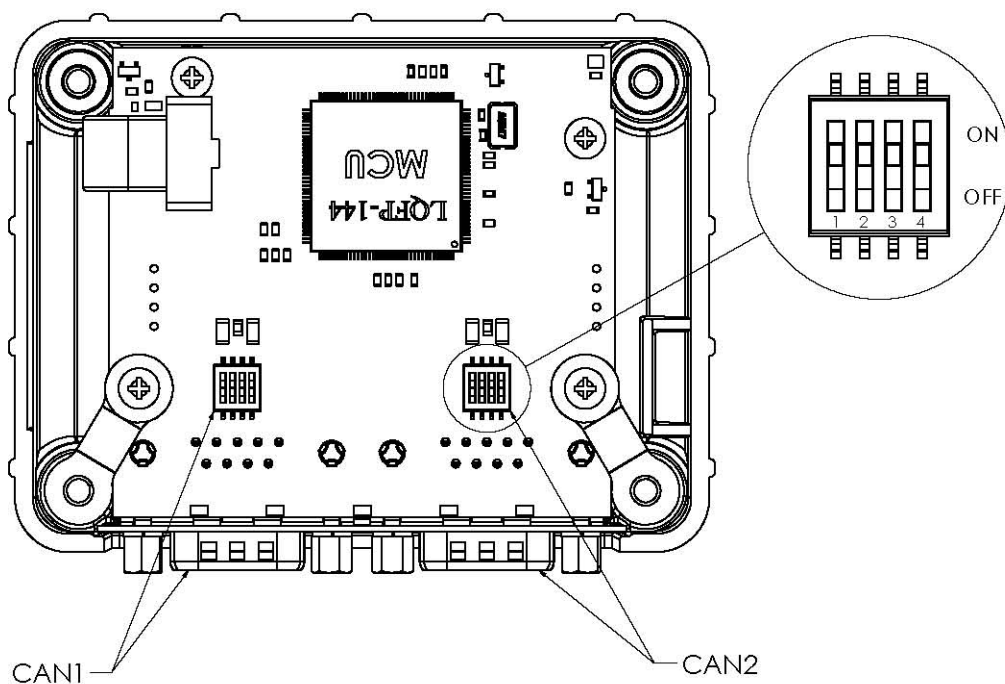
Figure 1
120 Ohm CAN Termination Selection

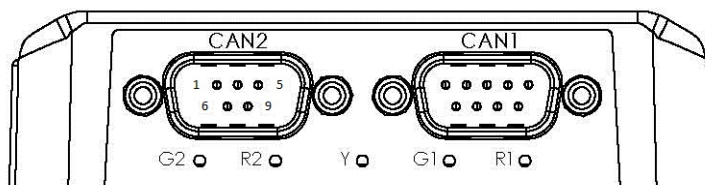The CAN interface has several indicator LEDs as shown in Figure 2.

Figure 2
CAN Interface Indicators

The following table shows the function of these indicators.

G2	R2	Y	G1	R1	Description
Off	Off	On	Off	Off	Module is not configured or loading
On	Off	On	On	Off	Module is configured and waiting
On	Flash	Flash	On	Flash	Module is working Yellow flash: Module communicated to panel Red flash: Module received CAN telegrams

For CAN interface pinout information, refer to section 7.2.6, "Optional CAN Interface." For information about software configuration, refer to the CAN driver information in iX Developer or *CAN Module with Windows CE Communication Guide (M01-083-00).*

Notes

CHAPTER 5

INSTALLATION

A QTERM-A7 terminal uses a rugged chemical resistant polymer housing and mounting components. When properly installed in a NEMA-4X rated panel, the QTERM-A7 meets all NEMA-4X specifications including hose-down, icing and salt spray.

A QTERM-A7 terminal can be installed in either a landscape or portrait orientation. Take the following steps to install the terminal:

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

- To install a panel-mount QTERM-A7, cut a hole in the panel or drywall. See section 5.1.1, "Cutout for a Panel-Mount Terminal" for specifications.

- To install a modular QTERM-A7, you need to construct a panel. See section 5.1.2, "Cutout and Studs for a Modular 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-A7 terminal. See Chapter 3, "Applying Power" for information.

5.1 Panel Cutout Requirements

5.1.1 Cutout for a Panel-Mount Terminal

A panel-mount QTERM-A7 terminal can be mounted in panels from 0.8 to 10 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		Portrait	
Horizontal:	199 ± 1 mm	Horizontal:	145 ± 1 mm
Vertical:	145 ± 1 mm	Vertical:	199 ± 1 mm

NOTE ☞ *See the "QTERM-A7 Cutout and Mounting Guide" insert that was included in the box with the QTERM-A7 for installation instructions. Printed on the back of the insert is a cutout template that can be used to trace the cutout area onto the housing panel.*
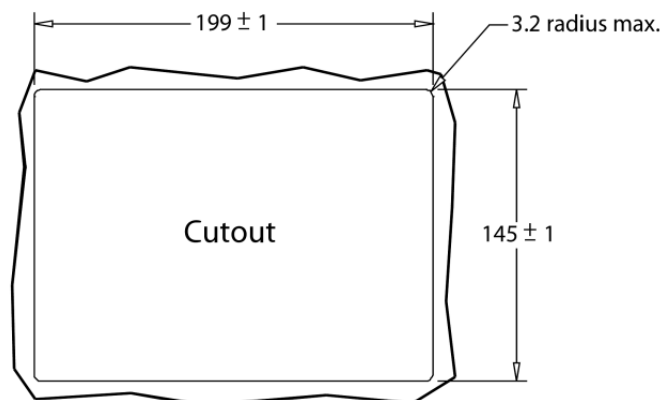
Figure 3 is a diagram of the landscape cutout.

Figure 3
Panel-Mount QTERM-A7 Landscape Cutout (units: mm)

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

5.1.2 Cutout and Studs for a Modular Terminal

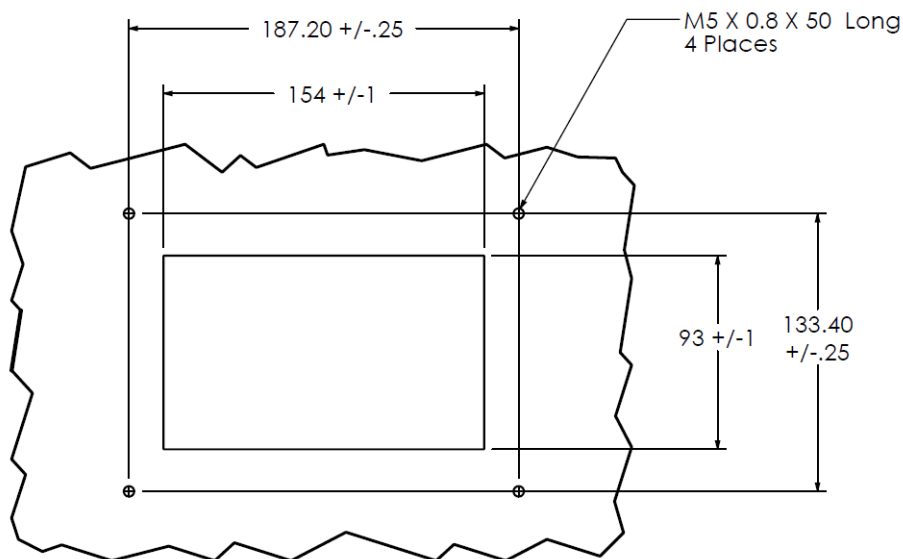A modular QTERM-A7 can be mounted in a panel with studs as shown in Figure 4, below.

Figure 4
Modular QTERM-A7 Landscape Cutout (units: mm)

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

5.2 Installing the Terminal

WARNING

When mounting the QTERM-A7 terminal within a final enclosure, make sure you provide adequate ventilation: a minimum of 51 mm (2.0 inches) around the back, sides and bottom and 77 mm (3.0 inches) clearance above the top of the QTERM-A7 terminal.

CAUTION

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or non-hazardous locations only.

CAUTION

EXPLOSION HAZARD
Substitution of components may impair suitability for Class I, Division 2.

CAUTION

For Class I, Division 2 installations:
Do not connect or disconnect cables while power is applied unless the area is known to be non-hazardous.

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

5.2.1 Installing a Panel-Mount Terminal

Take the following steps to install a panel-mount QTERM-A7 terminal.

1. Verify that the panel surface around the cutout is clean and free of rough edges. A gasket built into the terminal seals against the panel surface. Dirt or imperfections on the panel may prevent a proper seal. To achieve a NEMA-4X seal, the panel must maintain a flatness of no greater than 1 mm overall and no greater than .05 mm/mm locally. Additionally, a Ra surface roughness of 1.6 μm must not be exceeded (standard NEMA-4 enclosures).

2. Place the terminal into the panel cutout and verify that the terminal is oriented correctly. The printed labels on the back panel may indicate the orientation. If not, you can determine which side should be at the top 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 facing down.

- Portrait
  When looking at the front of the unit, the back panel serial port(s) should be facing left. Refer to Figure 5 for an example of a landscape installation.
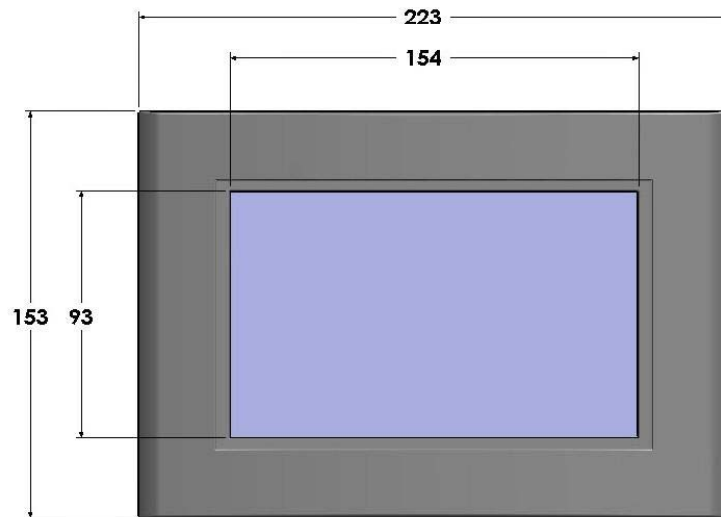

Figure 5
Panel-mount QTERM-A7 Front (units: mm)

3. On the back of the panel, align the terminal mounting ring holes with the mounting studs, and place the mounting ring against the back of the panel. Refer to Figure 6.
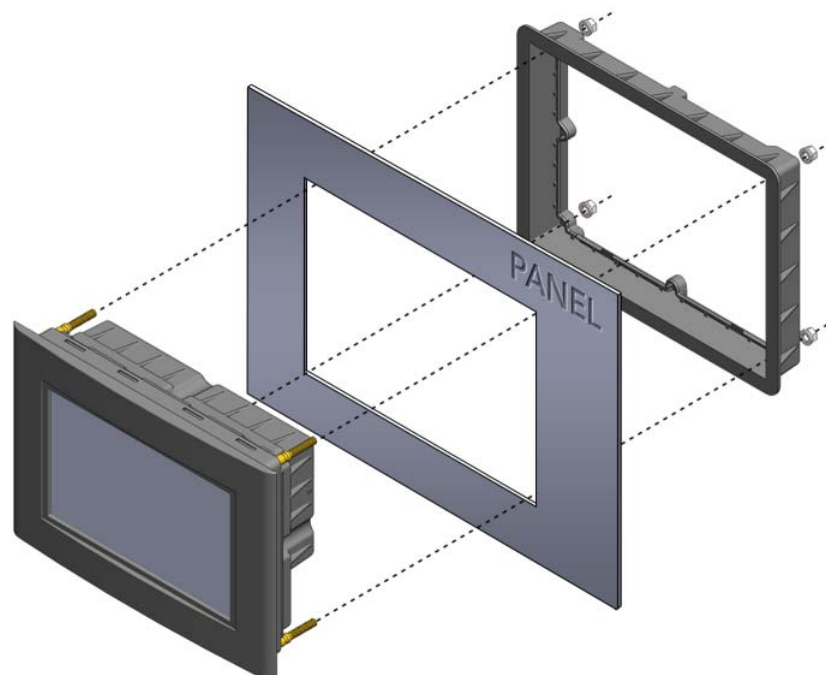

Figure 6
Panel-mount QTERM-A7 Back

4. Install nuts and washers (supplied with the terminal) onto each of the four mounting studs. Torque all nuts to 90.4 N cm (8 lbs in) to create a seal between the terminal gasket and the panel. Avoid overtightening the nuts.

5.2.2 Installing a Modular Terminal

Take the following steps to install a modular QTERM-A7 terminal.

1. Verify that the panel surface around the cutout is clean and free of rough edges and that the studs are properly located. A gasket built into the terminal seals against the back of the panel surface. Dirt or imperfections on the panel may prevent a proper seal. To achieve a NEMA-4X seal, the panel must maintain a flatness of no greater than 1 mm overall and no greater than .05 mm/mm locally. Additionally, a Ra surface roughness of 1.6 μm must not be exceeded (standard NEMA-4 enclosures).

2. Position the terminal mounting holes over the studs on the back of the panel, and verify that the terminal is oriented correctly. The printed labels on the back panel may indicate the orientation. If not, you can determine which side should be at the top 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 facing down.

    - Portrait
      When looking at the front of the unit, the back panel serial port(s) should be facing left. Refer to Figure 7 for an example of a landscape installation.
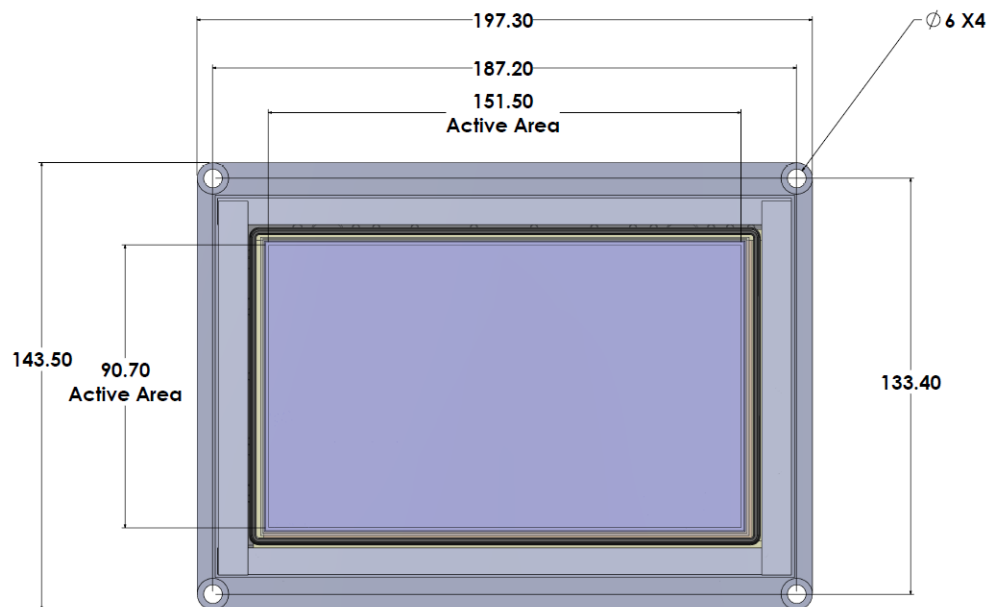

Figure 7
Modular QTERM-A7 Front (units: mm)

3. Install nuts and washers (supplied with the terminal) onto each of the four mounting studs. Torque all nuts to 90.4 N cm (8 lbs in) to create a seal between the terminal gasket and the panel. Avoid overtightening the nuts. Refer to Figure 8.
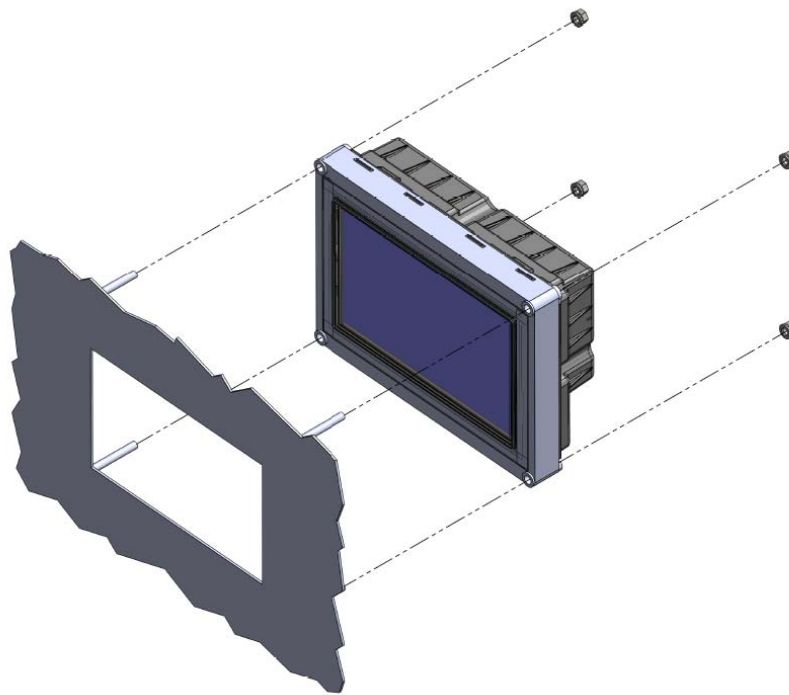
Figure 8
Modular QTERM-A7 Back

CHAPTER 6

SPECIFICATIONS

DISPLAY	
Color	TFT color WVGA LCD display 65,536 colors
Size	177 mm (7") diagonal 152 mm x 91 mm "live area"
Pixels	800 x 480 (WVGA)
Dot pitch	0.19 mm
Lighting	LED
	Brightness is software controllable
Backlight brightness	500 nits typical
Contrast ratio	500:1 (minimum)
Backlight lifetime	50 k hours minimum

TOUCH SCREEN
Analog-resistive operation
Transparent touch area over viewable display

INTERFACE	
Primary serial port	User-configurable EIA-232, EIA-422 or EIA-485 interface with selectable 485 AC terminations and fail-safe network
Secondary serial port	EIA-232 serial port with hardware or software flow control
Ethernet	10/100Base-T wired Ethernet with optional PoE
USB host	Two USB 2.0 full-speed host ports
Power connector	3-pin, 5.0 mm pitch terminal strip. (Phoenix Contact MSTBVA 2,5/3-G – 1755529)
Optional CAN interface	Two independent CAN ports with configurable 120 Ohm termination

AUDIO	
Speaker	0.7 W 8 ohm speaker on back of unit

PHYSICAL	
Panel-mount Terminal:	
	Four-bolt clamp ring panel mount
Size	224 (W) x 154 (H) x 60 (D) mm
Weight	0.93 kgf
Modular Terminal:	
	Four hex nuts and flat washers
Size	198 (W) x 144 (H) x 63 (D) mm
Weight	0.86 kgf

ENVIRONMENTAL	
Sealing	NEMA-4X, IP66 (front panel only)
Temperature	Operating: -30 to 70 °C Storage: -40 to 85 °C
Humidity	5 to 95%, non-condensing
Vibration	10 to 1500 Hz, 4 g RMS
Shock	40 g, 11 ms, common orthogonal axes
Electrical transient and noise	As specified in EN55024
ESD	8 kV contact, 15 kV air on all surfaces

POWER	
Input voltage range	10 to 32 VDC
Average power consumption	7 Watts (500 mA @ 12 VDC)

OPTIONAL POWER-OVER-ETHERNET (PoE)	
Input voltage range	37 to 57 VDC
Typical power consumption	10.5 W

CPU	
ARM Architecture V5TE Marvell PXA300 with Intel XScale technology	
Speed	624 MHz
Cache	32 kbytes instruction cache, 32 kbytes data cache

MEMORY	
DDR SDRAM	128 Mbytes standard, 16 bit wide bus, 130 Mhz => 520 Mbytes/s transfer rate
Non-volatile storage	4 Gbytes standard

SOFTWARE	
Operating system	Microsoft Windows Embedded CE version 6.0 R3 Professional

Certification
FCC Part 15, Subpart B, Class A
CE EN-55022, EN-55024 and EN-60950-1
UL 508, CSA-C22.2
Class I, Division 2, Group A, B, C, D, ISA 12.12.01 (UL1604)
Temperature range -30 to 65 °C
RoHS
UL 50 Type 4X Outdoor, NEMA-4X, IP66 (front panel only)

CHEMICAL RESISTANCE	
Plastic Enclosure	
Chemical Class	**Effects**
Acids	No significant effect under most typical conditions of concentration and temperature.
Alcohols	Generally compatible at low concentration and room temperature. Higher concentrations and elevated temperatures can result in etching and attack evidenced by decomposition.
Alkalis	Generally compatible at low concentration and room temperature. Higher concentrations and elevated temperatures can result in etching and attack evidenced by decomposition.
Aliphatic Hydrocarbons	Generally compatible.
Amines	Surface crystallization and chemical attack. Avoid.
Aromatic Hydrocarbons	Partial solvents and severe stress cracking agents (i.e., xylene, toluene). Avoid.
Detergents and Cleaners	Mild soap solutions are generally compatible. Strong alkaline materials should be avoided.
Esters	Cause severe crystallization. Partial solvents. Avoid
Greases and Oils	Pure petroleum types generally compatible. Many additives used with them are not.
Halogenerated Hydrocarbons	Solvents. Avoid.
Ketones	Cause severe crystallization and stress cracking. Partial solvents. Avoid.
Silicone Oil and Greases	Generally compatible up to 185 °F. Some contain aromatic hydrocarbons which should be avoided.

| CHEMICAL RESISTANCE |
| :---: |
| **Touchscreen** |
| Industrial chemicals: acetone, methylene chloride, methyl ethyl ketone, isopropyl alcohol, hexane, turpentine, mineral spirits, unleaded gasoline, diesel fuel, motor oil, transmission fluid, antifreeze. Food service chemicals: vinegar, coffee, tea, grease, cooking oil, salt, plus most commercial cleaners including ammonia-based glass cleaner, and laundry detergent. |

CHAPTER 7

MECHANICAL

7.1 Layout and Dimensions

7.1.1 Panel-Mount Terminal
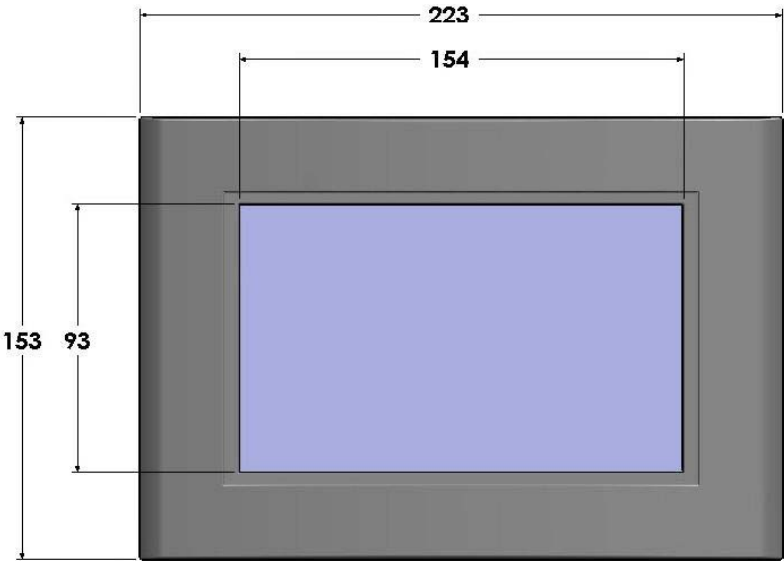
Figure 9
Panel-mount QTERM-A7 Front View (units: mm)
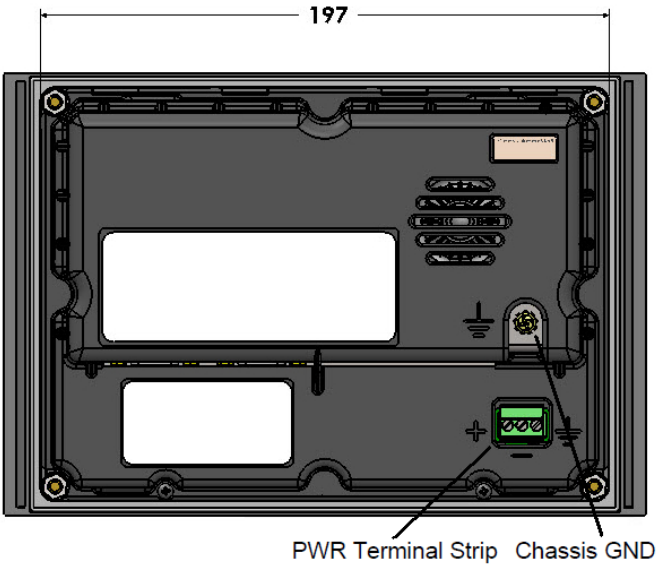
Figure 10
Panel-mount QTERM-A7 Back View (units: mm)
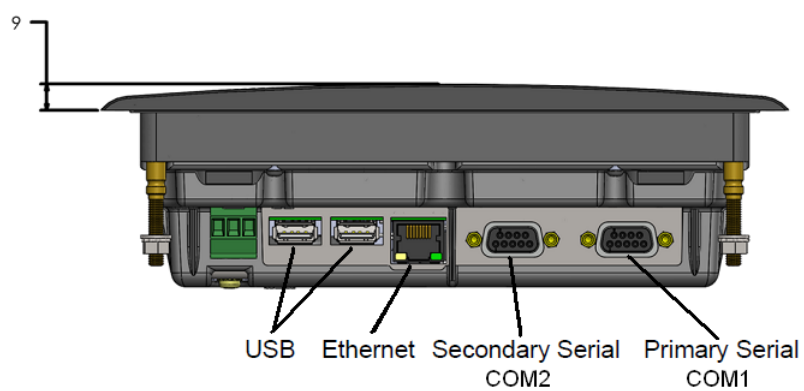
Figure 11
Panel-mount QTERM-A7 Bottom View (units: mm)
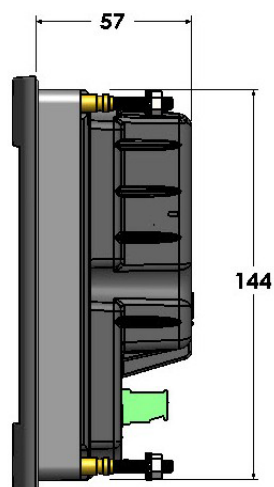
Figure 12
Panel-mount QTERM-A7 Side View (units: mm)

7.1.2 Modular Terminal
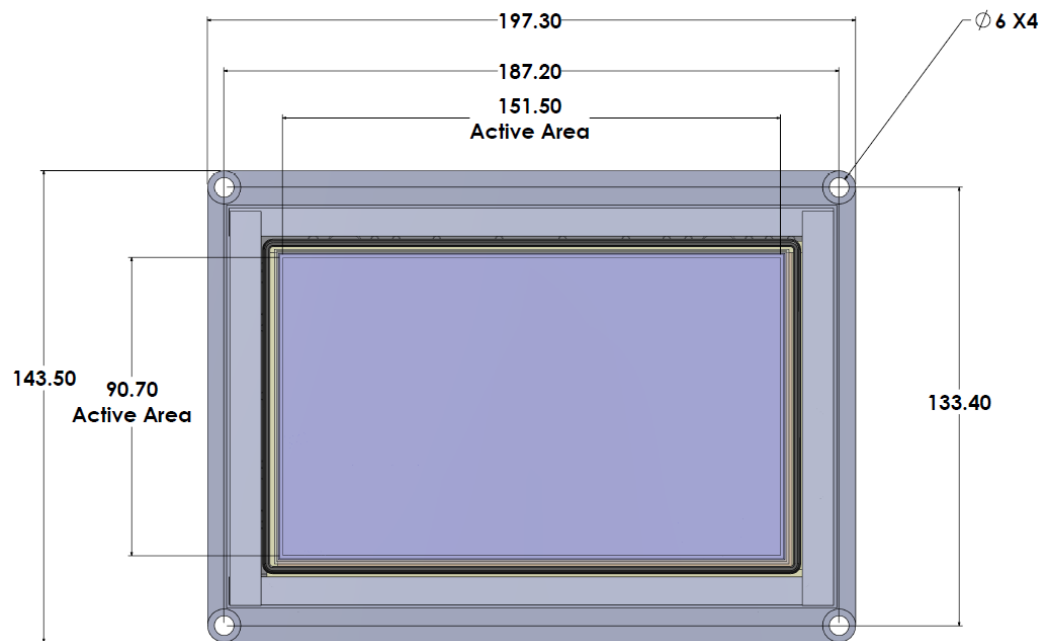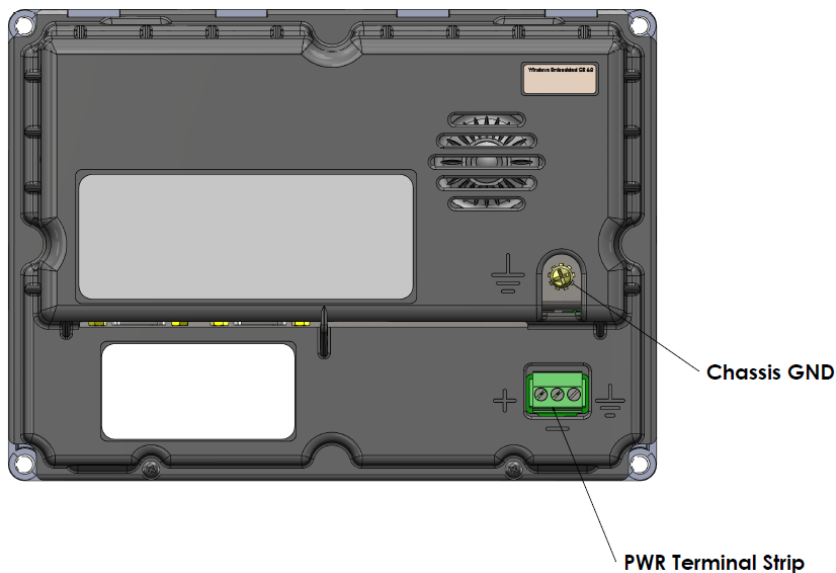

Figure 13
Modular QTERM-A7 Front View (units: mm)
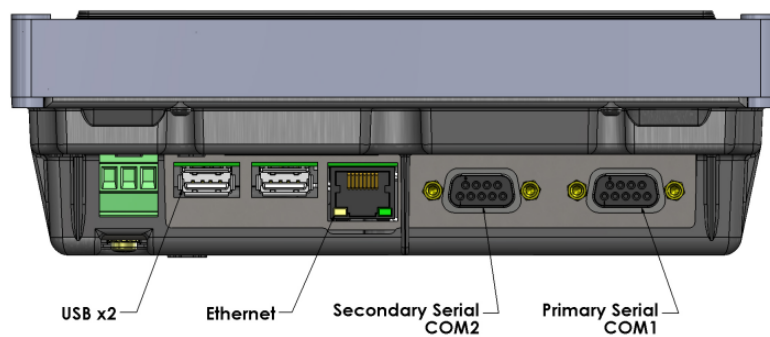

Figure 14
Modular QTERM-A7 Back View (units: mm)

Figure 15
Modular QTERM-A7 Bottom View (units: mm)
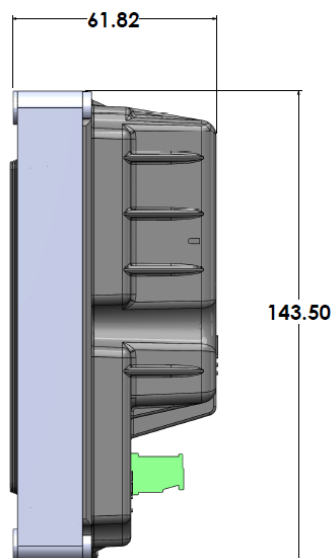
Figure 16
Modular QTERM-A7 Side View (units: mm)

7.1.3 Optional CAN Interface

The optional CAN interface is mounted to the rear of the terminal during manufacture. Figure 17 shows the dimensions of the CAN module in relation to the terminal.
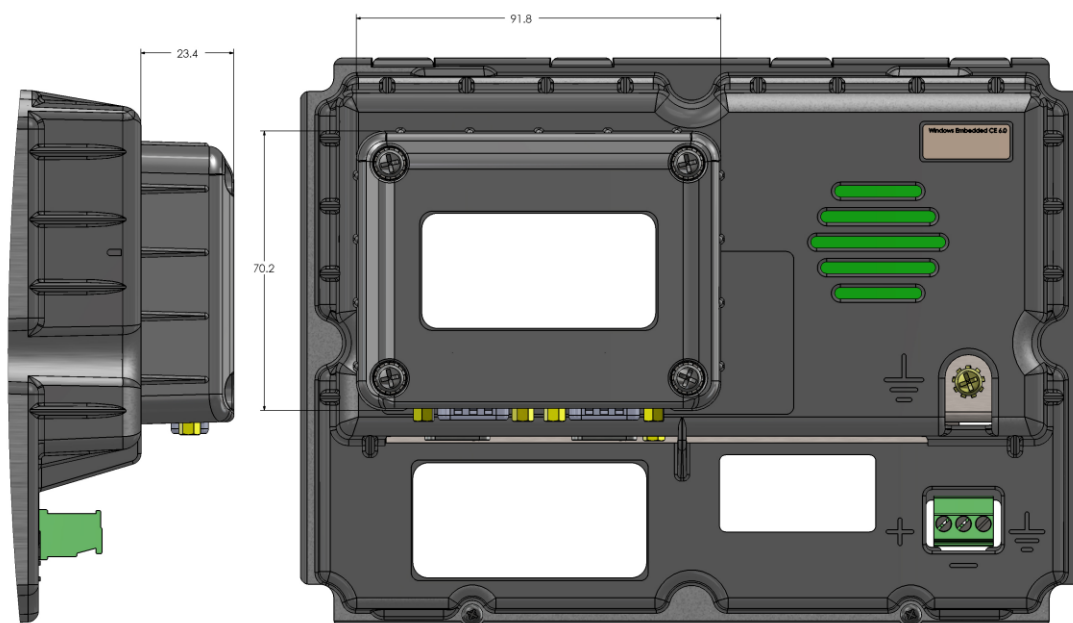

Figure 17
Optional CAN Module Dimensions

7.2 Connector Pinouts

7.2.1 Primary Serial Port

CAUTION

For Class I, Division 2 installations:
Do not connect or disconnect cables while power is applied unless the area is known to be non-hazardous.

The following table shows the pinouts for each type of serial interface on the primary serial port. Signal names in the table describe the functions of the QTERM terminal not the mating cable.

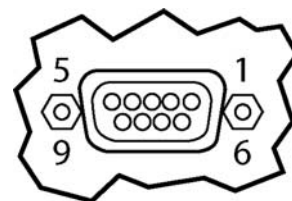| Pin	EIA-232	EIA-422	EIA-485
1	—	—	—
2	TX	TX-	RTX-
3	RX	RX+	—
4	—	—	—
5	Ground	Ground	Ground
6	—	—	—
7	CTS (in)	RX-	—
8	RTS (out)	TX+	RTX+
9	Power In	Power In	Power In

Figure 18
Female DB9 Connector

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

WARNING

Although the terminal includes protection circuitry to prevent power supply contention, power should not be simultaneously connected to both the 3-pin terminal strip and the primary DB9 connectors.

WARNING

QTERM-A7 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 10 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-A7 does not respond or exhibits abnormal behavior on power up, disconnect power and contact Beijer Electronics for technical support.

7.2.2 Secondary Serial Port

The secondary serial port on the QTERM-A7 is configured as EIA-232 only with hardware or software handshaking. The pins are defined below. Signal names in the table describe the functions of the QTERM terminal not the mating cable.

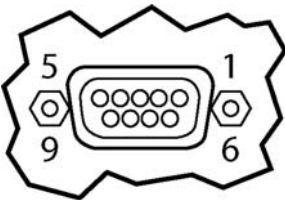| Pinout Table	
1	—
2	TX
3	RX
4	—
5	Ground
6	—
7	CTS (in)
8	RTS (out)
9	—

Figure 19
Female DB9 Connector

7.2.3 Terminal Strip for Power Input

The 3-pin terminal strip is used to provide input voltage and ground to the terminal. The terminal strip provides a chassis ground connection. The chassis ground pin is isolated from the system ground of the terminal. The 3-pin terminal strip is used to provide input voltage and ground to the terminal. The terminal strip provides a chassis ground connection. The chassis ground pin is isolated from the system ground of the terminal. Torque wire termination screws to 5 to 7 inch pounds.

Pin	Function
1	Power
2	Ground
3	Chassis GND

Figure 20
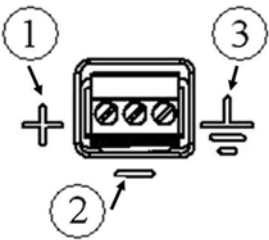*3-Pin Power Connector*

7.2.4 Ethernet Port

CAUTION

> For Class I, Division 2 installations:
> Do not connect or disconnect cables while power is applied unless the area is known to be non-hazardous.

The Ethernet port has a standard 10/100Base-T interface with an 8-pin (RJ-45) modular jack connector. The connector orientation and pinout table are shown below. For PoE pinout information please refer to section 3.4, "Optional Power-over-Ethernet Interface".

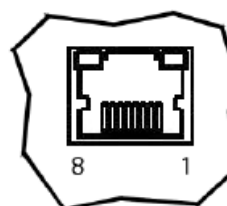| Pinout Table	
1	TX+
2	TX-
3	RX+
4	—
5	—
6	RX-
7	—
8	—

Figure 21
RJ-45 Connector

7.2.5 USB 2.0 Ports

CAUTION

> For Class I, Division 2 installations:
> The USB ports are for operational maintenance only. Do not leave USB devices permanently connected unless the area is known to be non-hazardous.

CAUTION

> For Class I, Division 2 installations:
> Do not connect or disconnect cables while power is applied unless the area is known to be non-hazardous.

The QTERM-A7 includes two USB 2.0 full-speed ports. The connector orientation and pinout table are shown below.

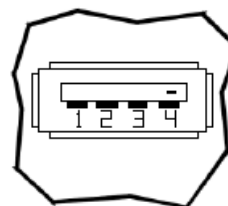| Pinout Table	
1	VCC (+5 VDC)
2	Data -
3	Data +
4	Ground

Figure 22
USB Connector

7.2.6 Optional CAN Interface

CAUTION

⚠️

For Class I, Division 2 installations:
Do not connect or disconnect cables while power is applied unless the area is known to be non-hazardous.

The optional CAN interface provides two individual CAN ports, CAN1 and CAN2. Each CAN port features galvanic isolation from the terminal and from the other CAN port. The CAN ports have standard male DB9 connectors. The pins are defined below.

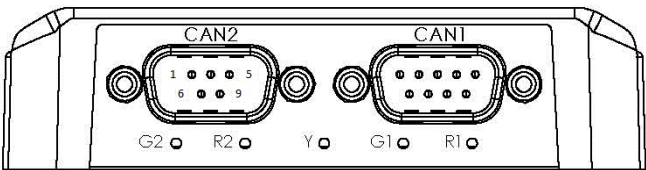| Pinout Table	
2	CAN_L
3	CAN_GND
5	CAN_SHLD
7	CAN_H

Figure 23
CAN Connectors

Notes