TLS4/8601 Series Consoles

Troubleshooting Manual

VEEDER-ROOT

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Contact TLS Systems Technical Support for additional troubleshooting information at 800-323-1799.

DAMAGE CLAIMS / LOST EQUIPMENT

Thoroughly examine all components and units as soon as they are received. If any cartons are damaged or missing, write a complete and detailed description of the damage or shortage on the face of the freight bill. The carrier's agent must verify the inspection and sign the description. Refuse only the damaged product, not the entire shipment.

Veeder-Root must be notified of any damages and/or shortages within 30 days of receipt of the shipment, as stated in our Terms and Conditions.

VEEDER-ROOT'S PREFERRED CARRIER

1. Contact Veeder-Root Customer Service at 800-873-3313 with the specific part numbers and quantities that were missing or received damaged.

2. Fax signed Bill of Lading (BOL) to Veeder-Root Customer Service at 800-234-5350.

3. Veeder-Root will file the claim with the carrier and replace the damaged/missing product at no charge to the customer. Customer Service will work with production facility to have the replacement product shipped as soon as possible.

CUSTOMER'S PREFERRED CARRIER

1. It is the customer's responsibility to file a claim with their carrier.

2. Customer may submit a replacement purchase order. Customer is responsible for all charges and freight associated with replacement order. Customer Service will work with production facility to have the replacement product shipped as soon as possible.

3. If "lost" equipment is delivered at a later date and is not needed, Veeder-Root will allow a Return to Stock without a restocking fee.

4. Veeder-Root will NOT be responsible for any compensation when a customer chooses their own carrier.

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For the parts return procedure, please follow the appropriate instructions in the "General Returned Goods Policy" pages in the "Policies and Literature" section of the Veeder-Root **North American Environmental Products** price list. Veeder-Root will not accept any return product without a Return Goods Authorization (RGA) number clearly printed on the outside of the package.

Figures

Tables

Introduction

This manual contains instructions to troubleshoot a Veeder-Root TLS4/8601 Series ATG. Also included are USIOM and CPU component replacement instructions.

Contractor Certification Requirements

Veeder-Root requires the following minimum training certifications for contractors who will install and set up the equipment discussed in this manual:

Service Technician Certification (Previously known as Level 2/3): Contractors holding valid Technician Certifications are approved to perform installation checkout, startup, programming and operations training, system tests, troubleshooting and servicing for all Veeder-Root Series Tank Monitoring Systems, including Line Leak Detection. This certification includes TLS-3xx and TLS4xx certification training.

In-Station Diagnostics (ISD-PMC) Technician Certification: ISD PMC Contractors holding a valid ISD/PMC Certification are approved to perform (ISD/PMC) installation checkout, startup, programming, and operations training. This training also includes troubleshooting and service techniques for the Veeder-Root In-Station Diagnostics system. A current Veeder-Root Technician Certification is a prerequisite for the ISD/PMC course.

All service personal on site must comply with all recommended safety practices identified by OSHA and your employer.

Review and comply with all the safety warnings in this and any related documents, and any other Federal, State or Local requirements.

 • **Warranty Registrations** may only be submitted by selected Distributors

Related Documents

577014-022   TLS4 Certification Site Prep Manual

Safety Precautions

The following safety symbols may be used throughout this manual to alert you to important safety hazards and precautions.

	EXPLOSIVE Fuels and their vapors are extremely explosive if ignited.		**FLAMMABLE** Fuels and their vapors are extremely flammable.
	ELECTRICITY High voltage exists in, and is supplied to, the device. A potential shock hazard exists.		**TURN POWER OFF** Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.
⚠WARNING	**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.	NOTICE	**NOTICE** is used to address practices not related to physical injury.

STATIC SENSITIVE COMPONENTS
Wear grounded anti-static wrist strap before handling the printed circuit boards and mounted components.

READ ALL RELATED MANUALS
Knowledge of all related procedures before you begin work is important. Read and understand all manuals thoroughly. If you do not understand a procedure, ask someone who does

⚠ WARNING

This product is to be installed and operated in the highly combustible environment of a gasoline station where flammable liquids and explosive vapors may be present.

FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.

The following hazards exist:

1. **Electrical shock resulting in serious injury or death may result if power is on during installation and the device is improperly installed.**

Observe the following precautions:

1. **Read and follow all instructions in this manual, including all safety warnings.**
2. **Comply with all applicable codes including: the National Electrical Code; federal, state, and local codes; and other applicable safety codes.**
3. **Before installing this device, turn Off, tag/lock out power to the system.**
4. **Substitution of components may impair intrinsic safety.**

Component Identification

Figure 1 through Figure 4 show assembly and component locations referenced in the troubleshooting section of this manual.
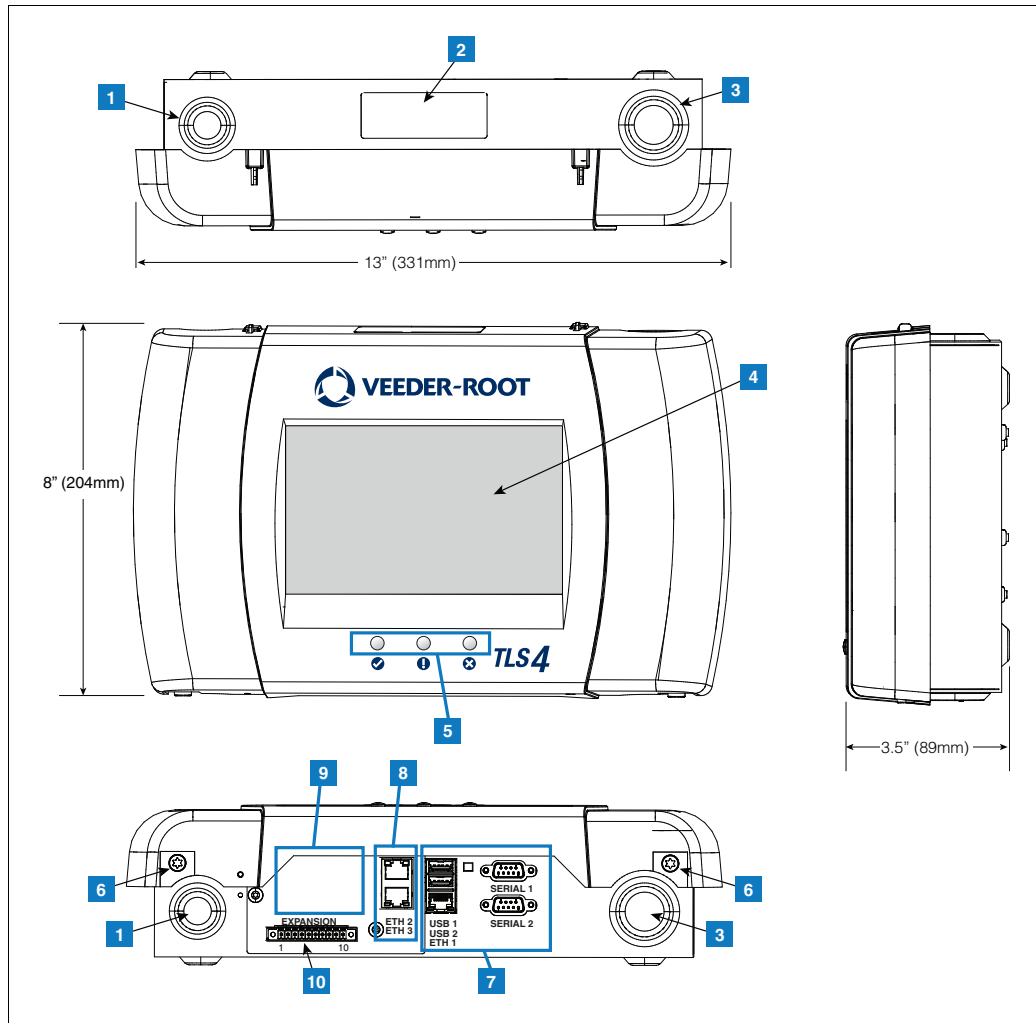
Figure 1. TLS4/8601 Series Console - Dimensions and Hardware

LEGEND FOR NUMBERED BOXES IN Figure 1

1. Power conduit knockout (1 top/1 bottom)
2. Console label contains input power ratings and Form and Serial number
3. Intrinsically safe wiring conduit knockout (1 top/1 bottom)
4. Optional touch screen display
5. Status LEDs
6. T15 screws secure cover (2 places)
7. Communication ports - standard:
   Serial ports 1 (full handshaking) and 2
   USB ports 1 and 2
   Ethernet port 1
8. Communication port - optional integrated ethernet switch ports 2 and 3
9. Factory Installed Optional Module
10. Expansion port
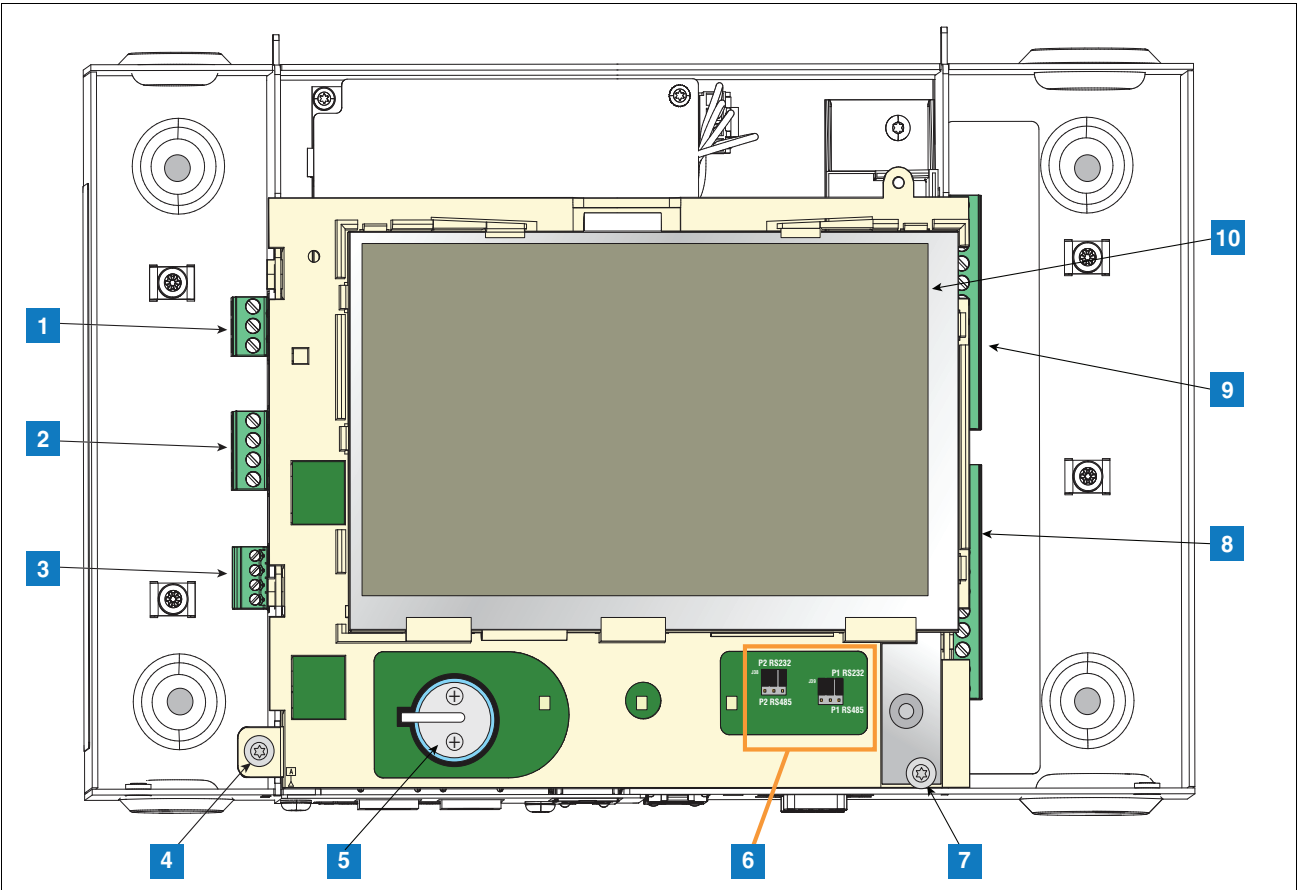
Figure 2. Component Locations (Front Cover Removed)

LEGEND FOR NUMBERED BOXES IN Figure 2

1. AC or DC input power connector (as ordered)
2. High voltage output relay connector
3. Low voltage external input connector
4. T15 screw secures Display/CPU assembly
5. Rechargeable 3V Lithium battery (battery backup)
6. RS232/485 selection jumpers SERIAL 1 (P1) and SERIAL 2 (P2)(factory set to RS232 position)
7. T20 screw secures Display/CPU assembly
8. Optional 6-device intrinsically safe input connector (7 - 12)
9. Standard 6-device intrinsically safe input connector (1 - 6)

10. Optional Graphical User Interface (GUI) display (on non-display consoles), the GUI display is replaced with the Alarm Reset (Acknowledge) button panel shown below:
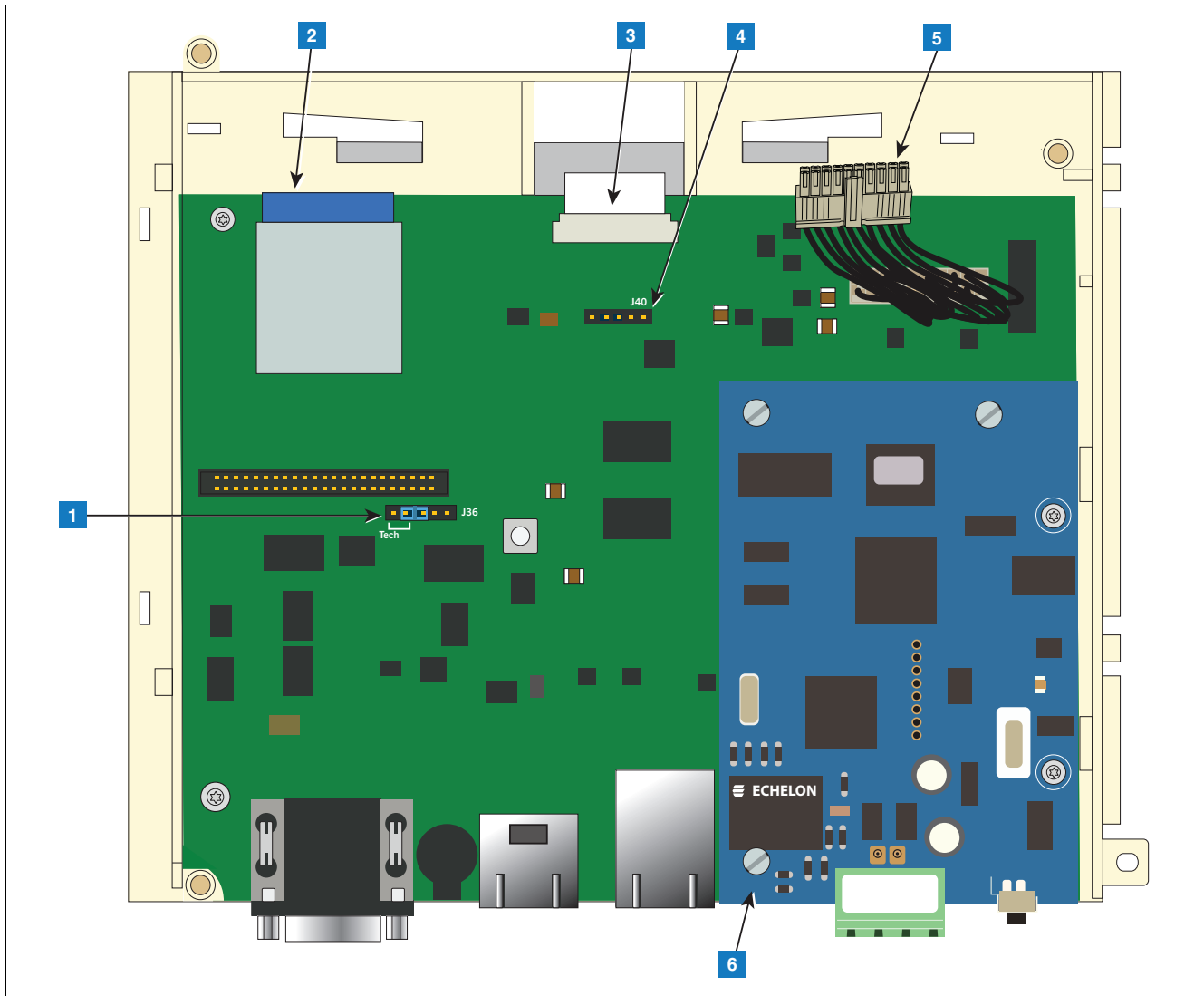
Figure 3.   Component Locations Underside of Display/CPU Board Ass'y.

LEGEND FOR NUMBERED BOXES IN Figure 3	
1. J36 Mode Jumper (shown in Operating Mode Position)	5. 20-pin CPU-to-USIOM board cable
2. SD Card	6. Optional CDIM module or IFSF module (IFSF module shown)
3. Display ribbon cable connector - Consoles with GUI display only	
4. Acknowledge switch cable connector (J40) - Consoles without GUI display only	
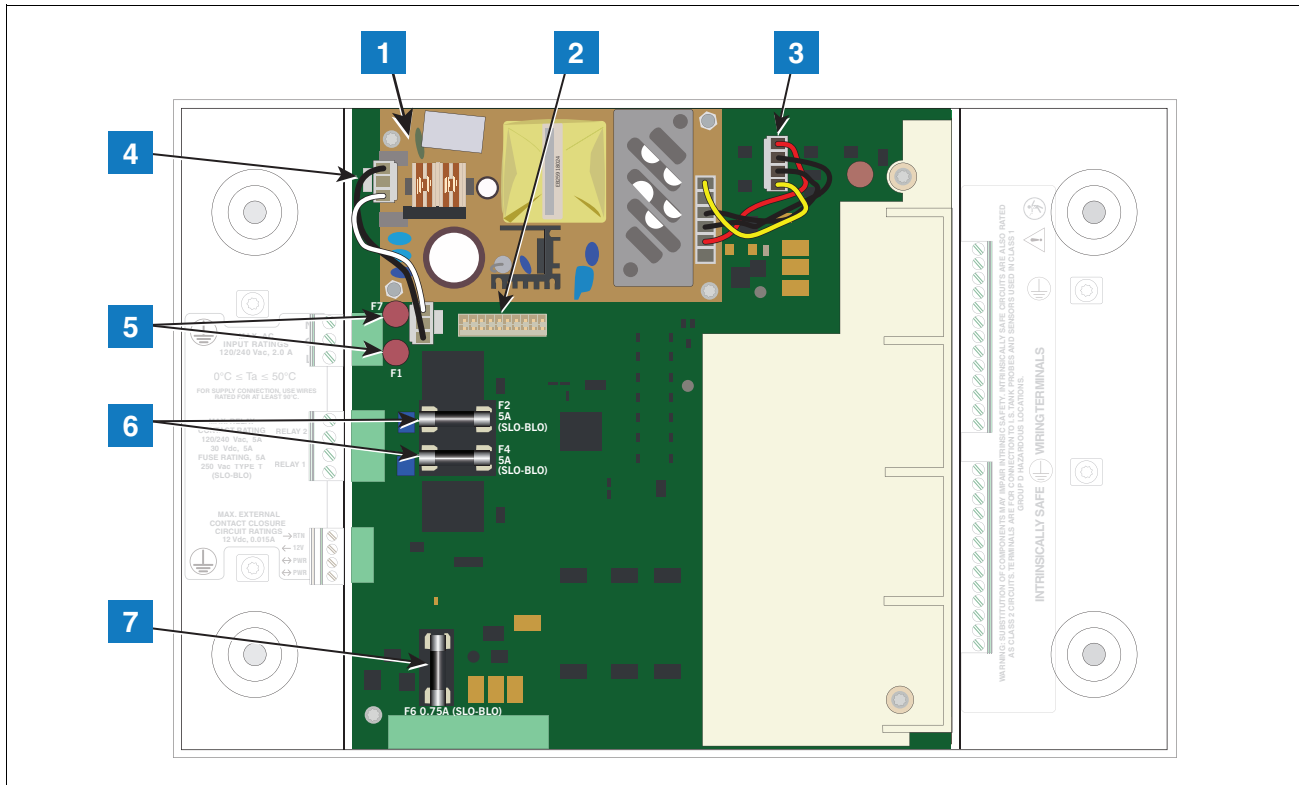
Figure 4.   Component Locations USIOM Board

LEGEND FOR NUMBERED BOXES IN Figure 4

1. Power Supply Board (protective cover removed)
2. 20-pin connector for CPU-to-USIOM board cable
3. DC output cable
4. AC input cable
5. Fuses F7 and F1
6. Relay output fuses F2 (R2) and F4 (R1)
7. Fuse F6 24 Vdc (Expansion option)

Console Wiring Inputs

This section details TLS4 power, communication, and device input connections and requirements.

Table 1. TLS4 Wiring Inputs
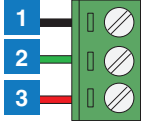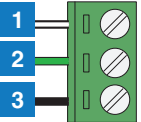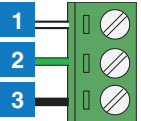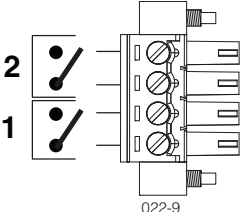
Connector	Description
Input Power (Item 1, Figure 2)	**NOTE: The TLS4/8601 Series console is factory configured for either AC input power or DC input power, but not both.** Universal AC power supply:100 to 249Vac, 50/60Hz, 2A maximum; or DC power supply (optional): +24Vdc, 2A max. and +5Vdc, 4A max. Um <= 250Vrms or 250Vdc **240 Vac input:** 1 - N/L2 (black), 2 - Ground (green), 3 - L1 (red) **120 Vac Input:** 1 - N/L2 (white), 2 - Ground (green), 3 - L1 (black) **+24/+5 Vdc Input:** 1 - +24 (white), 2 - Ground (green), 3 - +5 (black). NOTE: This input wiring diagram is only for consoles with DC Power option.
HV Relay Outputs (Item 2, Figure 2)	2 relay outputs: 120/240 Vac, 5A; 30 Vdc, 5A; Fuse ratings 5A, 250 Vac Type T (Slo-Blo) 022-9

Table 1. TLS4 Wiring Inputs
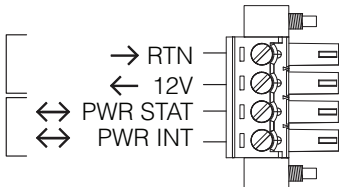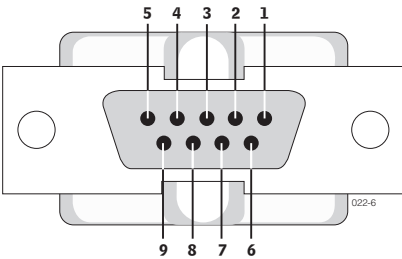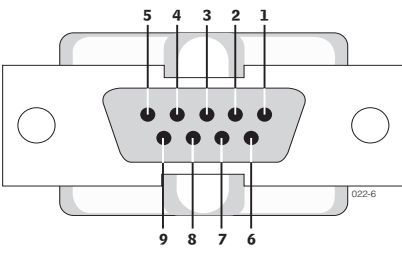
Connector	Description
Low Voltage Inputs (Item 3, Figure 2)	1 Low Voltage Input: Maximum contact closure circuit ratings 12 Vdc, 0.015A Class I wiring is required for these 12 volt closure circuits.

Legend	Pin	Input	
Dry Contact Switch	1	RTN	→ RTN ← 12V ↔ PWR STAT ↔ PWR INT
	2	12V	
For Future Use	3	PWR STAT	
	4	PWR INT	

Connector	Description
RS-232 Ports (Item 7 in Figure 1)	2 optically isolated serial ports standard, labeled SERIAL 1 (full handshaking) and SERIAL 2 (Item 10 in Figure 1). The RS-232 D-connector is a panel mount, 9-pin female type, wired in a Data Terminal Equipment (DTE) configuration. For example, any RS-232 port in any TLS consoles is also a DTE, therefore, a Null Cable is needed in order for communication to happen between the two consoles. A Data Communication Equipment (DCE) device such as a modem may be connected directly to the interface using a straight-through cable (modem support may not be available on all ATGs). Handshake signals in the system are configurable. RS-232 signals are wired to the female D-connectors as follows:

SERIAL1 (Full Handshake)

Pin	Signal	Pin	Signal	
1	Data Carrier Detect	6	Data Set Ready	
2	Received Data	7	Request to Send	
3	Transmitted Data	8	Clear to Send	
4	Data Terminal Ready	9	Ring Indicator	
5	Signal Ground			

SERIAL 2

Pin	Signal	Pin	Signal	
1		6		
2	Received Data	7		
3	Transmitted Data	8		
4		9		
5	Signal Ground			

Table 1. TLS4 Wiring Inputs
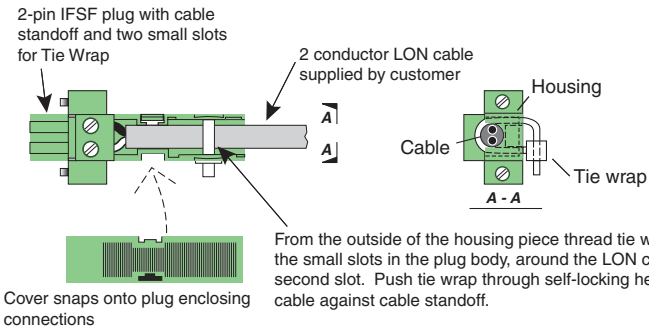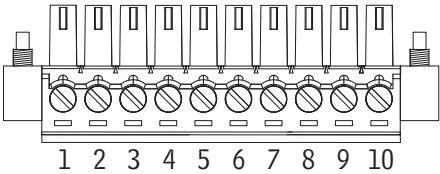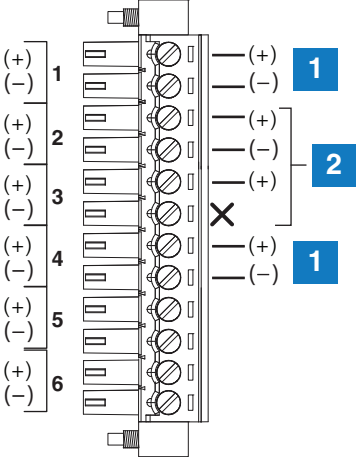
Connector	Description
Ethernet Ports	1 Ethernet port standard, labeled ETH 1 (Item 7 in Figure 1)
	1 Optional Ethernet port (Switch ETH 2 and ETH 3) (Item 8 in Figure 1)
Factory Installed Optional Modules (One module per console)	Optional CDIM module - Two RJ-45/RJ-485 serial ports, labeled CDIM 1 and CDIM 2 (Item 9 in Figure 1)
	Optional IFSF module - One IFSF port, labeled IFSF LON (Item 9 in Figure 1). The IFSF cable's plug will have to be assembled in the field as shown below: 2-pin IFSF plug with cable standoff and two small slots for Tie Wrap 2 conductor LON cable supplied by customer Housing Cable Tie wrap A - A Cover snaps onto plug enclosing connections From the outside of the housing piece thread tie wrap up through one of the small slots in the plug body, around the LON cable and back out through second slot. Push tie wrap through self-locking head and pull tight to secure cable against cable standoff.
USB Ports	2 USB ports, labeled USB 1 and USB 2 (Item 10 in Figure 1)
Expansion Port	10-pin connector VR bus, labeled EXPANSION (Item 11 in Figure 1)

Legend			
Pin	**Signal**	**Pin**	**Signal**
1	+W	6	Ground
2	-W	7	+24 Vdc
3	+15 Vdc	8	+Expansion Bus
4	Ground	9	− Expansion Bus
5	N/C	10	Expansion Reset

1 2 3 4 5 6 7 8 9 10

Table 1. TLS4 Wiring Inputs

Connector	Description		
Intrinsically Safe inputs	6 or 12 universal intrinsically safe inputs as ordered (Items 8 and 9 in Figure 2)		
	Item	**Description**	
	1	Typical 2-wire device	
	2	Typical 3-wire device	
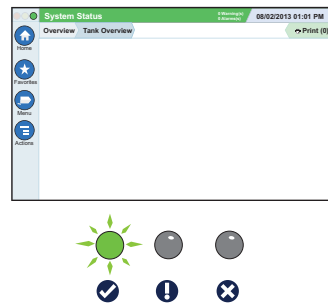
Troubleshooting

Boot-Up Errors

NORMAL FRONT PANEL LED BOOT-UP SEQUENCE
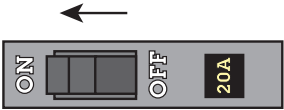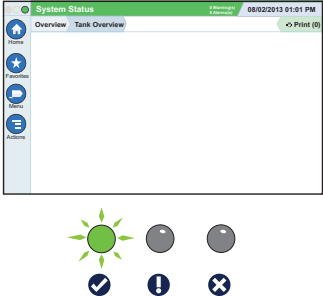
A normal TLS4 boot-up sequence can be followed observing the front panel status LEDs as described in Table 2.

Table 2. Front Panel LED Normal Boot-Up Sequence

Boot-Up Sequence	Visual Sequence	System Task
1. Console powered On at the breaker.		
2. The beeper sounds two quick beeps and the Green LED flashes rapidly.		Console is loading U-Boot.
3. The beeper is Off and the Green LED flashing slows to 1 second intervals.		U-Boot is loading the Operating System (OS).
4. The Yellow and Red LEDs turn On. The Green LED flashes at 1 second intervals. The beeper is Off.		Linux is loaded and starts the drivers for USB, Ethernet, etc.
5. The Red and yellow LED's remain On, the Green LED flashing slows to 2 second intervals.		Linux is running and the system is being initialized.
6. Green LED On Steady and the designated Home screen displays (when equipped with a touch screen display). The beeper is Off.		The console completes the boot-up sequence, starts the applications and brings up the GUI, or is ready for use..

BOOT-UP ERROR 1

Table 3. Incorrect Boot-Up Sequence - Missing Serial 2

Boot-Up Sequence	Visual Sequence	Symptom	Probable Cause	Action
1. Console powered On at the breaker		Only Serial Port 1 is available Menu>Setup>Communication>Serial Port setup.	Mode jumper J36 (Item 1 in Figure 3) is not in the Operating Mode position.	Remove the console's cover and the Display/CPU assembly following the assembly removal steps beginning on page 26. Move the Mode jumper J36 on the CPU board to the Operating Mode position (on the 2nd and 3rd pins from the left) as shown in Figure 5.
2. - 5. The console follows the normal boot up sequence, slower than normal - Green LED On Steady and the designated Home screen displays				
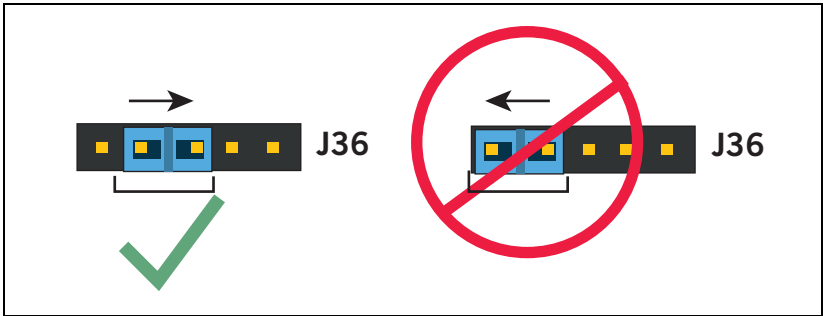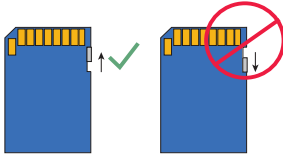
Figure 5.   Mode Jumper J36 Operating Mode Position

BOOT-UP ERROR 2

Table 4. Incorrect Boot-Up Sequence - Boot Sequence Stalled

Boot-Up Sequence	Visual Sequence	Symptom	Probable Cause	Action
1. Console Powered On at the breaker.				
2. Beeper sounds two quick beeps, the Green LED is flashing rapidly.		The Green LED keeps flashing, but the boot-up sequence is stuck in this step.	The console cannot read the SD Card, is not able to read the RAM, or the SD Card is missing.	1. Remove the console's cover and the Display/CPU assembly following the assembly removal steps beginning on page 26. 2. Confirm SD is present, if not order SD card. If present continue to next step. 3. Remove the SD Card (Item 2 in Figure 3) by pushing in on the SD Card then quickly releasing it letting it spring free of its enclosure's latch so you can slide it out. While you have the SD Card out, check the position of the write protect slide on the side of the SD Card, making sure it is in the position shown below and then reinsert it in its enclosure until it clicks into the enclosure's latch. 4. Reapply power to console. If problem does not go away, replace the SD card. 5. If problem still exists after replacing the SD card, replace the Display/CPU assembly.

BOOT-UP ERROR 3

Table 5. Incorrect Boot-Up Sequence - Console Does Not Boot
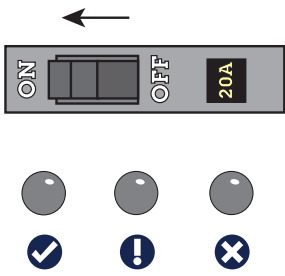
Boot-Up Sequence	Visual Sequence	Symptom	Probable Cause
1. Console Powered On at the breaker		No beeper sounds. The boot-up sequence fails. All LEDs are Off.	See Table 6 below.

Table 6. Troubleshooting Procedure if Console Does Not Boot

Probable Cause	Action	OK?	Action	OK?	Action	OK?	Action	OK?	Action
1. No DC voltage at Pins 3 and 7 of Expansion Port connector (Item 10 in Figure 1).	Measure for +15 VDC and +24VDC at Expansion Port connector (see Table 1 for pin outs).	Yes	1. Remove the console's cover and the Display/ CPU assembly following the assembly removal steps beginning on page 26. 2. Check 20-pin cable (Item 6 in Figure 3) between Display/CPU assembly and USIOM board for loose plugs, wires.	Yes	Replace Display/CPU assembly.				
		No	Go to Probable Causes 2, 3 or 4 below.						

Table 6. Troubleshooting Procedure if Console Does Not Boot

Probable Cause	Action	OK?	Action	OK?	Action	OK?	Action	OK?	Action
2. Power input plug (Item 1 in Figure 2) is loose. 3. The wires in the power input plug are pinched underneath the terminal's screws. 4. Wires to the power input plug are attached to the wrong power input terminals.	1. Verify power input plug is fully seated in its connector. 2. Verify each of the wires is correctly seated in each of the plug's terminal clamps. If the clamps are not opened all the way when inserting the wires into the plug, the wires can be inserted behind the clamps preventing proper contact. 3. Verify power input connections (see Table 1).	Yes	Check F1/F7 fuses (Item 5 in Figure 4).	Yes	Verify the AC Input or DC Output cables are attached and securely connected (see Items 3 and 4 in Figure 4).	Yes	Check 20-pin cable (Item 6 in Figure 3) between Display/CPU ass'y and USIOM board for loose plugs, wires.	Yes	Replace Display/CPU assembly.

Display Is Dark After Boot-Up Sequence

Table 7. Display Dark After Boot-Up
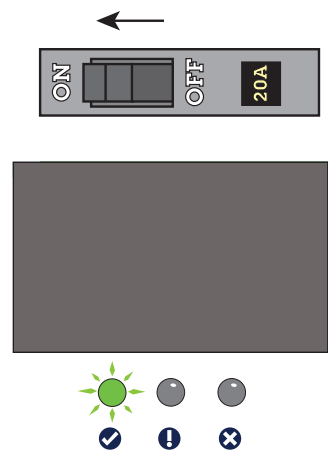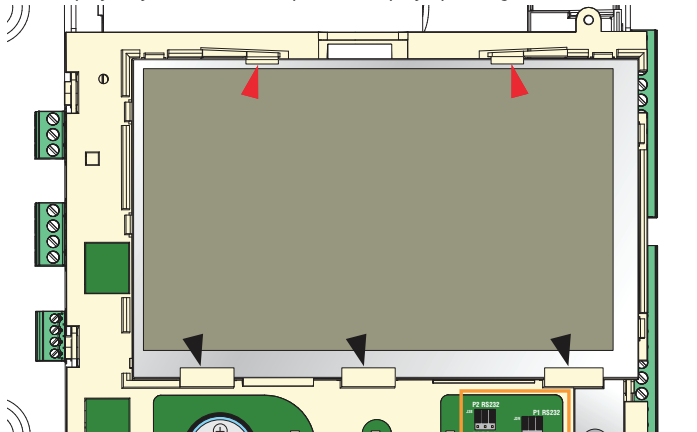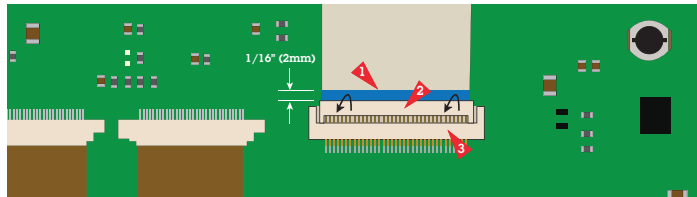
Boot-Up Sequence	Visual Sequence	Symptom	Probable Cause
1. Console Powered On at the breaker		The console follows the normal boot up sequence until step 5 in Table 2 - Green LED is On steady, but the display is dark.	See Table 8 below.

Table 8. Troubleshooting Procedure For Dark Display

Probable Cause	Action	OK?	Action
1. One end of the Display ribbon cable is loose or out of its connectors.	1. Remove the console's cover and the Display/CPU assembly following the assembly removal steps beginning on page 26. 2. Verify the Display ribbon cable (Item 4 in Figure 3) is securely seated in its CPU board connector and that both sides of the locking latch are down against the connector as shown below: 3. Place the Display/CPU Assembly on a clean surface, Display side up. 4. Place your thumbs against the spring tabs at the top of the display indicated by the upper (red) pointers in Figure 13, and gently push them away from the top of the display as you can tilt the top of the display up enough to clear the tabs. 5. Slide the display up and out from under the three angular base supports indicated by the lower (black) pointers. 6. Holding the Display/CPU Assembly in one hand carefully rotate the display away from the Display/CPU Assembly until the cable connector on the back of the display can be seen. The cable is not very long and can pull out if the display is rotated too far from the Display/CPU Assembly. 7. If inserted fully, the blue end of the cable (1 pointer) will a maximum of 1/16" (2mm) above the connector on the back of the display as shown below: 8. If the cable appears loose or out of the display connector, remove the Display cable from its CPU connector, reversing the procedure in Step 2 above. 9. Place the Display face down on a clean surface and rotate the locking member of the cable's Display connector (2 pointer) up 90° from the connector's fixed base (3 pointer). Reseat the cable end into the display board connector as far as it will go and then push the locking member down onto the connector snapping it in place. 10. Replace the Display board into its place in the Display/CPU Assembly reversing the steps above. 11. Reseat the CPU board end of the Display cable as discussed in step 2 above.	No Yes	Insert ribbon cable fully into its CPU board connector and push down on each side of the locking latch until it rests against the connector. Replace Display/CPU assembly.
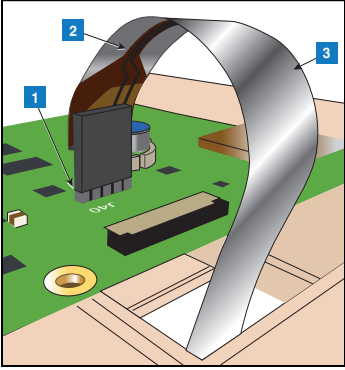
Touch Screen Is Defective

Table 9. Troubleshooting Procedure for Defective Touch Screen

Probable Cause	Action	OK?	Action
1. Bad Display cable, loose display cable.	1. Reseat display cable.	No	Replace SD card. If changing SD card does not fix problem, replace Display/CPU assembly.

Acknowledge Switch is Defective

Table 10. Troubleshooting Procedure for Defective Acknowledge (Ack) Switch

Probable Cause	Action	OK?	Action	OK?	Action
1. The Ack cable plug is loose or not plugged in Ack connector.	Verify cable is not loose.	No	Reseat cable connector.		
		Yes	Go to next cause.		
2. Ack cable is broken.	Verify cable is not broken.	Yes	Replace the Ack/CPU assembly.		
		No	Go to next cause.		
3. Ack cable connector incorrectly installed.	Verify all pins of Ack cable plug are seated in the Ack switch connector, J40. Legend: 1. Connector J40 on CPU board. Notice the cable plug is over all five pins of the connector. 2. Ack cable is attached to the metal shield. 3. Metal shield. Notice the orientation of the shield, Ack cable underneath.	No	Reconnect Ack plug.		
		Yes	Replace SD Card	No	Replace Ack/CPU assembly.

Serial Port(s) - No RS-232 Communication

Table 11. Troubleshooting Procedure for No RS-232 Communication

Probable Cause	Action	OK?	Action
1. Serial settings are incorrect for data transfer such as Baud Rate, Parity Setting, Data Bit, and Flow Control.	Verify serial communication settings to make sure settings are correct for data transfer.	No	Correct Serial Port comm settings.
		Yes	Go to next cause.
2. Bad cable connecting TLS4 to serial device.	Verify if cable is bad.	Yes	Replace cable.
		No	Go to next cause.
3. Incorrect DB9 Adapters are used.	Verify serial cable has **Straight** DB9 adapter on one end and a **Null** adapter on the other end.	No	Install correct adapter(s).
4. Serial Jumpers are installed in incorrect position(s) (Item 6 in Figure 2).	Remove the console's cover following the Display/CPU assembly removal steps 1 & 3 on page 26. Check all jumpers are in RS-232 position(s) shown below:	No	Put jumper(s) in RS-232 position(s).
		Yes	Replace Display/CPU Assembly.
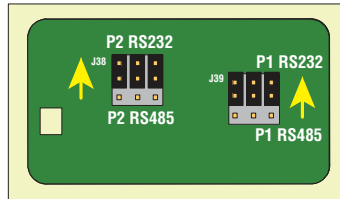
Serial Port(s) - No RS-485 Communication

Table 12. Troubleshooting Procedure for No RS-485 Communication

Probable Cause	Action	OK?	Action
1. Serial settings are incorrect for data transfer such as Baud Rate, Parity Setting, Data Bit, and Flow Control..	Verify Serial communication settings to make sure settings are correct for data transfer.	No	Correct Serial Port comm settings.
		Yes	Go to next cause.
2. Bad cable connecting TLS4 to serial device.	Verify if cable is bad.	Yes	Replace cable.
		No	Go to next cause.
3. Serial Jumpers are installed in incorrect position(s) (Item 6 in Figure 2).	Remove the console's cover following the Display/CPU assembly removal steps 1 & 3 on page 26. Check all jumpers are in RS-485 position(s) shown below:	No	Put jumper(s) in RS-485 position(s).
		Yes	Replace Display/CPU Assembly.
4. Polarity of wiring is wrong.	Check wiring polarity.	Yes	Rewire connections.
		No	Replace Display/CPU assembly.
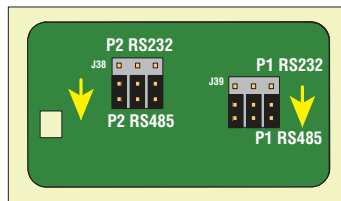
No IFSF - Communication

Table 13. Troubleshooting Procedure for No IFSF Communication

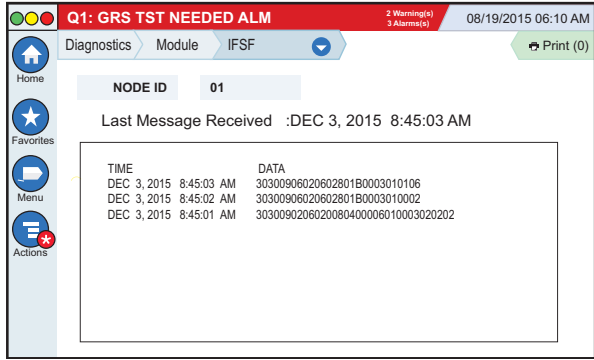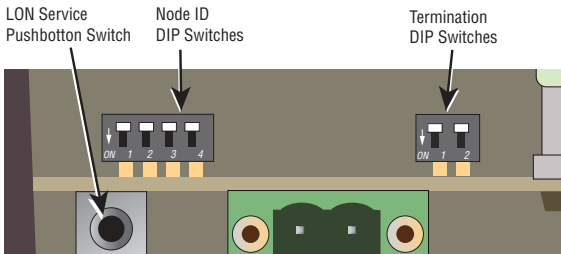| Probable Cause	Action	OK?	Action
1. IFSF communication setup incorrect	Verify LON Card selected for device field on IFSF Communication Setup screen.	No	Correct Device selection
		Yes	Go to next cause.
2. No communication	Verify Node ID and IFSF messages on Diagnostic Module IFSF screen: On the front panel screen touch Menu＞Diagnostics＞Module＞IFSF:. This screen allows you to view messages for the Node Id so you can validate IFSF communications. The messages (Data) are listed in descending order with the latest message at the top (see example below).	No	Go to next cause.
		Yes	Done

		OK?	Action
3. Node ID setting incorrect	Get the correct Node ID setting from the site's LON administrator and verify that the correct Node ID has been entered: TLS4/8601 console 1. Shut off power to the console. 2. On the bottom of the console, remove the LON cable plug and the Expansion port plug and Ethernet 2/3 plug (if connected). 3. Remove the two T15 torx screws and cover plate and set aside. Notice the Node ID, and Termination DIP Switches:	No	Set the Node ID setting.
		Yes	Go to next cause.

4. The Termination DIP switches are set in the NO TERMINATION or UP position (Default).

5. The Node ID switches are set to a value supplied by the Site IFSF LON Administrator. LON Node Address is subnet 9, Node X, where X is selected using DIP switches 1-4 using the legend below:

DIP SW	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	D		D		D		D		D		D		D		D	
2		D	D			D	D			D	D			D	D	
3				D	D	D	D					D	D	D	D	
4								D	D	D	D	D	D	D	D	

Node Address

Note: The Node ID DIP switches shown in the example illustration in Step 3 above are set to Node Address 1.

D (Down) = ON, Blank = Up

6. Replace the cover plate, comm plugs, close the console door and reapply power.

Table 13. Troubleshooting Procedure for No IFSF Communication

Probable Cause	Action	OK?	Action
4. Intermittent communication	Verify Termination switch is set for No Termination. Follow the procedure in Probable Cause 3 above to access Termination DIP switch and verify both DIP switches are in the up (No Termination) position.	No	Correct Termination switch setting. Verify Termination in site's Primary Junction Box.
		Yes	Go to next cause.
5. Bad cable connecting ATG to LON network.	Verify if wires are loose or broken.	No	
		Yes	Replace cable and install plug cover if not already installed.

No Connection to Ethernet Port 1 (ETH1)

NOTICE **Also follow the procedures in Table 14 to determine problems with connections problems with ethernet ports 2 (ETH2) and 3 (ETH3).**

Table 14. Troubleshooting Procedure for No Ethernet Connection at ETH1 Port

Probable Cause	Action	OK?	Action
1. Cable is plugged into the wrong port.	Verify ethernet cable is plugged into ETH1 port (Item 7 in Figure 1).	No	Insert cable in ETH1 port.
		Yes	Go to next cause.
2. Ethernet communication settings, such as, IP Address type, IP Address, etc.	1. Verify ethernet communication settings are correct.	No	Correct ethernet port 1 comm settings.
		Yes	Go to next cause.
	2. Check if problem ethernet port's Link and Activities LEDs are flashing.	No	Go to cause 4.
		Yes	Go to next cause.
	3. Try to communicate to the maintenance IP address: 169.254.21.12	No	Go to next cause.
4. Bad cable.	Verify if cable is bad - Are there loose or broken wires?	Yes	Replace cable.
		No	Go to next cause.
5. Defective Ethernet signal source.	Verify ethernet signal source, Is hub or switch bad?	Yes	Replace ethernet source.
		No	Replace Display/CPU Assembly.
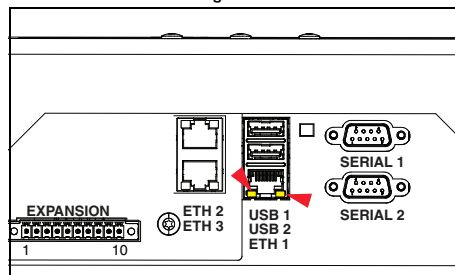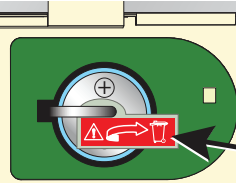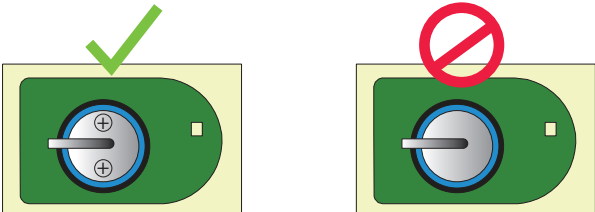
No Probe Address Under Devices Menu

Table 15. Troubleshooting Procedure for No Probe Address Under Devices Menu

Probable Cause	Yes or No?	Action	OK?	Action	OK?	Action
1. Probe wires were connected while the console was ON.	Yes	Re-boot console.				
	No	Go to next cause.				
2. Probe wiring installed incorrectly.		1. Remove the console's cover following the Display/CPU assembly removal steps 1 & 3 on page 26. 2. Polarity is required for this device. Locate the questionable probe's input wiring connections at the USIOM connector (Items 8 & 9 in Figure 2). Verify the two wires are connected with white to + terminal and black to − terminal. 3. Verify each of the wires is correctly seated in each of the plug's terminal clamps. If the clamps are not opened all the way when inserting the wires into the plug, the wires can be inserted behind the clamps preventing proper contact.	Yes	Go to next cause.		
			No	Correct wiring/plug issue(s).	No	Go to next cause.
3. Probe input in USIOM or bad probe.		Verify by connecting probe to different input in USIOM.	No	Replace probe.		
			Yes	Replace USIOM board.		

Incorrect Time Displayed After Console Power Loss

Table 16. Troubleshooting Procedure for incorrect Time Displayed After Power Loss

Probable Cause	Action	Yes or No?	Action
1. Battery Isolator strip not removed.	Remove the front cover of the TLS4 following Steps 1 & 3 of the Display/CPU Assembly removal instructions on page 26. Is the battery isolator strip in place?	Yes	Remove and discard the battery isolator strip.
		No	Go to Probable Cause 2.
2. Bad battery or battery is installed in backwards with ' + ' side of battery facing down in holder.	1. Remove the console's cover following steps 1 & 3 in Display/CPU Assembly removal instructions on page 26. 2. Is the ' + ' side of the battery (Item 5 in Figure 2) facing up in the holder as shown below?	No	Remove the battery by gently lifting the retaining clip over the battery as you slide it to the right. Reinstall the battery with the ' + ' side up, by sliding it from right to left under the retaining clip until it snaps securely into the holder.
		Yes	Replace battery.

"Could Not Validate iButton" or " Media Access Error" Displays on GUI

NOTICE **Table 17 errors only applicable for older consoles which have an iButton.**

Table 17. Troubleshooting Procedure for "Could Not Validate IButton" or "Media Access Error"
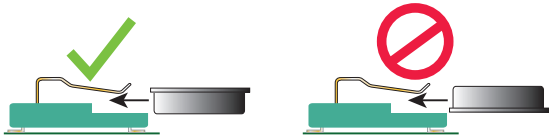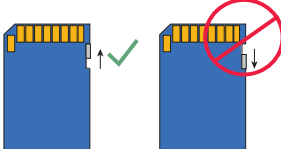
Probable Cause	Action	OK?	Action	OK?	Action
1. Features iButton is not seated properly in its holder. 2. Features iButton is not programmed.	1. Remove the console's cover and the Display/CPU assembly following the assembly removal steps beginning on page 26. 2. Check that iButton (Item 3 in Figure 3) on the CPU board is installed correctly as shown below:	Yes	Replace iButton with one that has been programmed with the required features.		
		No	Verify iButton is installed correctly.	No	With flange end up, slide the iButton under the clip until it snaps securely into the holder.
				Yes	Replace Display/CPU Assembly.

Table 17. Troubleshooting Procedure for "Could Not Validate IButton" or "Media Access Error"

Probable Cause	Action	OK?	Action	OK?	Action
3. Bad Cyclic Redundancy (CRC) check sum error.	Replace Display/CPU Assembly.				

Cannot Save Setup Data, "Data Retrieved" Error Message In Status Bar

Table 18. Troubleshooting Procedure for Can't Save Data
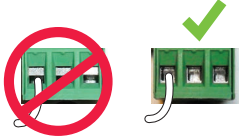
Probable Cause	Action
1. SD Card in write protect mode.	1. Remove the console's cover and the Display/CPU assembly following the assembly removal steps beginning on page 26. 2. Remove the Card (Item 2 in Figure 3) by pushing in on the Card then quickly releasing it letting it spring free of its enclosure's latch so you can slide it out. While you have the Card out, check the position of the write protect slide on the side of the Card, making sure it is in the position shown below and then reinsert it in its enclosure until it clicks into the enclosure's latch.

Relay Will Not Change State

Table 19. Troubleshooting Procedure for Relay That Will Not Change State

Probable Cause	Action	OK?	Action
1. Setup problem - relay is not enabled.	Verify relay is enabled in the GUI.	No	Enable relay.
		Yes	Go to next cause.

Table 19. Troubleshooting Procedure for Relay That Will Not Change State

Probable Cause	Action	OK?	Action
2. Connector is not pushed all the way in or incorrect input wiring from external device. **⚠ WARNING** **WARNING! When troubleshooting I/O Relays, high voltages could be present on the input wiring. Lock out, tag and shut down the equipment connected to these two relays before attempting to troubleshoot the wiring or fuses to these relays.**	1. Remove the console's cover following steps 1 & 3 in Display/CPU Assembly removal instructions on page 26. Verify the relay plug is pushed all the way into the connector (Item 2 in Figure 2). Verify each of the wires is correctly seated in the plug's terminal clamps. If the clamps are not opened all the way when inserting the wires into the plug, the wires can be inserted behind the clamps preventing proper contact.	No	Correct wiring connections.
		Yes	Go to next cause.
	2. Verify external wiring into the relay input connector.	No	Correct wiring connection.
		Yes	Go to next cause.
3. Fuse missing or blown.	Remove the Display/CPU assembly following the Display/CPU Assembly removal instructions on page 26. Locate the Relay 1 fuse (F4) and the Relay 2 fuse (F2) (see Item 6 in Figure 4). Check fuse(s).	No	Install or replace fuse(s) with the correct type as shown on label next to relay input plug.
		Yes	Replace USIOM board.

External Input Does Not Recognize External Contact Closure

Table 20. Troubleshooting Procedure for External Input Not Recognizing External Contact Closure

Probable Cause	Action	OK?	Action
1. Setup problem - external input is not enabled.	Verify external input is enabled in the GUI.	No	Enable external input.
		Yes	Go to next cause.
2. Incorrect external wiring to external input connector	Remove the console's cover following steps1 & 3 in Display/CPU Assembly removal instructions on page 26. Verify the external input plug is pushed all the way into the connector (Item 3 in Figure 2). Verify each of the wires is correctly seated in the plug's terminal clamps. If the clamps are not opened all the way when inserting the wires into the plug, the wires can be inserted behind the clamps preventing proper contact.	No	Correct wiring connections.
		Yes	Replace USIOM board.

Component Removal Procedures

In non-display consoles the Ack/CPU assembly is, except for the display screen itself, essentially the same as the Display/CPU assembly. The Display ribbon cable connects to a different CPU board connector than the Ack switch panel cable plug (see Items 4 and 5 in Figure 3). Other than the GUI display and Ack switch panel difference, the additional removal procedures discussed in this section are identical. When troubleshooting non-display consoles, where applicable substitute Ack/CPU assembly for Display/CPU assembly in this manual.

Removing Display/CPU Assembly

⚠WARNING **Turn Off, tag and lockout power to the console.**

1. Using masking tape, mark each connected comm cable with the port to which each cable is attached and remove the comm cables.

2. Remove the two T15 torx shoulder screws under the front cover of the console (Item 6 in Figure 1). Tilt the bottom of the cover out as you lift it off of the two hooks in the top of the console's housing.

3. Remove the T15 #8 x .3125 screw (Item 4 in Figure 2) and the T20 #8 x .875 screw (Item 7 in Figure 2) securing the Display/CPU assembly to the console and set them aside. Slide the Display/CPU assembly up as far as it will go and tilt out the bottom of the assembly to access the short 20-pin cable connecting the Display/CPU assembly to the USIOM board in the console. Disconnect the cable plug from its USIOM board socket by pressing against the vertical locking lever in the middle of the plug as you lift it away from the socket.

4. The CPU board is on the underside of the Display/CPU assembly.

Avoid unnecessary contact with the CPU board components to avoid static damage to the board's circuitry.

Removing The SD Card

1. Follow the steps above to remove the Display/CPU or Ack/CPU assembly.

   With the Display/CPU assembly removed, set it on a clean surface, display side down. The SD card (Item 2 in Figure 3) is removed by pushing in gently on the end of the card and quickly releasing it so it springs free of its enclosure's latch.

2. When replacing the SD card, always check the read/write-protect switch on the side of the card is in the position shown in Figure 6. Insert the SD card into its enclosure with the contact side facing the CPU board and gently push the card into its enclosure until it clicks into the enclosure's latch.
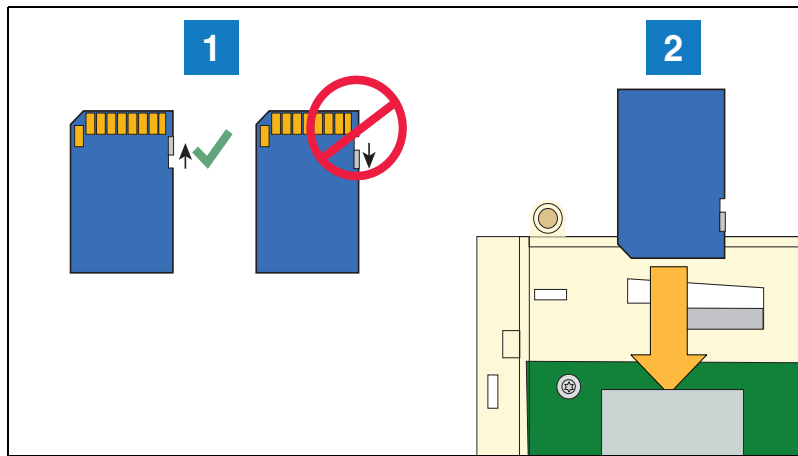
Figure 6. Inserting SD Card In Its CPU board Enclosure

1. Check the SD Card read/write slide position.
2. Insert the SD card into its enclosure with the contact side facing the CPU board.

Replacing The Features iButton

NOTICE **This section only applicable for older consoles which have an iButton**

1. Remove the Display/CPU Assembly as discussed on page 26.
2. Place the Display/CPU Assembly on a clean surface, display side down.
3. Locate the Features iButton (Item 1 in Figure 7).
4. Slide the iButton out from under the retaining clip until it is free of the holder.
5. With the flanged end up, slide the replacement iButton under the retaining clip until it snaps securely into the holder.
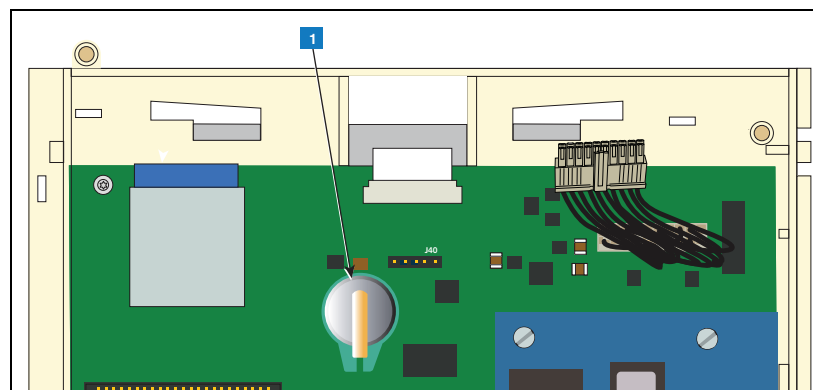
Figure 7. Locating iButton on Older Console CPU Boards

1. iButton

Replacing the Backup Battery

1. Remove the front cover of the TLS4 following step 1 and 2 of the Display/CPU Assembly removal instructions on page 26.

2. Locate the backup battery beneath the display (Item 5 in Figure 2).

3. Slide the battery out from under the retaining clip until it is free of the holder.

4. With the '+' side up, slide the replacement battery under the retaining clip until it snaps securely into the holder.

Replacing the USIOM Board

1. Remove the Display/CPU Assembly as discussed on page 26.

2. Place the Display/CPU Assembly on a clean surface, display side down.

3. Remove all plugs connected to the USIOM board (see Figure 8).

4. Remove the two T15 #8 x 0.3125 screws securing the expansion comm port plate to the bottom of the console enclosure and set them aside with the comm plate. (see Figure 9).

5. Remove the two T15 #6 x .375 screws securing the I.S. cover and right side of the USIOM board to the console chassis (see Figure 12). Set the plastic I.S. cover, the two T15 screws holding the cover aside.

6. Remove the T15 #6 x 0.375 screw from the lower left corner of the USIOM board (see Figure 11) and set it aside.

7. Remove the two T10 #4 x 0.625 screws from the opposite corners of the power supply board and set them aside (see Figure 10).

8. With your fingers under the two I.S. sockets and your thumbs positioned on top of them, lift/pry the right side of the USIOM board out enough to release the USIOM board from the snap-on retaining post between the two I.S. sockets (see Figure 13).

9. With the USIOM board now free from the retaining post, swing the right side of the USIOM board toward you as you lift it free of the chassis.

10. Install the replacement USIOM board by reversing steps 9 through 3 above.

Figure 8.   Remove all plugs attached to USIOM board

Figure 9.   Remove Two T15 Screws Securing Comm Plate

Figure 10.   Remove Two Corner T10 Screws From Power Supply Board

Figure 11.   Remove Lower Left Corner USIOM Board T15 Screw
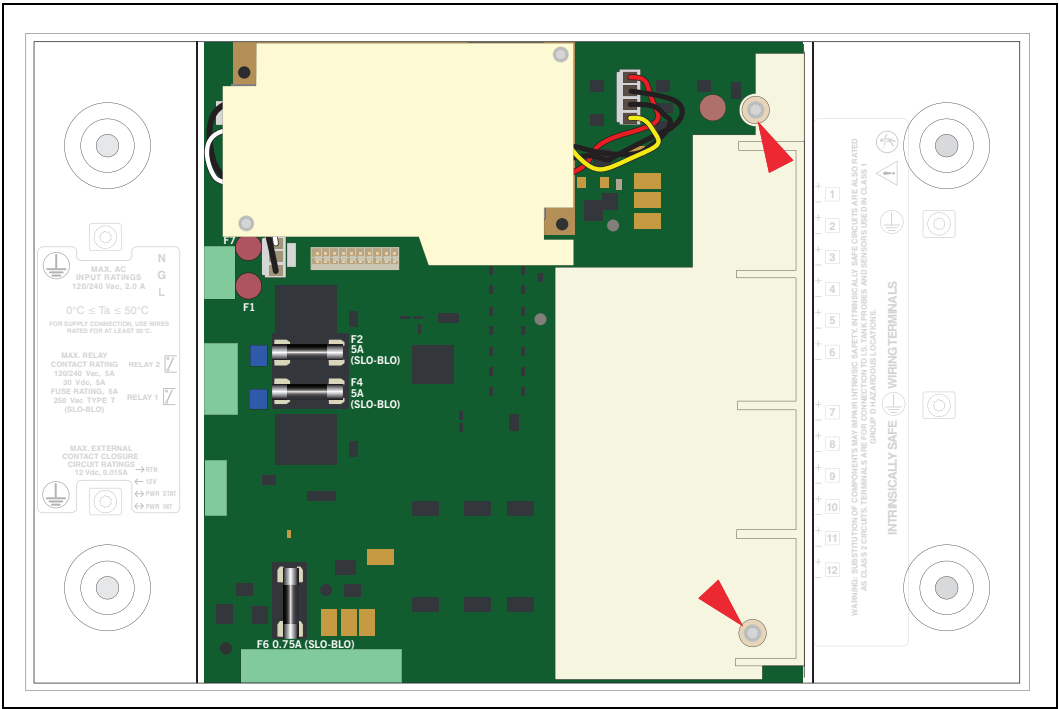
Figure 12.   Remove Two T15 Screws Securing I.S. Cover
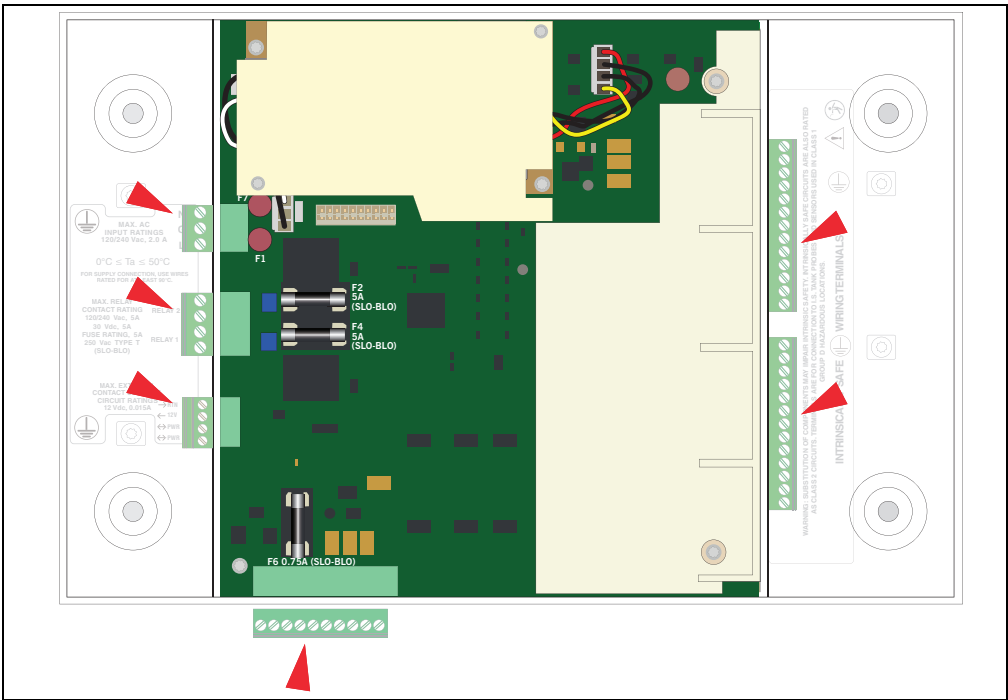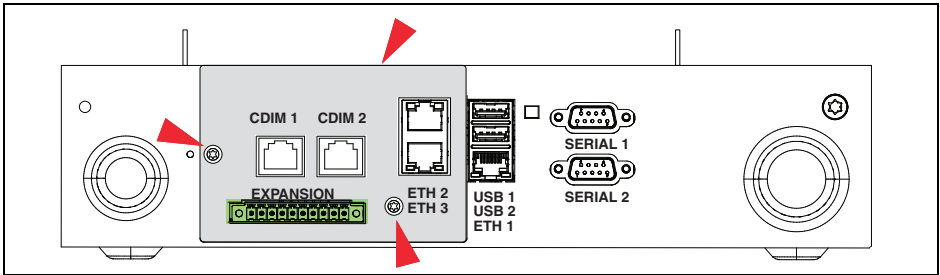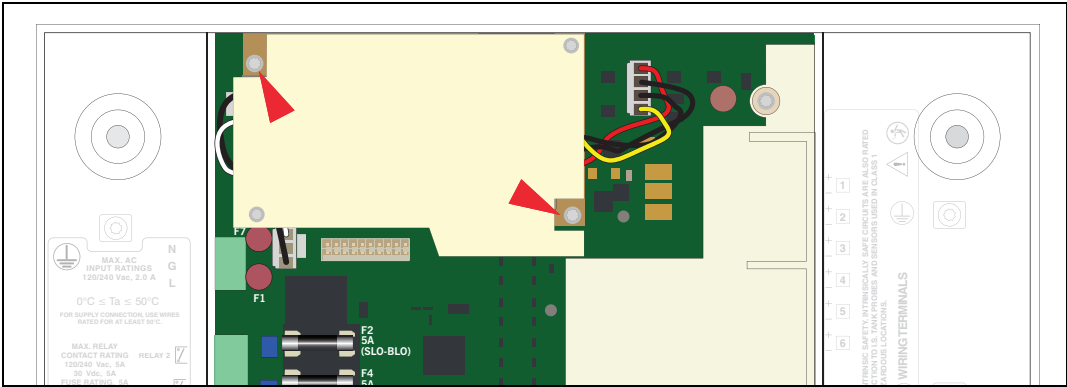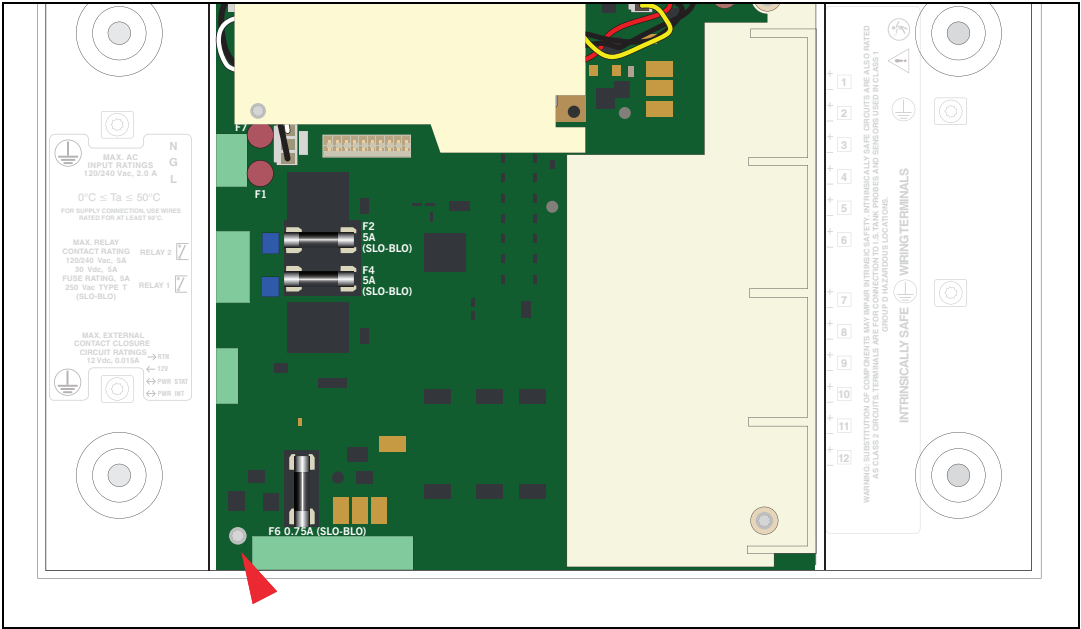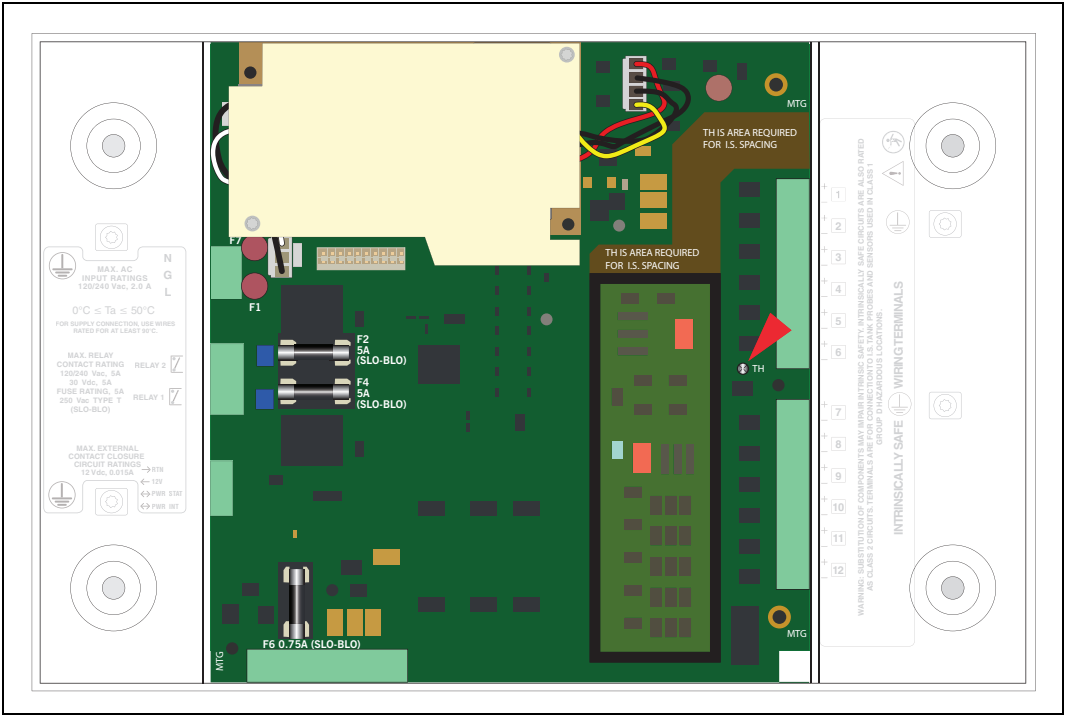
Figure 13.   USIOM Board Snap-On Retaining Post

Console Diagnostics Using The TELTECH Diagnostic Tool

Remote users may connect a laptop to the TLS4 via the network the TLS is on or via crossover connection. An SSH connection can be established from a laptop using a terminal program such as Putty, or the command line in some operating systems. The method below describes a crossover Ethernet network SSH connection.

1. Establish a crossover network connection to an available Ethernet port on the bottom of the TLS4 (see Figure 1).
2. Open a Command Prompt window.
3. Using the console's IP address (e.g., 169.254.21.12) and 22 (port number) type the following ssh format:

   ssh tlstech@169.254.21.12 22

4. Press **Enter**.
5. When the login screen appears, login as **tlstech**

```
login as: tlstech
Warning:  This computer system including all related equipment,
software, hardware and networking is for authorized use only.
Violations may be pursued to the fullest extent of the law.
Any and all access and use may be monitored and recorded.
Use of the system implies consent to these conditions.

tlstech@10.2.4.96's password: █
```

6. Enter the password: **tlstech**

```
login as: tlstech
Warning:  This computer system including all related equipment,
software, hardware and networking is for authorized use only.
Violations may be pursued to the fullest extent of the law.
Any and all access and use may be monitored and recorded.
Use of the system implies consent to these conditions.

tlstech@10.2.4.96's password:
Welcome to Veeder-Root TLS-4 tech menu
Please make a selection from the below menu
by entering the number for the choice

--------------------------------------------------
[1]  Check status of apps
[2]  Take a system snapshot (not yet implemented)
[3]  Copy a snapshot to a thumb drive (not yet implemented)
[4]  Display CPU/memory statistics
[5]  Display network settings
[6]  Monitor network traffic (abort with CTRL-C)
[7]  Ping gateway and DNS servers
[8]  Test DNS lookup for E-mail
[9]  Show disk statistics
[0]  Exit
```

7. When the TLSTECH menu appears, enter the number of a desired choice then press **Enter** to view that result. To exit the program, press **0** then press **Enter**.

TLSTECH Menu Examples

The TLSTECH menu is shown below and examples of each menu item are shown below.

[1] Check status of apps

[2] Take a system snapshot (not yet implemented)

[3] Copy a snapshot to a thumb drive (not yet implemented)

[4] Display CPU/memory statistics

[5] Display network settings

[6] Monitor network traffic (abort with CTRL-C)

[7] Ping gateway and DNS servers

[8] Test DNS lookup for E-mail

[9] Show disk statistics

[0] Exit

MENU SELECTION 1

Checking status of apps

1674	mysql	mysqld
2275	exim	sendmail
6033	tlsuser	SOAPServer
6023	tlsuser	TLS4GUI
2366	tlsuser	CommServices
2353	tlsuser	CoreServer
2343	tlsuser	CommandProcesso
2333	tlsuser	DeviceServer
2273	tlsuser	WatchDog
2236	tlsuser	MaintServer
1686	root	httpd
21676	daemon	_ httpd
29299	daemon	_ httpd
26014	daemon	_ httpd

MENU SELECTION 4

Display system statistics

Linux 2.6.35.3-433-g0fae922+ (tls4)   08/08/13   _armv7l_   (1 CPU)

08/08/13 09:35:26

avg-cpu: %user   %nice   %system   %iowait   %steal   %idle

            13.75   0.00   15.95   0.18   0.00   70.13

 09:35:26 up 6 days, 33 min, 1 user, load average: 2.78, 2.81, 2.77

	total	used	free	shared	buffers	cached
Mem:	505792	357612	148180	0	39600	197288
-/+ buffers/cache:		120724	385068			
Swap:	0	0	0			

MENU SELECTION 5

Displaying network settings

Kernel Interface table

eth0   Link encap:Ethernet HWaddr 00:50:83:f0:04:99

         inet addr:10.2.1.71 Bcast:10.2.1.255 Mask:255.255.255.0

         inet6 addr: fe80::250:83ff:fef0:499/64 Scope:Link

         UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1

         RX packets:1833262 errors:0 dropped:0 overruns:0 frame:0

         TX packets:440681 errors:0 dropped:0 overruns:0 carrier:0

         collisions:0 txqueuelen:1000

         RX bytes:142122262 (135.5 MiB) TX bytes:357490031 (340.9 MiB)

         Base address:0x2000

eth0:9   Link encap:Ethernet HWaddr 00:50:83:f0:04:99

         ...

MENU SELECTION 6

Monitoring network traffic (CTRL-C to abort)

Every 2.0s: /bin/netstat -s | grep -A 7 '^Ip:'

Thu Aug 8 09:36:30 2013

Ip:

      13598624 total packets received

      112 with invalid addresses

      0 forwarded

      0 incoming packets discarded

      13598512 incoming packets delivered

      13266813 requests sent out

      2 dropped because of missing route

MENU SELECTION 7

Pinging gateway and DNS servers

Pinging gateway

PING 10.20.95.1 (10.20.95.1): 56 data bytes

64 bytes from 10.20.95.1: icmp_seq=0 ttl=255 time=0.760 ms

64 bytes from 10.20.95.1: icmp_seq=1 ttl=255 time=1.114 ms

64 bytes from 10.20.95.1: icmp_seq=2 ttl=255 time=0.606 ms

--- 10.20.95.1 ping statistics ---

3 packets transmitted, 3 packets received, 0% packet loss

round-trip min/avg/max/stddev = 0.606/0.827/1.114/0.213 ms

Pinging name servers

PING 10.20.77.5 (10.20.77.5): 56 data bytes

64 bytes from 10.20.77.5: icmp_seq=0 ttl=127 time=0.532 ms

64 bytes from 10.20.77.5: icmp_seq=1 ttl=127 time=0.404 ms

64 bytes from 10.20.77.5: icmp_seq=2 ttl=127 time=0.387 ms

--- 10.20.77.5 ping statistics ---

3 packets transmitted, 3 packets received, 0% packet loss

round-trip min/avg/max/stddev = 0.387/0.441/0.532/0.065 ms

PING 10.28.54.15 (10.28.54.15): 56 data bytes

64 bytes from 10.28.54.15: icmp_seq=0 ttl=124 time=39.489 ms

64 bytes from 10.28.54.15: icmp_seq=1 ttl=124 time=27.339 ms

64 bytes from 10.28.54.15: icmp_seq=2 ttl=124 time=27.159 ms

--- 10.28.54.15 ping statistics ---

3 packets transmitted, 3 packets received, 0% packet loss

round-trip min/avg/max/stddev = 27.159/31.329/39.489/5.770 ms

MENU SELECTION 8

Testing Internet e-mail MX lookup with configured DNS servers

Server: 10.20.77.5

Address: 10.20.77.5#53

Non-authoritative answer:

veeder.com   mail exchanger = 10 mail.global.frontbridge.com.

Authoritative answers can be found from:

mail.global.frontbridge.com   internet address = 216.32.180.190

mail.global.frontbridge.com   internet address = 216.32.181.178

mail.global.frontbridge.com   internet address = 65.55.88.22

mail.global.frontbridge.com   internet address = 207.46.163.30

mail.global.frontbridge.com   internet address = 213.199.154.190

mail.global.frontbridge.com   internet address = 213.199.154.254

mail.global.frontbridge.com   internet address = 213.199.180.150

mail.global.frontbridge.com   internet address = 216.32.180.22

Server: 10.28.54.15

Address: 10.28.54.15#53

Non-authoritative answer:

veeder.com   mail exchanger = 10 mail.global.frontbridge.com.

Authoritative answers can be found from:

mail.global.frontbridge.com   internet address = 216.32.180.22

mail.global.frontbridge.com   internet address = 216.32.180.190

mail.global.frontbridge.com   internet address = 216.32.181.178

mail.global.frontbridge.com   internet address = 65.55.88.22

mail.global.frontbridge.com   internet address = 207.46.163.30

mail.global.frontbridge.com   internet address = 213.199.154.190

mail.global.frontbridge.com   internet address = 213.199.154.254

mail.global.frontbridge.com   internet address = 213.199.180.150

MENU SELECTION 9

Showing disk related information

Disk devices:

NAME	FSTYPE	SIZE	MOUNTPOINT
mmcblk0		3.8G	
|-mmcblk0p1		1.9G	/
`-mmcblk0p2		1.9G	

Disk usage:

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
rootfs	rootfs	1.9G	1013M	742M	58%	/
/dev/root	ext3	1.9G	1013M	742M	58%	/
tmpfs	tmpfs	10M	4.0K	10M	1%	/dev
tmpfs	tmpfs	247M	228K	247M	1%	/tmp
tmpfs	tmpfs	247M	4.0K	247M	1%	/dev/shm
tmpfs	tmpfs	247M	0	247M	0%	/run

IO statistics:

03/08/14 08:26:42

Device:	tps	kB_read/s	kB_wrtn/s	kB_read	kB_wrtn
mmcblk0	0.80	28.91	7.16	141526	35052
mmcblk0p1	1.74	28.71	7.16	140521	35044
mmcblk0p2	0.03	0.14	0.00	669	8