

TELSEC® RM/WM
Models 800, 1500 & 2000
(TL1 Version with 100Mb Secure Ethernet
Communications Module)

User's Manual

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Lithium Battery Notice

Replace Battery with Panasonic CR2032 or equivalent Lithium Battery (Quest PN 250034), rated at 3 Vdc. Use of another battery may present a risk of fire or explosion. **CAUTION - Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.**

Revision History

Date	Rev #	Modifications	By:
8/14/19	5.0	<ul style="list-style-type: none">• Section 6.3.1 and 6.7 UIN names support 32 characters• Section 5.4 Bypass UIN command added• Section 4 Secure Ethernet module functions added.	K. Nickel
10/21/19	5.1	Added new shell commands for setting the upgrade path and performing an upgrade	K. Nickel

1 Introduction

Congratulations on the purchase of your new TELSEC 2000/1500 RM/WM product! The TELSEC is a state-of-the-art electronic monitor and controller providing you with an integrated solution for the facility management of your remote sites such as CEVs, CUEs, Shelters/Huts, Cabinets, Customer Prem Sites, Central Offices, Switching & Data Centers, and Head-Ends. Acting as your smart eyes and ears at the remote site, the TELSEC is capable of performing your HVAC Control and Monitoring, Environmental Monitoring, Power Capacity and Battery Monitoring, Generator Monitoring, Telephony Equipment Monitoring, Cable Pressure & Air Flow Monitoring, Tower Light Monitoring, and Door Access Control --- all in ONE NEBS LEVEL III approved product.

This User's Manual is intended to provide you with the information you need to get started with the TELSEC, understand its specifications, how to install it, how to apply it, how to operate and program it, and how to service and maintain it plus much more. Please contact us at Quest if you have product questions or suggestions to improve this User's Manual.

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2 Product Specifications

2.1 Scope

Chapter 2 describes the general specifications of the TELSEC 800, 1500 and 2000 environmental control, monitoring and alarming system. It describes only the general specifications of the system and does not define the detailed functional specifications.

2.2 Description

2.2.1 Features:

The TELSEC system is designed to collect wet or dry discrete alarms from telephone equipment, controlling, monitoring and alarming critical operating equipment such as HVAC, power plant, intrusion, fire alarms and any other alarms that are indicated by wet or dry contact closure. All environment conditions can be monitored through discrete alarm contacts or via analog input sensors. In addition, the system provides security access control for the facility.

The TELSEC is capable of formatting discrete alarm data into SNMP traps or text messages and transmitting the alarm messages via the TELSEC's built-in modems, through the optional PPP modem module or through the optional Ethernet module.

2.3 General Requirements

2.3.1 Hardware Architecture:

The TELSEC is a microprocessor-based controlling, monitoring, data collecting and alarm reporting system designed for the management and effective operation of remote facility assets. A fully configured product can monitor as many as 64 discrete inputs and provide 32 control contact points.

2.3.2 Basic Product (TELSEC RM/WM):

The basic product is available in two styles: a rack mountable shelf (TELSEC RM) and wall mountable enclosure (TELSEC WM). The single board layout design of the master unit incorporates the power supply, memory and serial and modem communication ports with up to 32 universal inputs and 16 control contact points per enclosure.

2.3.3 Rack Mount:

The TELSEC RM shelf is designed for a 19-inch or 23-inch standard telephone type rack mounting utilizing reversing brackets to provide flexibility for positioning the system on the rack. The front panel includes: a 32-character display; 8-button keypad; and a RS232 connector (craft port) for local serial input/output. The rear of the product includes: a green LED to indicate power on or off; two 50-pin connectors for inputs/outputs; connectors for power, expansion and communication ports; and a connector for card access control.

2.3.4 Wall Mount:

The TELSEC wall mount enclosure is designed to mount to the wall of any type facility. The unit comes with two mounting plates, which should be attached to the back of the unit. The front panel includes a 32-character display and 8-button keypad. The bottom includes a green LED to indicate power on or off, connectors for power and expansion and communication ports, as well as a connector for card access control. The top includes two 50-pin connectors for input/outputs and a RS232 connector (craft port) for serial input/output.

2.3.5 **Power Supply:**

The TELSEC is powered by a negative 48 VDC battery or an equivalently rated 48 VDC source. The system supports dual power feed with no interruption in operation if one of the feeds should fail. The green LED on the lower right of the back panel will be illuminated continuously to indicate the system is connected to the source voltage. Standard 4-position screw terminal provides interconnection of the power sources and a built-in re-settable fuse provides surge and overload protection.

2.3.6 **Expansion Module:**

The TELSEC 2000 expansion module (DIEM) is a remote module that will expand a basic TELSEC input and output capability. The module provides up to an additional 200 wet or dry digital inputs. This unit is rack mounted in either a 19" or 23" rack. The DIEM communicates with the TELSEC through a 3-wire network connection. The Expansion module can be located up to 1000 feet (300M) from the main TELSEC. The DIEM support dual (A&B) power feed. A standard 4-position screw terminal provides interconnection of the power sources and a built-in re-settable fuse provides surge and overload protection. Contact Quest Controls, Inc. for wall mount options if desired.

2.3.7 **Expansion Card:**

The TELSEC 1500 expansion card is a plug-on module that will expand a basic TELSEC 1500 to accommodate an additional 16 universal inputs and 8 outputs. This module is typically installed in the factory but is designed to be field upgradeable, if required.

2.3.8 **Alarm Ports and Pre-Connectorized Block**

Type 'T' Pre-connectorized Terminal Blocks, Part #300718: The terminal block is designed to be used with all terminations required for dry and wet alarms. It is a 'Telzon' type connectorized terminal block and has 4 predetermined 50-pin TELCO connectors on the rear and 8 horizontal rows of 200 wire-wrap pins for cross connecting the alarm leads from the specific device being monitored.

2.4 **Communications Modules**

2.4.1 **Local Serial Port:**

The local serial port supports the asynchronous serial communications located on the front of the rack mount unit and the side of the wall mount unit.

2.4.2 **Modem Port:**

The TELSEC has an optional plug-in modem that provides up to 56K baud (optional) asynchronous communications on the public switch network. The modem is used for remote maintenance and/or alarm reporting to the NMA network.

2.4.3 **Ethernet Port:**

The TELSEC system has an optional 100Base-T Ethernet port for alarming via SNMP traps. All status can be viewed by a Web Browser (HTTP), SNMP Gets or command line via a Telnet or SSH session.

2.4.4 **Alarm Reporting:**

The TELSEC has the ability to send TL1 alarm messages to ten unique nailed up telnet or SSH sessions. In addition alarms can be sent using SNMP traps to four SNMP managers, emails to nine addresses (distribution groups) and Modem dial out to four alarm numbers.

2.4.5 Password Security:

In order to prevent unauthorized access to the TELSEC requires a username/password when accessing the system by Web Server, Telnet access, local craft port and modem. TL1 alarm sessions are separate read only connections and do not require a password to start the alarm process.

2.5 Specifications

2.5.1 TELSEC 1500/2000:

Specifications	TELSEC® 1500RM	TELSEC® 2000RM	TELSEC® 1500WM	TELSEC® 2000WM
Part Number	150619	150618	150617	150612
Mounting	Rack mount 19" or 23"		Wall mount	
Number of Universal Inputs	16	32	16	32
Number of Outputs	8 NO	16 NO	8 NO	16 NO
Input Types	All universal inputs can be analog (0-5 VDC or 0-20mA), dry contact closure or wet contact (3-75 VDC)			
Output Types	Normally Open (NO), 1 amp at 30 VDC, 0.3 amps at 60 VDC, 0.5 amps at 125 VAC			
Card Access	Supports industry standard Wiegand format, proximity or card swipe readers. Up to 4 doors can be controlled. Control 4 doors with 3500 cards. Logs 500 most recent events			
Power	Dual Feed ±18 to 65 VDC, 0.5 amps. Optional 120/110 VAC, 60Hz, 0.25 amps			
Front Panel	Built-in programming panel with 8 keys and a 32-character backlit LCD Display			
Modem (with Caller ID)	56K modem with Caller ID. Up to 24 phone numbers can be programmed to limit access to the system. Note: Caller ID service must be present on the phone line			
Serial Port	Craft port -Asynchronous db9 RS232 serial port. Programmable for speed, parity, and bit format Optional 3 serial ports programmable for speed, parity and bit format. Supports RS232, 485 and 422 configuration			
Network Interface (option) Protocols Supported	Ethernet 10/100BaseT TCP/IP, Telnet, SSH, NTP, HTTP, HTTPS, SMTP, SNMP v1, v2c & v3 for Sets, Gets, Traps & Informs			
Logging	Logs all inputs, outputs, and alarms, up to 12,000 points			
Software	Supports any standard terminal client and web browser			
I/O Terminals	Two (2) 50 PIN Amphenol connectors for outputs, discrete and analog inputs. Supports 2 wire (tip & ring), connections for each point using 25 pair cable			
Battery	Long-life lithium. 10-year shelf, 1.5 years under load			
Temp/Humidity Sensor Accuracy	Temp: ±1°F (±0.5°C), Humidity: ±2% of range. Temperature & Humidity sensors included			
Ambient Operating Temp	-40 to 180°F (-40 to 82°C), 0-95% RH Non-condensing			
Certification	NEBS Level III Approved, UL Listed, CE			
Dimensions	Rack mount - 17" W X 10.5" D X 1.75" H (43.1cm W X 26.7cm D X 4.5cm H) Wall mount - 11"H X 11"W X 2"D (279 mm X 279 mm X 51 mm)			
Shipping Weight	Rack mount - 6 lbs. (2.7 kg.), Wall mount - 4 lbs. (1.8 kg.)			

2.5.2 TELSEC 800:

Part Number	150679; for SNMP/WEB browser option, order part number: 150769
Mounting	Rack mount 19" or 23", or on cabinet door
Inputs	8 universal inputs: analog (0-5 VDC or 0-20 mA), dry contact closure or wet contact (3-75 VDC)
Outputs	8 Normally Open (NO), 1 amp at 30 VDC, 0.3 amps at 60 VDC, 0.5 amps at 125 VAC
Card Access	Supports industry standard Wiegand format, proximity or swipe card readers. Up to 3500 cards can be programmed per site. Logs 500 most recent events
Power	±18 to 65 VDC, 0.5 amps. Optional 110 VAC/220 VAC, 60 Hz, 0.5 amp
Modem (with Caller ID)	56K modem with Caller ID. Up to 24 phone numbers can be programmed to limit access to the system. Note: Caller ID service must be present on the phone line
Serial Port	One asynchronous db9 RS232 serial port. Programmable for speed, parity, and bit format
Network Interface (option) Protocols Supported	Ethernet 10 Base-T TCP/IP, Telnet, HTTP, SMTP, SNMP v1, v2c, Sets, Gets, Traps & Informs
Logging	Logs all inputs, outputs, and alarms, up to 12,000 points
Software	Supports any standard terminal client and web browser
I/O Terminals	A single 50-pin Amphenol® connector for outputs, discrete and analog inputs. Supports 2 wire (tip and ring), connections for each point using 25 pair cable
Battery	Long-life lithium. 10-year shelf, 1.5 years under load
Temp Sensor Accuracy	±1°F (±0.5°C)
Ambient Operating Temp	-40 to 180°F (-40 to 82°C), 0-95% RH Non-condensing
Certification	NEBS Level III Approved, UL Listed, CE
Dimensions	1.75" H x 13.25" W x 9.5" D (45 mm x 337 mm x 241 mm)
Shipping Weight	4 lbs. (1.81 kg)

2.5.3 TELSEC Expansion Modules:

Specifications	TELSEC® DIEM
Part Number	150794-100 (100 inputs), 150794-150 (150 inputs), 150794-200 (200 inputs)
Mounting	Rack mount 19" and 23"
Power	Dual Feed ±18 to 65 VDC, 0.5 amps. Optional 120/110 VAC, 60Hz, 0.25 amps
Inputs	Up to 200 dry contact closure or wet contact (3-75 VDC)
Dimensions	Rack mount - 17" W X 9" D X 1.75" H (43.1cm W X 22.9cm D X 4.5cm H)
Shipping Weight	Rack mount - 6 lbs. (2.7 kg.),
Specifications	TELSEC® IO Expansion Module
Part Number	150640 for Rack Mount, 150724 for Wall Mount
Mounting	Rack mount 19" and 23" or Wall Mount
Power	Dual Feed ±18 to 65 VDC, 0.5 amps. Optional 120/110 VAC, 60Hz, 0.25 amps
Inputs	32 universal inputs: analog (0-5 VDC or 0-20 mA), dry contact closure or wet contact (3-75 VDC)
Outputs	16 Normally Open (NO), 1 amp at 30 VDC, 0.3 amps at 60 VDC, 0.5 amps at 125 VAC
Certification	NEBS Level III Approved, UL Listed, CE
Dimensions	Rack mount - 17" W X 10.5" D X 1.75" H (43.1cm W X 26.7cm D X 4.5cm H) Wall mount - 11"H X 11"W X 2"D (279 mm X 279 mm X 51 mm)
Shipping Weight	Rack mount - 6 lbs. (2.7 kg.), Wall mount - 4 lbs. (1.8 kg.)

3 Installation Instructions

3.1 Scope:

This Chapter describes the hardware installation, for the TELSEC Rack Mount and Wall Mount (RM/WM). For a general description of the TELSEC, refer to Product Specifications. *The TELSEC comes in two basic hardware configurations. The TELSEC RM (Figure 1) is a rack-mounted unit designed to fit in either a 19" or 23" rack. The TELSEC WM (Figure 2) is a wall-mounted unit designed to mount to any type of wall surface that can support the product.*

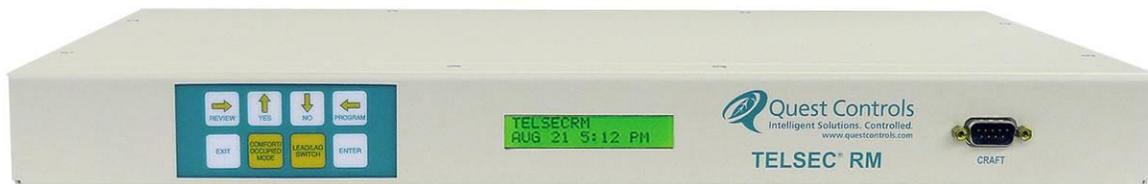


Figure 1 TELSEC RM Rack Mount



Figure 2 TELSEC WM Wall Mount

3.2 Unpacking the System:

The TELSEC may be ordered in a number of configurations to suit a wide variety of installations. All options ordered are tested and installed at the factory, and the complete system is ready for installation when it is removed from the shipping carton. This carton and the packaging material should be retained in case it becomes necessary to return the unit to the factory for repair. In addition to the TELSEC unit, the following items will be found inside the carton:

3.2.1 TELSEC RM Included Components

- Two (2) reversible rack-mounting brackets.
- Mounting Hardware four each of: #8 screws, #8 lock washers, #8 flat washers, #12 screws, #12 internal tooth star washers and #12 flat washers.
- Two 5.5" tie wraps for securing the 50 pin Amphenol cables to the input/output connectors.
- Two Ferrite coils for incoming power noise suppression.
- Humidity/Temp sensor with enclosure and mounting hardware.
- Phone cords. Optional: one for each modem provided with the unit.
- Configuration sheet listing all serial numbers and options installed in the unit.

3.2.2 TELSEC WM Included Components

- Two mounting brackets.
- Mounting Hardware four each #6 flat head screws.
- One 5.5" tie wraps for securing the 50 pin Amphenol cable to the input/output connectors.
- Two Ferrite coils for incoming power noise suppression.
- Humidity/Temp sensor (removable but comes mounted to bottom of chassis).
- Phone cords. Optional: one for each modem provided with the unit.
- Configuration sheet listing all serial numbers and options installed in the unit.

3.3 Additional Material and Equipment:

The following items may be required for installation, which are in addition to the items provided by Quest:

3.3.1 Installation Materials:

- Cable and Shielded cable
- Butt splices
- Cable ties
- Bushings/strain relief
- Anchors, screws etc.

3.3.2 Tools

- Hand Tools - Screwdrivers, Hammer, wire cutters, pliers, etc.
- Wire wrap & unwrap tools or punch tool
- Crimping tool
- Hammer drill and drill bits (if wall mounting devices)

3.4 Mounting the TELSEC RM:

The TELSEC is shipped with two (2) angle brackets, which allow the system to be mounted in either a 19-inch or 23-inch equipment rack. The brackets are reversible, with a long side and a short side. To mount the system in a 19-inch rack, the long side of a bracket is attached to each side of the TELSEC (using the #8 mounting hardware provided) and the short sides of the bracket are attached to the equipment rack (using the #12 mounting hardware provided). To accommodate a 23-inch rack, the brackets are reversed, with the short sides being attached to the TELSEC and the long sides attached to the rack.

3.4.1 Connecting Mounting Brackets

There are three (3) sets of two (2) holes on each side of the System console. Any of these sets may be used to attach the mounting brackets to the system. Use the #8 screw with lock washer and flat washer to secure the bracket to the side of the chassis in two places. **USE ONLY THE ATTACHING SCREWS PROVIDED, AND DO NOT ATTACH THE BRACKETS WITHOUT USING THE WASHERS PROVIDED** – Screws longer than those provided to mount the brackets might engage the cables or interface board inside the unit, resulting in damage to one or more system components. Clearance on the top and bottom is not a concern because the ventilation perforations are on the side of the console.

3.4.2 Attaching the TELSEC RM to the Rack

Use the #12 hardware provided to mount the unit to the rack. The Mounting ears will accommodate either 1 inch or 1 ¼ mounting hole spacing. Use a #12 screw with flat washer in front of the mounting bracket and the #12 star washer between the bracket and rack frame to create a good frame ground. Mount with two screws per side.

3.5 Mounting the TELSEC WM

The unit is designed to mount to a wall without having to remove the cover. The system comes with two mounting plates to mount the unit to wall or to the front of an electrical enclosure.

3.5.1 Connecting the Mounting Plates

Use the four #6 flat head screws to secure the mounting plates to the back of the chassis.

3.5.2 Attaching to the Wall

Use the appropriate anchors (not provided) for the type of wall you are mounting the TELSEC on. The mounting holes will accommodate a #8 screw. It is recommended that the panel be mounted so that the display can be seen at eye level approx. six feet from the floor.

3.6 Mounting the Expansion Modules:

The TELSEC RME or DIEM is shipped with two (2) angle brackets, which allow the system to be mounted in either a 19-inch or 23-inch equipment rack. The brackets are reversible, with a long side and a short side. To mount the system in a 19-inch rack, the long side of a bracket is attached to each side of the Expansion Module (using the #8 mounting hardware provided) and the short sides of the bracket are attached to the equipment rack (using the #12 mounting hardware provided). To accommodate a 23-inch rack, the brackets are reversed, with the short sides being attached to the Expansion Module and the long sides attached to the rack.

3.6.1 Connecting Mounting Brackets

There are three (3) sets of two (2) holes on each side of the System console. Any of these sets may be used to attach the mounting brackets to the system. Use the #8 screw with lock washer and flat washer to secure the bracket to the side of the chassis in two places. **USE ONLY THE ATTACHING SCREWS PROVIDED, AND DO NOT ATTACH THE BRACKETS WITHOUT USING THE WASHERS PROVIDED** – Screws longer than those provided to mount the brackets might engage the cables or interface board inside the unit, resulting in damage to one or more system components. Clearance on the top and bottom is not a concern because the ventilation perforations are on the side of the console.

3.6.2 Attaching the Expansion Module to the Rack

Use the #12 hardware provided to mount the unit to the rack. The Mounting ears will accommodate either 1 inch or 1 ¼ mounting hole spacing. Use a #12 screw with flat washer in front of the mounting bracket and the #12 star washer between the bracket and rack frame to create a good frame ground. Mount with two screws per side.

3.7 Mounting Field Terminal Devices:

The TELSEC RM/WM supports four methods for field wiring of inputs and outputs. The wire wrap block and punch block are used when rack mounting of field wiring is required and the Control Interface Module (CIM) is used for a wall mounted field termination device. The fourth method for field wiring is to direct wire from the alarm point with a cable that has a 50 pin Amphenol connector to connect to the TELSEC. All four methods ultimately connect the field wiring to the 50 pin ports on the TELSEC. Some applications may require that a CIM module is used for the first 16 inputs and 8 outputs and a wire wrap block is used for inputs 17-32 and outputs 9-16. See Figure 3

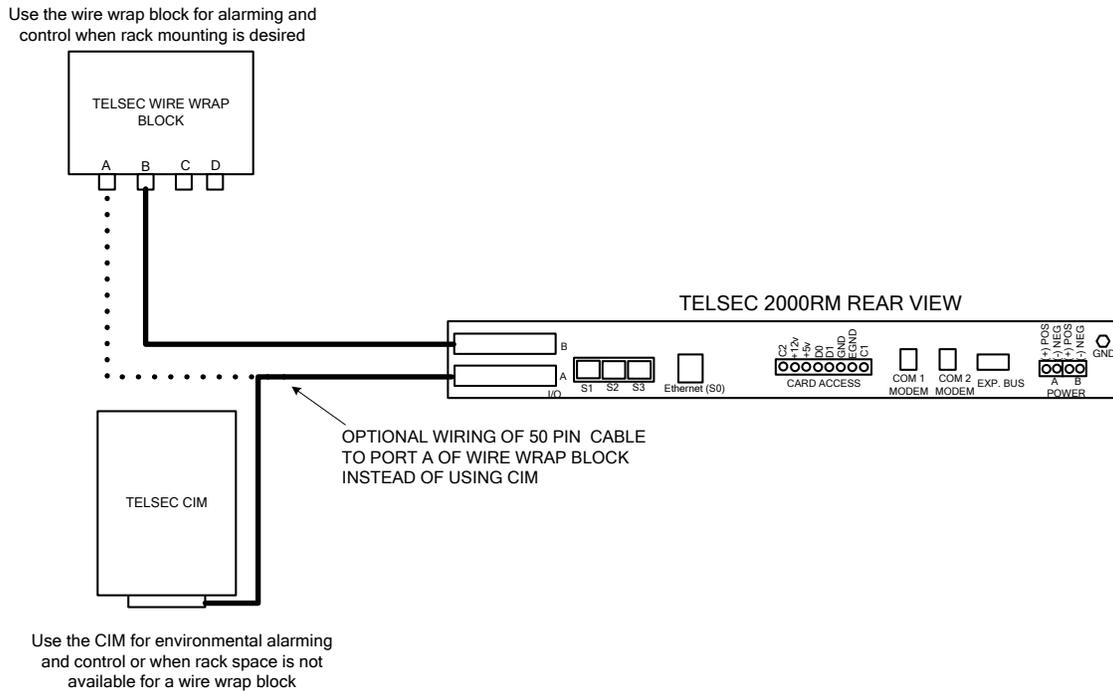


Figure 3 Field wiring options.

3.7.1 Wire Wrap Block

Quest's Wire Wrap block Figure 6 (p/n 300718) can be used to terminate all field wiring. The block will support four 50-pin ports for a maximum of 64 inputs and 32 outputs. Mount the block to the rack using the supplied bracket and then use a 25 pair cable (p/n 300705) to interconnect the ports on the block to the TELSEC. Make sure the connector is seated properly into the connector at each end and secured with the locking screw and tie wrap.

3.7.4 Input/Output Matrix

Figure 9 below is a matrix showing the wire color for each input and output and the pin out for the wire wrap block. Use this chart to determine where to terminate each field wire whether you are using direct termination to cable or punch blocks.

Cable Pin #	Cable Wire Color	TELSEC Main		TELSEC RME	
		I/O Port A	I/O Port B	I/O Port C	I/O Port D
		Point Name	Point Name	Point Name	Point Name
1	BLU/WHT	Input 1	Input 17	Input 33	Input 49
26	WHT/BLU	12V Source	12V Source	12V Source	12V Source
2	ORN/WHT	Input 2	Input 18	Input 34	Input 50
27	WHT/ORN	5V Source	12V Source	12V Source	12V Source
3	GRN/WHT	Input 3	Input 19	Input 35	Input 51
28	WHT/GRN	12V Source	12V Source	12V Source	12V Source
4	BRN/WHT	Input 4	Input 20	Input 36	Input 52
29	WHT/BRN	12V Source	12V Source	12V Source	12V Source
5	SLA/WHT	Input 5	Input 21	Input 37	Input 53
30	WHT/SLA	12V Source	12V Source	12V Source	12V Source
6	BLU/RED	Input 6	Input 22	Input 38	Input 54
31	RED/BLU	12V Source	12V Source	12V Source	12V Source
7	ORN/RED	Input 7	Input 23	Input 39	Input 55
32	RED/ORN	12V Source	12V Source	12V Source	12V Source
8	GRN/RED	Input 8	Input 24	Input 40	Input 56
33	RED/GRN	12V Source	12V Source	12V Source	12V Source
9	BRN/RED	Input 9	Input 25	Input 41	Input 57
34	RED/BRN	12V Source	12V Source	12V Source	12V Source
10	SLA/RED	Input 10	Input 26	Input 42	Input 58
35	RED/SLA	12V Source	12V Source	12V Source	12V Source
11	BLU/BLK	Input 11	Input 27	Input 43	Input 59
36	BLK/BLU	12V Source	12V Source	12V Source	12V Source
12	ORN/BLK	Input 12	Input 28	Input 44	Input 60
37	BLK/ORN	12V Source	12V Source	12V Source	12V Source
13	GRN/BLK	Input 13	Input 29	Input 45	Input 61
38	BLK/GRN	12V Source	12V Source	12V Source	12V Source
14	BRN/BLK	Input 14	Input 30	Input 46	Input 62
39	BLK/BRN	12V Source	12V Source	12V Source	12V Source
15	SLA/BLK	Input 15	Input 31	Input 47	Input 63
40	BLK/SLA	12V Source	12V Source	12V Source	12V Source
16	BLU/YEL	Input 16	Input 32	Input 48	Input 64
41	YEL/BLU	12V Source	12V Source	12V Source	12V Source
17	ORN/YEL	Ground	Ground	Ground	Ground
42	YEL/ORN	Ground	Ground	Ground	Ground
18	GRN/YEL	Output 1	Output 9	Output 17	Output 25
43	YEL/GRN	Output 1	Output 9	Output 17	Output 25
19	BRN/YEL	Output 2	Output 10	Output 18	Output 26
44	YEL/BRN	Output 2	Output 10	Output 18	Output 26
20	SLA/YEL	Output 3	Output 11	Output 19	Output 27
45	YEL/SLA	Output 3	Output 11	Output 19	Output 27
21	BLU/VIO	Output 4	Output 12	Output 20	Output 28
46	VIO/BLU	Output 4	Output 12	Output 20	Output 28
22	ORN/VIO	Output 5	Output 13	Output 21	Output 29
47	VIO/ORN	Output 5	Output 13	Output 21	Output 29
23	GRN/VIO	Output 6	Output 14	Output 22	Output 30
48	VIO/GRN	Output 6	Output 14	Output 22	Output 30
24	BRN/VIO	Output 7	Output 15	Output 23	Output 31
49	VIO/BRN	Output 7	Output 15	Output 23	Output 31
25	SLA/VIO	Output 8	Output 16	Output 24	Output 32
50	VIO/SLA	Output 8	Output 16	Output 24	Output 32

Figure 9 Input/Output Matrix

***TELSEC DIEM**

		I/O Port A	I/O Port B	I/O Port C	I/O Port D	I/O Port E	I/O Port F	I/O Port G	I/O Port H
Cable Pin #	Cable Wire Color	Point Name							
1	BLU/WHT	Input 33	Input 58	Input 83	Input 108	Input 133	Input 158	Input 183	Input 208
26	WHT/BLU	Return							
2	ORN/WHT	Input 34	Input 59	Input 84	Input 109	Input 134	Input 159	Input 184	Input 209
27	WHT/ORN	Return							
3	GRN/WHT	Input 35	Input 60	Input 85	Input 110	Input 135	Input 160	Input 185	Input 210
28	WHT/GRN	Return							
4	BRN/WHT	Input 36	Input 61	Input 86	Input 111	Input 136	Input 161	Input 186	Input 211
29	WHT/BRN	Return							
5	SLA/WHT	Input 37	Input 62	Input 87	Input 112	Input 137	Input 162	Input 187	Input 212
30	WHT/SLA	Return							
6	BLU/RED	Input 38	Input 63	Input 88	Input 113	Input 138	Input 163	Input 188	Input 213
31	RED/BLU	Return							
7	ORN/RED	Input 39	Input 64	Input 89	Input 114	Input 139	Input 164	Input 189	Input 214
32	RED/ORN	Return							
8	GRN/RED	Input 40	Input 65	Input 90	Input 115	Input 140	Input 165	Input 190	Input 215
33	RED/GRN	Return							
9	BRN/RED	Input 41	Input 66	Input 91	Input 116	Input 141	Input 166	Input 191	Input 216
34	RED/BRN	Return							
10	SLA/RED	Input 42	Input 67	Input 92	Input 117	Input 142	Input 167	Input 192	Input 217
35	RED/SLA	Return							
11	BLU/BLK	Input 43	Input 68	Input 93	Input 118	Input 143	Input 168	Input 193	Input 218
36	BLK/BLU	Return							
12	ORN/BLK	Input 44	Input 69	Input 94	Input 119	Input 144	Input 169	Input 194	Input 219
37	BLK/ORN	Return							
13	GRN/BLK	Input 45	Input 70	Input 95	Input 120	Input 145	Input 170	Input 195	Input 220
38	BLK/GRN	Return							
14	BRN/BLK	Input 46	Input 71	Input 96	Input 121	Input 146	Input 171	Input 196	Input 221
39	BLK/BRN	Return							
15	SLA/BLK	Input 47	Input 72	Input 97	Input 122	Input 147	Input 172	Input 197	Input 222
40	BLK/SLA	Return							
16	BLU/YEL	Input 48	Input 73	Input 98	Input 123	Input 148	Input 173	Input 198	Input 223
41	YEL/BLU	Return							
17	ORN/YEL	Input 49	Input 74	Input 99	Input 124	Input 149	Input 174	Input 199	Input 224
42	YEL/ORN	Return							
18	GRN/YEL	Input 50	Input 75	Input 100	Input 125	Input 150	Input 175	Input 200	Input 225
43	YEL/GRN	Return							
19	BRN/YEL	Input 51	Input 76	Input 101	Input 126	Input 151	Input 176	Input 201	Input 226
44	YEL/BRN	Return							
20	SLA/YEL	Input 52	Input 77	Input 102	Input 127	Input 152	Input 177	Input 202	Input 227
45	YEL/SLA	Return							
21	BLU/VIO	Input 53	Input 78	Input 103	Input 128	Input 153	Input 178	Input 203	Input 228
46	VIO/BLU	Return							
22	ORN/VIO	Input 54	Input 79	Input 104	Input 129	Input 154	Input 179	Input 204	Input 229
47	VIO/ORN	Return							
23	GRN/VIO	Input 55	Input 80	Input 105	Input 130	Input 155	Input 180	Input 205	Input 230
48	VIO/GRN	Return							
24	BRN/VIO	Input 56	Input 81	Input 106	Input 131	Input 156	Input 181	Input 206	Input 231
49	VIO/BRN	Return							
25	SLA/VIO	Input 57	Input 82	Input 107	Input 132	Input 157	Input 182	Input 207	Input 232
50	VIO/SLA	Return							

*The DIEM starts with input 33 since the first 32 points are on the TELSEC main system.

Figure 10 DIEM Input Matrix

3.8 Connecting to the COM Ports

The TELSEC comes standard with a 9 pin RS232 port for serial communications on the front and has the option of supporting to two modems in dial up or lease line configuration. The TELSEC has an optional communications module that supports three serial ports and a 10/100 Ethernet port. The serial ports are configurable for RS232, 485 and 422.

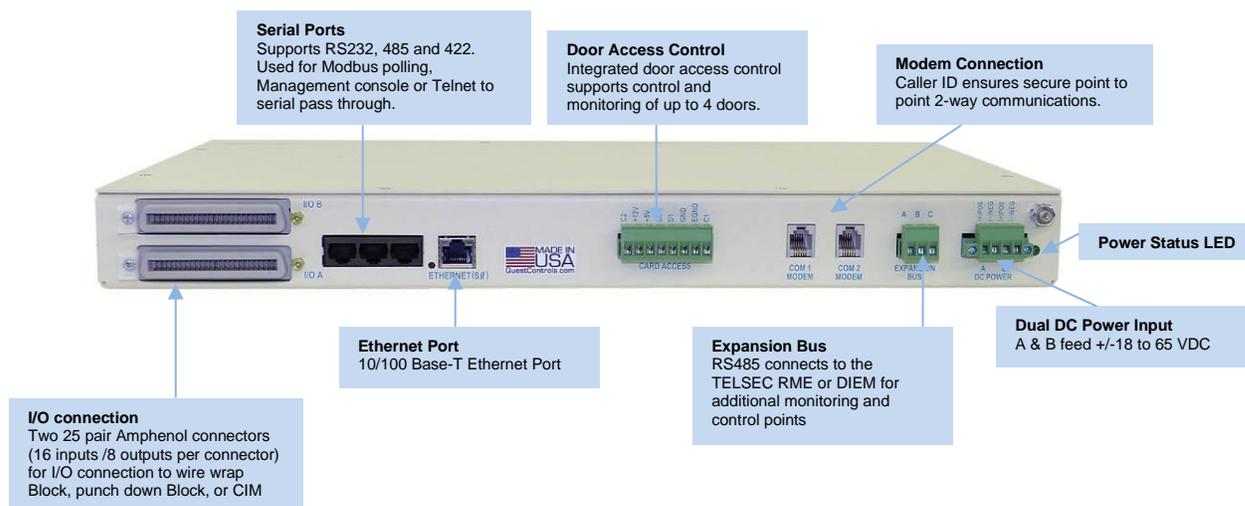


Figure 11 - TELSEC Ports

3.8.1 Ethernet Connection

Connect a Cat5 cable to the RJ45 Ethernet jack. The switch port that you are connecting the TELSEC should be configured Auto/Auto for speed and duplex. If you are required to have static settings, then configure the port for 100Mb and Full duplex. Also, if the Spanning Tree protocol is being used, configure the port for the TELSEC to have Port Fast enabled. There are two status LEDs on the Ethernet jack. The Amber LED is for speed detection and will be illuminated with a 100Mb connection and off when there is a 10Mb connection. The green LED is for link and will be illuminated if link is present. The green LED also indicates activity and will flicker when activity is present.

3.8.2 RS232 Connection

The DB9 RS232 port (front) is set up as DCE device so that a laptop can be connected to the TELSEC with a straight through 9pin cable. The ports default setting is 9600 baud, no parity, with 8 data bits and 1 stop bit. Use a 9 pin straight through cable with a female DB9 connection to connect to the craft port on the front of the TELSEC.

3.8.3 Modem Connection

The TELSEC supports up to two modems (p/n 300204) for remote dialup connections over a standard POTS phone line. Connect the modems to a functional phone line by using the RJ11 cables provided with the unit. Refer to the configuration sheet that shipped with the unit to determine which port (COM1 or COM2 default) the modem is in.

3.8.4 RJ45 Serial Ports

The TELSEC communications module supports three serial ports with RJ45 connectors. Each port can be individually configured for RS232, RS485 or RS 422 communications. The RJ45 pin outs are as follows:

Pin#	RS232	RS485	RS422
1			
2			
3		-/D0	Tx -
4	Ground	Ground	Ground
5	RxD	+/D1	Tx +
6	TxD		Rx +
7			Rx -
8			

*Pins are left to right looking at the jack.

There are jumpers present for each serial port for line biasing when using RS485. The default is for the line bias to be off, but can be enabled by removing the cover of the TELSEC and moving the jumpers as follows:

Serial Port	Enable Line Bias	Disable Line Bias
S1	J5/J6 Pins 1&2	J5/J6 Pins 2&3
S2	J7/J8 Pins 1&2	J7/J8 Pins 2&3
S2	J10/J11 Pins 1&2	J10/J11 Pins 2&3

3.8.5 Connecting Expansion Module to the TELSEC

Use three conductor 24 AWG shielded cable to connect the expansion module to the TELSEC. Wire terminals A to A, B to B and C to C. Ground the shield to chassis ground only at the TELSEC. Cut and insulate the other end of the shield.

3.9 Keypad/Card Reader

The TELSEC supports one card reader which is wired to the back of the rack mount chassis (bottom of wall mount) via a pluggable connector (refer to figure 11). The card reader is typically mounted near the door that is to be controlled. Read the installation documentation that comes with the reader for detail installation instructions. Access control can be expanded to two readers using Quest's two door module (part # 150856) and up to 4 doors with Quest's four door reader (part # 150671).

3.9.1 Wiring the Card Reader

Make sure power to the TELSEC is turned off prior to connecting the reader. Terminate the wires on the keypad prior to terminating at the TELSEC. Use a 5 conductor 20 AWG shielded cable. Cut and insulate the drain wire at the reader. Ground the drain wire at the TELSEC only. Connect the +12V to the readers DC in. Connect D0 to D0, D1 to D1, GND to Ground and the drain wire to EGND on the TELSEC.

3.10 Connecting to a DC Power Supply

Power is supplied to the system from the -48 VDC power source located in the facility. The TELSEC has two screw terminals for an A power feed and two terminals for a B power feed. The TELSEC will obtain power from either A or B depending on which one has the highest potential. Attach the screw terminals located on the rear of the TELSEC shelf to power source A and B with 14–20 gauge wire (See Figure 12).

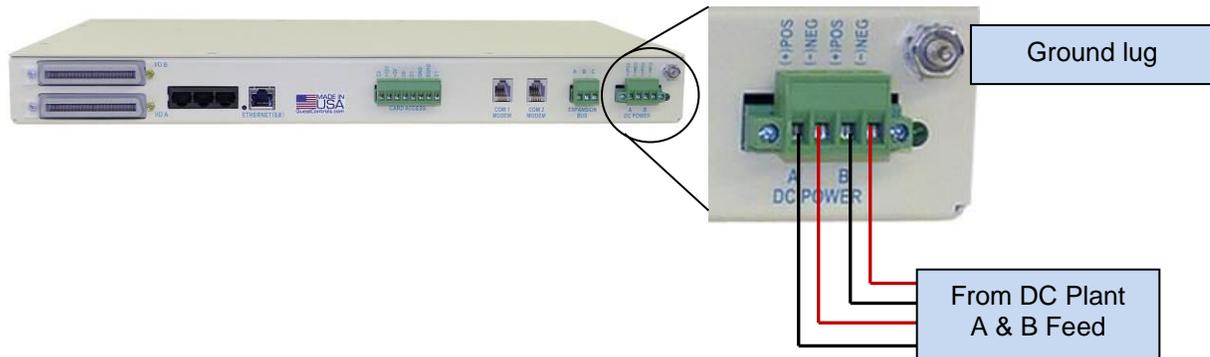


Figure 12 Power Connection

3.10.1 Power Wiring

Connect the negative power lead to the negative terminal (the one to the right) for source A and Source B. Connect the positive lead from power source A and B to the positive terminals. Connect the earth ground strap to the rack frame. Make sure that the system is fused externally with two (2) amp fuses. The green power LED will be illuminated when power is present to the system.

3.10.2 Install Ferrite Coil

Each TELSEC comes with two ferrite coils that need to be installed on the incoming power cables. The ferrite coil should be located as close to the incoming power terminals as possible. Clamp the coil around the incoming power leads (one for each feed). Note make a loop in the power cable and clip the coil into the loop to prevent the coil from sliding or use cable ties to secure in position.

!!!WARNING!!!
48 VOLTS CAN BE HAZARDOUS – REMOVE THE RACK FUSE BEFORE CONNECTING OR DISCONNECTING THE POWER SUPPLY.

3.10.3 Powering-up the TELSEC

When the TELSEC has been completely installed, power should be supplied to the system by inserting a 3-amp fuse(s) in the fuse panel powering the TELSEC. If stable power is being supplied to the system, the green LED indicator will light steadily. A series of sign-on messages will appear on the display as the system comes on-line. After successful initialization, the system will need to be configured to match the particular requirements of the present installation.

Configuration may be accomplished quickly and easily using a laptop computer connected to the maintenance port on the front of the TELSEC or by establishing a Telnet connection to the system using a standard terminal client. See Chapter 4 for configuring and using the Ethernet connection and refer to *Chapter 5 – Programming* for more detailed configuration procedures.

4 Ethernet Interface

The Ethernet module option for the TELSEC RM/WM product will provide IP connectivity through a standard 100Mb Ethernet connection. The module has a built-in web server for configuration and status, SNMP support, Telnet or SSH connectivity and Email alarm generation. This section will provide the operator with the necessary information to operate the TELSEC system over a network connection.

4.1 Connecting to the TELSEC

Initial connection to the TELSEC can be made by a laptop computer using a cross-over cable. Set the laptop connection to a static address of 192.168.1.30 with a subnet of 255.255.255.0 and a gateway of 192.168.1.1. You can then connect to the web server at <http://192.168.1.31>. The system supports an "out of band" method to change the Ethernet settings using the S1 serial port. See section for instructions 4.7

4.2 Web Page Navigation

All web pages will have a top header section that shows the Site Name, the systems date/time and a menu ribbon with the available choices for navigation. The choices presented on the menu ribbon will be dependent on the access level of the password used.

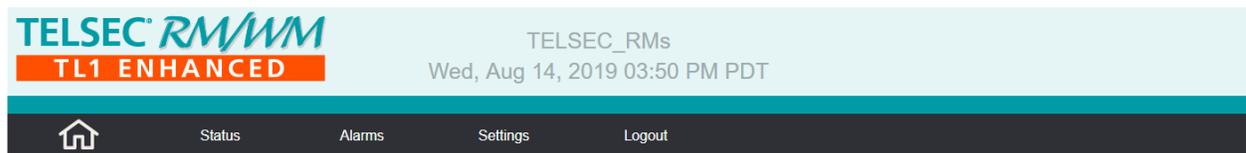


Figure 13 - Web Page Header Section

4.2.1 Security

The Web Server uses a username and password combination to authenticate the user into various supported realms (areas) on the server. No information will be shown without proper authorization. The default username/password is Admin/admin

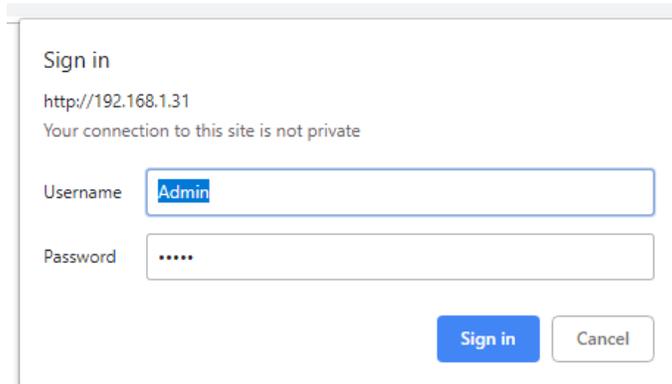


Figure 14 - Log in Screen

4.2.2 The Home Page

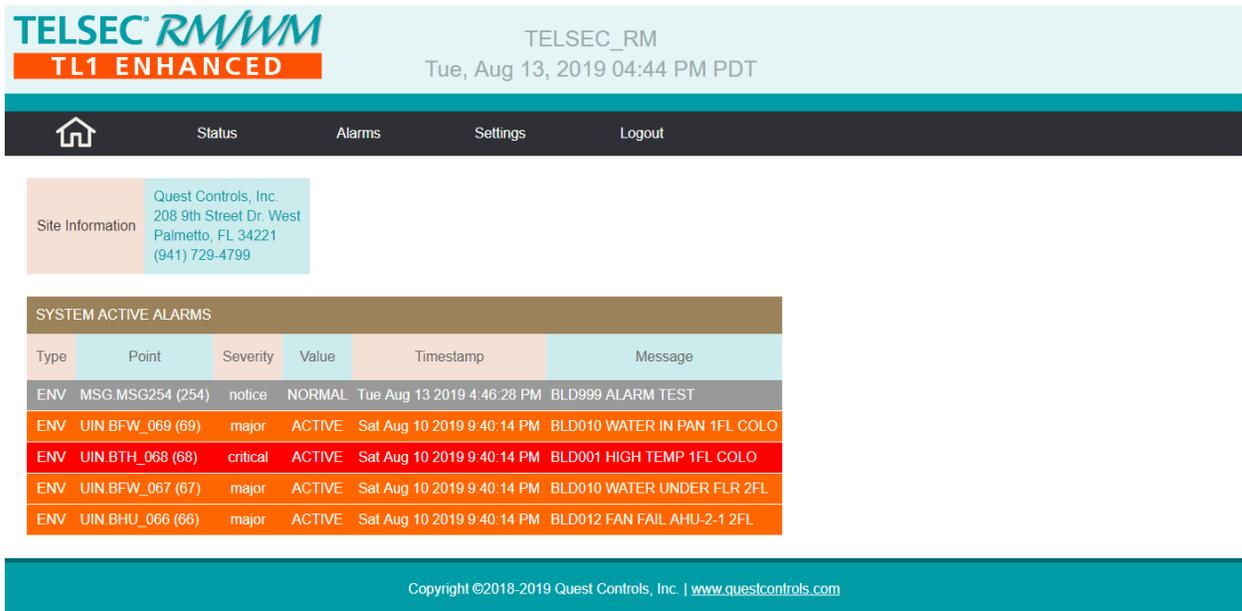
After you log in with your username and password, the TELSEC will present the Home page. This page can also be reviewed if you click on the HOME link icon. The home page will show the site information box along with a table of any Active Alarms. See Figure 15 - The TELSEC Home Page.

4.2.2.1 Active Alarms

The table on the Home page are Active Alarms. Any currently active alarm condition will be displayed on the main page. Alarms are color coded based on severity. Critical alarms will be shown in red, major alarms are in orange and minor alarms are shown in yellow. If the page doesn't show any alarms under the Active Alarm header then there are no alarms present in the system. This page will refresh automatically every 30 seconds.

4.2.2.2 Site Information

A teal colored box is provided to put site specific information such as the site name, address, phone number and contact number. This information gets programmed through the Settings/General page under the Site Parameters tab (see section 4.3.1).



The screenshot shows the TELSEC RM/WM interface. At the top, it displays 'TELSEC RM/WM TL1 ENHANCED' and 'TELSEC_RM Tue, Aug 13, 2019 04:44 PM PDT'. Below this is a navigation bar with icons for Home, Status, Alarms, Settings, and Logout. A teal box contains site information for Quest Controls, Inc. Below the navigation bar is a section titled 'SYSTEM ACTIVE ALARMS' with a table of active alarms.

Type	Point	Severity	Value	Timestamp	Message
ENV	MSG.MSG254 (254)	notice	NORMAL	Tue Aug 13 2019 4:46:28 PM	BLD999 ALARM TEST
ENV	UIN.BFW_069 (69)	major	ACTIVE	Sat Aug 10 2019 9:40:14 PM	BLD010 WATER IN PAN 1FL COLO
ENV	UIN.BTH_068 (68)	critical	ACTIVE	Sat Aug 10 2019 9:40:14 PM	BLD001 HIGH TEMP 1FL COLO
ENV	UIN.BFW_067 (67)	major	ACTIVE	Sat Aug 10 2019 9:40:14 PM	BLD010 WATER UNDER FLR 2FL
ENV	UIN.BHU_066 (66)	major	ACTIVE	Sat Aug 10 2019 9:40:14 PM	BLD012 FAN FAIL AHU-2-1 2FL

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Figure 15 - The TELSEC Home Page

4.2.3 Input Status Page

Click on Status and Inputs to show the current status of all inputs in the system. The number of inputs shown depends on the type of TELSEC system you have. Each input will be shown with their physical input number where the point is wired to the system, the input name, the current value of the point, Bypass time remaining, a 32-character alarm description, an interval on timer and event counter. The bypass time will show zeros if the point is in automatic or will show the time remaining on a bypass or the work FOREVER. Point bypassed for FOREVER must be manually cleared to auto. See section 5.4 for operation of the bypass function via SSH. The interval on timer will show how long the point has been in the ON or alarm condition. The Event Counter will track the number of ON/OFF events that have occurred. Each transition constitutes an event. The web server will update the status of the inputs every time the Inputs link is selected or when switching between tabs. If you stay on a particular tab, then the web page will update automatically every 30 seconds.

TELSEC RM/WM
TL1 ENHANCED

TELSEC_RM
Tue, Aug 13, 2019 04:56 PM PDT


Status
Alarms
Settings
Logout

UNIVERSAL INPUTS

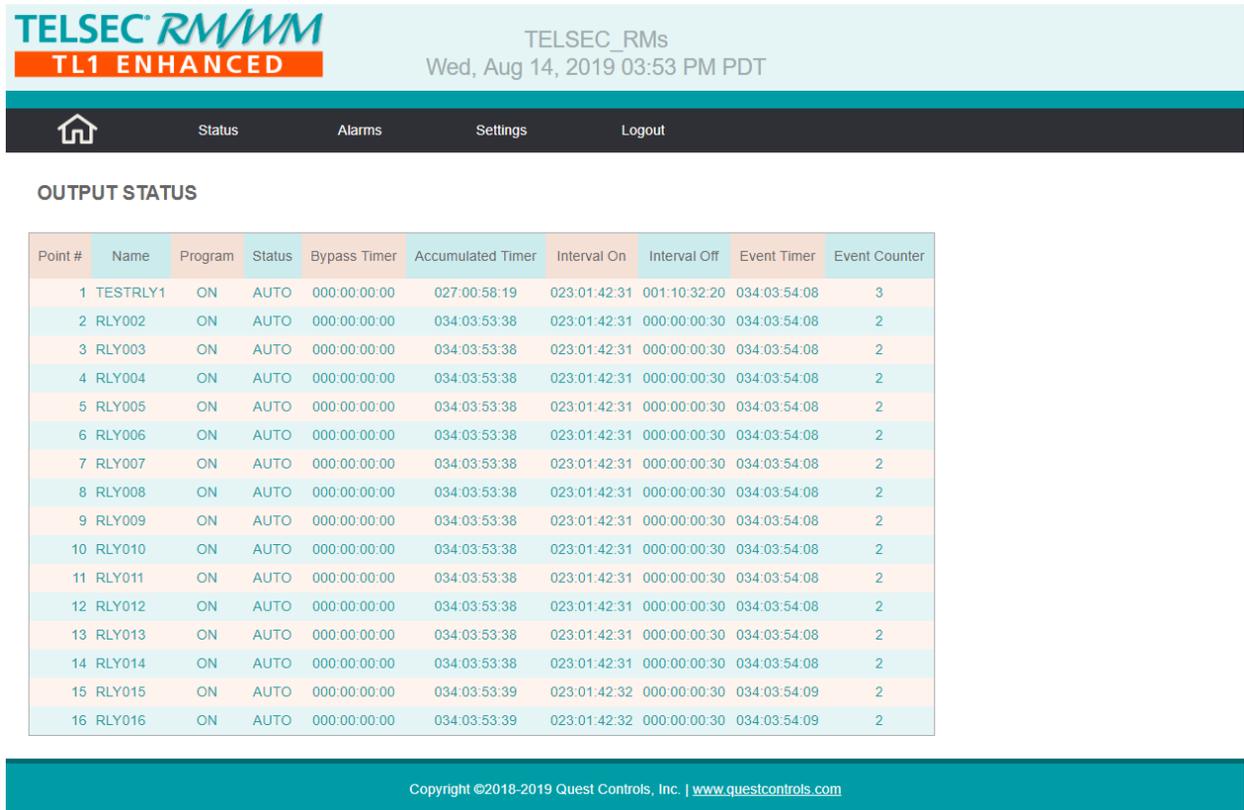
Point #	Name	Value	Bypass	Description	Interval On	Event Counter
INPUTS 1-32						
INPUTS 33-64						
- INPUTS 65-96						
65	BTL_065	OFF	FOREVER	BLD002 LOW TEMP 2FL BAT RM	000:00:00:00	6
66	BHU_066	ON	000:00:00:00	BLD012 FAN FAIL AHU-2-1 2FL	002:19:16:35	13
67	BFW_067	ON	000:00:00:00	BLD010 WATER UNDER FLR 2FL	002:19:16:35	13
68	BTH_068	ON	000:00:00:00	BLD001 HIGH TEMP 1FL COLO	002:19:16:35	13
69	BFW_069	ON	000:00:00:00	BLD010 WATER IN PAN 1FL COLO	002:19:16:35	13
70	BTL_070	OFF	FOREVER	BLD002 LOW TEMP 1FL SESS RM	000:00:00:00	6
71	BTH_071	OFF	FOREVER	BLD001 HIGH TEMP 1FL SESS RM	000:00:00:00	6
72	BTL_072	OFF	FOREVER	BLD002 LOW TEMP 1FL TOLL RM	000:00:00:00	6
73	BTH_073	OFF	FOREVER	BLD001 HIGH TEMP 1FL TOLL RM	000:00:00:00	6
74	UIN074	0 MV	000:00:00:00	N/A	N/A	N/A
75	UIN075	0 MV	000:00:00:00	N/A	N/A	N/A
76	UIN076	0 MV	000:00:00:00	N/A	N/A	N/A
77	UIN077	0 MV	000:00:00:00	N/A	N/A	N/A
78	UIN078	0 MV	000:00:00:00	N/A	N/A	N/A
79	UIN079	0 MV	000:00:00:00	N/A	N/A	N/A
80	UIN080	0 MV	000:00:00:00	N/A	N/A	N/A
81	UIN081	0 MV	000:00:00:00	N/A	N/A	N/A
82	UIN082	0 MV	000:00:00:00	N/A	N/A	N/A
83	UIN083	0 MV	000:00:00:00	N/A	N/A	N/A
84	UIN084	0 MV	000:00:00:00	N/A	N/A	N/A
85	UIN085	0 MV	000:00:00:00	N/A	N/A	N/A
86	UIN086	0 MV	000:00:00:00	N/A	N/A	N/A
87	UIN087	0 MV	000:00:00:00	N/A	N/A	N/A
88	UIN088	0 MV	000:00:00:00	N/A	N/A	N/A
89	BPA_089	OFF	000:00:00:00	PWR048_ATS_PROPER_OPERATION_2	000:00:00:00	0
90	BTF_090	OFF	000:00:00:00	PWR054_ATS_POWER_FAILURE_2	000:00:00:00	0
91	BER_091	OFF	000:00:00:00	PWR047_ATS_ENGINE_START_2	000:00:00:00	0
92	BCP_092	OFF	000:00:00:00	PWR002_ATS_LINE_POWER_2	000:00:00:00	0
93	BBC_093	OFF	000:00:00:00	PWR053_BATT_CHARGER_FAULT_2	000:00:00:00	0
94	BFM_094	OFF	000:00:00:00	PWR060_VEEDER_ROOT_LOW_FUEL_2	000:00:00:00	0
95	BFD_095	OFF	000:00:00:00	PWR051_VEEDER_ROOT_FUEL_TRBLE_2	000:00:00:00	0
96	BGF_096	OFF	000:00:00:00	PWR015_GEN_OVERSPEED_SHUTDOWN_2	000:00:00:00	0
INPUTS 97-128						
INPUTS 129-160						
INPUTS 161-192						
INPUTS 192-224						
INPUTS 225-232						

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Figure 16 - Input Status

4.2.4 Output Status Page

Click on Status and Outputs to see the current status of all outputs. The number of outputs shown depends on the type of TELSEC system you have. Each output will be shown with their physical output number, point name, program status, actual status of the point and bypass time. The actual status will show AUTO meaning it is following the program state unless the point has been bypassed. If a point is bypassed, the time remaining on the bypass or the word FOREVER will appear under the Bypass Time column. See section 5.4 for bypassing outputs through an SSH connection.



Point #	Name	Program	Status	Bypass Timer	Accumulated Timer	Interval On	Interval Off	Event Timer	Event Counter
1	TESTRLY1	ON	AUTO	000:00:00:00	027:00:58:19	023:01:42:31	001:10:32:20	034:03:54:08	3
2	RLY002	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
3	RLY003	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
4	RLY004	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
5	RLY005	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
6	RLY006	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
7	RLY007	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
8	RLY008	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
9	RLY009	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
10	RLY010	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
11	RLY011	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
12	RLY012	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
13	RLY013	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
14	RLY014	ON	AUTO	000:00:00:00	034:03:53:38	023:01:42:31	000:00:00:30	034:03:54:08	2
15	RLY015	ON	AUTO	000:00:00:00	034:03:53:39	023:01:42:32	000:00:00:30	034:03:54:09	2
16	RLY016	ON	AUTO	000:00:00:00	034:03:53:39	023:01:42:32	000:00:00:30	034:03:54:09	2

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Figure 17 - Output Status Page

4.2.4.1 Output Time Definitions

ACCUMULATED ON	The total accumulated ON time. This timer will keep track of the total amount of time the input has been in the on state.
INTERVAL ON	The interval ON time. When a point turns on the timer resets to zero and keeps track of how long the point has been on for the current interval.
INTERVAL OFF	The interval OFF time. When a point turns off the timer resets to zero and keeps track of how long the point has been off for the current interval.
MANUAL	The total time that has elapsed since the timers were manually reset to 0.
EVENTS	The number of cycles that have occurred. Every time a point goes on or off counts as an event, thus there are two events for a complete cycle.

4.2.5 Alarm Status

Click on Alarms and System Active to show the Active Alarms table. This is the same information that is presented on the Home page. Each alarm will be color coded based upon the severity of the alarm with red for critical, orange for major and yellow for minor. Alarm severity is dependent on the program that was loaded into the TELSEC system. Each alarm will be presented with the point name, severity, point value, date and time the alarm occurred, along with an additional message.

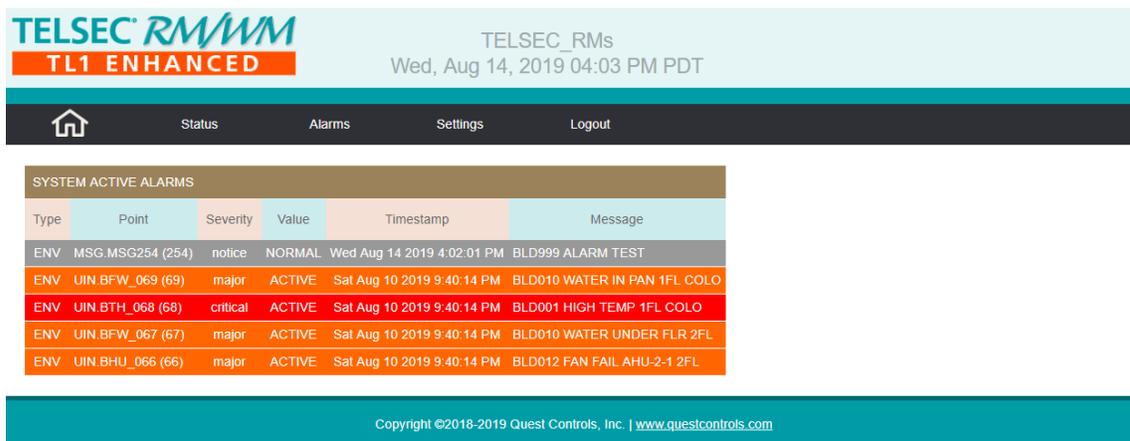


Figure 18 - Active Alarms

4.2.6 Alarm History

Click on the Alarms menu and then System History to get the history log of the most recent 254 alarms that have occurred in the system. In addition to the color-coded alarms for critical, major and minor, the page will show cleared alarm events in green and system notice events such as power fails in grey. Use the scroll bar on the right side of the window to review all alarms. The alarms will be from newest at the beginning of the log to the oldest alarm at the end of the file. Note the system could take up to 30 seconds to download and display the history log

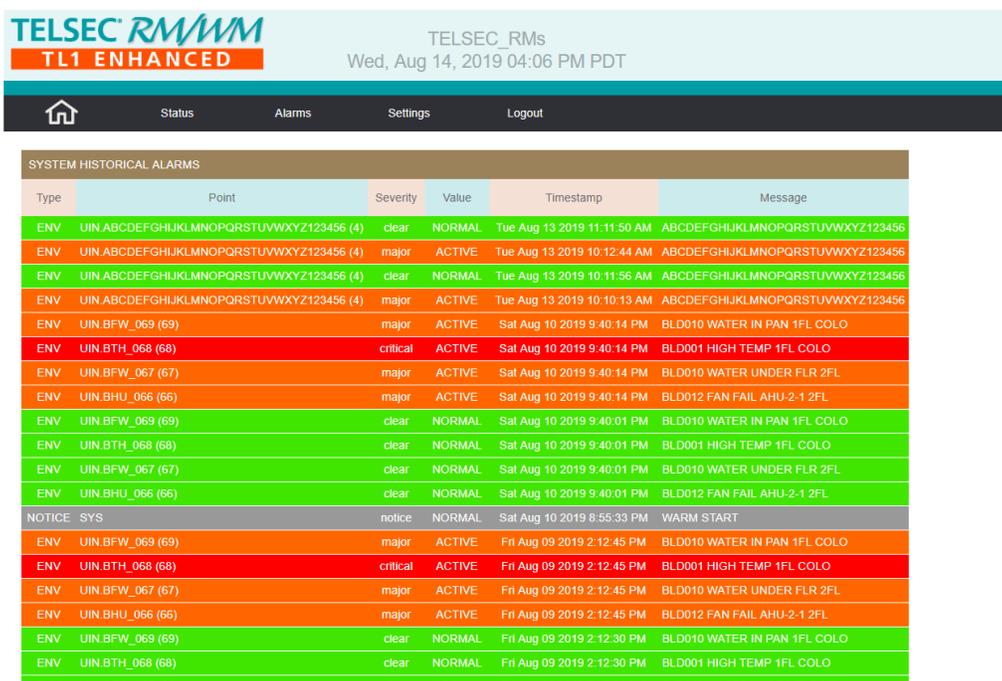


Figure 19 - Alarm History

4.3 System Setup

Select Settings from the main menu and choose General. The TELSEC will display a list of options for configuration with the first one being Site Parameters. Click on each accordion header to modify the settings for each section and press Save Settings to write the changes to non-volatile flash memory. Save Settings will cause the system to save the changes and reboot to come up with the new values. You can navigate through each section tab on this page, make changes and then press the Save button to save all changes at once. **Changes will not be saved if you navigate from this page without pressing the "Save Settings" button.**

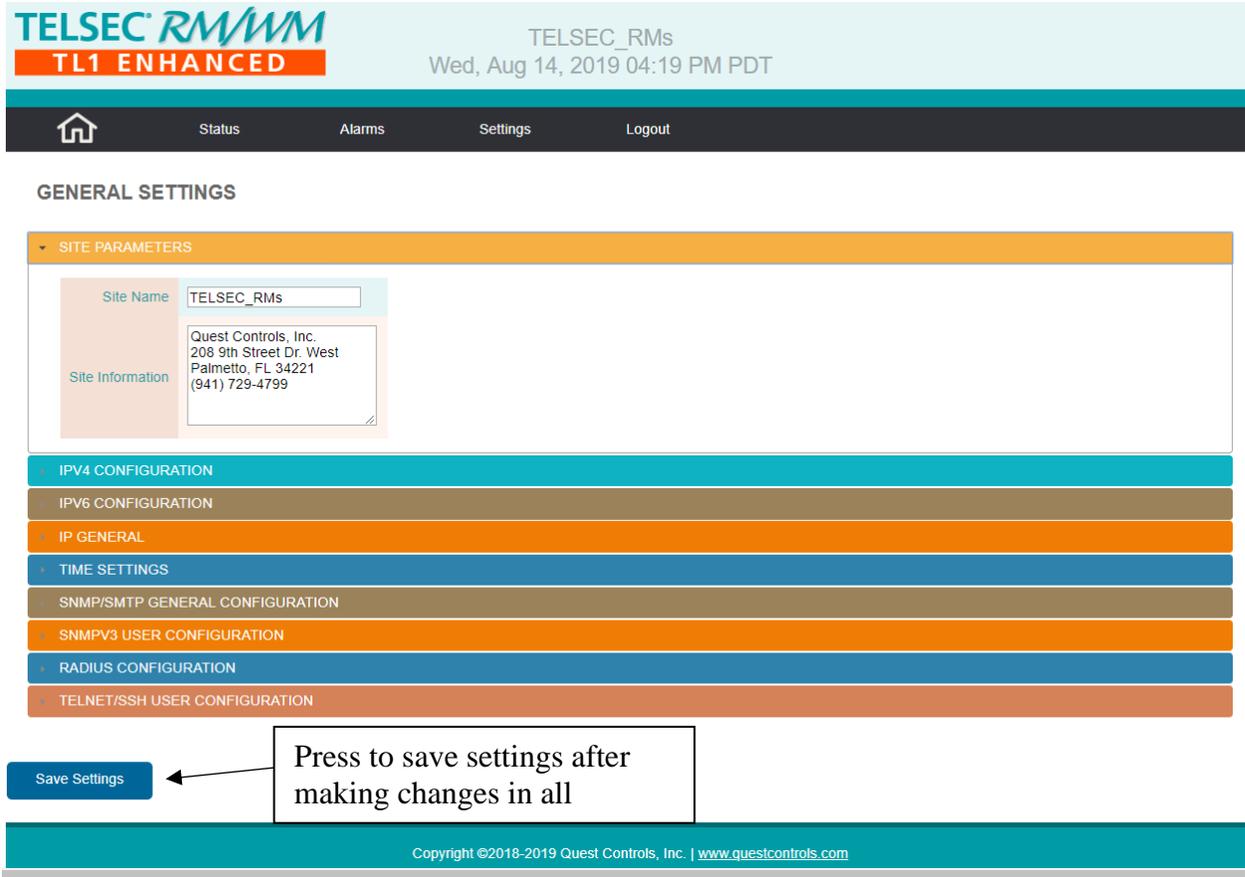


Figure 20 - Web Server Setup

4.3.1 Site Parameters

The Site name is displayed in the header of web pages and is used when sending Emails and/or SNMP traps. Enter the desired name to reference the site where the TELSEC is located. **Note spaces are not allowed and will be converted to underscores.** The Site Information section is to store unique information about the site such as the address to the facility or contact information.



▼ SITE PARAMETERS

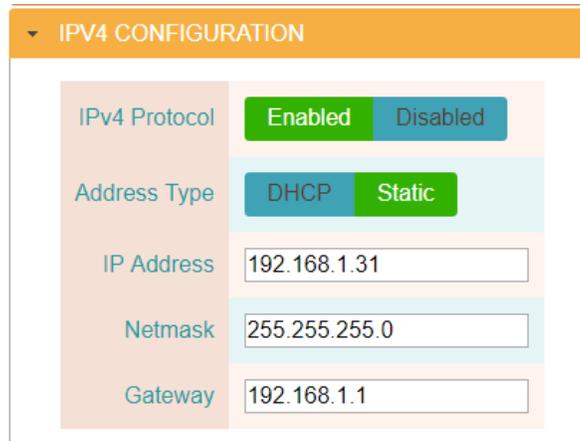
Site Name: TELSEC_RMs

Site Information: Quest Controls, Inc.
208 9th Street Dr. West
Palmetto, FL 34221
(941) 729-4799

Figure 21 - Site Name and Information

4.3.2 IPV4 Configuration

The TELSEC supports dual stack for IPv4 and IPv6 or you can disable either IPv4 or IPv6. The default setting is for IPv4 to be enabled and IPv6 disabled. The system will not allow a user to disable both. Use this section to enable/disable IPv4 protocol and to configure an IP address for the unit. The system supports DHCP or Static. If Static is chosen, then enter the desired IP address, Subnet mask and Gateway address.



▼ IPV4 CONFIGURATION

IPv4 Protocol: Enabled

Address Type: DHCP

IP Address: 192.168.1.31

Netmask: 255.255.255.0

Gateway: 192.168.1.1

Figure 22 - IP address and settings

4.3.3 IPV6 Configuration

The TELSEC supports either dual stack for IPv4 and IPv6 or you can enable IPv6 and disable IPv4. Use this section to enable IPv6 and configure the network address using either Auto configuration or manual configuration. If Auto is chosen, then the system will display the address in the IP address field after pressing the Save Settings button and the system goes through its restart. For manual configuration, enter the IP address with the prefix and the gateway address without a prefix.



IPv6 CONFIGURATION	
IPv6 Protocol	Enabled Disabled
Auto Config	Auto Manual
IP Address (with /prefix)	fd75:983f:60e7:a16e::4/64
Gateway (without /prefix)	fd75:983f:60e7:a16e::1

Figure 23 - IPv6 settings

4.3.4 IP General

This section is used to enter the DNS server IP addresses, change the default IP ports, enable/disable SSL and configure the location of where the update server is located.

The values shown for Telnet and SSH are the default or commonly known port numbers for the protocol. Enter a new port number if desired or enter a zero (0) to disable the protocol. For example, if you want to turn off Telnet, enter a zero in the Telnet Port field.

The TL1 Port is a special Telnet session designed for interfacing to NMS systems for sending TL1 formatted alarm messages. This port does not require a Username/Password for connection and only supports the read only commands of retrieve header and retrieve alarm. Any other command entered will not be allowed and will be ignored. Enter a new port number if desired or enter a zero (0) to disable the protocol. For example, if you want to turn off TL1 Port, enter a zero in the TL1 Port field.

When selecting SSL, the system will allow you to copy/paste the contents of your own PEM data file if available. If no PEM data is entered, then the system will create a self-certification. Self-certification will allow HTTPS connection, but your browser will generate an error notice and ask you if you want to continue.

The update server section is used to identify where to look for updates when a user presses the Check and Install Updates button found on the Settings/Advanced page. It is recommended that this field is not changed unless you know the IP address and path for update files.

▾ IP GENERAL

DNS1	<input type="text" value="8.8.8.8"/>
DNS2	<input type="text" value="8.8.4.4"/>
Telnet Port	<input type="text" value="23"/>
TL1 Port	<input type="text" value="3024"/>
SSH Port	<input type="text" value="22"/>
HTTP Port	<input type="text" value="443"/>
SSL	<input type="button" value="Disable"/> <input checked="" type="button" value="Enable"/> <div style="border: 1px solid #ccc; padding: 5px; margin-left: 20px; width: 200px; height: 40px;"> PASTE PROPERLY FORMATTED PEM DATA BELOW </div>
Update Server	<input type="text" value="www.questcontrols.com/up"/>
Ethernet MAC Address	3C:FB:96:77:88:AB

Figure 24 - Additional network settings

4.3.5 Time Settings

Use this section to either set the system clock manually or to turn on automatic time updates using an NTP Server. This page will also allow you to enter a time zone for the system and configure daylight savings time. In manual mode, the web page will allow you to set the time of the system manually by clicking on the time field. This will bring up a dialog box for setting the time which will include a button to set the time using time on your computer.

▾ TIME SETTINGS

Type	<input checked="" type="button" value="Automatic"/> <input type="button" value="Manual"/>		
NTP Server	<input type="text" value="pool.ntp.org"/>		
Time Zone	UTC-8 (US Pacific Time) ▾		
Enable / Disable DST	<input checked="" type="button" value="Enable"/> <input type="button" value="Disable"/>		
DST On Point	Sun Mar 10, 2019 2:00		
	Week <input type="text" value="Second"/> ▾	Day of Week <input type="text" value="Sunday"/> ▾	Month <input type="text" value="March"/> ▾
DST Off Point	Sun Nov 3, 2019 2:00		
	Week <input type="text" value="First"/> ▾	Day of Week <input type="text" value="Sunday"/> ▾	Month <input type="text" value="November"/> ▾

Figure 25 - System clock settings

4.3.6 SNMP/SMTP General Configuration

Use this section to set up the common settings when using SNMP or SMTP (Email). When using SNMPv3, you can have SNMPv1 & v2c active by putting in a Read and Write community string. Leave these fields blank to disable v1 & v2c SET and GET operations. Contact Quest to obtain the MIB files for the TELSEC. There is a specific TELSEC MIB for doing SET and GET commands along with trap reception.

The Heartbeat function can be enabled by entering an interval value in seconds. This will cause the system to send an Informational level trap to indicate the system is active and the SNMP

protocol is operable. Note this automated function is for SNMP only. For TL1, a user specific message must be created alarm with a heartbeat program. This can be enabled using Quest's OspreyDMS program.

The SMTP setup is to allow the TELSEC to send text-based emails when an alarm occurs. Enter the SMTP server information, username and password if necessary, to allow the TELSEC to connect to the sever for sending email notifications. The email dispatch addresses and alarm severity are configured in the Settings Alarm Dispatch page (section 4.4.2). The format of the email can be found in **Appendix C – Email Alarm Format**.

▾ SNMP/SMTP GENERAL CONFIGURATION

Incoming SNMP Port	<input type="text" value="161"/>
SNMP Read Community	<input type="text" value="public"/>
SNMP Write Community	<input type="text" value="private"/>
SNMP sysContact	<input type="text" value="TechSupport"/>
SNMP sysName	<input type="text" value="TELSEC_RM"/>
SNMP sysLocation	<input type="text" value="Palmetto_FL"/>
SNMP Heartbeat Trap Interval (sec, 0=disabled)	<input type="text" value="0"/>
SMTP Server	<input type="text" value="smtp.emailserver.net"/>
SMTP Server Port Number	<input type="text" value="25"/>
SMTP Auth Username	<input type="text" value="User@emailserver.net"/>
SMTP Auth Password	<input type="password" value="....."/>
SMTP From Address	<input type="text" value="TELSEC@questcontrols.c"/>

Figure 26 - SNMP and Email configuration

4.3.7 SNMPv3 User Configuration

Use this section to create up to four different users for SNMP Set/Get access to the system and sending traps if v3 traps are configured under the Settings/Dispatch page (see section 4.4.1). The TELSEC supports authentication using MD5 or SHA and Privacy using DES or AES.

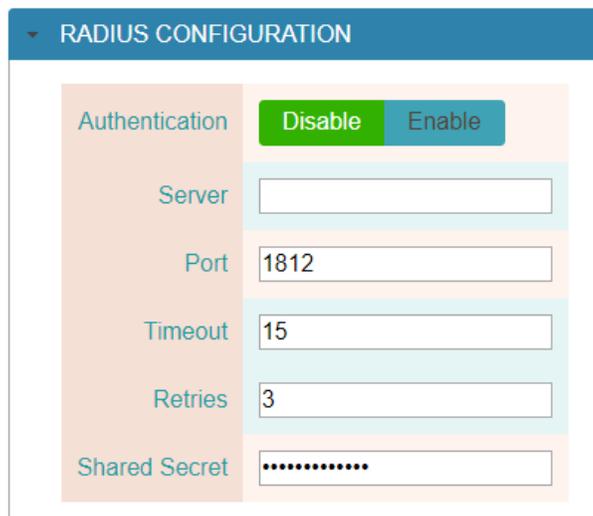
▾ SNMPv3 USER CONFIGURATION

Username	Access Type	Auth Type	Auth Protocol	Auth Pswd (twice)	Priv Protocol	Priv Pswd (twice)
<input type="text" value="UserNumber1"/>	<input type="checkbox"/> R/O <input checked="" type="checkbox"/> R/W	authPriv ▾	<input checked="" type="checkbox"/> MD5 <input checked="" type="checkbox"/> SHA	<input type="password" value="....."/> <input type="password" value="....."/>	<input checked="" type="checkbox"/> DES <input checked="" type="checkbox"/> AES	<input type="password" value="....."/> <input type="password" value="....."/>
<input type="text" value="UserNumber2"/>	<input type="checkbox"/> R/O <input checked="" type="checkbox"/> R/W	noAuthNoPriv ▾	<input checked="" type="checkbox"/> MD5 <input checked="" type="checkbox"/> SHA	<input type="password" value=""/> <input type="password" value=""/>	<input checked="" type="checkbox"/> DES <input checked="" type="checkbox"/> AES	<input type="password" value=""/> <input type="password" value=""/>
<input type="text" value="UserNumber3"/>	<input type="checkbox"/> R/O <input checked="" type="checkbox"/> R/W	authNoPriv ▾	<input checked="" type="checkbox"/> MD5 <input checked="" type="checkbox"/> SHA	<input type="password" value="....."/> <input type="password" value="....."/>	<input checked="" type="checkbox"/> DES <input checked="" type="checkbox"/> AES	<input type="password" value=""/> <input type="password" value=""/>
<input type="text" value=""/>	<input type="checkbox"/> R/O <input checked="" type="checkbox"/> R/W	noAuthNoPriv ▾	<input checked="" type="checkbox"/> MD5 <input checked="" type="checkbox"/> SHA	<input type="password" value=""/> <input type="password" value=""/>	<input checked="" type="checkbox"/> DES <input checked="" type="checkbox"/> AES	<input type="password" value=""/> <input type="password" value=""/>

Figure 27 - SNMPv3 Username configuration

4.3.8 RADIUS Configuration

If RADIUS is enabled, the TELSEC will contact the defined server when a user attempts to log into the web server to determine if the username/password is valid. The TELSEC will grant access if the username/password is valid and will show the menu options based upon the user's access level defined in the RADIUS server. See Appendix B - RADIUS Server Configuration for the required setting when configuring the RADIUS server.



RADIUS CONFIGURATION	
Authentication	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
Server	<input type="text"/>
Port	<input type="text" value="1812"/>
Timeout	<input type="text" value="15"/>
Retries	<input type="text" value="3"/>
Shared Secret	<input type="password" value="....."/>

Figure 28 - RADIUS server interface setup

4.3.9 Telnet/SSH User Configuration

The Ethernet module supports a total of ten concurrent SSH and/or Telnet sessions. This section allows the administrator to set the username, password, inactivity timeout and access level. The usernames and passwords will work over either SSH or Telnet. This page will allow up to ten unique username/password combinations, but the same username/password can be used for multiple concurrent sessions. The access levels are as follows:

- TL1 – allows access for receiving TL1 alarm messages and supports the read only commands for retrieve header and retrieve alarm. The default username/password is TL1level/tl1level.
- Admin – Provides the same access as TL1 level plus command line access for programming of all control and monitoring functions. The default username/password is Adminlevel/adminlevel.
- Shell – Access to the shell commands for configuring network communications of the system. Passwords configured with shell can be used with SSH, Telnet or through the “out of band” serial port (S1). The default username/password is Shelllevel/shelllevel.

Note: an inactivity time value of zero (0) will disable the inactivity timeout function.

TELNET/SSH USER CONFIGURATION			
Username	Password (twice)	Inactivity Timeout (minutes)	Access Type
Adminlevel	15	admin ▼
Shelllevel	15	shell ▼
TL1level	60	tl1 ▼
			none ▼
			none ▼
			none ▼
			none ▼
			none ▼
			none ▼

Figure 29 - Telnet/SSH User Config

4.4 Alarm Dispatch Settings

The Alarms Dispatch option under the Settings menu will display the current settings for both the SNMP dispatch and Email dispatching of alarms.

4.4.1 SNMP Dispatch

The TELSEC supports sending SNMP traps or Informs (v2c or v3 only) to four trap servers. Enter the IP address of the trap server and select the SNMP version and either Trap or Inform. Some trap servers require a specific Community String to be used, but if not, use the value of Trap which is the default. For SNMPv3, you will need to use one of the defined Usernames that was created during the configuration of SNMPv3 (see section 4.3.7). Press the “Save Settings” button to save all of your changes. **Note: if you are also using Email dispatching, then make those entries first prior to pressing the “Save Settings” button (section 4.4.2).**

ALARM DISPATCH

- SNMP DISPATCH

Number	Receiver IP	Version	Type	Community String/V3 Username
1.	<input type="text" value="192.168.1.100"/>	v1 v2 v3	Trap Inform	<input type="text" value="WhyWontYou"/>
2.	<input type="text" value="192.168.1.104"/>	v1 v2 v3	Trap Inform	<input type="text" value="Trap"/>
3.	<input type="text"/>	v1 v2 v3	Trap Inform	<input type="text" value="Trap"/>
4.	<input type="text"/>	v1 v2 v3	Trap Inform	<input type="text" value="Trap"/>

+ EMAIL DISPATCH

Figure 30 - SNMP Trap/Inform configuration

4.4.2 Email Dispatch

Click on the Email Dispatch expand icon to display the settings for creating email distribution. The Email server settings must be configured in order for emails alarming to occur (See section 4.3.6). The TELSEC supports nine email addresses for sending alarms. Enter the users email address or distribution list address to be used. The subject field allows for a custom message to be included with the email. The system will create a subject line with the severity of the alarm followed by the text entered in the subject field. The last column allows for filtering of what type of alarms to be sent. The system will automatically send a clear email when the alarm condition clears. For example, if only Critical alarms are sent via email then the Clear for those critical alarms will be sent.

ALARM DISPATCH

- SNMP DISPATCH

- EMAIL DISPATCH

Number	Recipient	Subject	Severity Filter
1.	<input type="text"/>	<input type="text"/>	Disabled
2.	<input type="text"/>	<input type="text"/>	Critical, Major, and Minor
3.	<input type="text"/>	<input type="text"/>	Critical and Major
4.	<input type="text"/>	<input type="text"/>	Critical Only
5.	<input type="text"/>	<input type="text"/>	All Severities
6.	<input type="text"/>	<input type="text"/>	Disabled
7.	<input type="text"/>	<input type="text"/>	Disabled
8.	<input type="text"/>	<input type="text"/>	Disabled
9.	<input type="text"/>	<input type="text"/>	Disabled

Figure 31 - Email alarm dispatch

Press the Save Settings button at the bottom of the page when completed. This will save any changes made to the email dispatch and changes made to the SNMP dispatch.

4.4.3 Test Alarms

The  button at the bottom of the page will cause a test trap to be sent to all the defined destinations along with a test email to the defined recipients. The Test alarm will have a critical severity with all the data fields showing TEST ALARM.

4.5 HTTP User Administration

This page sets up the six available usernames for the password and what areas the user can access. If the RADIUS server function is enabled, then this option does not affect user access. The default passwords are the same as the username, but in all lower case. No characters are displayed in the password field for security reasons. Enter a new password for the desired Username and then select the privilege levels for the user.

USER ADMINISTRATION							
User	Password	Confirm Password	Privileges				
User1	<input type="password"/>	<input type="password"/>	Home	Status	Alarms	Program	Settings
User2	<input type="password"/>	<input type="password"/>	Home	Status	Alarms	Program	Settings
User3	<input type="password"/>	<input type="password"/>	Home	Status	Alarms	Program	Settings
User4	<input type="password"/>	<input type="password"/>	Home	Status	Alarms	Program	Settings
User5	<input type="password"/>	<input type="password"/>	Home	Status	Alarms	Program	Settings
Admin	<input type="password"/>	<input type="password"/>	Home	Status	Alarms	Program	Settings



Figure 32 - Webserver password setup

4.6 Advanced Settings

4.6.1 System Version & Update

Choosing the Advanced settings will display the current version of the system's firmware. Selecting the Update button will cause the system to try and connect to an update server to look for upgrades. The IP address used for upgrades must be accessible from the network the TELSEC is on in order to perform the upgrade. The IP address for the upgrade server is configured in the IP General window. See section 4.3.4. Contact Quest for upgrade information.

ADVANCED OPTIONS

SYSTEM VERSION & UPDATE

Kernel version	#1 Tue Aug 13 10:46:43 PDT 2019
Filesystem version	#1



CONFIGURATION UPLOAD & DOWNLOAD

EVENT & DEBUG LOG

Figure 33 - Firmware version and update

4.6.2 Configuration Upload & Download

Select the expand arrow to display the option for downloading or uploading a configuration file to the system. The download option will download a text file to your web browser. The file will have all of the current settings configured in the system. This file can then be saved in case the site needs to be uploaded in the future. The Upload option will allow you to load a configuration file to the system. While the system will download all settings into a single file, it will accept uploading files with individual sections. This way you can upload only the sections requiring changes. Each section has a label in brackets [name] to denote the section. The entire section must be loaded together to be successful.

First select the Choose File button to navigate and select a file from your computer. Then select the Upload button. The system will receive the file and then verify the information to ensure it conforms to the proper syntax. The system will then present a dialogue box displaying any errors with their line number or a notice of no errors. If there are no errors, then there will be a Save and Reboot button below the dialogue box. Pressing this button will cause the system to save the contents of the configuration file to flash and then reboot and come back up with the new settings.

ADVANCED OPTIONS

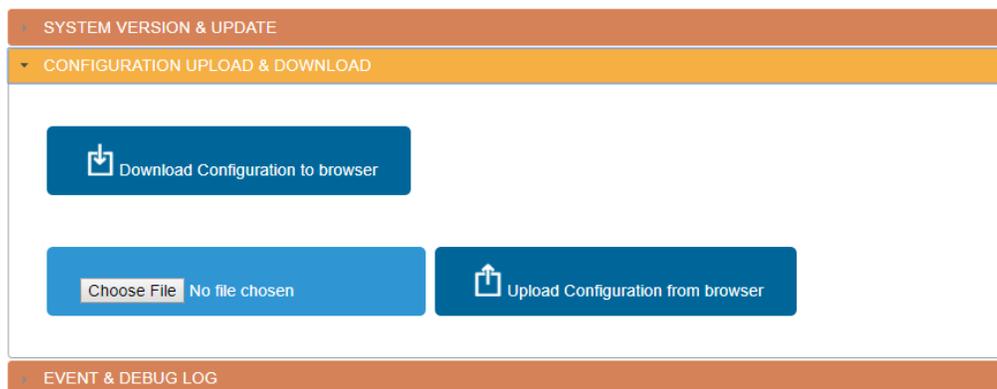


Figure 34 - Configuration file upload & download

4.6.3 Event & Debug Log

The Event and Debug log will provide diagnostic information regarding the operation of the TELSEC. Typical use of this log would be to resolve issues with sending traps or email alarms. Contact Quest for assistance if you are experiencing issues with your TELSEC system. The filter options allow you to select the category and then the detail level of events to be displayed. Select the choices you want and use the optional date range and press the Regenerate Debug Log button. The information will be displayed in a window with controls for forward, back, beginning and end of log navigation. A download button will also be displayed which when pressed will download a text file of the log to your browser.

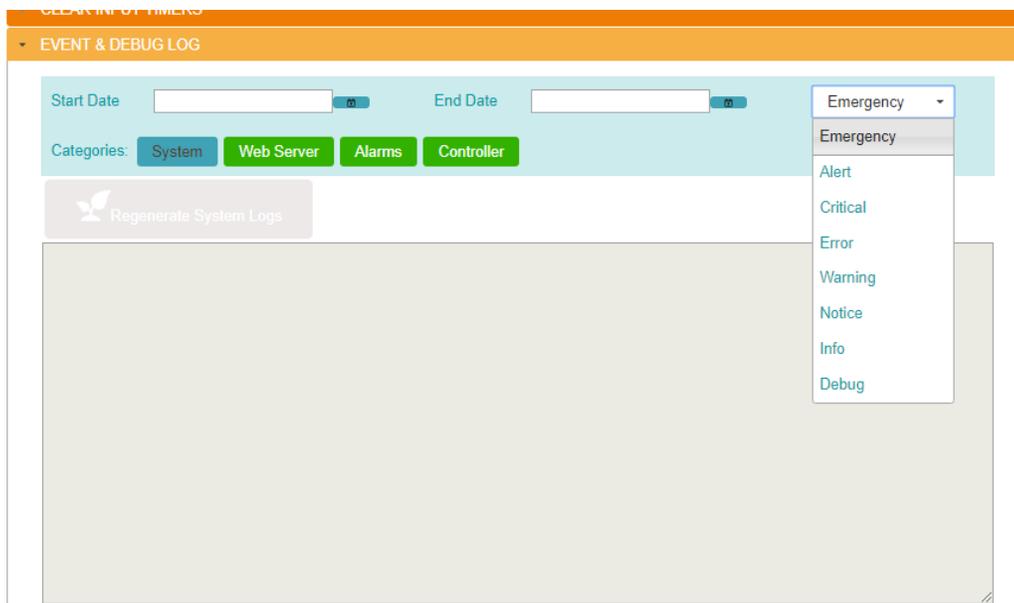


Figure 35 - Event and debug log

4.7 TELSEC Management Shell

The TELSEC supports a management shell that is accessible through SSH/Telnet or the S1 serial port. From this shell, the user can issue various commands to administer the communications of the system.

Connect a serial cable from the TELSEC port S1 to a remote terminal server or PC. Use the terminal server to remotely connect to the TELSEC. Once connected, press the enter key once and the system will prompt you with a Username prompt. This port uses any username/password created in the Web Server setup page for Telnet/SSH User Configuration that has the “Access Type” value of shell. A password prompt will follow the username prompt. The default username/password is Shelllevel/shelllevel. A command prompt will be shown after a successful login. Type the word “show” to see the available commands:

Available commands:

```
warmstart
coldstart
set ip
set mtu
set adminuser
set httpswd
set snmpmgr
set upgradeurl
set upgradecheck
ping
show
exit
logout
```

All commands when entered will execute without further confirmation to the user. When using the “set” commands the system will output a message of “parameters set...unit will restart after you exit”. You can do multiple “set” commands and then type “exit” or “logout” to exit and reboot the system. The system will then restart and come up with the new settings.

4.7.1 Warmstart Command

Entering in warmstart will cause the TELSEC and the Ethernet module to do a reset. This will not erase any TELSEC memory stored in battery backed RAM.

4.7.2 Coldstart Command

The coldstart command will cause the TELSEC and Ethernet module to do a reset. Any data stored in battery backed memory will be erased and the application program stored in flash will be reloaded into the operating memory.

4.7.3 Set IP Command

Format: set ip <ipaddress> <subnetmask> <gateway> <DNS1 | none> <DNS2 | none>
<http_port>

Where:

<ipaddress> = the IP address for the device in decimal dot format

<subnetmask> = The subnet mask entered in decimal dot format

<gateway> = the gateway IP address entered in decimal dot format.

<DNS1 | none> = DNS 1 server IP address in decimal dot format or the word none when DNS is not used

<DNS2 | none> = DNS 2 server IP address in decimal dot format or the word none when DNS is not used

<http_port> = The port number to use for HTTP access.

Example:

```
set ip 192.168.1.58 255.255.255.0 192.168.1.1 8.8.8.8 8.8.4.4 80
```

Where 192.168.1.58 is the IP address, 255.255.255.0 is the subnet, 192.168.1.1 is the gateway, 8.8.8.8 is DNS 1 server, 8.8.4.4 is DNS 2 server and the HTTP port is 80.

When there is no DNS then use the following example:

```
>set ip 192.168.1.58 255.255.255.0 192.168.1.1 none none 80
```

4.7.4 Set MTU Command

The set mtu command will change the size of the Maximum Transmission Unit value. The default value is 1500.

Format: set mtu <value>

Example: set mtu 1200

Sets the max mtu size to 1200.

4.7.5 Set adminuser Command

This command will change the default username and password for Telnet/SSH defined with an “Access Type” value of admin. Usernames and passwords must be a minimum of eight characters each. Note when using this command from the shell console, the system will erase all other usernames/passwords with an “Access Type” value of admin.

Format: set adminuser <username> <password> <pswd copy> <timeout>

Where:

<username> = a minimum eight-character value for the username

<password> = a minimum eight-character value for the password

<pswd copy> = a minimum eight-character value for the password as confirmation

<timeout> = inactivity timeout in minutes. A value of 0 disables the inactivity timeout.

Example: set adminuser QuestTelsec TelsecRMWM 45

Clears all other ssh/telnet username/password configured and "Access Type" of admin and creates one entry with the username/password of QuestTelsec/TelsecRMWM and an inactivity timeout of 45 minutes.

4.7.6 Set httpsd Command

The set httpsd command will change the Admin level password for the build in web server.

Format: set httpsd <pswd> <pswd copy>

Where:

<pswd> = the password value used when logging into the webserver with Admin username

<pswd copy> = reenter the password again for confirmation.

Example: set httpsd Quest1234

Sets the password for username Admin (Admin level) to Quest1234

Set snmpmgr Command

This command will allow you to set the four SNMP trap receiver addresses. Typing "set snmpmgr" without any parameters will show the existing settings for the four trap server addresses.

Format: set snmpmgr <#> <ipaddress|none> <v1|v2|v3> <Trap|Inform> <community string/v3 username>

Where:

<#> = The trap server number to be changed 1-4

<ipaddress|none> = IP address of the trap server or the word none to remove and existing definition

<v1|v2|v3> = the trap format to be used

<Trap|Inform> = Whether to send traps or informs to the server.

<community string/v3 username> = the SNMP community string to be used or one of the defined SNMP user names to be used if sending v3 traps/informs (see section 4.3.7).

Example: set snmpmgr 1 192.168.1.104 v2 Inform Trap

Sets the first trap manager to IP address 192.168.1.104 and will send SNMP v2c informs with a community string of Trap.

4.7.7 Upgrade URL

The set upgradeurl will allow the user to change the IP address and path of where the Ethernet module can locate upgrades. Typing “set upgradeurl” and pressing enter will show the current location of where upgrades can be found when the system is told (through the web server link or the upgrade command) to check for upgrades. The format for changing the location is as follows:

Format: set upgradeurl <ipaddress/filelocation>

Example: set upgradeurl 192.168.1.105/RMv2

4.7.8 Checking for Upgrades

The set upgradecheck command can be used to have the system go check to see if there is an available upgrade and if so, the system will upgrade to the version stored on the upgraded server assuming the build number of the code is greater than what is currently running in the TELSEC RM Ethernet module. Entering “set upgradecheck” will show the current firmware build number. Entering “set upgradecheck on” will cause the system to check for and perform the upgrade.

Example:

```
set upgradecheck
kernel version is #2 Fri Oct 4 10:28:18 PDT 2019
filesystem version is 2
```

```
set upgradecheck on
upgrade check turned on...unit will restart and check after you exit
```

4.7.9 Ping Command

The ping command will allow you to verify communications on the network. This command can be helpful when reusing an IP address for the TELSEC. By doing the ping, the switch the TELSEC is connected to will update its ARP table for the new MAC address of the unit.

Format: ping <ipaddress>

Example: ping 192.168.1.1

Response:

```
PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: seq=0 ttl=64 time=10.726 ms
64 bytes from 192.168.1.1: seq=1 ttl=64 time=0.758 ms
64 bytes from 192.168.1.1: seq=2 ttl=64 time=0.775 ms
64 bytes from 192.168.1.1: seq=3 ttl=64 time=0.802 ms
```

```
--- 192.168.1.1 ping statistics ---
```

```
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.758/3.265/10.726 ms
```

4.7.10 Exit & Logout Command

The exit and logout command have the same function. Typing exit or logout will terminate your session and if changes were made, will cause the system to reboot and come back up with the new settings.

4.8.1 SNMP Traps

The TELSEC generates alarm conditions by sending traps in v1, v2c or v3 format. Additionally, the TELSEC can send v2c and v3 traps as notifications or Informs. Refer to section 4.4.1 for programming the system trap operation and alarm dispatching.

4.8.1.1 Trap OID and Message

Every trap sent will have an OID based on severity level and seven specific variable bindings associated with the alarm. For v2c traps, there are a total of 10 bindings with the first binding being the system up time and the second binding being the trap OID.

4.8.1.1.1 Informational Traps

Traps that are sent from the TELSEC with the Severity of INFO will be sent with this OID. This includes items such as Heartbeat notifications, any informational message and the Card Access activity notices. Info Traps have the OID of 11476.2.0.1

4.8.1.1.2 Clear Alarm Traps

When an alarm condition clears, the TELSEC will send a trap with the Clear OID. Clear traps are used to automatically cancel an alarm condition. Clear traps have an OID of 11476.2.0.2

4.8.1.1.3 Minor Alarm Traps

If an alarm point is defined as a minor alarm severity then when the alarm occurs, the TELSEC will send an alarm with the OID for minor alarms. The Minor alarm OID is 11476.2.0.3

4.8.1.1.4 Major Alarm Traps

If an alarm point is defined as a major alarm severity then when the alarm occurs, the TELSEC will send an alarm with the OID for major alarms. The Major alarm OID is 11476.2.0.4

4.8.1.1.5 Critical Alarm Traps

If an alarm point is defined as a critical alarm severity then when the alarm occurs, the TELSEC will send an alarm with the OID for critical alarms. The critical alarm OID is 11476.2.0.5

4.8.1.2 Trap Variable bindings

Every Alarm trap will have the same variable bindings associated with it. Figure 36 shows a sample of a v2c Critical alarm condition. For v2c traps, the first two bindings are defined as the system up time and trap OID, whereas v1 traps do not use this function. This section will focus on the seven bindings unique to the TELSEC system.

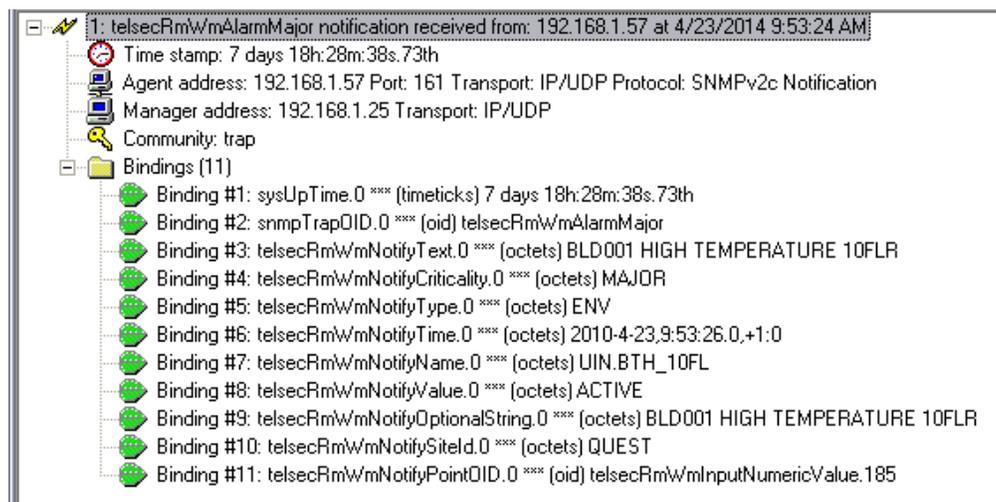


Figure 36 - SNMP v2c Critical Alarm

4.8.1.2.1 sysUpTime

The sysUpTime binding is available when sending traps in v2c format. This variable keeps track of amount of time the system has been up since it was connected to the network or reset. The value will be reset when the Ethernet cable is disconnected or if the system is reset or power cycled.

4.8.1.2.2 snmpTrapOID

The snmpTrapOID binding will contain the object identifier value (OID) for the type of alarm that was generated. This binding is only present when traps are sent in v2c format. The available values are: telsecRmWmInfo, telsecRmWmClear, telsecRmWmMinor, telsecRmWmMajor and telsecRmWmCritical.

4.8.1.2.3 telsecRmWmNotifyText

This binding contains the text string of the alarm message

4.8.1.2.4 telsecRmWmNotifyCriticality

This binding will have the value of the alarm criticality for the generated alarm. Values in this binding will be CRITICAL, MAJOR, MINOR, CLEAR and INFO

4.8.1.2.5 telsecRmWmNotifyType

The TELSEC supports three types of alarms that can be used for sorting. The types are ENV for environmental, EQPT for equipment alarms and ACC for Access Control messages and MOD for Modbus alarms. Access control message will be detailed further below.

4.8.1.2.6 telsecRmWmNotifyTime

This binding will show the date and time when the alarm condition was sent to the server.

4.8.1.2.7 telsecRmWmNotifyName

The name of the point that generated the message will be stored in this binding. Example UIN.FIRE means that the alarm was generated by Universal input labeled with a user programmable name of FIRE. The name will be sent when the point goes into alarm and clears.

4.8.1.2.8 telsecRmWmNotifyValue

This OID will show the value of the alarm point when the alarm was generated. The value is in text since it could be a number or a name. Possible values in this field are ON, OFF for digital points or sensor reading in the appropriate engineering units for analog points. Additionally, Text strings such as system alarm messages can be in this field.

4.8.1.2.9 telsecRmWmNotifyOptionalString

Input alarms are user programmable and have the ability to be programmed with an additional 32-character message. This message providing additional detail of the alarm will be sent when the point goes into alarm and clears.

4.8.1.2.10 telsecRmWmSiteld

This binding contains the site identification data that was programmed into the Web Server. This is the same ID that appears at the top of each Web page when connecting to the system.

4.8.1.2.11 telsecRmWmNotifyPointOID

This binding contains the OID (object Identifier) number of the point that generated the alarm.

5 Reviewing Information and General Operation

5.1 Getting On-line:

There are four methods of communicating with the TELSEC:

- Telnet or SSH
- Dial up modem
- Direct connect RS232 port
- The front panel keypad

The front panel keypad is designed to allow a user to make simple setpoint changes and review data. The main program must be loaded over the Ethernet, modem or from the serial port.

All four methods of communication are password protected, and the TELSEC will always ask for a password when system interrogation or programming is attempted. The default passwords are MASTER, PROGRAM, and READ for the serial port, Modem and front panel. The default for Telnet access is username Admin and password admin.

5.1.1 A Word about Passwords:

The passwords described in this section are used for the front panel keypad, the local serial port and modem connections. For Telnet connections the system uses the Admin level password(s) defined in the Web Browser interface. See section 4.3.9 for setting up Telnet access.

The TELSEC has five levels of security for serial communications: READ, PROGRAM, BYPASS, ACCESS, and MASTER. The READ priority allows users to access only status information. Input values, output states, and control states can be viewed by a user with READ priority. If a user wants to change any programmed settings, he must have a PROGRAM password. This level accesses all programming functions (except equations and card access) and status information. The BYPASS level allows a user to use the BYPASS command. The ACCESS level allows a user to use the functions associated with the card access capabilities of the TELSEC. The MASTER level includes access to all previous levels, allows change of the control logic (EQUs) and allows change of the user passwords. There are 50 available passwords in the system.

The TELSEC comes pre-programmed with the passwords MASTER (password #50), PROGRAM (password #49), and READ (password #48) for the three levels of security. It is a good idea to change all three passwords before any programming is done. In this way, you can ensure your system integrity.

5.1.2 Modem:

The TELSEC system supports two modems for dialup communications. To communicate with the TELSEC via dial-up modem you need an AT command set compatible modem on the other end with communications software to handle the call. Any off the shelf package will do. For software recommendations, contact your Quest representative. The TELSEC modem will connect using the highest negotiated speed. Be certain the calling modem is set to use error correction and data compression.

The phone should ring once and the TELSEC will answer. After a few seconds, the TELSEC will print out the system identification and will be ready to accept a command. The system will prompt for a password when the first recognizable command is entered. If you press the enter key twice prior to entering a command, the system will prompt for your Username and then password. The default usernames and passwords are the same. I.e. MASTER and MASTER. Enter any recognized password to begin your session. When finished with the TELSEC, simply hang-up (drop DTR to) the modem using your communications software or issue the HANGUP (HA)

command; the TELSEC will log out. If the TELSEC senses no modem activity after a 10-minute period, it will hang-up the modem and log out.

5.1.3 Direct Connect:

Use a straight through 9-pin serial cable to connect to the terminal port on the front of the TELSEC. Set your terminal software for 9600 baud, 8 data bits, no parity, and 1 stop bit.

Press 'Enter' and a string of text will appear on the terminal as the TELSEC detects the new hardware connected to the db9 port and will interrogate to find whether or not a modem has been plugged in. If you press the enter key twice prior to entering a command, the system will prompt for your Username and then password. The default usernames and passwords are the same. I.e. MASTER and MASTER. After attempting to initialize the port, the TELSEC will display a message stating "direct connect mode established." You may now enter a command and begin your session. When finished, disconnect your terminal and the TELSEC will log you out.

5.1.4 Telnet over Ethernet:

The Telnet connection over the optional Ethernet interface will act just like the direct connection to the TELSEC. Use your Telnet client to establish a connection to the IP address. Then enter the username and password when prompted. The passwords used for the Telnet session is one of the Admin Level username/passwords that are configured in the Web Server. See section 4.3.9.

5.1.5 Front Panel:

To get on-line using the front panel, begin by pressing either the REVIEW or PROGRAM key. The TELSEC will require a password for PROGRAM access. Using the up and down arrow keys, to scroll through the letters appearing on the display to the first letter of the password. When set, use the right arrow key to move over to the next letter position. Once there, use the up and down arrows to display the second letter of your password. Continue until the complete password has been entered.

Use the left arrow key to make corrections. When finished, press the ENTER key. The TELSEC will display "OK" if the correct password has been entered. You may now begin your session. When finished, press the EXIT key two times in succession to log off the front panel. If no keys are pressed for a period of ten (10) minutes, the TELSEC will automatically log off the user.

5.2 TL1 Commands and Alarm:

TL1 stands for "Transaction Language 1." The TELSEC supports TL1 alarm messaging for all alarms being sent out. All digital inputs can be defined as alarm points and will automatically generate an alarm if an ON condition is detected for the specified delay (see DEFINE UIN). Equations can also generate TL1 alarms based upon a monitor and control strategy that the operator defines. The following read only commands are available for use with the TELSEC.

5.2.1 RTRV-HDR:

The RTRV-HDR command is used to retrieve the system identification which is contained in the definition of ID 1 (see DEFINE ID). The command format is as follows:

```
RTRV-HDR:<TID>::<CTAG>;
```

TID Target identifier (the first ID line). This can be omitted on direct connect.

CTAG Correlation tag. Used to match the response to the command with who sent the command

Example:

```
RTRV-HDR:TELSECRM::K;  
RTRV-HDR:::K;
```

5.2.2 RTRV-ALM:

The RTRV-ALM command is used to review active alarms. By issuing the command, the TELSEC will show all currently active alarms. Use the REV ALARM command to see a history log of alarms. The format for RTRV-ALM command is as follows: RTRV-ALM-<TYPE>:<TID>::<CTAG>;

Where:

TYPE

ALL Will show all active alarms.
ENV Shows active environmental alarms.
EQPT Shows active equipment alarms

TID Target identifier (first line of the ID). This can be left out for direct connect.
CTAG Correlation tag to match the request with response.

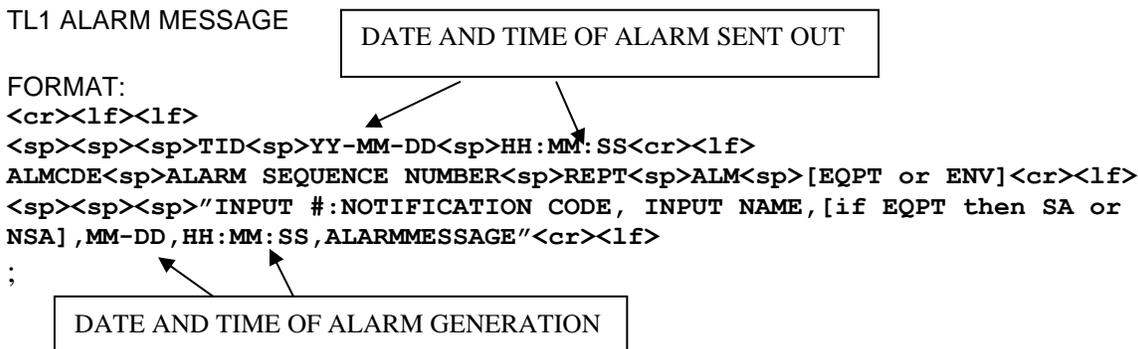
Examples:

```
RTRV-ALM-ALL:TELSECRM::X123;
RTRV-ALM-ENV:::XYZ;
RTRV-ALM-EQPT:TELSECRM::K;
```

5.2.6 Automatic TL1 Alarms

Once a point is determined to be in alarm, the controller will automatically send the alarm and log the event in the alarm log. When the alarm goes away, the controller will automatically send out a clear message in TL1 format. The clear will also be logged in the alarm log. Refer to section 6.3.1 for programming alarm points.

TL1 ALARM MESSAGE



ALMCDE

*C = CRITICAL ALARM

** = MAJOR ALARM

*<sp> = MINOR ALARM

A<sp> = AUTOMATIC used for the clear message

NOTIFICATION CODE

CR = Critical alarm

MJ = Major alarm

MN = Minor alarm

CL = Cleared alarm

The ALARMMESSAGE is a 32-character message that can be defined for each alarm input. The text of the message should be descriptive and provide additional detail on the type of alarm point.

Sample Environmental alarm:

```
SITE401 99-10-26 11:43:39
** 1 REPT ALM ENV
"UIN.1:MJ,POWER,10-26,11:43:39,COMMERCIAL POWER FAILURE"
;
```

Sample Clear Alarm:

```
SITE401 99-10-26 11:43:59
A 2 REPT ALM ENV
"UIN.1:CL,POWER,10-26,11:43:59,COMMERCIAL POWER FAILURE"
;
```

Sample equipment alarms:

```
SITE404 99-10-26 11:43:39
** 3 REPT ALM EQPT
"UIN.2:MJ,CGA,SA,10-26,11:43:39,"
;
```

```
SITE404 99-10-26 11:43:59
A 4 REPT ALM EQPT
"UIN.2:CL,CGA,SA,10-26,11:43:59,"
;
```

5.3 REVIEW Command:

The REVIEW command is used to see the current status of a point or of several points.

Syntax: REVIEW <POINTTYPE>[.#]

<POINTTYPE>: Available point types are:

UIN RLY DAT TOD EQU VAR SPT DOR BAT ALARM LOG BUS

Note: Under the LOG command you will have access to:

LOG UIN.# or RLY.#	Review log entries for the specified point.
LOG FREE[POINT.#]	Review the freeform log entries. These are entries put in the log with equations.
LOG ACCESS	Review the Access Control Log
ALARM	Review the entries in the Alarm Log

5.3.1 Column Header Definitions:

Each point type and TELSEC header will be explained in this section. In all cases, the # will be the point number (physical or virtual) and the NAME will be the user defined name given to each point.

5.3.2 REVIEW UIN:

#	NAME	VALUE	DESCRIPTION	INT	ON	EVENT
---	------	-------	-------------	-----	----	-------

Value	The analog input sensor value or the digital input status (ON or OFF).
DESCRIPTION	The 32-character message defined with the digital input for TL1 alarming.

INT ON Interval ON time (resets to 0 every time the input goes on and then counts ON time for this cycle).
 EVENT Digital event counter. The number of on and off events. There are two events per one complete cycle.

(For more on timers, see Chapter 8, Section 7.4.)

5.3.3 REVIEW RLY

NAME PRG STAT BYPASS ACCUM INT ON INT OFF TIMER EVENT

PRG Shows the current program state.
 STAT Shows AUTO meaning it is following the program state or the bypass state of ON or OFF.
 BYPASS If this RLY has been bypassed, the time remaining on the bypass will be seen here or the word FOREVER meaning it has to manually set to AUTO.
 ACCUM Accumulated ON time (keeps track of the total amount of on time).
 INT ON Interval ON time (resets to 0 every time the output goes on and then counts ON time for this cycle).
 INT OFF Interval OFF time (resets to 0 every time the output goes off and then counts OFF time for this cycle).
 TIMER Relay event timer (total time since timers were cleared).
 EVENT Relay event counter. Increments when RLY changes state (ON or OFF).

5.3.4 REVIEW DAT

NAME STATUS

STATUS Shows the DAT schedule status of ON or OFF.

5.3.5 REVIEW TOD

NAME STATUS

STATUS Shows the TOD state (ON or OFF)

5.3.6 REVIEW EQU

NAME VALUE DISABLE

VALUE Shows the EQU value, which is the result of using the RETURN command in your equations.

DISABLE Shows if the equation has been DISABLED (ON = DISABLED or OFF = ENABLED). A disabled equation is suspended from operation and won't run until it is enabled.

5.3.7 REVIEW VAR

NAME VALUE

VALUE Shows the current value of the memory variables. This could differ from the initial (LIST VAR) value if an equation has been programmed to change it.

5.3.8 REVIEW SPT

NAME VALUE

VALUE Shows the current value of the set points. This could differ from the initial (LIST SPT) value if an equation has been programmed to change it.

5.3.9 REVIEW DOR

NAME VALUE

VALUE Shows the ON and OFF status of the door points that work in conjunction with the card access portion of the system. An ON value means that a valid card has been presented and the system has energized the door control point to allow access.

5.3.10 REVIEW BAT

NAME VOLTAGE TIME REMAINING CAPACITY

VOLTAGE The voltage being reported by the input monitoring the batteries. This is typically UIN.3 which is tied to the incoming power to the TELSEC.

TIME REMAINING The amount of time remaining, in hours, until low voltage disconnect is reached. When the system is not in battery discharge, the TELSEC will make the TIME REMAINING equal the capacity.

CAPACITY The estimated total capacity in hours of the battery plant. This figure is calculated during battery discharge and is updated every 15 minutes while in discharge.

Note: values of 0 for the time remaining and capacity mean that the system has not been in a discharge, so it has not done the initial calculations.

5.3.11 REVIEW ALARM

This command will cause a list back of the alarm history log. There are no headers for this log. The most recent 254 alarms will be listed with the most recent at the beginning of the log to the oldest at the end. The log will also include system notices that are logged, but not sent out to an alarm center.

5.3.12 REVIEW LOG:

The system logging retrieval scheme allows the user to review combinations of as many as four inputs and outputs. The system will also allow you to specify a start date and time and a retrieval interval. The interval allows you to specify the frequency of the data that you are reviewing. If you log analog inputs every 10 minutes but want to see a report showing the value every hour, then you would specify an interval of 60 for every sixty minutes.

Syntax: REVIEW <POINT 1>[<POINT 2> <POINT 3> <POINT 4>] [<MM/DD/YY> <HH:MM> <AM/PM>] [<INTERVAL>]

Examples:

```
REVIEW LOG UIN 1
REVIEW LOG UIN 1 UIN 2 RLY 1 RLY 2
REVIEW LOG UIN 1 UIN 2 RLY 1 RLY 2 3/31/19
REVIEW LOG UIN 1 UIN 2 RLY 1 RLY 2 3/31/19 3:00 AM
REVIEW LOG UIN 1 UIN 2 RLY 1 RLY 2 3/31/19 3:00 AM 60
```

Use of REVIEW LOG: To see history log entries with date, time and point value, in ascending (oldest to newest) date/time order.

REVIEW LOG FREE [POINT.#]: Entries in the freeform log will display with date and time stamp in ascending order.

Example:

```
REV LOG FREE
(Shows all entries in the free form log)
REV LOG FREE VAR.1
(Shows entries for variable 1 only)
```

REVIEW LOG ACCESS: Access control entries will display with date and time stamp in descending order. See *Chapter 9 - Access Control* for more information.

5.3.13 REVIEW BUS

ADDR PRESENT STATE RETRIES CRCERRS

ADDR The address of the expansion module. Currently there is only one module supported.

PRESENT This field will show YES or NO depending on if the module is defined to be on (SET BUS ON).

STATE The status of the module. The value will be either OK or ERR.

RETRIES when the module is in error, this field will show the number of retries the TELSEC did to try and communicate with the expansion module.

CRCERRS This field counts the total number of errors that have occurred when the TELSEC is trying to communicate with the expansion module.

5.4 Bypass Command:

Use the **BYPASS** command to toggle RLYs and UINs to a specified state or to override programming. Once bypassed, use the **AUTO** state to remove the bypass. If using a time interval, the point will revert back to **AUTO** state once the period times out. The **BYPASS** command overrides the automatic control.

Syntax: BYPASS <RLY.#|UIN.#> <ON/OFF/TO #/AUTO> <TIME HH:MM - (0=FOREVER)>

Example:

```
BYPASS RLY.1 ON 00:05
(Turns RLY.1 ON for 5 minutes.)
```

```
BYPASS RLY.2,3 OFF 0
(Turns RLY.2 and 3 OFF forever. Operator must BYPASS to AUTO to clear BYPASS.)
```

```
BYPASS RLY.2 AUTO
(Clears any RLY.2 bypass.)
```

BYPASS UIN.4 ON 00:05
(Turns input 4 ON for 5 minutes.)

BYPASS UIN.5,6 OFF 0
(Turns input 5 and 6 OFF forever. Operator must BYPASS to AUTO to clear BYPASS.)

BYPASS UIN.2 to 50 00:05
(sets analog input 2 to 50% of its range for 5 minutes.)

BYPASS UIN.2 AUTO
(Clears the bypass on input 2.)

Note: Bypassing and input ON or OFF means the input will have that status value and any alarm associated with the point will active or clear.

5.5 CLEAR Command:

The CLEAR command provides a quick and easy way of resetting TELSEC timers, setpoints, and variables. Timers and event counters will be reset to a zero (0) value while variables and setpoints will be set to their initial defined value.

Syntax: CLEAR <POINTTYPE>.#

<POINTTYPE>: Available points to clear are:

UIN RLY VAR SPT RAC RLO RLF RTM REC DNO DEC

Example: CLEAR VAR.1-10
CLEAR SPT.3,8,10-32
CLEAR RTM.2
CLEAR UIN.1
CLEAR RLY.5

Note: RAC RLO RLF RTM REC are the individual Relay point timers and DNO DEC are the individual Digital input timers

5.6 HANGUP Command:

Use the HANGUP command when you wish to log off the TELSEC when communicating over the modem or to log the user's password off the system if direct connected. The modem will hang-up and log the user out of the system.

Syntax: HANGUP or HA

5.7 **SEARCH Command:**

Use the `SEARCH` command to look for points in all of your equations. The command will report back equation numbers where the `point.#` occurs. This way you can quickly and easily find every control strategy (EQU) where the point is referenced.

Syntax: `SEARCH <POINTTYPE>.#`

`<POINTTYPE>`: Any TELSEC point type.

Example: `SEARCH RLY.3`

Response: Found in equations 1, 2, 5, and 10.

5.8 **Special Command Characters:**

The TELSEC accepts a few additional special function characters.

5.8.1 **ABORT keys :**

ESCAPE (ASCII 27) and Ctrl-C (ASCII 3). These two characters can be used to abort any TELSEC command or display of information. You issue the Ctrl-C command by holding down the Ctrl key on your terminal and then pressing the C key. All Ctrl sequences are activated in this manner.

5.8.2 **Flow Control:**

Ctrl-Q (ASCII 17) and Ctrl-S (ASCII 19). These two characters are also known as `XON` and `XOFF`. The Ctrl-S is the `XOFF` and if issued by the user will temporarily stop transmission from the TELSEC. The Ctrl-Q is the `XON` and will cause the TELSEC to continue transmission after an `XOFF` has been issued. It should also be noted that the TELSEC will issue `XON` and `XOFF` characters during high speed downloading of programs when using the ASCII text transfer method.

5.9 **Setting Up a Modem Alarm Receiver**

For the TELSEC to call out alarms through a modem, an Alarm Receiver must be hooked-up on the other end. The alarm receiver is usually placed in the service department where the appropriate personnel can respond quickly if an alarm is generated. An alarm receiver usually consists of a modem and a serial printer. The TELSEC will call out alarms at the speed programmed in the `DEF ANM` command or use the default speed if none was specified. The Alarm Receiver modem should be set to automatically answer the phone. Review your modem's instructions for the proper commands. Once the phone is answered, the TELSEC will begin transmitting the alarm text. This is where the printer comes in. Most modems use a serial port for communication. By hooking this serial port to a serial printer, the TELSEC text will be printed. You must match the printer baud rate with the baud rate of the modem. Once set up, any TELSEC alarm will be printed on the printer.

Another variation of the alarm receiver involves a computer system. You can set up communication software to automatically answer modem call-ins. Once answered, the software can capture any transmitted text and either save it, print it, or both. If you have questions about alarm receivers, contact your Quest Controls representative.

5.10 TELSEC Point Acronyms and Quantities

The numbers in parenthesis show the maximum number available for the TELSEC.

KEY	Yellow Keys on Front Panel (2)
EQU	Equations or control strategies (64)
VAR	Memory Variables used for status and storing the outcome of equations (64)
SPT	Setpoints. Used to store and reference setting for control strategies. (32)
DOR	Door access control point (4)
MSG	User definable 32-character messages (255)
ANM	Alarm Phone Number (4)
UIN	Universal Input Point TELSEC1500 (16), 2000 (32), with RME expansion module (64), DIEM (232 total)
RLY	Digital Output Point TELSEC1500 (8), 2000 (16), with RME expansion module (32)
TOD	Time Of Day Schedule Point (4 schedules with 16 priorities each)
DAT	Alternate Date Schedules (8)
RAC	Relay Accumulating ON Timer
RLO	Relay Interval ON Timer (1 per RLY)
RLF	Relay Interval OFF Timer (1 per RLY)
RTM	Relay Event Timer (1 per RLY)
REC	Relay Event Counter (1 per RLY)
DNO	Digital Input Interval ON Timer (1 per Digital UIN)
DEC	Digital Input Event Counter (1 per Digital UIN)
CARD	Access Control Cards (600)

6 Basic Programming Commands

6.1 General Information

The TELSEC uses a control program called "Equation Language" for developing control strategies in addition to the standard ON/OFF discrete alarm monitoring which is handled with a single define statement. The building blocks for this system are called points. A point can be any input, output, or control unit. Each point has a name associated with it. A program is developed by defining these points and setting certain constraints around them. The TELSEC has been designed to enable a person with no experience in programming to easily learn the system. This section will show how to define all the points in the system. Defining a point tells the TELSEC how the point is to be used. I.e. reading inputs in certain engineering units or how an output operates etc.

6.2 Command Syntax

This section outlines the syntax for defining the TELSEC's points through the modem, local communication port or Telnet. This is a reference section. Each command will be listed and then each command component will be explained in detail. If defaults exist for a specific command or point, they will be shown here. For the actual programming of the TELSEC, see Equation Language.

6.2.1 Conventions:

Text shown in this `TYPEFACE` contain commands that are sent to the TELSEC. Optional text is shown in brackets, [text]. If the user can enter one command from a list, greater-than/less-than symbols denote the list, <list>. These same conventions are used with the TELSEC help prompts.

All programming must be ended by pressing the `ENTER`, `RETURN` or semicolon (;) key. If a mistake is made during input, use the backspace character to erase or press the escape (ESC) key to abort.

6.2.2 A Word about Names:

The TELSEC associates an eight-character, alphanumeric name with every point except the inputs (UIN) which support a 32-character name. The name must start with an alpha (A-Z) character followed by additional alpha-numeric (A-Z,0-9) or special characters. The special characters are %, &, and _. The TELSEC will not recognize a space within a name. The TELSEC has default names for all points but we recommend users assign their own names. For example, the TELSEC has default name of `UIN001` for `UIN.1`. This name does not provide much information for this point. Let's say this point is a temperature sensor input for the outside air temperature. If this point is named `OUTAIR`, it will have much more meaning in your programming.

6.2.3 HELP Command:

Issuing the `HELP` or `?` command alone will present the user with a list of available `KEYWORD` entries. A `KEYWORD` entry is defined as any command that starts a TELSEC programming line. The available `KEYWORD` list is:

<code>DEFINE</code>	<code>CLEAR</code>	<code>REVIEW</code>	<code>LIST</code>	<code>NAME</code>	<code>SET</code>
<code>REMOVE</code>	<code>BYPASS</code>	<code>COPY</code>	<code>HELP</code>	<code>HANGUP</code>	<code>SEARCH</code>

A user must start a line of programming with one of these `KEYWORDS`. You can see specific help on a `KEYWORD` by entering the `KEYWORD` followed by the `ENTER` key. Further help levels can be seen by entering the `KEYWORD` followed by a point type.

6.2.4 Short Cuts

All commands can be abbreviated to the first three characters command from another. For example, the REVIEW command can be shortened to REV.

6.3 DEFINE Command:

The DEFINE command begins all point definition programming. By defining a point, the TELSEC is programmed as to how that specific point will operate. Each of the following point types can be defined:

UIN RLY KEY DAT TOD EQU VAR SPT DOR ANM MSG BAT CARD

6.3.1 DEFINE UIN:

Inputs come in two types which are Digital and Analog. Digital inputs are either dry contact or wet contact (3 – 75 VDC) and can be defined as normally open or normally closed. Analog inputs are any device that outputs 0-6 VDC or 0-20 mA. The TELSEC provides built in conversion factors for various sensors as well as manual scaling factors for sensors with different ranges and engineering units. (See section 6.4.6)

Use the DEFINE UIN command to define your analog and digital inputs.

Format:

```
DEF [NAME =] UIN.# (ANA)
<TEMPF|TEMPC|THERMF|THERMC|RH|FC|MV|PSI|HPSI|B48|B24|B12|PSI1|PSI2|CFH1
|CFH2|CFH3|CFH4|SCALE #>
  <OFFS> [MSG.#] <[NOT] LOG> [TOD.#] <[NOT] AVG (1-120)>
(DIG) <DIG|INVDIG> [<ENV|EQPTSA|EQPTNSA> <CR|MJ|MN> <DLY (0-600)>
<MSG.#|NONE> [ANM LIST]]
  <NOT LOG|LOG [TOD.#]> [THERMF]
```

[NAME =]: A user-defined 32-character point name. (i.e. OUTAIR). The name is optional in the define command. You do not have to enter the NAME and equal sign if you are redefining a point.

6.3.1.1 Analog inputs (ANA):

TEMPF	Degrees Fahrenheit using AD592 temperature sensors.
TEMPC	Degrees Centigrade using AD592 temperature sensors.
THERMF	Degrees Fahrenheit using 10k Type III Thermistor temperature sensors.
THERMC	Degrees Centigrade 10k Type III Thermistor temperature sensors.
RH	Relative Humidity conversion factor.
FC	Foot-Candle (light level) conversion factor.
MV	Milli volt conversion factor.
PSI	0-100 PSI (pounds per square inch) conversion factor.
HPSI	0-500 PSI conversion factor.
B48	48v battery monitoring from 37 to 60 VDC.
B24	24v battery monitoring from 21 to 30 VDC.
B12	12v battery monitoring from 0 to 15 VDC.
SCALE #	Use a manual scaling factor for this input. (See section 6.4.6)

<OFFSET>: A number between -127 and 127 must be entered here. Only whole numbers will be accepted. This number is used to correct the sensor reading.

[MSG.#]: The message option (MSG) allows you to assign one of the 64 messages to the input. When the point is alarmed, the system will send the assigned message in the alarm message.

[TOD.#]: This is an optional setting where you can enter a time of day schedule (TOD) so that the input only logs when the schedule is in the ON condition.

<[NOT] LOG>: The TELSEC can be programmed for this input to automatically insert an entry into the log space for this point. Use the word LOG if you want to log the input or use NOT LOG to prevent automatic entry into the history log.

<[NOT] AVG>: This input can be programmed to have instantaneous data or averaged data sampled every minute for the log entry. NOT AVG will cause the system to wait the delay time and then enter the current reading into the history log. AVG will cause the system to average the sensor reading over the interval time and then enter the average reading once the interval time has been met.

<LOG INTERVAL>: Input the minute interval for log entries here. The range is 1 - 120 minutes.

6.3.1.2 Example Analog Define UIN:

```
DEF ROOMTEMP = UIN.1 TEMPF -1 MSG.1 LOG AVG 15
DEF ROOM_%RH = UIN.2 RH 0 LOG NOT AVG 16
DEF OUTAIR = UIN.7 THERMF 0 LOG TOD.1 AVG 30
DEF DC_AMPS = UIN.16 SCALE 1 0 LOG AVG 5
```

6.3.1.3 Digital inputs (DIG):

<DIG/INVDIG>: A point defined as DIG will show an ON or alarm value when a contact closure is made (normally open). A point defined as INVDIG will show an ON or alarm value when the input is in the open state (normally closed).

DIGITAL	Digital input point for normally open points.
INVDIG	Digital input point for normally closed points.

Alarm Type: <ENV/EQPTSA/EQPTNSA> This section is optional for automatic alarming of the point. Omit this section for inputs that are monitor only or will be alarmed through the equations.

ENV	Specifies an environmental alarm.
EQPTSA	Specifies a service affecting equipment alarm.
EQPTNSA	Specifies a non-service affecting equipment alarm.

<CR/MJ/MN> Alarm Condition:

CR	Critical alarm
MJ	Major alarm
MN	Minor alarm

<DELAY 0-600 SECONDS> Alarm Delay: 0-600 seconds that the system will wait prior to generating an alarm.

<MSG. #/NONE>: A 32-character message can be associated with this point. See Defining MSGs. There are 254 messages available. Messages can be added to digital inputs that are defined with the automatic alarming and for digital inputs that are monitor only points or will be alarmed through Equations.

[ANM LIST]: When digital inputs defined as alarm points <ENV/EQPTSA/EQPTNSA>, you can specify which alarm phone number you want the system to dial when the point goes into alarm and then clears the alarm condition. The acronym for alarm number is ANM. Add the list of ANM's one at a time after the <MSG. #/NONE> field. Example ANM 1 ANM 2 etc. All defined alarm numbers will be dialed if you do not specify ANMs.

<[NOT] LOG>: The TELSEC can be programmed for this input to automatically insert an entry into the log. Digital inputs log when the point changes state. Using the keyword NOT LOG will prevent the system from entering change of states in the history log.

[TOD.#]: This is an optional setting where you can enter a time of day schedule (TOD) so that the input only logs when the schedule is in the ON condition.

[THERMF]: This is an optional parameter that tells the system to use the built-in thermistor circuit for sensing the digital input. The thermistor circuit looks for voltage in the 0 to 5v range. This option is useful when piggybacking other alarm systems that are monitoring the same point.

Examples:

```
DEFINE SMOKE = UIN.4 INVDIG ENV MJ 10 MSG.4 LOG
DEFINE FUSEPNL = UIN.5 DIG EQPTSA MJ 1 MSG.5 ANM 1 ANM 3 LOG
DEFINE LIGHT_SW = UIN.10 DIG LOG
DEFINE FIRETRBL = UIN.11 INVDIG ENV MJ 10 MSG.11 LOG THERMF
DEFINE Vent_SW = UIN.12 DIG MSG.12 LOG
```

Default:

Inputs 1,2 & 3 are preset as:

```
UIN.1  TEMPF  for the included temp sensor
UIN.2  RH     for the included humidity sensor
UIN.3  B48   for monitoring the incoming power to the unit.
```

6.3.2 DEFINE RLY:

Digital outputs are the TELSEC's interface to the outside world. Countless different devices can be controlled using the digital outputs of the TELSEC. In simple terms, the digital outputs turn a connected device ON or OFF according to programmed parameters.

Use the DEF RLY command to define all of your digital outputs.

Syntax: DEFINE [<NAME> =] RLY.# <FAIL STATE> <STAGING TYPE> <ENERGIZING TYPE> <[NOT] LOG>

[<NAME> =]: A user-defined point name. This is optional and does not need to be entered if you are redefining the point, but what to keep the same name.

<FAIL STATE> ON or OFF: The relay will take this state immediately after power up and before any equations can affect it.

<STAGING TYPE>:

```
STAGED      Three-second staging time active for this output.
IMMEDIATE   No staging time between digital output energizing.
```

<ENERGIZING TYPE>: On commands.

ENERGON Energizes the relay when an ON command is given by an equation or when the user Bypasses the point ON. An OFF command by the equations or by the user will de energize the relay.

ENERGOFF Energizes the relay when an OFF command is given by an equation or when the user Bypasses the point OFF. An ON command by the equations or by the user will de energize the relay.

<[NOT] LOG> Type:

LOG RLY logs on change of state.

NOT LOG RLY does not log on change of state.

Default: ON STAGED ENERGOFF LOG

Examples:

DEFINE COOL = RLY.1 ON STAGED ENERGON LOG

DEFINE VENTFAN = RLY.2 STAGED ENERGOFF LOG

6.3.3 DEFINE KEY:

The **DEF KEY** can be used to program specific functions for the two yellow buttons on the TELSEC keypad. The key labeled "COMFORT/OCCUPIED MODE" is KEY.1 and KEY.2 is labeled "LEAD/LAG SWITCH" The actual function of the keys is determined by the control strategy (equation or EQU) written to use them

Syntax: DEFINE [<NAME>=] KEY.#

<NAME>: A user-defined point name.

KEY#: A user-defined key number assignment.

Example:

DEF OCCUPIED = KEY 1

DEF LEAD_LAG = KEY 2

6.3.4 DEFINE DAT:

Use to define special date ranges or holidays to be used in programming. There are eight (8) schedules. Date schedules can be used inside of time of day (TOD) schedules or can be referenced within equations. They are used when you want action on a specific date(s) instead of a day of the week schedule.

Syntax: DEFINE [<NAME> =] DAT.# <FIRST DATE> [<CONJUNCTION> <SECOND DATE>]

[<NAME> =]: A user-defined point name. This is optional and does not need to be entered if you are redefining the point, but what to keep the same name.

<FIRST DATE>: Any valid date entry. A valid date can be in numeric format MM/DD or text format consisting of month name and numeric date.

<CONJUNCTION>:

AND Denotes two separate dates.

TO Denotes an inclusive range of dates.

<SECOND DATE>: Any valid date entry.

Default: None

Example:

```
DEFINE CHRISTMS = DAT.1 DEC 24
DEFINE JULY4TH = DAT.2 7/4
DEFINE HOLIDAY = DAT 3 12/25 AND 1/1
DEFINE WINTER = DAT.4 NOV 1 TO APR 30
```

6.3.5 DEFINE TOD:

Use the `DEFINE TOD` command to set up the 16 priorities of `ON` or `OFF` times for your `TODS`. The `TODS` can then be used in other `TELSEC` program areas such as equations, input definitions for when logging is to occur, alarm numbers to activate the number and card access to determine when a card is valid. Note: You can only name `TODS` using the `NAME` command. There are four (4) schedules.

Syntax: `DEFINE TOD.# PRIORITY# <STATE> <TIME> <DAYLIST>`

PRIORITY#: The priority of this `TOD` program entry (16 possible).

<STATE>: The digital state (`ON` or `OFF`) this `TOD` will take if the `TIME` and `DAYLIST` conditions are satisfied.

<TIME>: A time of day in the form `HH:MM [AM,PM]` when this `TOD` should become active. Time will be accepted in `AM`, `PM` or 24-hour military format.

<DAYLIST>: Days-of-the-week (`D.O.W.`) list or a date schedule (`DAT.#`). If the current date or `D.O.W.` agrees with the programmed list, the `TOD` priority will return the programmed `STATE`.

Examples:

```
DEFINE TOD.1 1 ON 8:00 AM M TU W TH F
(TOD.1 will be ON if the time is after 8:00 AM and the DOW is on a weekday.)
DEFINE TOD.1 2 ON 10:00 AM SA SU
(TOD.1 will be ON if the time is after 10:00 AM and the DOW is on a weekend.)
DEFINE TOD.1 3 OFF 5:01 PM M TU W TH F
DEFINE TOD.1 4 OFF 3:01 PM SA SU
DEFINE TOD.1 5 OFF 12:01 AM DAT.XMASDAY
(TOD.1 will be OFF if the time is after 12:01 AM and the DAT schedule XMASDAY is ON.)
```

Default: None

6.3.6 DEFINE EQU:

Equation Language

6.3.7 DEFINE VAR:

Use `DEFINE VAR` to define memory variables used in equations. There are 64 available. Variables cannot be changed from the front panel. Memory variables are useful to report status or to store numbers for equations such as the outcome of a mathematical equation (average of two sensors) or as a "flag" to tell other equations to be active based on the value.

Syntax: `DEFINE [<NAME> =] VAR.# <INITIAL VALUE>`

[<NAME> =]: A user-defined point name. This is optional and does not need to be entered if you are redefining the point, but what to keep the same name.

VAR.# <INITIAL VALUE>: The starting value of the variable. The range is -65535 to 65535. Equations can change this value. The current value can be seen with the REV VAR command where the initial value can be seen with the LIST VAR command.

Default: 0

Example: DEFINE ROOMAVG = VAR.1 70

6.3.8 DEFINE SPT:

Use DEFINE SPT to define the setpoints used in equations. The difference between SPTs and VARS is that SPTs can be modified from the front panel. There are 32 available.

Syntax: DEFINE [<NAME> =] SPT.# <INITIAL VALUE>

[<NAME> =]: A user-defined point name. This is optional and does not need to be entered if you are redefining the point, but what to keep the same name.

<INITIAL VALUE>: The starting value of the variable. The range is -65535 to 65535.

Default: 0

Example: DEFINE ROOMSPT = SPT.1 70

6.3.9 DEFINE DOR:

See Access Control

6.3.10 DEFINE ANM:

The TELSEC has the ability to send alarms or page up to four phone numbers. When an alarm (or clear) occurs, the system will use all alarm numbers that are active at that time. Alarm numbers that are not active due to a TOD qualifier will not be used. Additionally, in the UIN definition for digital alarms or equation alarming, you have the option to specify which alarm numbers to use. If you specify a number, that number will only be used if it is currently active.

Syntax: DEF [NAME=] ANM.# <'PH #'> [<TOD.#> <ON|OFF>] <PAGE|MODEM>
(when MODEM) <retry> [BACKUP] [ALMBAUD <rate>]

[<NAME> =]: A user-defined point name. This is optional and does not need to be entered if you are redefining the point, but what to keep the same name.

ANM.#: the schedule number from 1 to 4

<'PHONE NUMBER'>: The phone number that the TELSEC will dial in ALARM instances. Valid AT command characters can be used in the phone number field for delay, pulse dialing etc. The number must be enclosed in single quotation marks (') and has a maximum length of 39 characters.

[<TOD.#> <ON|OFF>]: An optional TOD qualifier can be used to make this ANM active when the TOD schedule is in either the ON or OFF state. If the TOD qualifier's state is the same as this state, the alarm will call out. If the states are not true, the alarm will not call out.

<PAGE|MODEM>: An ANM defined as PAGE will dial phone number including all pauses (,) etc. It will do this one time and is intended to connect to a digital pager and send the remaining digits after the pause character. This way the technician will now what site has paged them. An ANM defined as MODEM will attempt to connect to another modem and send the alarm message. Typically, the receiving modem is attached to a PC and setup to receive alarms. The TELSEC will continually attempt to call the modem number until successful in sending the alarm message.

<retry>: The `retry` delay is the number of minutes the TELSEC should wait between calls before making another attempt or moving to the next valid number. The value can be between 1 and 5 minutes.

[BACKUP]: The `BACKUP` option works in conjunction with the `SET COM` command (see section 6.4.9). If one COM port is defined as Network and the other as POTS, then the system will only use this alarm number if the NETWORK connection is down.

[ALMBAUD <rate>]: Some alarm receivers may require that you specify the baud rate used when transmitting the alarms. With this option you can specify the callout rate of 300, 1200, 2400 or 9600 baud. The TELSEC will use the default rate as defined in the `SET COM` command if you do not specify a rate. Enter the word `ALMBAUD` plus the rate desired to use this function.

Default: None.

Example:

```
DEFINE HEADQRTS = ANM.1 '1-813-555-1000' MODEM 1
DEFINE NITEONLY = ANM.2 '5556637' TOD.1 ON MODEM 1 BACKUP ALMBAUD 2400
DEFINE PAGENUM = ANM.3 '555-3393,,,66558' PAGE
```

6.3.11 DEFINE MSG:

The TELSEC can send the `MSG` point as an alarm message (through an equation or as part of an input definition, see `DEFINE UIN`), store the `MSG` in the freeform log, or send the `MSG` to the front panel display. See *Equation Language* for syntax using the `SEND`, `LOG`, and `ALARM` statements. The message must be enclosed in single quotation marks (') and have a maximum length of 32 characters. There are 64 `MSGs` available.

Syntax: `DEFINE [<NAME> =] MSG.# '<ASCII MESSAGE>'`

[<NAME> =]: A user-defined point name. This is optional and does not need to be entered if you are redefining the point, but what to keep the same name.

<'ASCII MESSAGE'>:

Default: None.

Example:

```
DEFINE TOOHOT = MSG.1 'TOO HOT IN SHELTER'
DEFINE SMOKEALM = MSG.2 'SMOKE OR FIRE IN SHELTER'
```

6.3.12 DEFINE BAT:

The define BAT command is used to set the alarm parameters used with the automatic battery monitoring algorithm built into the TELSEC system. The TELSEC will monitor the batteries from the incoming power to the system and report the battery voltage on input 3.

Syntax: DEF [NAME=] BAT.# <UIN.X> <CAP ALM> <TIME MJ ALM> <TIME CR ALM>

[<NAME> =] : A user-defined point name. This is optional and does not need to be entered if you are redefining the point, but what to keep the same name.

BAT.# : the number of the battery point. Currently only one (1) is supported.

<UIN.X> : the input number where the battery voltage is being monitored from. UIN.3 is tied to the incoming power of the unit so if the TELSEC is being powered from the source to be monitored, no further wiring is required.

<CAP ALM> : This is the capacity alarm threshold. Capacity is defined as the calculated total amount of time from discharge until the predicted time the battery voltage will reach the low voltage disconnect. The value for this alarm is entered in Minutes and will alarm if the calculated capacity is less than this value.

<TIME MJ ALM> : Time remaining Major Alarm. The system calculates the remaining amount of time before reaching low voltage disconnect. The system will then send a major severity alarm if the estimated time remaining is less than this value. The value is entered in minutes.

<TIME CR ALM> : Time remaining Critical Alarm. The system calculates the remaining amount of time before reaching low voltage disconnect. The system will then send a critical severity alarm if the estimated time remaining is less than this value. The value is entered in minutes.

Default:

```
DEFINE BATTERY = BAT.1 UIN.3 480 240 120
```

Uses input 3 with a capacity alarm of 8 hours, a major time remaining of 4 hours and a critical time remaining of 2 hours.

Note: The Battery monitoring function can be turned off and removed from the home page of the web server by issuing the commands NAME BAT001 = BAT.1<enter> and SET BTRY OFF<enter>. The save to flash by using the SET PRO DEF<enter> command.

6.3.13 DEFINE CARD:

See Access Control

6.4 SET Command:

The SET command is used to configure items that are global to all the other functions such as the system clock, passwords and communications ports to name a few. The available items to SET are:

```
ID CLOCK PSWD DLS BUS MAIL SCALE LIST PROGRAM COM FALSE  
APPEND CID
```

6.4.1 SET ID

The Set ID command is used to set the system identification. There are three lines available for the user to change.

Syntax: SET ID <IDNUMBER> <' ID STRING'>

SET ID <IDNUMBER>: A number from 1 to 3. The TELSEC actually has four (4) ID strings but the fourth is unchangeable.

<' ID STRING'>: A string of alphanumeric characters used to identify this particular TELSEC site. The ID strings are displayed during all call-ins and callouts. The maximum length is 78 characters and the string must be enclosed within single quotes ('). ID string 1 is used as the TID (TL1 Target Identifier) for the system and is sent with all TL1 alarm messages.

NOTE: If you are using TL1 alarm messaging, ID 1 is sent with the alarm. ID 1 should be no more than 20 characters in length and should not contain space characters in order to conform to the TL1 specification.

Example:

```
SET ID 1 'CEV#1001'  
SET ID 2 'PALMETTO, FLORIDA'  
SET ID 3 'INSTALLED DECEMBER 15, 1999'
```

Default:

```
SET ID 1 'TELSECRM'  
SET ID 2 'QUEST CONTROLS, INC.'  
SET ID 3 'PALMETTO, FL'  
SET ID 4 'REV X.X - RELEASE DATE'
```

6.4.2 SET CLOCK:

Use the SET CLOCK command to set the system clock.

Syntax: SET CLOCK <DATE FORMAT> <TIME FORMAT>

<DATE FORMAT>: Enter the current MM/DD/YYYY. The system will accept the year with only the last two digits. I.e. 07 instead of 2007

<TIME FORMAT>: Use HH:MM:SS with optional AM/PM or military time accepted. You do not need to specify the seconds. The system assumes 00 seconds if none are specified.

Example:

```
SET CLOCK 4/21/2007 3:15:20 PM  
SET CLOCK 4/21/2007 3:15 PM  
SET CLOCK 4/21/07 15:15
```

Leap Year Note: The TELSEC automatically adjusts for leap year.

Daylight Savings Note: The system will adjust for daylight savings (DLS). This feature can be changed or turned-off using the SET DLS command.

6.4.3 SET PSWD:

SET PSWD is used to set the available access codes and level of access.

Syntax: SET PSWD <#> <READ|PROG|BYPASS|ACCESS|PORT|MASTER> <'UNAME'>
<'PSWD'>

<PSWD NUMBER>: A number from 1 to 50

<ACCESS LEVELS>:

READ	Allows REVIEW, HELP, HANGUP
PROGRAM	Allows CLEAR, LIST, NAME, SET, REMOVE, COPY, SEARCH, DEFINE
BYPASS	Allows BYPASS commands
ACCESS	Allows DEFINE CARD, DEFINE DOR, REVIEW, LOG ACCESS, LIST CARD
MASTER	Allows SET PSWD, DEFINE EQU

<'UNAME'> The alphanumeric username for the particular PSWD TYPE. Maximum length is eight characters. The username must be enclosed within single quotes ('). The system uses the username and password combination when you press two successive enter keys when first logging on via the Modem or Serial port.

<PSWD STRING>: The alphanumeric password code for the particular PSWD TYPE. Maximum length is eight characters. The password code must be enclosed within single quotes (').

The password levels associate specifically with commands. If you want access to a specific command, you must specify a password with the corresponding level. A MASTER level alone would not have access to the REVIEW command. You need READ access for this command to function.

Example:

```
SET PSWD 1 READ 'AAA' 'AAA';  
SET PSWD 2 READ PROGRAM BYPASS 'TECH' '7618'  
SET PSWD 3 READ PROGRAM BYPASS ACCESS MASTER 'BIG' 'KAHUNA'  
SET PSWD 4 PORT 'COM4' 'COM4'
```

Default:

```
SET PSWD 48 READ 'READ' 'READ'  
SET PSWD 49 READ PROGRAM BYPASS 'PROGRAM' 'PROGRAM'  
SET PSWD 50 READ PROGRAM BYPASS ACCESS MASTER 'MASTER' 'MASTER'
```

6.4.4 SET DLS (Daylight Savings):

This is used to change the default daylight savings time.

Syntax: SET DLS <SPRING|FALL> < {<FIRST|SECOND|THIRD|FOURTH|LAST> <DOW>
<MONTH>} | <NONE> >

<SPRING|FALL>:

SPRING Clock moves ahead one hour.

FALL Clock moves back one hour.

{<FIRST|SECOND|THIRD|FOURTH|LAST> <DOW> <MONTH>}: Specify the position of the month, the day of the week and the month in which you want the DLS to take effect.

<FIRST|SECOND|THIRD|FOURTH|LAST> To specify the position in the month.

<DOW> To specify which Day Of the Week DLS occurs.

<MONTH> Enter the month of daylight savings.

The word NONE can be entered for no DLS clock adjustment.

Example:

```
SET DLS SPRING SECOND SUNDAY MARCH
```

```
SET DLS FALL FIRST SUNDAY NOVEMBER
```

```
SET DLS FALL NONE
```

```
SET DLS SPRING NONE
```

Default:

```
DLS SPRING: SUNDAY, MAR 10, 2019 2:00:00 AM
```

```
DLS FALL : SUNDAY, NOV 3, 2019 2:00:00 AM
```

Once a date type is entered, the TELSEC calculates the actual date of DLS. The LIST DLS command can then be used to see the actual date. The time adjustment occurs at 2:00 AM on the calculated date.

6.4.5 SET BUS:

The set BUS command is used to turn on the communications to the TELSEC expansion module. Once the BUS is set to ON, you will have access to the additional 32 inputs (numbered 33-64) and 16 inputs (numbered 17-32), or 200 additional inputs with the DIEM. Additionally, if communications fail between the modules, the TELSEC will automatically generate a BUS alarm to notify the alarm center of a problem. The system will also display the BUS alarm on the front display.

Syntax: SET BUS <ON|OFF>

<ON|OFF>: ON turns on the bus communications and OFF disables the BUS communications.

Example:

```
SET BUS ON
```

```
SET BUS OFF
```

Default:

```
SET BUS OFF
```

6.4.6 SET SCALE:

There are eight (8) user-definable scaling factors that can be used to create custom engineering units for inputs. Once you create a scale you can reference it with the DEF UIN command (see section 6.3.1.1)

Syntax: SET SCALE # <MIN> <MAX> <' 3 CHAR NAME' > [T]

MIN: The minimum value of the sensor. This is the value the TELSEC will display when the input is at zero (0) volts.

MAX: The maximum value of the sensor. This is the value the TELSEC will display when the input returns a value of six (6) volts. Many sensors return a maximum of five (5) volts so the value must be calculated in this situation. Example: you have a 0-100 amp transducer that provides a proportional signal of 0-5 VDC. There is 20 amps per volt DC (100/5) so at 6 volts the sensor would read 120 amps. Enter 120 as the maximum and 0 as the minimum.

3-CHAR NAME: The three -character name that will display when any input defined with this SCALE # is REVIEWED.

[T] : By using the optional T on the end of the SCALE command, you tell the system to use the Thermistor (resistive) circuit instead of the normal 0-6v input. Use this function when you are scaling resistive input devices such as temperature sensors or setpoint adjuster slide switches.

Example:

```
SET SCALE 1 0 60 'AMP'
```

(scale for a 0-50 amp transducer with an output of 0-5 vdc)

```
SET SCALE 2 -25 125 '%RH'
```

(scale for a 0-100% humidity sensor over 4-20 mA, which is converted to 1-5 vdc)

```
SET SCALE 3 -3 3 'ADJ' T
```

(scale for a +/- 3 degree setpoint adjustment slider)

Default: None. There are eight (8) user-definable scaling factors.

6.4.7 SET LIST:

SET LIST establishes the format for how equations will be displayed when they are listed for viewing.

Syntax: SET LIST <NUMBER|NAME|NONE>

<NUMBER|NAME|NONE> :

NAME : Equations will list using the format PT.NAME. (Example: UIN.OUTAIR)

NUMBER : Equations will list using the format PT.NUMBER. (Example: UIN.3)

NONE : Equations will list using the format NAME. (Example: OUTAIR)

Default: NUMBER

6.4.8 SET PROGRAM:

The SET PROGRAM command is used to receive application programs, store programs, remove programs and perform upgrades.

Syntax: SET PROGRAM <TYPE>

<TYPE>:	
DEFINE:	Takes the current program in RAM and writes it to the non-volatile flash memory.
REMOVE:	Removes the application program stored in flash. When the system is cold started, it will come back with no application program loaded.
PROGRAM:	Starts the Xmodem protocol to receive an application program using Xmodem transfer.
MAX:	Starts the Xmodem protocol to receive an operating system Upgrade via Xmodem transfer. Contact your Quest representative for available upgrades and further instruction.

6.4.9 SET COM:

The SET COM command sets the communications functions for the two COM ports. COM 1 is typically used for primary communications to a central alarm center and COM 2 is used for craft and regional groups. Physically on the unit, COM 1 is associated with the rear SR232 port and the first communications socket (M1). COM 2 is associated with the front RS232 Craft port and the M2 communications socket. The M1 and M2 sockets support either a modem or an interface card to the Ethernet module. Both COM ports can support dual duty of remote and local serial connection, but when a serial cable is connected, the remote communication function is disabled for that port.

Syntax: SET COM <1|2|4> <POTS|DIRECT|NETWORK> <BAUD> <8|7> <2|1> <N|E|O>
<ON|OFF (ECHO)> ['AT STR'] [BLOCK]

<COMNUMBER>: Enter 1 or 2. Typically COM 1 is for the main alarm center or NMA.

<TYPE>:	
POTS	Dial-up connection.
DIRECT	RS232 connection only.
NETWORK	Network connection. Works similar to DIRECT, but allows the BACKUP function in the DEF ANM to work when the port is down (see section 6.3.10).

Note: if a COM port is defined as POTS, you can still plug into the corresponding serial port and the controller will allow access after it sends out a modem initialization (init) string and does not receive response. The system will then temporarily enter direct connect mode until the user unplugs it.

<BAUD>: Enter the speed you want to use for communications from 300 to 9600 baud.

<8|7> Data Bits: Enter 7 or 8 for the data bits.

<2|1> Stop Bits: Enter 1 or 2 for the stop bits.

< N E O >	Parity:
E	even parity
O	odd parity
N	no parity

<ON OFF (ECHO)>:	
ON	Shows characters typed.
OFF	Does not show characters typed.

['AT STR']: optional AT init string is available for ports defined as POTS. It is recommended that you do not change the init string unless you are familiar with AT command sets and require setting changes for proper connectivity.

[BLOCK] : This is an optional parameter that will prevent any program changes from a remote site via modem dialup. If BLOCK is specified then no changes will be accepted via the modem, regardless of the person's password level.

Example:

```
SET COM 1 NETWORK 9600 8 1 N ON
SET COM 2 DIRECT 9600 8 1 N OFF
SET COM 2 POTS 9600 8 1 N ON
```

Default:

```
SET COM 1 POTS 9600 8 1 N ON 'ATE0V1X4&C1S0=1&S0&D3S7=45'
SET COM 2 POTS 9600 8 1 N ON 'ATE0V1X4&C1S0=1&S0&D3S7=45'
```

NOTE: Default COM settings are dependent on how the system is configured at the factory.

6.4.10 SET CID:

The TELSEC system supports caller ID modems to prevent people from connecting with the system unless they are calling from a specific location. In order to use this function, you must have a Caller ID modem in M1 or M2 socket of the TELSEC and also must have the Caller ID feature turned on for the phone line the TELSEC is using. Once CID in the TELSEC is set to ON, it will not answer the phone unless the caller ID string matches one of the phone numbers in the database.

Syntax: SET CID <ON|OFF> | <# (1-24)> <'10 DIGITS'>

<ON|OFF>:

ON = Turns on the Caller ID feature.

OFF = Turns off the Caller ID feature.

<# (1-24)>: Up to 24 different numbers can be programmed. Choose 1-24 for the number you want to enter or change.

<'10 DIGITS'>: The 10-digit phone number of the acceptable phone line you want to allow calls from.

Example:

SET CID ON (turns on the Caller ID function)

SET CID 1 '9415551212' (the first acceptable number)

Default:

OFF

Note: The list of numbers will stay in the system if you turn off the CID function. You may want to temporarily turn off this function to allow access and then turn it back on later.

6.5 LIST Command:

Use the LIST command to retrieve the TELSEC program data. The list command will list back the program element in the exact format that the TELSEC will accept command.

Syntax: LIST < POINTTYPE > [.#]

< POINTTYPE>: Any TELSEC point type.

UIN	Definitions of the Inputs
RLY	Definitions of the Outputs
KEY	Definitions of the two yellow keys on the keypad
DAT	Alternate date schedule definitions
TOD	Time OF Day schedule definitions
EQU	Listing of an equation program.
VAR	The initial setting for memory variables
SPT	The initial setting for set points
DOR	Definition of the door access control points
ANM	Definition of the Alarm phone numbers.
MSG	The definition of all system messages
BAT	Alarm settings for the Battery monitoring Algorithm.
ID	The System Identification strings.
PSWD	The settings for the various available passwords.
DLS	Day Light Savings settings
CARD	The definitions of a CARD for the card access option.

BUS	Shows if the BUS is set to ON or OFF.
SCALE	Shows the scale factors for the manual scales
LIST	Shows how the equations will list back.
COM	The current settings for the communications ports.
CID	Shows if Caller ID is on and valid phone numbers.

[.#]: An optional number list shows the specified point type. This can be used for all points that more than one entry.

Examples:

```
LIST UIN.1,2,5-7   Programming will list for UINs 1,2,5,6,7.
LIST RLY          Programming will list for all RLY points.
LIST TOD.1       Programming will list for TOD.1.
```

The LIST command supports the key word ALL, which will cause the system to list back all of the TELSEC programming with the exception of the card access (CARD) database. This is useful for retrieving the program for storage on a local computer.

Example:

```
LIST ALL (lists all programming except CARDS)
```

6.6 REMOVE Command:

Use the REMOVE command to delete a point(s) from the TELSEC programming memory. Some items may not be removed and should be re-defined rather than removed. The points you removed only affects RAM memory and doesn't affect the program stored in flash unless you do a SET PRO DEF command to store the new settings from RAM memory

Syntax: REMOVE <SOURCE POINTTYPE>.#

<SOURCE POINTTYPE>: Available point types are:

```
RLY KEY DAT TOD EQU DOR ANM MSG PSWD CARD MAIL
```

Example:

```
REMOVE PSWD.1   Deletes PSWD.1 from the system.
REMOVE EQU.1-4  Removes equation 1 through 4.
REMOVE TOD.1    Removes programming for all priorities of TOD.1
```

!!CAUTION!! The REMOVE command will wipe out programming for the TELSEC. Use it with caution.

6.7 NAME Command:

Use the NAME command to set names for any TELSEC system points. The name assignments can be as many as eight (8) characters long (32 characters for UIN) and must start with an alpha letter (A - Z). The characters %, _, and & can also be used within the name.

Syntax: NAME <STRING> = <POINT.#>

<STRING>: A string up to 32 characters for inputs (UIN) and as many as eight characters for all other points.

<POINT.#>: Any of the TELSEC system points.

Available system points are:

UIN RLY KEY DAT TOD EQU VAR SPT DOR ANM MSG BAT CARD

Example: NAME FAN_FAIL=UIN.5

6.8 COPY Command:

The COPY command provides a quick and easy way of copying point definitions. After programming one point, you can use the copy command to write that programming to one or a range of specified points. The name of the point is NOT copied. You must name your points after the COPY procedure.

Syntax: COPY <SOURCE POINTTYPE>.# <DESTINATION RANGE>

<SOURCE POINTTYPE>: Available points for the copy command are:

UIN RLY KEY DAT TOD VAR SPT ANM MSG BAT

<DESTINATION RANGE>: A single or list of numbers. A list must be delimited by commas and a range uses the dash symbol.

Example:

COPY UIN.1 3

(Copies programming from UIN.1 to UIN.3.)

COPY RLY.1 2,4,5-8

(Copies programming from RLY.1 to RLY 2, 4, 5, 6, 7, and 8.)

7 Equation Language

7.1 General Remarks

Equations are the heart of the TELSEC's programming. Basic Programming Commands tells about the various program elements. Before writing equations, these elements should be defined to give them names and outline how they should work. When writing equations, defined program elements are combined. An equation is a sequence of activities, directed toward a specific goal. This goal might be: Computing degree days, logging abnormal temperature readings, operating RLY. 3 as desired, or some other function of your choosing.

As many as 64 equations can be programmed into the TELSEC. Each equation has its own goal. One equation may compute a number value and convey it to another equation for its use. Together, these equations control the TELSEC and the equipment attached to its relays.

The TELSEC operates all equations at the same time. For instance, if an equation tells the TELSEC to do something in any situation, the TELSEC does that thing repeatedly, and also does everything it is told to do by any other equation. An equation can tell the TELSEC, "Wait for ten minutes." Such a statement doesn't bring the entire TELSEC to a halt, but only that equation. When any equation is waiting, the TELSEC recognizes it, and recognizes what the equation is waiting for. The TELSEC continually checks to see if the equation can resume operation. (Section 7.9.3 gives more detailed information about the exact sequence in which the TELSEC runs equations.)

7.2 The Components of Equations

7.2.1 Formulas:

Formulas tell the TELSEC to do arithmetic. Formulas combine program elements that have numeric values, by adding, multiplying, taking remainders of division, and other operations. When a formula appears in an equation, the TELSEC does the computation and uses the resulting number in place of the formula. (See Section 7.3.6)

7.2.2 Assignments:

Assignments look like equations in mathematics, because they use an equal sign. However, equations in the TELSEC mean something different. The TELSEC computes the value of the formula on the right side of the equal sign and assigns it to the object on the left side. So you can write seemingly impossible math equations, such as: $\text{VAR. 4} = \text{VAR. 4} + 1$.

7.2.3 Statements:

Statements take actions, like turning on a relay, logging data, or making a phone call. Each statement has a different form and requires entry of a different combination of formulas or program elements. Assignments are a form of statement. This chapter will present each type of statement and provide examples of how they are used.

7.3 The Form of Equations

Every equation consists of a define line and one or more statements. The statements are separated by commas. This usually does not look like an equation from mathematics. If the equation doesn't have an assignment or a comparison in it, it may not even have an equal sign. In the TELSEC, "equation" means a separate, goal-directed sequence of steps.

7.3.1 General Format:

The general format for writing equations is as follows:

```
DEFINE <EQUNAME> = EQU.#<cr>  
<STATEMENT>,<cr>  
<STATEMENT><cr>  
<cr>
```

<EQUNAME>: EQUAME can be any unique 8-character name. The # symbol can be any number from 1 to a maximum of 64. STATEMENTS are entered on successive lines after the DEFINE line. If more than one STATEMENT is to be entered, separate them with commas. When the equation is completed, terminate the entry with two successive carriage returns. The TELSEC will then know to process the equation and will report any errors or accept what was sent with an "OK" followed by the amount of memory the equation occupies.

7.3.2 Conditional Equations:

Conditional equations (see Section 7.3.10) are an especially useful form. They use the words IF, THEN and ELSE. The TELSEC performs the statements only IF the specified condition is TRUE. Otherwise, an ELSE condition statement can be executed. This is the way to program the TELSEC to take different actions at different times or in different situations.

Follows is a typical equation:

```
DEFINE TIMESCHD = EQU.18  
IF TOD.1 = ON THEN TURN ON RLY.1  
ELSE TURN OFF RLY.1
```

7.3.3 One-time Equations:

One-time only equations can be programmed using the DO command. Simply enter the word DO [ENTER] when at the semicolon (;) prompt and enter an equation. The equation will run one time and then destroy itself. This is an easy way to make quick changes to the system.

Example:

```
DO <enter>  
ALARM UIN 1 ENV MJ<enter><enter>  
(The system will alarm input 1 with Major severity)
```

7.3.4 Typing numbers:

When typing a number, type only the series of digits. Commas and/or decimal points cannot be used. If typing a negative number, start the number with a minus sign.

For example: 15000
 -25
 0

7.3.5 Typing intervals:

One way to specify an interval is to simply type a counting number, as just described. A number that represents an interval cannot be negative. The TELSEC interprets this number as a number of seconds. You can also specify an interval in the form hh:mm:ss (hours, minutes, and seconds). For example, 1:00:00 represents one hour. Typing 1:00 represents 1 minute and typing 0:15 represents a fifteen-second interval.

7.3.6 Arithmetic:

The TELSEC uses formulas to perform arithmetic. Formulas combine program elements discussed in Basic Programming Commands. Number arithmetic combines number items such as variables, analog inputs, event counters, and intervals (which are numbers of seconds). In the TELSEC, all numeric program elements have values which are counting numbers, such as 0, 72, or -20. If you write a formula that uses division or takes a percentage of something, the result will be a fraction. But before you can store this number anywhere, the TELSEC truncates the number. For example, 18.5 would be 18. If you need greater accuracy multiply the numerator by 10, to move the decimal point, before dividing.

7.3.7 Operators:

Using "m" and "n" to represent any number or system point that has a numeric value (e.g. UIN, RYL, VAR, SPT etc.) elements, two elements can be combined by typing one of these symbols:

m + n add two numbers
m - n subtract the second number from the first
m * n multiply two numbers
m / n divide the second number into the first
m % n take m percent of n. This is $(m / n) * 100$
m MOD n find the remainder of the division m / n

Parentheses tell the TELSEC which operators to perform first. The TELSEC evaluates everything inside the parentheses before combining the resulting value with anything outside the parentheses. For example:

$(3 * 4) + 5$ has the value 17
 $3 * (4 + 5)$ has the value 27

When the TELSEC lists an equation, it supplies parentheses if the programmer did not type them originally. This shows exactly how the TELSEC interpreted the formulas entered. The TELSEC follows normal rules of precedence; multiply/divide operations first, then addition/subtraction operations.

7.3.8 Functions:

Functions also combine numeric elements. Enter the name of the function, an open parenthesis, the element or elements to which the function will be applied, and a closed parenthesis. If a function will be applied to more than one number, separate the numbers by commas. The TELSEC provides these functions:

ABS(m) Absolute value: remove any minus sign that 'm' may have.
MIN(m,n) Find the minimum (lowest) number in a list of up to ten numbers.
MAX(m,n) Find the maximum (highest) number in a list of up to ten numbers.
AVG(m,n) Find the average of a list of up to ten numbers. The TELSEC adds each element and divides the sum by the count of elements in the list.

Combinations are legal, since formulas and functions are themselves number elements. For instance, you can put a function inside another function. This example returns the lowest of three temperature readings, but never returns a number lower than 10:

```
MAX (10, MIN (UIN.TEMP1, UIN.TEELSEC, UIN.TEMP3) )
```

When a function is placed within a function, be sure to type matching left and right parentheses. Notice in the above example there two left parentheses and two right parentheses. The TELSEC will evaluate the MIN function first and then evaluate the MAX function.

7.3.9 Inputs in Equations:

The TELSEC inputs read to the nearest 100th, but equations process only whole numbers. Therefore, an input with the value of 70.15 will be interpreted by the equation as having a numeric value of 7015 and use that value for the basis of comparison. You can use this number and compare it to SPT or VAR that are also whole numbers i.e. if you wanted a SPT of 80 you would enter 8000 or you can perform a mathematical function on the input to covert the number.

Example:

```
DEF CALUIN = EQU 1
VAR.1 = UIN.1/100, VAR.2 = UIN.2/100
```

Variable one (VAR 1) will have the value of the input dived by 100 so in our example, it will read 70 instead of 7015, which is 7015 divided by 100. The TELSEC will truncate everything to the right of the decimal.

7.3.10 Conditionals:

Conditional statements can be utilized in equations to link the functions of any system point to a corresponding action. They always contain a condition (**IF**) followed by an action (**THEN**).

The keyword '**IF**' appears in an equation to make one or more statements after it conditional. The conditional statements only take effect if the specified condition is. You type **IF**, followed by condition you want to test, followed by **THEN**, followed by the action statements:

```
IF fact THEN statement, statement, ...
```

If there are statements you want to take effect only if the specified fact is **FALSE**, then use the word '**ELSE**.' Although several statements may have been entered after **THEN**, separated by commas, do not type a comma immediately before the word '**ELSE**':

```
IF fact THEN statement, statement, ..., statement
ELSE
IF fact THEN statement, statement, ..., statement
ELSE
statement, statement, ..., statement
```

The **IF/THEN/ELSE** technique enables the TELSEC do perform different functions in different situations. It is the primary way to link physical points and program points to create a control sequence.

The word '**THEN**' must be used after every use of the word '**IF**.' If the only relevant case is the case where the fact is **FALSE**, then test the opposite fact by using the word '**NOT**' as follows:

```
IF NOT (fact) THEN statement, statement...
```

It's common to use **IF/THEN/ELSE** where it is desirable for only one group of statements to take effect:

```
IF fact THEN statement, statement...
```

```
ELSE
IF fact THEN statement, statement...
ELSE
IF fact THEN statement, statement...
```

If an entire equation follows the form shown above, then the statements on only one line take effect at a given time. The first line where the fact is `TRUE` is the line from which statements take effect. After carrying out the statements, the TELSEC proceeds to the next equation. At other times, if some of the facts switch between `TRUE` and `FALSE`, the statements from different lines may take effect instead. The TELSEC always process the equations from the beginning (top) going left to right. Once it finds a `TRUE` statement, it will do the corresponding action statements (after the `THEN`). Think of each `IF` statement as priorities where the first `IF` statement will be the highest priority.

7.3.11 Comparisons:

The operators and functions in Section 7.3.7 combine numbers and produce a number. Comparisons are also operators, but they produce a value of `TRUE` or `FALSE`. The most common place for comparisons is between the words `IF` and `THEN`. The TELSEC will perform a function only if the comparison is `TRUE`; this is how the TELSEC tests its points.

Once again using “m” and “n” to stand for any number element, the TELSEC provides six comparisons:

```
m=n   TRUE if m equals n (FALSE otherwise).
m<n   TRUE if m is less than n.
m>n   TRUE if m is greater than n.
m<=n  TRUE if m is less than or equal to n.
m>=n  TRUE if m is greater than or equal to n.
m<>n  TRUE if m is not equal to (less or greater than) n.
```

As well as comparing number elements, digital elements can be compared. For example, you can see whether a digital input is `ON` by writing:

```
IF UIN.SWITCH4 = ON
```

In fact, digital elements can be compared and combined with number elements by assuming `OFF` = 0 and `ON` = 1.

Conjunctions combine elements (such as digital inputs and the results of comparisons). Conjunctions are operators, but they take the form of separate words. The words ‘`AND`’ and ‘`NOT`’ are conjunctions. They mean exactly the same thing as they do in English. For example, use ‘`AND`’ to conjoin two comparisons:

```
(m = 12) AND (n = 19)
```

This formula is `TRUE` only if both sides are `TRUE`; otherwise, it is `FALSE`. You could use the word `NOT` to reverse this state:

```
NOT ((m = 12) AND (n = 19))
```

This formula is `FALSE` only if both the comparisons are `TRUE`.

You can use the conjunction `OR` just like `AND`. But this `OR` is “inclusive,” not an either/or, as you usually mean in English. For example, you could write the following:

```
(m = 12) OR (n = 19)
```

The meaning of this is obvious except for one thing: If both halves are `TRUE`, the total formula is still `TRUE`.

7.3.12 The FOR keyword:

Any comparison or other `TRUE/FALSE` element can be followed with the word 'FOR' and a time interval. The time interval can be a constant or any numeric element, representing a number of seconds. For example: `IF UIN.TEMPSSENS > 85) FOR 0:10:00`

This expression asks the TELSEC to see if the input is greater than the number 85 for ten minutes running. When the TELSEC reaches a comparison of this form, it sets an internal timer to 00:00. The TELSEC continually tests the element. If it is `TRUE`, the timer runs. If the TELSEC ever finds it `FALSE`, the timer goes back to 00:00. Only if the timer reaches the specified interval (in this example, ten minutes) does the equation proceed. If a comparison with the word 'FOR' is entered, it takes the TELSEC at least the specified interval, and possibly longer, to produce a result.

7.3.13 Switching Relays:

The `TURN` statement sets a specified relay to the `ON` or `OFF` state. *Chapter 6 - Programming* discusses relays and explains what 'ON' and 'OFF' means in the real world. There are two forms of the statement; both require exactly one relay to be specified:

```
TURN ON rly <#>  
TURN OFF rly <#>
```

A sequence of `TURN` statements separated by commas can be used in an equation to switch more than one relay. The `TURN` statement has no effect if the relay was already `ON` or `OFF`; it simply stays in the desired state.

Examples: `TURN ON RLY.14, TURN OFF RLY.COOL_1`

7.3.14 Waiting:

The `WAIT` statement indicates that any remaining statements in the equation should not run until sometime in the future. When the TELSEC reaches a `WAIT` statement, it suspends work on that equation for some number of seconds that you specify. When typing a `WAIT` statement, you must specify a number of seconds, either by typing an interval or by specifying a numeric element: `WAIT interval`.

If a numeric element is used (for example, a variable) to specify a number of seconds and another equation changes the element's value during the wait, it can change the length of the wait.

Examples: `WAIT 1:00:00`
`WAIT VAR.DELAY`

7.3.15 WAIT UNTIL:

The `WAIT UNTIL` statement is a more complex `WAIT` statement. After the words `WAIT UNTIL`, you can type any element: a comparison, a digital input, or a conjunction of several of these. When the TELSEC reaches `WAIT UNTIL`, it suspends work on the equation if the element has the value `FALSE`. The TELSEC will continue to evaluate the element in case its value should change to `TRUE`. When this happens, the equation proceeds; statements following `WAIT UNTIL` will then take effect.

WAIT UNTIL fact: In an equation that tests for a problem condition, the last statement in the list is often `WAIT UNTIL`, to ensure that the problem has gone away. This makes sure the TELSEC doesn't start the equation over again until the next time the problem occurs.

Examples:

```
WAIT UNTIL NOT UIN.ALARM
WAIT UNTIL (UIN.12 < VAR.SETPOINT)
WAIT UNTIL (UIN.TEMP4 > 80) FOR 0:03:00
```

7.3.16 Assignment:

Assignment means changing the value of something. To form an assignment statement, specify what you want to change, type the equal sign, then type a formula. Whenever the TELSEC encounters an assignment statement, it computes the current value of the formula and stores that value in the element you specified. (E.g. element = formula.)

Example: RLY.1=UIN.4

In the example above, the RLY.1 will go ON and OFF as the UIN.4 goes ON and OFF. The SET statement is also an assignment statement; it has the same effect as the form shown above.

7.3.17 SET element TO formula:

You can assign values to many of the elements presented in *Chapter 6 – Programming and Operation*. Inputs cannot be assigned a new value. Their value is always a number or ON/OFF that is the signal the TELSEC currently reads at that input.

Relays can be assigned a value of ON or OFF. Doing so turns the relay ON or OFF, just as the TURN statement does (see Section 3.11). These statements are equivalent:

```
RLY.1 = ON
SET RLY.1 TO ON
TURN ON RLY.1
```

7.3.18 Variables:

Variables exist for the purpose of receiving values in assignments. Instead of having a complicated formula in a single assignment statement, you can use several assignment statements with shorter formulas. Temporary variables hold the partial results.

Two equations can use variables to communicate. For example, one equation can put a certain value in a variable (e.g. VAR.GOWILD = 100) to tell another to start working. The other equation tests the variable using the IF/THEN technique discussed in Section 7.3.10. It typically resets the variable once it has sensed the value it was looking for...

IF (VAR.GOWILD = 100) THEN VAR.GOWILD = 0, ...and then continues with other statements.

7.3.19 Setpoints:

Setpoints act exactly the same way variables do with one exception: a user can modify a setpoint's value using the TELSEC front panel. Setpoints can be used to allow the user to modify his environment easily. Suppose you wanted to control an air conditioning unit connected to RLY.1. The standard setpoint for the room is 70 degrees Fahrenheit. You also have a temperature sensor connected to UIN.1 that monitors the room temperature. Your setpoint definition and equation might look like this:

```
DEFINE AC1SPT = SPT.1 70
DEFINE DELTA = SPT.1 2
DEFINE AC1CTL = EQU.10
IF UIN.SPACETMP > SPT.AC1SPT THEN TURN ON RLY.1
ELSE
IF UIN.SPACETMP < SPT.AC1SPT - SPT.DELTA
THEN TURN OFF RLY.1
```

In this simple form, you can see that the AC will turn on if the temperature is greater than the set point. Now suppose it is an extremely hot day and the people in the room wish the air to go on at a lower temperature. Instead of calling up the TELSEC and making a change to EQU.10, they can go up to the front panel and modify SPT.AC1SPT slightly. One other point to remember is that the formulas have no control over what values users may enter through the front panel. Suppose someone modifies the setpoint to 30 degrees F. The room will get extremely cold! Therefore, this potential must be taken into account when writing equations to impose limits on the setpoints. This must be done before the setpoint is used in another equation. Here is the new example:

```
DEFINE AC1VARH = VAR.1 75 (High setting)
DEFINE AC1VARL = VAR.2 65 (Low setting)
DEFINE AC1SPT = SPT.1 70
DEFINE AC1LMT = EQU.9
SPT.1 = MIN(VAR.1, (MAX(VAR.2, SPT.1)))

DEFINE AC1CTL = EQU.10
IF UIN.ROOMTEMP > SPT.AC1SPT THEN TURN ON RLY.1
ELSE TURN OFF RLY.1
```

Notice that equation 9 limits the setpoint value between the two variables. This method controls the range that a user can modify a setpoint. The TELSEC will then run equation 10 with the corrected setpoint value.

7.3.20 Additional ways to change values:

The values of specified numeric elements can be changed using the INCREMENT or DECREMENT statements.

7.3.20.1 Increment Statement

The INCREMENT statement increases the value of a specified numeric element. The two statement forms below have an identical effect; the INCREMENT form is legal only where the SET form would be legal:

```
INCREMENT element1 BY element2
SET element1 TO element1 + element2
```

If the word 'BY' and the second element are omitted, the INCREMENT statement simply adds one (1) to the value of the number element specified.

7.3.20.2 Decrement Statement

The DECREMENT statement decreases the value of a specified numeric element. The two statement forms below have an identical effect; the DECREMENT form is legal only where the SET form would be legal:

```
DECREMENT element1 BY element2
SET element1 TO element1 - element2
```

Examples:

```
INCREMENT VAR.1
DECREMENT SPT.1 BY 2
SET VAR.TEMPSPT TO 70
```

If word 'BY' and the second element are omitted, the DECREMENT statement simply subtracts one (1) from the value of the numeric element specified.

7.3.20.3 Clear Statement

The `CLEAR` statement sets an element's value back to zero. The exceptions are variables and setpoints where the command resets the variable to its initial defined value. The two statement forms below have an identical effect; the `CLEAR` form is legal only where the `SET` form would be legal:

```
CLEAR element  
SET element TO 0
```

The `CLEAR` statement is typically used to reset the values of point statistics. If you `CLEAR RLY.#` or `UIN.#` all associated timers and counters are set to zero.

Examples:

```
CLEAR VAR.HOWMANY  
CLEAR SPT.COUNTER  
CLEAR REC.4  
CLEAR RTM.4  
CLEAR RLY.1  
CLEAR UIN.DIGSWTCH
```

7.4 Timers and Counters

The TELSEC has a few special point types. These are the digital timer and counter points. Each digital output and digitally defined input have these points. You may use these points in your equations to calculate various things: run time for equipment, pulse accumulation, equipment maintenance, etc. The following sections 4.01 – 4.04 provide descriptions for each point.

7.4.1 Digital Output Points (RLY):

- RAC Accumulated ON time (counts total on time).
- RNO Interval ON time (resets to 0 when RLY goes on and starts counting).
- RNF Interval OFF time (resets to 0 when RLY goes off and starts counting).
- RTM RLY event timer (time since timers were cleared).
- REC RLY event counter (increments when RLY changes State).

7.4.2 Digitally defined Input Points (UIN):

- DNO Interval ON time (resets to 0 when UIN goes on and counts on time).
- DEC Digital event counter (increments when UIN changes State).

7.5 Send Command:

The SEND statement sends point values to the front panel display. When you enter a SEND statement, you specify what to send using this form:

```
SEND <point.>
```

You may specify any TELSEC point type except ANM. The TELSEC will update the front panel with a new message. If no new message exists, the current message will continue on the display. If there is another message to be displayed, the current message will be displaced by the new message. The front display has a thirty-two message buffer and will round robin each message or point to the screen. Once you send a point to the screen, it will continue to be displayed until you issue a SEND <point> CLEAR statement.

If you SEND MSG to the front panel, the name of the MSG will not appear. The actual MSG text will appear on the front panel display. The first sixteen characters show on the first line and characters 17-32 show on the second line.

Example:

```
DEF DISPLAY = EQU 1  
SEND UIN 1, SEND UIN 2, SEND UIN 3,  
IF UIN.4 = ON THEN SEND MSG.4  
ELSE  
SEND MSG.4 CLEAR
```

7.6 Alarm Equations:

The `ALARM` statement places point values into the `ALARM` log and causes a `TL1` message to be generated. When an `ALARM` statement is entered, specify what to send using this form:

```
ALARM <point.#> <type> <severity> [list of ANM]
```

<point.#>: Any point within the TELSEC such as `UIN`, `RLY`, `SPT`, `MSG`, `ETC`.

<type>:

<code>ENV</code>	Used for environmental alarms.
<code>EQPTSA</code>	Equipment service affecting.
<code>EQPTNSA</code>	Equipment non-service affecting.

<severity>:

<code>CR</code>	Critical alarm.
<code>MJ</code>	Major alarm.
<code>MN</code>	Minor alarm.
<code>CLEAR</code>	Alarm condition has cleared.
<code>NONE</code>	Alarm condition is status only.

[list of ANM]: Optional - Like the digital alarms in section 6.3.1.3, you can specify which alarm numbers to dial when the alarm is generated. All active numbers will be dialed if you do not specify.

Once an entry has been placed into the alarm log, the TELSEC will take appropriate action. If alarm phone numbers (`ANMS`) have been defined, the TELSEC will wait for the modem to become available and then attempt to call out the alarm. Once the TELSEC makes the alarm callout connection, it will dump all alarms not yet sent in the alarm log. The information contained in an alarm callout includes system `TID`, the current date and time and the point information specified to alarm. This information will be sent in a `TL1` formatted message.

Example of an alarm equation:

```
DEF HITEMP = EQU 1
IF UIN.TEELSEC > VAR.SETPOINT THEN
ALARM UIN.TEELSEC ENV MJ, WAIT UNTIL
UIN.TEELSEC < VAR.SETPOINT, ALARM UIN.2 ENV CLEAR
```

Notice that a `WAIT UNTIL` statement ends this equation block. This will keep this equation from continuing to enter `ALARM` statements in the alarm log each time this equation is processed. The equation will now only process once and `WAIT UNTIL` the alarm condition has gone away before it processes the rest of the equation and goes back to the beginning again.

Example of an alarm equation with specify which ANM's to use:

```
DEF HITEMP = EQU 1
IF UIN.TEELSEC > VAR.SETPOINT THEN
ALARM UIN.TEELSEC ENV MJ ANM 1 ANM 3, WAIT UNTIL
UIN.TEELSEC < VAR.SETPOINT, ALARM UIN.2 ENV CLEAR ANM 1 ANM 3
```

If the TELSEC cannot complete the alarm callout, it will wait five (5) minutes and then attempt the call again. This ensures alarms are not missed due to busy or noisy phone lines.

7.7 Freeform Logging:

The `LOG` statement makes an entry into the freeform log. When you type a `LOG` statement, you must specify the element to store using this form:

```
LOG <point.#>
```

The TELSEC records the current value of the specified element in the log, noting the current date and time. The log also keeps an indication of the name of the element you logged. You may review this information using the `REVIEW LOG FREE` command (see section 5.3.12). The freeform log contains approximately 800 entries arranged in a circular queue. If the log is full when the `LOG` statement processes, the current entry causes the oldest entry to scroll out of the log.

Example:

```
DEF LOGAVG = EQU 1  
VAR.1 = (AVG(UIN.1,UIN.5)/100),LOG VAR.1, WAIT 10:00
```

This equation variable 1 equal to the average reading of input 1 and 5 divided by 100 (see section 7.3.9) and then logs variable 1. The equation then waits 10 minutes before running again.

7.8 Advanced Equation Functions:

7.8.1 Enable/Disable:

When an equation is first defined it becomes enabled. This means it is set to operate continually. (Section 7.9.3 discusses the exact sequence of activities.) An equation can be disabled or enabled. Disabling an equation takes it out of service. The TELSEC suspends all work on the disabled equation for as long as it is disabled.

One equation can disable or enable another equation or disable itself. A restart or power failure always re-enables all equations. In addition, a restart or power failure re-starts all equations at the beginning.

The `DISABLE` statement disables an equation. After typing `DISABLE`, specify the equation to disable:

```
DISABLE equation
```

The equation is out of service and has no further effect on the TELSEC until the next time an equation or an operator `ENABLES` it (see below), restarts the TELSEC, or if the power fails. If the specified equation was already out of service, the `DISABLE` statement has no effect.

Having an equation disable itself is a useful programming technique. For instance, equation number 1 can specify a power failure recovery sequence. The equation ends by disabling itself.

The `ENABLE` statement enables an equation. `ENABLE` follows the same form as `DISABLE`:

```
ENABLE equation
```

The equation resumes operation starting where it left off when you disabled it. If the equation was in a `WAIT` statement when you disabled it, it resumes its wait until the specified time is up or the specified condition is `TRUE`. The equation disregards time that passed while it was disabled, or conditions it is waiting for that were `TRUE` only while the equation was disabled. Using `ENABLE` on an equation that was already enabled has no effect.

Suppose equation number 1 specifies a power failure recovery sequence, as mentioned above. Then any other equation could make this sequence happen at any time, using this statement:

```
ENABLE EQU.1
```

7.8.2 Returning Values:

Section 7.3.16 gives an example of an equation assigning a value to a variable so that another equation will see the value and do something. This is an example of communication between equations.

Each equation has a variable associated with it. You specify it by typing the symbol `EQU.` followed by the equation's number. This can be used anywhere that a numeric element is legal.

The `RETURN` statement is used by an equation to specify a value for that equation's variable. Any equation can then read the specified value, using the symbol `EQU.` as described above. Type `RETURN` and then a numeric formula:

`RETURN [(number) or (value of a formula)]`

The TELSEC computes the current value of that formula and makes it the value of the equation.

Unlike many other programming languages, the `RETURN` statement on the TELSEC does not change the order in which the TELSEC performs statements; it does not keep the statement following `RETURN` from being reached; and there is no limit on the number of `RETURN` statements you can use in a single equation. Whenever another equation uses the `EQU.` symbol, it sees the number value most recently computed by a `RETURN` statement inside the specified equation.

For example, say equation number 20 wants to pass a number value for use inside equation number 23. One of the statements inside equation 20 is: `RETURN 100`

Equation 23 can make some number of statements conditional, so they won't run until equation 20 gives this signal. Inside equation 23, you might type:

```
IF EQU.20 = 100 THEN ...
```

7.8.3 Multiple Conditionals:

In the sequence of statements that follows the word 'THEN,' there can be another `IF` test. When several `IF/THEN` pairs are used in a single equation, pay careful attention to the exact outcome. Unless the word 'ELSE' is used, the second `IF/THEN` test becomes just one of the statements in the list. Therefore, the TELSEC only makes the second test if the first one was true. Consider this equation:

```
IF UIN.1 > 72 THEN TURN ON RLY.1,  
IF UIN.2 > 72 THEN TURN ON RLY.2
```

This looks like a case where two relays turn on independently based on two analog inputs (say, temperatures). But this is not how the equation works. The first test controls the entire equation; the TELSEC doesn't even compare `UIN.2 > 72` unless it found `UIN.1 > 72` was `TRUE` and turned on `RLY.1`.

The conditionals presented so far are unbounded. That is, the first conditional used in an equation makes the rest of the equation conditional. The section below, 7.8.4, presents bounded conditionals. Use them to limit the range of an `IF` statement's effects, so several unrelated events in a single equation can be controlled.

7.8.4 Statement Blocks:

A statement block is a sequence of statements preceded by `DO` and followed by `END`. Use a statement block anywhere a single statement can be used (except inside another statement block). Follows is an example of a statement block:

```
DO TURN ON RLY.1, TURN ON RLY.2, SEND MSG.1 END
```

There may be a series of statements between `DO` and `END`, separated by commas. But do not type a comma immediately before the word `END`. A comma may be needed before the word '`DO`' or after the word '`END`.' Imagine that the entire `DO...END` range were replaced with a single statement. Supply commas if that single statement would need them before or after it—for instance, if other statements or statement blocks immediately precede or follow the `DO...END` range.

7.8.5 **Nested IFs:**

Statement blocks are also useful in the same way parentheses are, when one `IF/THEN/ELSE` group is typed within another. For example:

```
DEF ECONMZER = EQU.30
IF UIN.OUTAIR < 70 THEN DO
IF UIN.ROOMTEMP > SPT.COOL FOR 1:00 THEN TURN ON RLY.FREECOOL
ELSE
IF UIN.ROOMTEMP< SPT.C00L FOR 1:00 THEN TURN OFF RLY.FREECOOL
END
```

In this example, the equation will first check to see if the outside air is less than 70. If it is `TRUE` then it will process the `IF` statements after the `DO` command and pick the first one that is `TRUE`.

The spacing makes it clear to a reader what this equation is meant to do. However, without the `DO/END`, it would not be clear if the word '`ELSE`' applies to the first `IF` or to the second `IF`. Nested `DO`'s (`DO` statements within `DO` statements) are illegal. The word '`END`' must follow the word '`DO`' before the word '`DO`' can appear again to start another statement block.

7.8.6 **RATE and AVERAGE RATE function:**

The `RATE` function provides a very rough idea of how quickly the value of a formula is changing over time. There are three parameters inside parentheses: the formula to test, a time interval, and a number value.

```
RATE (formula, interval, number)
AVERAGE RATE (formula, interval, number)
```

Basically, the value the `RATE` function produces is a number that tells you how quickly the formula is changing over the specified interval. The third parameter is a "standard value." The `RATE` function simply provides this number if the specified interval has not yet occurred.

How the `RATE` function works:

Step One When '`RATE`' is first typed into an equation, the `TELSEC` sets its value equal to the "standard value." The `TELSEC` computes the current value of the formula and remembers it.

Step Two When a specified interval has passed, the `TELSEC` again computes the formula's value. The value of the `RATE` function becomes the difference between this and the remembered value of the formula. The `TELSEC` remembers the formula's new value for future use.

Step Three Step Two repeats at the specified interval.

The `TELSEC` conducts the computations above even in an equation where the `RATE` function is not currently being reached. (However, if an equation is `DISABLED`, these computations end.)

Follows is an example measuring the rate at which a temperature is changing:

```
RATE (UIN.TEELSEC, 0:10:00, 0)
```

What the example above actually measures is the net change of the specified temperature during a recent period of ten minutes. In this example, during the first ten-minute period, RATE has the standard value of 0, claiming there was no change in temperature.

The AVERAGE RATE will compute the average rate of change of the formula's value. Each time the RATE function evaluates, the stored value will be the average between the last calculated value and the new calculated value.

7.8.7 Pulse Command:

The pulse command allows the TELSEC to turn on or off a relay quickly with very detailed timing. The Pulses are accurate to the nearest 10th of a second. An example of using this function would be for connecting to pulse to analog transducers where sending contact closure for a specific period will change the amount of output that occurs such as with variable speed motors or variable position dampers.

The command format is PULSE <ON|OFF> RLY <#> FOR <time in 10ths>

Where:

<ON|OFF>: Turn the Relay either ON or OFF
 <#>: The relay #
 <time in 10ths>: Time in tenths. A 1 = 1/10, 10 = 1 second etc.

Example:

```
IF <statement> THEN PULSE ON RLY.1 FOR 1, WAIT 5:00
```

If the <statement> is true then the relay will pulse on for 1/10 of a second and then the equation will wait 5 minutes.

```
IF <statement> THEN PULSE ON RLY.1 FOR VAR.1, WAIT 5:00
```

If the <statement> is true then the relay will pulse on for the value of variable 1 and then the equation will wait 5 minutes. Another equation can be used to change the value of variable 1.

7.8.8 COM Port Status:

The status of the two communications ports can be monitored by equations and then additional alarming or control functions can be accomplished based on the status. The point names are COM1 and COM2 and will have the following value based on the status of the Data Carrier Detect (DCD) and Data Set Ready (DSR) signals:

Value	DSR BIT	DCD BIT	Meaning
0	0	0	DCD & DSR are not present
1	0	1	DCD present, but not DSR
2	1	0	DSR present, but not DCD
3	1	1	DSR and DCD present

Example:

```
DEF CK_COM1 = EQU 1
```

```
IF COM1 = 0 THEN ALARM MSG.1 EQPTSA MJ, WAIT UNTIL COM1 = 3
```

This equation will see if the COM1 has lost connectivity and then alarm a message saying the connection to COM1 is down. Once COM1 is active again, the equation will send a Clear alarm message.

7.8.9 Battery Monitor Status:

The equations can monitor the status of the battery monitoring algorithm to allow the user additional access to the various states of the algorithm. The BAT status is made up of 4 Bits of data that are added together to create one decimal number that represents the current status.

The Bits are as follows:

BAT Status Bits

- Bit 0 - Set to 1 for discharge state, clear for charge
- Bit 1 - Set to 1 for low capacity alarm state, clear for no alarm
- Bit 2 - Set to 1 for low time remaining major, clear for no alarm
- Bit 3 - Set to 1 for low time remaining critical, clear for no critical

BAT Value in Equations and meaning.

- 0 (0000) = No alarms, battery charging
- 1 (0001) = No alarms, battery in discharge
- 2 (0010) = Could exist, as capacity alarm is a static value. Once we've calculated a capacity, it's still true once the power comes back on.
- 3 (0011) = Major Capacity alarm, battery in discharge
- 4 (0100) = Can't happen. Once we are in charge mode, the time remaining gets cleared.
- 5 (0101) = Major Time remaining alarm and in discharge
- 6 (0110) = Can't happen. Same problem as #4.
- 7 (0111) = Major time remaining and low capacity alarm and in discharge.
- 8 (1000) = Can't happen. Once we are in charge mode, the time remaining alarms get cleared.
- 9 (1001) = Can't happen unless the defining is switched for the critical and major alarm times. We would have both Critical and Major, so bit 3 can't get set without bit 2.
- 10 (1010) = Can't happen. Same problem as #9
- 11 (1011) = Can't happen. Same problem as #9.
- 12 (1100) = Can't happen. Once we are in charge mode, the time remaining gets cleared.
- 13 (1101) = Critical and Major Time remaining alarm and in discharge
- 14 (1110) = Can't happen. Same problem as #4.
- 15 (1111) = All three alarms and in discharge.

The chart shows that there are some values that are not possible. Write your equations to test only for the alarm status you are interest in.

Example:

```
DEF BATALRM = EQU 60
IF BAT.1 = 5 OR BAT.1 = 13 THEN TURN ON RLY.16
ELSE
TURN OFF RLY.16
```

This example will turn on relay 16 if the battery status is either 5 (Major Time remaining alarm and in discharge) or 13 (Critical and Major Time remaining alarm and in discharge) are TRUE. Turning on a relay can be to provide an input to another device notify the equipment of the problem or it can be connected to a local alarm device.

7.9 Shortcuts:

The TELSEC's large number of operators, functions, and statements provide many different ways of solving a problem or specifying programmed action. In fact, there are usually several ways to write something that will have an identical effect. There is no one "right" way to write an equation. Different ways to write the same thing can be compared by asking these questions:

- Does the equation work as desired? (In every situation?)
- Is it as readable as it could be?
- Are there any wasted steps?
- How much of the TELSEC's memory does it occupy? (That is, could the equation be written more briefly?)

An efficient equation makes the TELSEC do no more computing than necessary, it has the shortest possible form, and it is readable. This last attribute produces efficiency by saving time when you or someone else must change it.

Trade-offs must sometimes be made. For example, an equation that is longer than necessary may be written to emphasize what its function is or make it easier to change. An example of this is to have all conditionals bounded.

Use the power of digital elements to make an equation shorter and more elegant. Digital elements are TRUE/FALSE elements, such as comparisons, schedules, or digital inputs or relays, which can be ON or OFF. In the TELSEC, TRUE is equivalent to ON (and to the number value 1); FALSE is the same as OFF (or 0).

Consider the following equation:

```
IF UIN.OCCUPIED THEN TURN ON RLY.LIGHTS  
ELSE TURN OFF RLY.LIGHTS
```

The equation above checks whether UIN.OCCUPIED is TRUE (ON) and moves ON to RLY.LIGHTS. If UIN.OCCUPIED is FALSE (OFF), it moves OFF to RLY.LIGHTS. In both cases, the desired effect is to move the value of UIN.OCCUPIED directly to RLY.LIGHTS.

Write this directly:

```
RLY.LIGHTS = UIN.OCCUPIED
```

This puts the relay in sync with the input.

A more general statement of this idea is: Write a formula that is true in all cases, instead of using IF/THEN to test each case at a time.

Follows is an equation that computes the lower of two temperatures:

```
IF UIN.TEMP1 < UIN.TEELSEC THEN VAR.LOWER = UIN.TEMP1  
ELSE VAR.LOWER = UIN.TEELSEC
```

A much easier way to do the same thing is to use the built-in MIN function to get the minimum temperature:

```
VAR.LOWER = MIN(UIN.TEMP1, UIN.TEELSEC)
```

Once it has been written in this way, the variable may not need to be used at all; the MIN function itself can be used in place of the variable.

7.9.1 **Avoiding Repeat Effects:**

Keep in mind that the TELSEC runs each equation continually. If a WAIT statement is reached, the TELSEC will suspend operation on that equation until the conditions are achieved. You must consider whether an equation will produce one effect or many effects, and whether these effects are desired.

7.9.2 **Repeat effects may not matter.**

Suppose the goal of a certain equation is to put RLY.LIGHTS in the correct state. This equation can be written so that the TELSEC will either reach TURN ON RLY.LIGHTS or TURN OFF RLY.LIGHTS every time. In this case, it does not matter how often the equation runs, as long as

it does the right thing each time. This is because turning on the lights has no effect if they're already on.

If the equation is written to complete a task such as pulsing a relay, making a phone call, logging, sending messages, etc., it is important to ensure the action only occurs once per occurrence.

The `WAIT UNTIL FALSE` statement is a typical way to produce a single effect. If an equation starts with an `IF/THEN` test, it may end with the same test, preceded by `WAIT UNTIL NOT`. This keeps the TELSEC from starting the equation again until the situation that made the TELSEC initiate the equation has ceased. Follows is an example of this form:

```
IF UIN.ALARMED THEN statement, statement,  
statement, statement,  
WAIT UNTIL NOT UIN.ALARMED
```

This equation does four things if an alarm button is pressed. The `WAIT` statement at the end waits until the button is released. If you pushed the button again, the four statements would run again. But if you didn't include the `WAIT` statement, the TELSEC would do the four statements as many times as it could until you let up on the button.

Using a `DISABLE` statement is another way to produce a one-time equation. The last statement in the equation is a `DISABLE` statement that refers to the equation it is in. This means that, when the TELSEC runs completely through the equation, it finishes by taking the equation out of service.

Another equation could use the `ENABLE` statement to make the first equation run again, one time. Normally, equations that disable themselves run once after a restart or power failure, since the TELSEC re-enables all equations on startup.

7.9.3 Detailed Timing:

The TELSEC runs any equation that isn't disabled by obeying each of the statements in the sequence in which they appear. The `IF` statement makes the TELSEC skip over some statements in certain cases. Some statements, such as `WAIT`, make the TELSEC stop working on that equation, though it continues to run other equations.

If it's time for the TELSEC to run an equation (see below), but that equation is waiting, then instead of going to the start of the equation, the TELSEC goes to the point where it left off and checks whether the equation can stop waiting.

When the TELSEC reaches the end of an equation (or the last statement it's allowed to obey, because of `IF` statements), then it is done with that equation and goes on to another one (see below). The next time it runs the original equation, it goes back to the start.

If an equation starts with an `IF` statement detecting an unusual condition, the TELSEC makes the specified test every time it runs the equation. Typically, it gets the value `FALSE`, decides there's nothing else it can do in this equation, and stops running it until the next time.

Including the `RATE` function in an equation makes certain computations occur every time the TELSEC runs a specific equation, even if the equation is waiting and can't continue. These computations will not occur, however, if the equation is disabled.

After a cold start, such as that during the TELSEC installation, there are no equations, so none will run. When a new equation is defined, it becomes enabled. This means the TELSEC runs it at least once. The equation may take itself out of service. This would still produce a one-time effect, unless another equation disabled it before the TELSEC reached it.

After a reset, such as restoration of power, to the TELSEC, the TELSEC automatically enables all equations. The equations are then processed and run in order expeditiously.

7.9.4 Use of Memory:

When an equation is defined, the TELSEC will report how many "bytes" of memory the equation requires. No equation is allowed fill more than 256 bytes. When an equation that is too complex is entered, the TELSEC will alert the programmer. The equation can be simplified or variables can be used to pass information to other equations, so that some of the computation can take place there. The TELSEC "byte" report will alert the programmer when an equation being entered is getting close to the 256-byte limit. Equations obtain memory in 32-byte sections. If the TELSEC reports an equation used 37 bytes, you should recognize that the equation actually used two 32-byte sections, and actually removed 64 bytes from the total available memory in the TELSEC.

7.9.5 Checksums:

The TELSEC system will do a check sum test on all equations when the unit comes up from a power failure or when the system is reset. This test ensures the integrity of programmed control strategies. Any equation that does not have the same check sum as that prior to the power fail or reset, will be disabled and will not perform any control or monitoring functions. The system will automatically insert an alarm in the alarm log stating that a failure for an equation has occurred. If an alarm phone number is programmed, the system will call out the alarm alerting the user to a failure. The equation will also return a value of -1 which can be seen with the `REVIEW EQU` command. You can also write strategies to monitor critical equations for failure and take a corresponding action. An example would be as follows:

```
IF MIN (EQU.1, EQU.2, EQU.3, EQU.4, EQU.5, EQU.6, EQU.7, EQU.8, EQU.9,  
EQU.10) = -1 THEN TURN ON RLY.ALARM  
ELSE  
TURN OFF RLY.ALARM
```

If an equation has a check sum failure, you can correct the strategy by transmitting the equation. The entire controller does not have to be reprogrammed.

7.10 Establishing Criteria to Write Equations:

The parameters of how the facility is to be controlled and monitored must be established. The decisions make up the "Criteria" or "Sequence of Events" for your facility. Writing equations is taking your criteria and putting into a syntax that the TELSEC can interpret. Use the following steps to program your system. Although the program can be loaded in any order, it is best to start with defining the physical inputs and outputs, and then complete the rest of the programming. This will establish a logical progression when writing the program.

Inputs: We have generated the following definitions. Note the names chosen for each of the inputs.

```
DEFINE ROOMTEMP = UIN.1 TEMPF 0 MSG.1 LOG AVG 30
DEFINE SMOKE = UIN.3 DIG ENV CR 5 MSG.3 LOG
DEFINE TOXIC = UIN.4 DIG ENV MJ 60 MSG.4 LOG
```

These definition lines will configure the TELSEC for our application. Of course, the individual sensor wires must be terminated at the proper TELSEC input terminal block location.

Outputs:

```
DEFINE VENT_FAN = RLY.1 OFF STAGED ENERGN
DEFINE COOL_1 = RLY.2 OFF STAGED ENERGN
DEFINE COOL_2 = RLY.3 ON STAGED ENERGN
DEFINE HEATING = RLY.4 ON STAGED ENERGN
```

We chose STAGED for all RLYS because none of our devices need critical ON/OFF timing.

Control: We have the inputs and outputs defined, so the next step is to provide the control interface.

We now define a few setpoints to use in our equations. Using setpoints (SPTs) allows us to easily change our operating parameters later. It also gives a front panel user the opportunity to change the settings.

```
DEFINE COOL_SP = SPT.1 78
DEFINE CL2DELTA = SPT.2 5
DEFINE HEAT_SP = SPT.3 65
DEFINE HIGHTEMP = SPT 4 90
```

We define a couple of memory variables so we can convert the readings of the inputs (see section 7.3.9).

```
DEFINE ROOM_TMP = VAR.1 0
DEFINE ROOMRH = VAR.2 0
```

A message will be defined so it can be sent to the display when the alarm occurs.

```
DEF HIGHTEMP = MSG.1 'HIGH TEMP ALARM IN ROOM'
```

Equation One: Its purpose is to convert the temperature and humidity readings and store the outcome in memory variables to be used by the other equations.

```
DEFINE CALCUINS = EQU.1  
VAR.1 = UIN.1/100,VAR.2 = UIN.2/100
```

Equation Two: Its purpose is to control RLY.2 which is the air conditioner Stage 1.

```
DEFINE COOL__1 = EQU.2  
IF UIN 3 = ON THEN TURN OFF RLY.2  
ELSE  
IF VAR.1 > SPT 1 FOR 2:00 THEN TURN ON RLY.2  
ELSE  
IF VAR.1 < SPT 1 FOR 2:00 THEN TURN OFF RLY.2
```

Notice there are three (3) IF..THEN..ELSE statements in the equation. This corresponds to the amount of tasks this equation must handle. The three tasks, in priority, are as follow:

Task 1 Turn off the air conditioning if the smoke detector is on.

Task 2 Turn on the AC if the temperature is greater than the current setpoint for two minutes.

Task 3 Turn off the AC if the temperature is less than the current setpoint for two minutes.

Equation Three: The control strategy for the second air conditioner can be programmed as follows:

```
DEFINE COOL__2 = EQU.3  
IF UIN 3 = ON THEN TURN OFF RLY.3  
ELSE  
IF VAR.1 > SPT 1 + SPT 2 FOR 2:00 THEN TURN ON RLY.3  
ELSE  
IF VAR.1 < SPT 1 FOR 2:00 THEN TURN OFF RLY.3
```

Again, there are three (3) IF..THEN..ELSE statements in the equation. This corresponds to the number of tasks this equation must handle. The three tasks are as follow:

Task 1 Turn off the air conditioning if the smoke detector is on.

Task 2 Turn on the AC if the temperature is greater than the current setpoint plus the stage 2 delta for two minutes.

Task 3 Turn off the AC if the temperature is less than the current setpoint for two minutes.

Equation Four: The heating can be programmed as follows:

```
DEFINE HEATER = EQU.4  
IF UIN 3 = ON THEN TURN OFF RLY.3  
ELSE  
IF VAR.1 < SPT 1 FOR 2:00 THEN TURN ON RLY.3  
ELSE  
IF VAR.1 > SPT 1 FOR 2:00 THEN TURN OFF RLY.3
```

Notice there are three (3) IF..THEN..ELSE statements in the equation. This corresponds to the number of tasks this equation must process. The three tasks, in priority, are as follow:

Task 1 Turn off the heater if the smoke detector is on.

Task 2 Turn on the heater if the temperature is less than the current setpoint for two minutes.

Task 3 Turn off the heater if the temperature is greater than the current setpoint for two minutes.

Equation Five: We have completed controlling the AC and heating units for the facility and can now work on alarm equations:

```
DEFINE HI_TEMP = EQU 5
IF VAR.1 > SPT 4 FOR 5:00 THEN ALARM UIN.1 ENV MJ,
SEND MSG.1, WAIT UNTIL VAR.1 < SPT.4,
ALARM UIN.1 ENV CLEAR, SEND MSG.1 CLEAR
```

Here the System generates an alarm message for high temperature when the temperature is greater than the high temperature alarm setpoint and sends the message to the front display. The system will then send a clear message once the input is below the alarm setpoint and stop (clear) sending the message to the front display.

Equation Six: Equation six is a special equation. By using `SPTs` in our equations, we have allowed front panel users to modify the setpoints. (See Keypad to see how this is done.) We could have used variables (`VARs`) and not allow the front panel user access to our equations. We opted not to do so in this case to demonstrate front panel access within limits. The TELSEC built-in functions of `MIN` and `MAX` are utilized here to limit the range a front panel user can modify a setpoint.

```
DEFINE STPTLMTS = EQU.6
SPT.1 = (MAX 70, (MIN (SPT.1, 80))),
SPT.2 = (MAX 0, (MIN (SPT.2, 5))),
SPT.3 = (MAX 55, (MIN (SPT.3, 70)))
```

Equation 6 recalculates each setpoint based on the two programmed limits. In this way, if a front panel user decides to try to change the temperature setpoint (`SPT.1`) to 64 degrees because he is too hot, the TELSEC will reset the setpoint to a value within the limits. In our example, the two limits for `SPT.1` are 70 and 80. The front panel user can move `SPT.1` freely between these values giving him the flexibility of modifying the setpoint somewhat.

Let's say he tries to bring `SPT.1` up to 82 degrees because he is too cold. The TELSEC will evaluate the `MIN (SPT.1, 80)` part of the equation first because of the parenthesis inserted. The function will compare the current value of `SPT.1` (or 82) with a limit of 80. The function will return the minimum (`MIN`) of these two values or 80. `SPT.1` has now been limited to 80. Personnel can be prevented from wasting energy in this way.

Equation Seven: Equation seven performs a simple function. It simply scrolls the analog values across the front panel display to be seen by anyone wanting to know the current conditions.

```
DEFINE DISPLAY = EQU.7
SEND UIN.1 SEND UIN.2, SEND UIN.3
```

7.11 Uploading Programs:

Once all TELSEC programming and equation definitions are complete, the information must be uploaded to the TELSEC. Entering programs manually is very time consuming. Most users write all programs using a computer and word processing software first. The programming is entered in ASCII text format. Be sure to save the program file in a non-document mode (in .TXT mode). You can use the forward slash (/) as the first character on a line to create comments in your program file. Once the programs are complete, communication software is used to quickly upload the program. Prior to uploading the program, it is recommended that you first set the system clock using the SET CLOCK command (refer to section 6.4.2). The TELSEC supports two methods for uploading programs the first and preferred method is using Xmodem protocol:

7.11.1 Xmodem File Transfer

Xmodem is the preferred method of sending programs since it provides error checking and will notify you of any errors in your program. Most communications programs support Xmodem transfer. In the setup for Xmodem on your communications program choose "used relaxed timing" if you have that option. To start an upload, first issue the command SET PRO to the TELSEC. The system will respond with: **START XMODEM XFR...** you have up to 1 minute to start sending the program or the system will time out and abort the transfer process. Send the program to the TELSEC using the Xmodem protocol. If the program is accepted completely then the system will respond with a message showing the number of bytes received. Otherwise the system will respond with an error message telling you what the problem is.

Example:

RCV ERR -2 @ LINE 0 – A -2 error code means the system timed out waiting for reception of the file.

RCV ERR -5 @ LINE 8 – A -5 error code means there is a problem with the line in the program. This message will show the line number in the program where the error was found.

7.11.2 ASCII Text Transfer

The TELSEC system accepts ASCII downloads using software flow control. All of your provisioning commands can be saved to an ASCII Text file and then loaded via ProComm to the controller. Make sure your ASCII download settings are set up as follows:

1. STRIP LF on upload
2. 5 millisecond character delay
3. Don't expand blank lines (ProComm default is to expand blank lines)
4. Use software flow control (XON/XOFF)

Note: you must be logged on with a password in order for the system to take your program files.

The system will respond with OK after each program line. An error message will be displayed if a line is not accepted. When this occurs, correct the line and then either retransmit the file or copy and paste the correction to the system by using the Windows copy and paste commands.

7.11.3 Saving Programs to Non-Volatile Memory

All programming when loaded to the system is stored in battery backed up RAM. The program can be written to the non-volatile FLASH memory once you have completed your provisioning. To store all programs to FLASH, Type the command **SET PROGRAM DEFINE** and the system will respond with a message stating it is writing to the FLASH.

8 Access Control

8.1 Overview

The TELSEC has an integrated Access Control port for key/card code access control of the facility. The hardware supports any card swipe or proximity reader using the Wiegand format with a maximum database of 600 cards, the TELSEC can handle large personnel requirements. The hardware also supports digital feedback from the door to alert during illegal entry and door ajar conditions. Quest also offers custom card formats tailored to specific applications. Contact your authorized Quest representative for more details. Quest also offers a peripheral module that will allow up to four card readers and control of four doors.

8.2 Using the Access Control System

We will discuss the software portion of the TELSEC Access Control system here. For Hardware installation, see Installation I. Once the card reader and door have been wired into the TELSEC, you are ready for programming.

8.2.1 Define the feedback digital point

(Optional): If the door closure is wired to the TELSEC to provide feedback, this input must be defined as `DIGITAL`. This is done using the following command line (see section 6.3.1.3):

```
DEFINE DOORSTAT = UIN.# DIGITAL LOG
```

The # is the `UIN` point where feedback digital is landed. The name 'DOORSTAT' can be any eight-character name.

8.2.2 Define your Digital Output:

Typically, you will define your relay output with this command line (section 6.3.2):

```
DEFINE DOORRLY = RLY.# OFF IMMEDIATE ENERGON
```

Where # is the digital output point where the door opening circuit is landed. If the output is required to have inverted logic, refer to the `DEFINE RLY` portion of your TELSEC User's Manual for more information.

8.2.3 Define the DOR point:

Define the DOR point to correlate a valid card presented to a reader with the control of a particular output that is actuating the door mechanism. This point returns an `ON` or `OFF` state using the `CARD` information which will be defined later. The syntax for this command is:

```
DEFINE [<NAME> =] DOR.<#> <RLY.#> <SECONDS OPEN> [<DIGITAL FEEDBACK>  
<SECONDS TO CLOSE>]
```

<NAME>: A unique, user defined point name.

<#>: Select DOR point 1-4. Note you must have the 4-port door peripheral present to support more than one door.

<RLY.#>: The digital output controlling the door solenoid.

<SECONDS OPEN>: This field contains the time in seconds that the door digital output will energize during a valid access condition. Once a valid card is recognized, the output relay will energize for this time allowing the cardholder to open the door. Valid seconds are 1 to 59.

<DIGITAL FEEDBACK> (optional): This field contains the UIN.# of the feedback digital used to sense actual door opening and closure. If a feedback digital was not used for installation, leave this field blank. The feedback digital will cancel the DOR ON command once the door is open so it can turn off quicker than the value in the <SECONDS OPEN> field.

<SECONDS TO CLOSE> (optional):

This field contains an amount of time in seconds that the TELSEC waits before alarming the door is ajar. If you have defined a feedback digital for your door, you must enter a number between 1 and 120 in this field. If no digital was defined, leave this field blank. A message will be entered in the access control log if the door is left ajar for longer than this time delay.

Note: An ACCESS-level password is necessary to use the DEFINE DOR command.

8.2.4 Define valid access cards:

The syntax to define your cards is:

```
DEFINE CARD <CARD ID> [TOD.#] [DOR.1,DOR.2,DOR.3,DOR.4] ["<NAME>"]
```

<CARD ID>: This field contains the card number (sometimes referred to as 'Badge ID' or 'Card ID') of the card you wish to have access to your door. The TELSEC will accept numbers from 1 to 1048575 but the maximum number of cards in the system is 600.

[TOD.#] (optional): This field contains an optional time schedule number used to grant access only during valid time periods. If the application requires this option, refer to the DEFINE TOD section 6.3.5 of the TELSEC User's Manual and input the special time period criteria. The TOD.# may now be entered in this field and this particular card number will only be given access during an ON state of the TOD.

[DOR.1,DOR.2,DOR.3,DOR.4]: you can specify which DOR point will work with this card if you have more than one dor wired into your system. If you do not specify a DOR, then the TELSEC system will automatically make the card valid for all DOR points.

["<NAME>"]: The TELSEC will allow you to attach a 16-character name to the card. The name can contain spaces and must be defined between quotation marks.

Example:

```
DEF CARD 300 "JOHN Q TECH"
```

Card code 300 is entered in the database and assigned the name JOHN Q TECH. There is no limit based on time of day and this card has access to all available doors.

```
DEF CARD 1050 TOD 1 DOR 1 "CLEANING CREW"
```

Card code 1050 is entered into the database and assigned the name CLEANING CREW. This code is limited to when time of day schedule 1 is active and will only work on the first door.

After completing and changes you will need to save your changes to flash with the SET PRO DEF command.

8.2.5 Setting site code and bit format:

Determine the site code and the bit format for the cards. You will need to know the bit positions for the following parameters: facility code start, facility code end, card id start, card id end, total bits. (Call Quest if these parameters are not known.)

Enter the following command line from a logged-on terminal:

```
DEFINE DOR.1 RLY.1 10 ENERCON <SITE CODE> <FACILITY START> <FACILITY END>
<CARD ID START> <CARD ID END> <TOTAL BITS> <KS>
```

- <SITE CODE>: The facility or customer code programmed for the card
- <FACILITY START>: The position of the first bit is for the facility code.
- <FACILITY END>: The position of the last bit for the facility code.
- <CARD ID START>: the position of the first bit for the unique cards code.
- <CARD ID END>: The position of the last bit for the unique cards code.
- <TOTAL BITS>: The total number of bits to be expected from the card.
- <KS>: Optional this is the facility code for the keypad if it is different from the cards being used. Note keypad codes will always be 26 bit.

Substitute the proper numeric values for the parameters.

Example:

```
DEFINE DOR.1 RLY.1 10 ENERCON 8 1 8 9 24 26 1
```

(This is a standard setup for a 26-bit Wiegand card with a facility code of 8 for the cards and a keypad facility code of 1)

The TELSEC will reply 'DONE' and display the help message. The previous DOR definition will not be affected. The format will be stored in non-volatile memory when you save your program to flash with the SET PRO DEF command.

8.2.6 Using Keypad Codes:

The TELSEC can support the use of keypad entries and proximity cards. It does this by mimicking a card being swiped when you enter keys on the keypad. Six numbers are required for each code to be entered into the keypad. The first two numbers are the facility code for the site followed by four unique digits for the user. The keys entered are in a hexadecimal format and are transmitted to the controller as a hexadecimal number. The controller will automatically convert the hexadecimal number to a decimal number and compare it to the defined cards to see if there is a match. All codes are entered into the system in decimal (DEC) format providing a level of encryption for security.

Create a list of passwords to be assigned. File this list in a secure location.

User Name	Keypad Code (Hex)	Card Code (Decimal)
John Doe	011234	4660

Next use the calculator that comes with windows. Set it up for scientific format and click on HEX numbers. Enter the unique 4 digits for the user and click on the DEC. The calculator will convert the number for you. For example, a four-digit key code of 1234 will be entered into the system as 4660. The command to enter the code will then look like the following:

```
DEFINE CARD 4660 "JOHN DOE"<enter>
```

When John wants access to the facility, he will enter 01 (value in the <KS> field) followed by 1234.

After completing and changes you will need to save your changes to flash with the SET PRO DEF command.

8.3 System Messages

The system will log one of the following statements in the access log when a card is flashed to the system:

NOTICE, IN, 09/25/07 14:21:00, DOR.1 , CARD 345 (OSCAR GRAHAM), ACCESS GRANTED#: A valid card has been received and the door relay has been energized.

NOTICE, IN, 09/25/07 14:20:00, DOR.1 , CARD 8 (DICK BRUTIS), ILLEGAL ATTEMPT: Access was attempted and denied to card #. The card # was not found in the database. This message will show you if anyone with the correct site code on their card does not have access to the door.

NOTICE, IN, 09/25/07 14:20:00, DOR.1 , CARD NONE (), ILLEGAL SITE CODE: A card with a site code differing from the one defined using the DEFINE DOR command was found. No access was given.

8.3.1 Reviewing Access Control Info

All access control system transactions are stored in a log in the TELSEC memory.

To review this information, enter the command:

```
REVIEW LOG ACCESS
```

The log data will be output listed with the most recent transactions first to the oldest entries. There are approximately 800 entries available in the log.

8.4 Listing Access Control Information

When the programming for the access control system is complete, the data can be listed back for storage or reference using the LIST command.

To list the door definition use:

```
LIST DOR
```

To list the valid card data use:

```
LIST CARD (will show all cards in the database. . If nothing is displayed, then there are no cards in the data base.)
```

```
LIST CARD 3100 (will list the card with access code 3100. If nothing is displayed, then the card number is not in the data base.)
```

8.5 Removing Cards

The `REM CARD <card#>` command will delete a specific card from the data base.

Format:

```
REM CARD <card#>
```

Where `<card#>` = the access code number of the card.

Example:

```
REM CARD 3050  
REM CARD 4095
```

CAUTION: If you send the command `REM CARD 0` to the system, it will delete the entire card database. Use this command carefully.

After completing and changes you will need to save your changes to flash with the `SET PRO DEF` command.

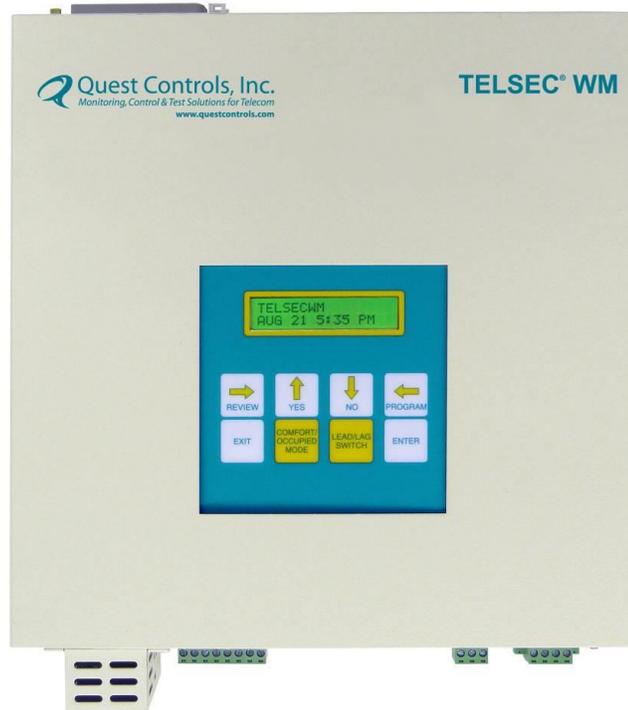
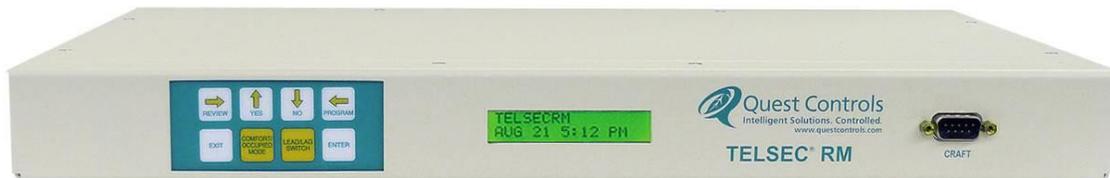
9 Front Panel Display and Keypad

9.1 Overview:

The TELSEC allows the following functions from the front panel:

- Display of ID and Time
- Equation Generated SEND information
- Digital Input Generated Alarms
- REVIEW of all point values
- Setpoint Entry
- Bypassing of Outputs
- Setting the Clock

Each of these functions will be explained in detail. By allowing these specific functions from the front panel, the TELSEC gives a user just enough access to the application as is necessary. The system administrator or programmer designs the underlying equations so a front panel user can modify his environment to his liking without disrupting programmed functions.



9.2 Basic Principles

9.2.1 Passwords:

The TELSEC requires a password when the PROGRAM key is pressed. The REVIEW key does not require a password and will allow instant access to TELSEC information.

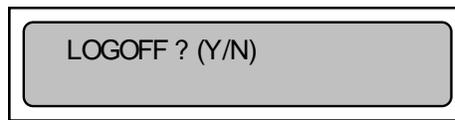
The passwords here are the same as those discussed in section 6.4.3. If the MASTER or PROGRAM passwords are entered, program changes can be made through front panel access. If the password is READ level only, the front panel will not be accessible for changes.

The password field is character entry. To change the character above the cursor, use the UP and DOWN arrows to scroll through the available letters and symbols. When satisfied with the character, press the RIGHT arrow key to continue entering characters.

When password entry is complete, press the ENTER key. If a valid password has been entered, the TELSEC will display 'OK' momentarily. If the password was invalid, the TELSEC will display 'INVALID PASSWORD' and program modifications will not be allowed. Once you have entered a correct password, the PROGRAM key will allow you to modify TELSEC information.

9.2.2 Logging Off:

To log off the front panel, press the EXIT key twice in succession. The TELSEC will prompt:



To log off of the system at this point, press the YES key. To continue using the front panel, press the NO key. The TELSEC will also automatically log you off if the inactivity delay of 10 minutes elapses without a key being pressed.

9.2.3 Choices:

The front panel and display provide an interactive environment for the TELSEC user. The TELSEC will provide the user a menu of choices from which to choose. The TELSEC question will be posed on the first line of the display and the menu will be on the second line. All menu selections are made using the scroll arrow keys.

A flashing block will appear in the middle of the current selection. The block will scroll based on the key input. If there is more information than will fit on the display, arrows will appear in the left and right corners indicating the RIGHT and LEFT scroll keys can be used to access this information. Once a selection has been made, press the ENTER key. Another menu or the requested data will be displayed.

9.2.4 Aborting:

Often we get busy and forget what we are doing. The TELSEC may present a menu and you have no idea of how you got there. If this occurs, press the EXIT key to escape. The EXIT key will abort the current choice and return to the initial state.

Display of ID and Time: When not in use, the front panel display shows the contents of ID.1 on the first line and the current date and time on the second line. After the user logs-off the front panel, this information will return.

TELSEC 2000
JAN 14 12:15 PM

9.2.5 Equation Generated SENDs:

In Equation Language, we discussed the `SEND` keyword when used in equations. The `SEND` command allows equations to display information on the front panel of the TELSEC. Any TELSEC point or timer can be displayed on the front panel.

The `SEND` option can be used to alert occupants to trouble or to continually display information.

9.2.6 Automatic Digital Input Alarms:

Any UIN defined as a digital alarm point (see section 6.3.1.3) will either display the status ON status of the point or the optional 32 message defined for the point. This message will continue to display until the alarm condition clears. Once the condition clears, the message will automatically be removed from the display buffer.

9.2.7 Reviewing Information:

To use the `REVIEW` command of the TELSEC, press the `REVIEW` key. It is not necessary to enter a password. A menu appears with a list of points to review. Simply scroll to your choice and press the `ENTER` key. The header for the chosen point will display on the first line, and the values displayed on the second line. If arrows are in the corners of the display, scroll the data left and right using the `RIGHT` and `LEFT` arrow keys. The `UP` and `DOWN` arrow keys can be used to rotate between the different points. The first point displayed is point number 1. If you need to review point number 3, press the down arrow key twice and point 3 will display.

For an explanation of the headers and data, refer to the Command Syntax area of Chapter 6, Section 5.3.1.

NOTE: TELSEC data displayed on the front panel is real-time. Any changes will dynamically update on the display.

9.3 Program Modification:

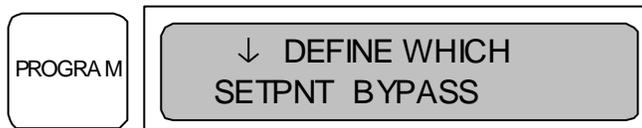
The next few sections review altering TELSEC program information. If you are unsure of what you are doing stop now and get further instruction.

The next five sections require `PROGRAM` or `MASTER` access. The keystroke sequence shown will assume that the user has already entered a valid password. `BYPASS` level access is required for bypassing.

Each step will show a key followed by a sample display. The user should press the corresponding TELSEC key and the sample display will appear on the TELSEC display.

9.3.1 Set Point Modification:

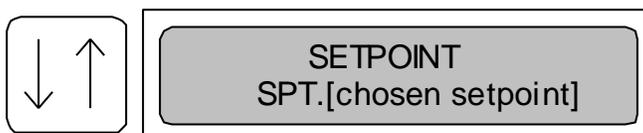
The TELSEC allows a front panel user to modify the current value of setpoints (`SPT`). In order for this to have any effect, the TELSEC equations must be designed with the `SPTs` in mind. (For example, equations, see Equation Language.) To modify a setpoint, follow these directions:



SETPNT has the cursor on it so it is the current choice.



We currently display `SPT.SPT001` which is the default name for setpoint one. If you have named setpoint one differently, the defined name will appear instead. You must now choose which `SPT` you wish to modify. Use the UP and DOWN arrow keys to scroll to the proper `SPT`.

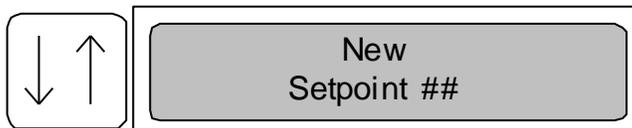


Once at the proper setpoint, press ENTER to modify it

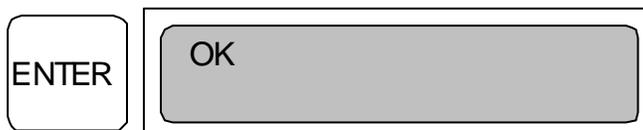


You now have the current value of the setpoint on your display. You can modify the value in a few different ways. Press the UP and DOWN arrow keys to increment or decrement the value by one. To toggle the setpoint's sign, press the LEFT arrow key. If the number was positive, a negative sign will appear. If the number was negative, the negative sign will disappear.

You can also press the EXIT key to abort your changes.



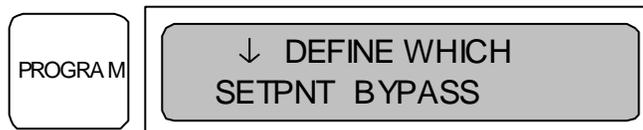
Press ENTER now to make your change active.



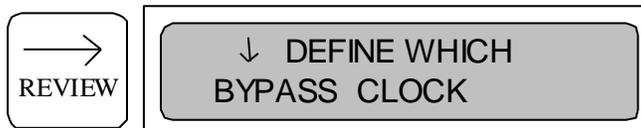
You have now modified a setpoint. The display will return to the setpoints list. The up/down arrow keys can be used to select another setpoint or press 'EXIT' to return to the main screen.

9.3.2 Bypassing Outputs:

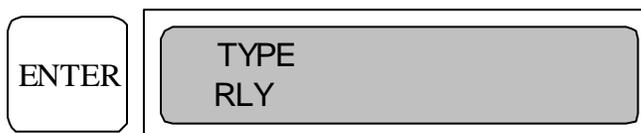
The TELSEC allows a front panel user to bypass digital (RLY) outputs. To do so, follow these directions:



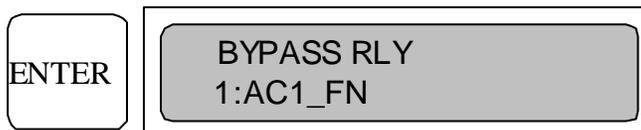
SETPNT has the cursor on it so it is necessary to press the RIGHT arrow once to scroll to BYPASS.



Press ENTER to activate BYPASS.

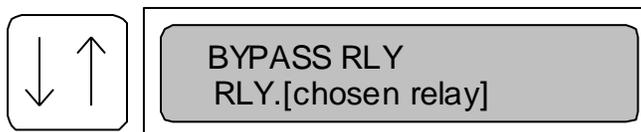


Choose which output type to bypass. The current choice is RLY. Press enter again.

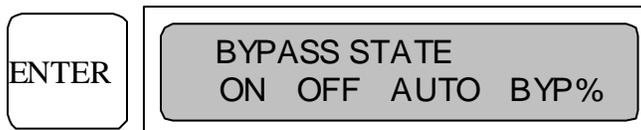


We currently display RLY.RLY001, which is the default name for relay one. If you have named relay one differently, the defined name will appear instead. Choose which RLY to bypass. Use the UP and DOWN arrow keys to scroll to the proper RLY.

Once at the proper RLY, press ENTER to bypass it

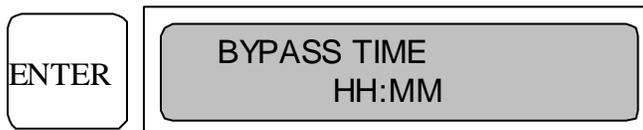


Choose how to bypass the RLY. ON and OFF are self-explanatory. Choose AUTO to clear any bypass active at this time.



If AUTO is chosen, press ENTER; the TELSEC will restore the RLY to its AUTO state and return to the initial display.

If ON or OFF is chosen, the TELSEC will display the screen below.

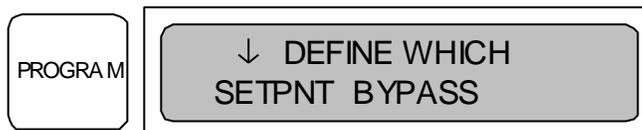


Now enter the RLY bypass time. Use the UP/DOWN arrow keys to input the time. Use the LEFT/RIGHT arrow keys to move to each field. The maximum time allowed is 23 hours and 59 minutes. If 00:00 is entered, the RLY will be bypassed FOREVER. In this state, it is necessary to bypass the RLY to the AUTO state to clear the FOREVER bypass.

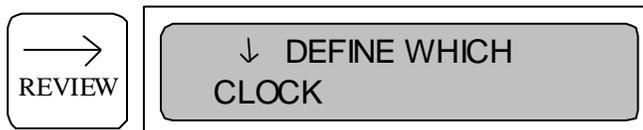
Once time is entered, press the ENTER key to bypass the RLY. If the information was entered incorrectly, an ERROR message will be displayed. Check to make sure you entered a valid time. The BYPASS procedure is now completed.

9.3.3 Setting the Clock:

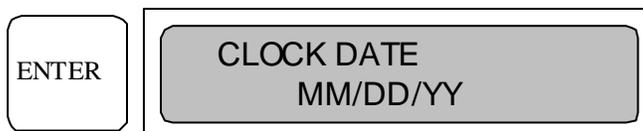
The TELSEC allows a front panel user to set the internal clock. To do so, follow these directions:



SETPNT has the cursor on it so you need to press the RIGHT arrow two times to scroll to CLOCK.

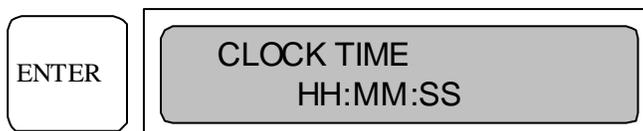


Press ENTER to activate CLOCK.



Use the UP/DOWN keys to enter the current month, date and year. Use the LEFT/RIGHT keys to shift to each field.

When the current date has been entered, press the ENTER key.



Use the UP/DOWN keys to enter the current hours in military format, minutes and seconds. Use the LEFT/RIGHT keys to shift to each field. Note you do not have to enter the seconds.

When the current date has been entered, press the ENTER key to change the clock.

10 SERVICE

10.1 Trouble Shooting Problems:

The procedures as outlined in the troubleshooting charts on the following pages should be helpful in isolating the most likely system malfunctions that may occur.

Troubleshooting Chart Guide:

Chart 1 – Power Problems

Chart 2 – System Failure

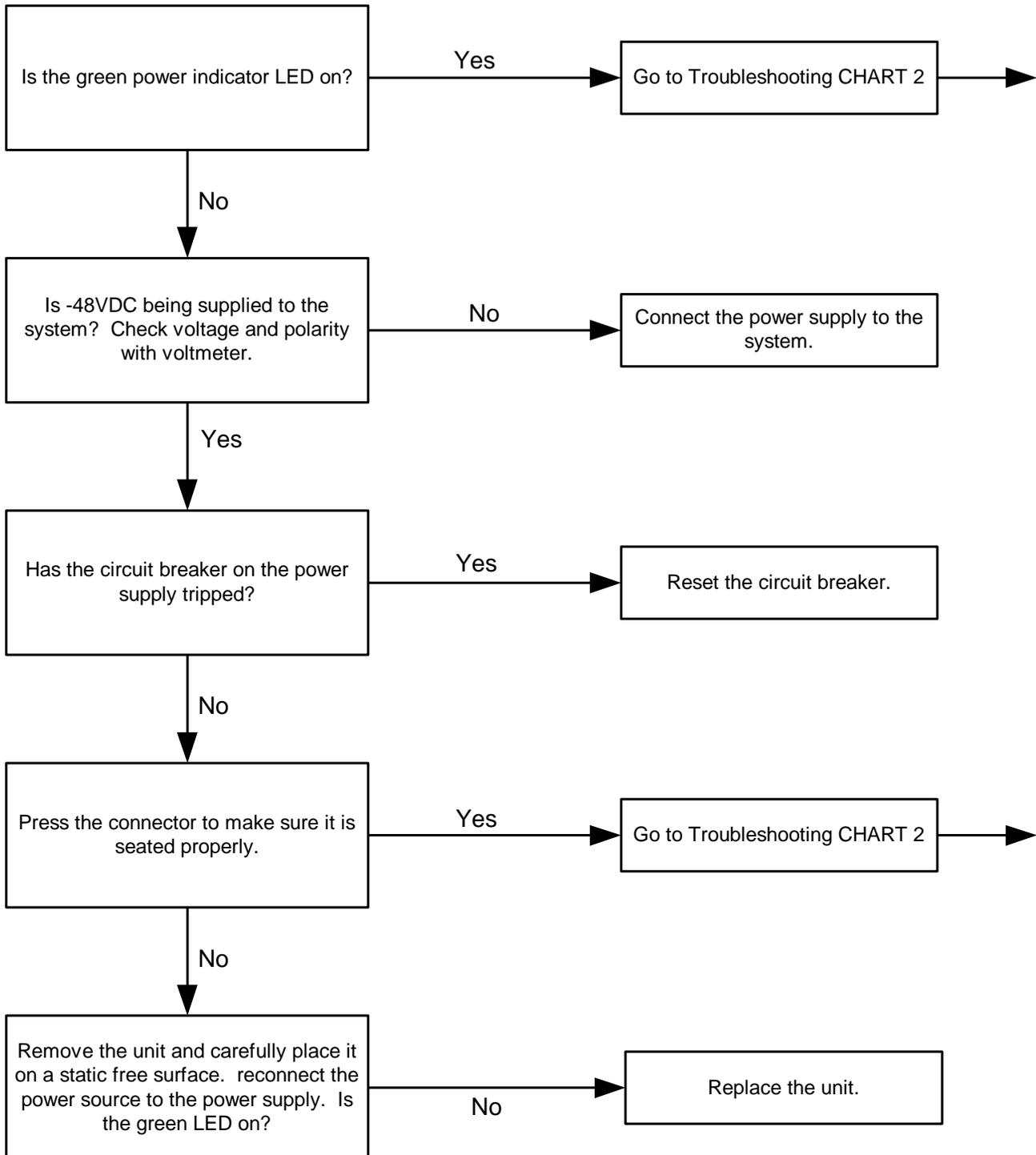
Chart 3 – No Diagnostic Output

Chart 4 – Modem Output

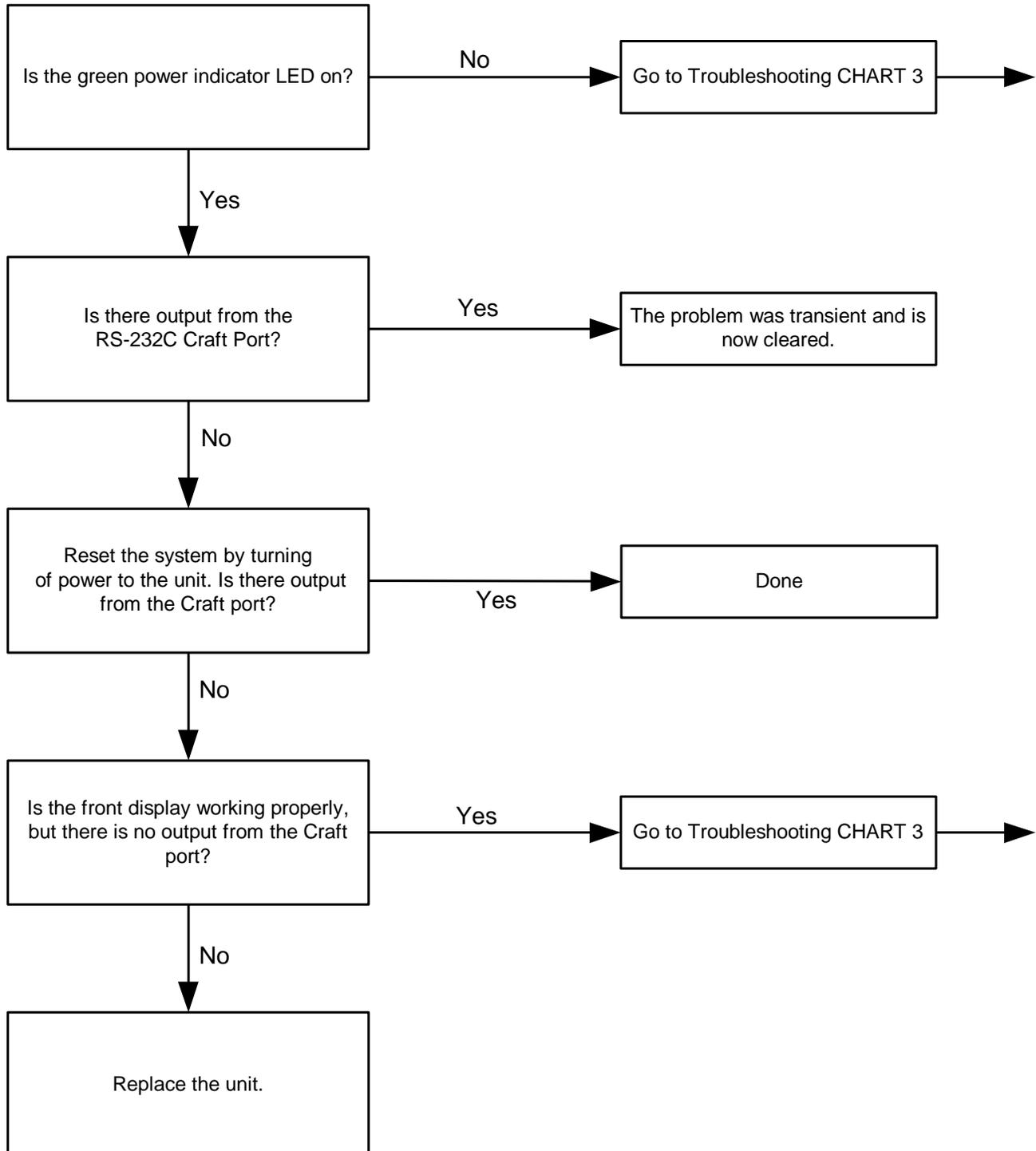
Chart 5 – Erroneous Trouble Reports

Chart 6 – Other Problems

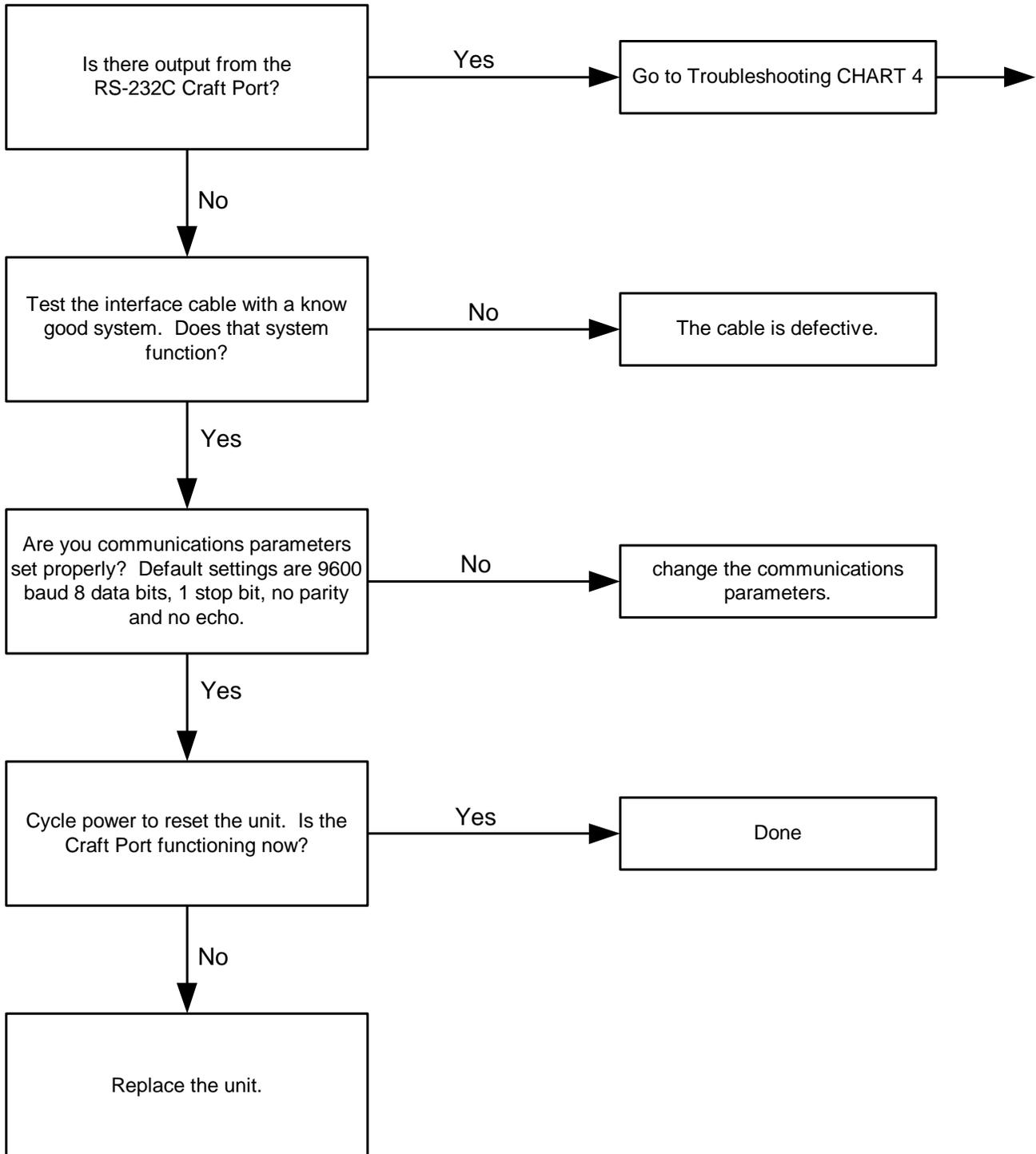
10.2 Chart 1 – Power Problems



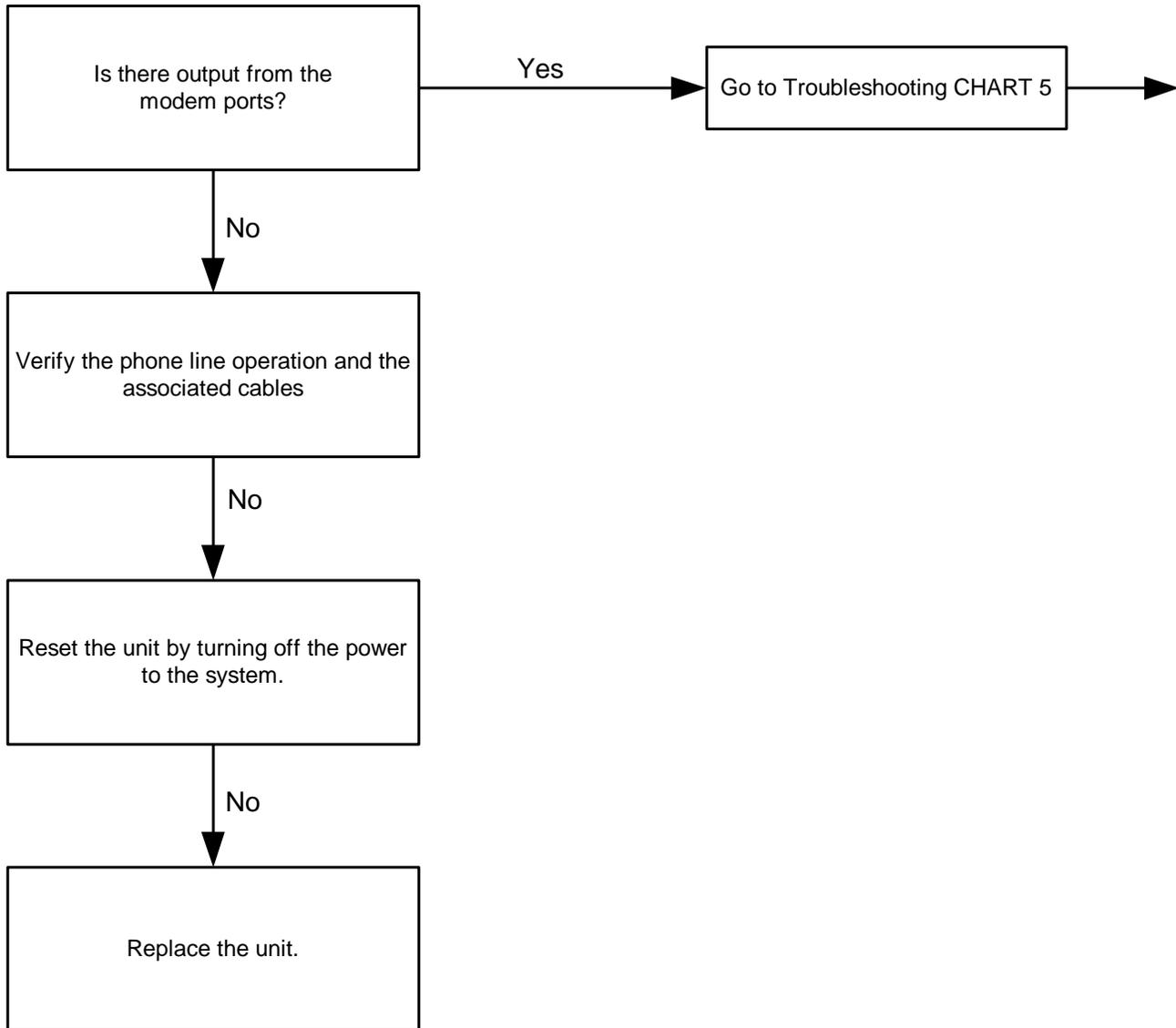
10.3 Chart 2 – System Failure



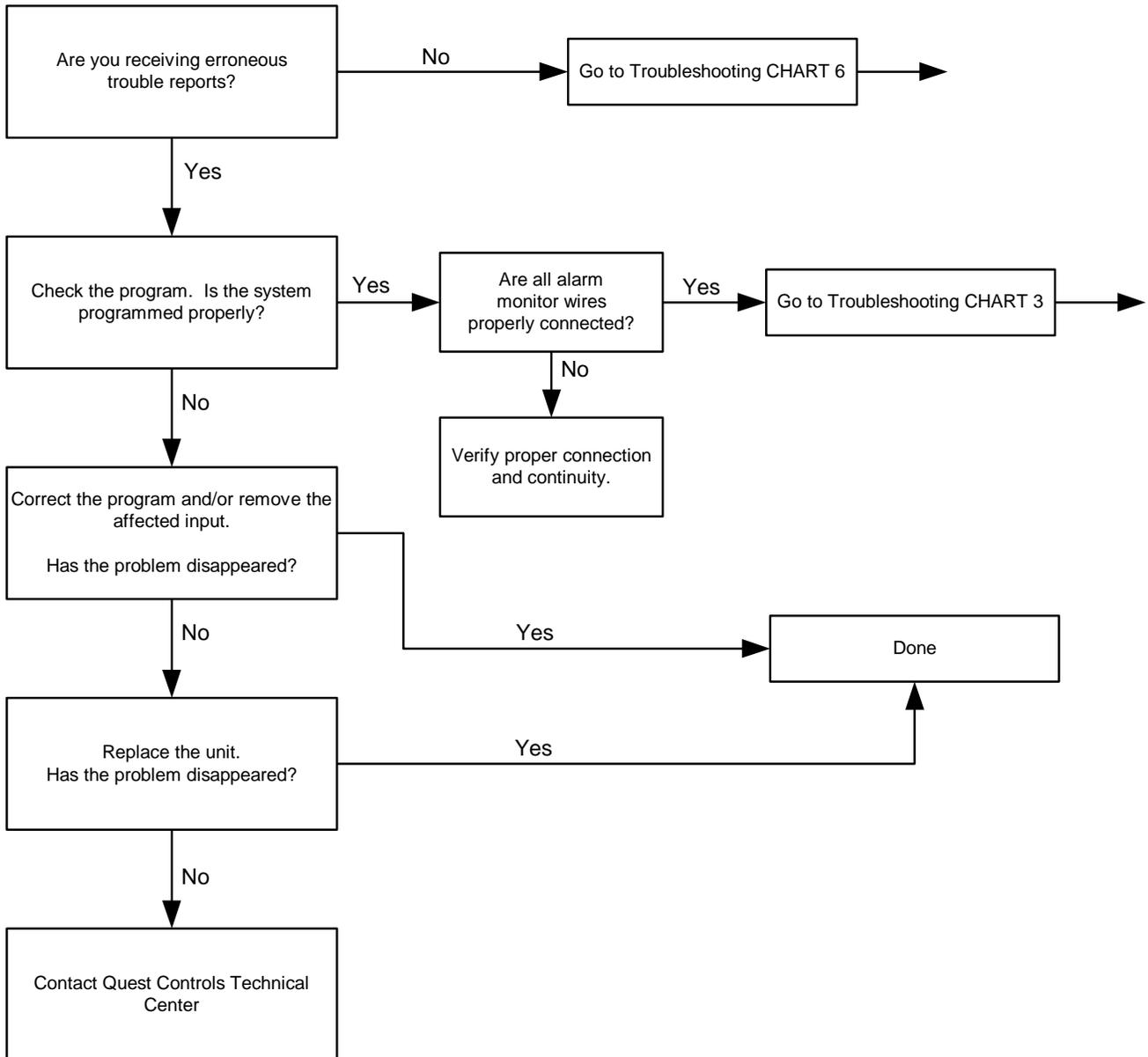
10.4 Chart 3 – No Diagnostic Output



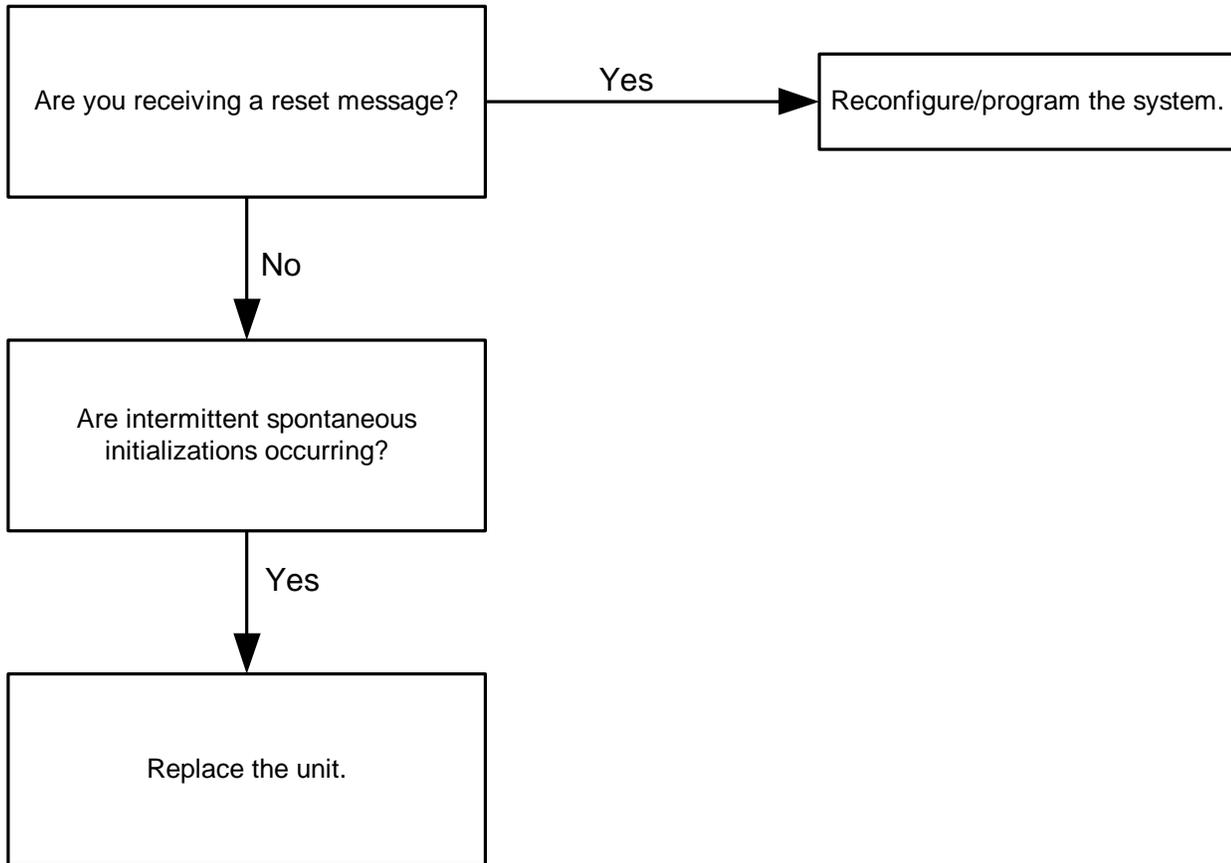
10.5 Chart 4 – Modem Output



10.6 Chart 5 –Erroneous Trouble Reports



10.7 Chart 6 - Other Problems



Appendix A - Blank Points List Forms

DIGITAL OUTPUTS			
1		9	
2		10	
3		11	
4		12	
5		13	
6		14	
7		15	
8		16	

UNIVERSAL INPUTS					
#	Input Name	Sensor Type	#	Input Name	Sensor Type
1	TEMPERATURE SENSOR	TEMP °F	17		
2	HUMIDITY SENSOR	%RH	18		
3	DC POWER PLANT VOLTAGE	VDC	19		
4			20		
5			21		
6			22		
7			23		
8			24		
9			25		
10			26		
11			27		
12			28		
13			29		
14			30		
15			31		
16			32		

Appendix B - RADIUS Server Configuration

For the RADIUS server configuration, you must use the “Filter-ID” attribute for each user to have access. Inside the “Filter-ID” you must have QuestMP2:<number> <number> is an encoded value for access to the different sections of the web server. The sections and values are:

Home page – 1

Status – 2

Alarms – 4

Program – 8

Settings – 16

Add up the access level for the user and use that number. Example if you want a user to have full access then the value to enter would be “QuestMP2:31”.

Appendix C – Email Alarm Format

The TELSEC will generate text-based emails for alarm conditions. The email notification will follow a specific format which is outlined below.

Format:

Subject line:

RMV2 <email type> (<severity>) - <user defined subject line>

Email body:

RMV2 named <site name> generated <email type>

Description of <alarm name>

Timestamped at <day month year hh:mm:ss -UTC>

Severity of <severity>

Value of <current value>

Data point name of <data point name>

Where:

<email type> = ALARM or CLEAR

<severity> CRITICAL, MAJOR, MINOR OR WARNING

<user defined subject line> = Subject field entered when defining the Email dispatch.

<site name> = The site name entered under Site Parameters

<alarm name> = The name of the alarm strategy that generated the alarm

<data point current value> = The current value of the data point causing the alarm condition

<data point name> = The name of the data point causing the alarm condition.

Example:

Subject: RMV2 ALARM (Critical) - TELSEC® Email notification

RMV2 named TELSEC_Site_101 generated ALARM

Description of UIN.BTH_068

Timestamped at 01 Mar 2019 13:30:04 -0700

Severity of Critical

Value of ACTIVE

Data point name of HIGH TEMP 1FL COLO

WARRANTY INFORMATION

QUEST warrants products of its manufacture to be free from defects in design, workmanship and material under normal and proper use and service for a period of 12 months starting upon shipment from the **QUEST** factory, with the exception of Software noted below. Products not manufactured by **QUEST** will have a 90-day warranty. Software is warranted to conform to **QUEST's** Software Product Description applicable at the time of order. **QUEST's** sole obligation hereafter shall be to remedy any nonconformance of the software to the Software Product Description during the 90-day period following delivery. This warranty shall not apply to fuses, batteries, or any product or parts subjected to misuse, neglect, accident, Acts of God, or abnormal conditions of operation.

QUEST agrees to repair or replace, at the place of manufacture and without charge, all parts of said products that are returned to the **QUEST** factory within the warranty period, provided the warrantor's examination discloses to its satisfaction that the product was defective and that the equipment has not been altered or repaired other than with **QUEST's** authorization and by its approved procedures. Repair or replacement of **QUEST** products does not extend the original warranty period. A product or board may be deemed beyond repair if **QUEST** determines that it has been subject to misuse, improper maintenance, negligence or accident, damaged or had its serial number or any part thereof altered, defaced or removed. If the failure has been caused by misuse, neglect, accident, or abnormal conditions of operation, or if the warranty period has expired, repairs will be billed at a nominal cost.

This warranty is in lieu of all other warranties expressed or implied, including but not limited to any implied warranty of merchantability, fitness, or adequacy for any particular purpose or use. In no event shall **QUEST** be liable for any special, incidental, or consequential damages, whether in contract, tort, or otherwise.

Glossary

Alarm Receiver - Device used to gather and display alarms. Usually a printer or computer with a modem is used.

Alarm - Condition generated by unusual circumstances. Alarms are used to alert someone to a particular condition.

Analog - Most easily defined as a range of values as opposed to two distinct values in the case of digital.

Analog Output - A DC voltage or milli amps output used to control an analog device through a range of action.

Analog Input - Sensing device that returns an analog value.

Bypass - Overriding a predetermined position.

Date Schedule - Facility to compare the current date to a user defined date or range of dates.

DB9 - Nine position connector used to connect equipment.

Digital - Either of two values. Examples: ON / OFF, IN / OUT, OLD / NEW.

Digital Input - Sensing device that senses contract closure.

Digital Outputs - Facility to drive a digital device to one of two states.

DOW - Acronym for Day-of-the-Week.

Energy Management - Means of controlling the amount of input energy (usually electricity) necessary to power certain devices.

Equation - A series of statements use to control outputs

Facility Automation - Means of properly controlling certain devices automatically without human intervention.

Hardware - Term for various electrical and mechanical devices.

Input - Any sensing device that returns a meaningful value.

Keyword - One of a list of words with reserved meaning that cannot be used for any other purpose.

Logging - Method of recording information for later use.

MADC - Abbreviation for milli amperes of direct current.

Modem - Device which allows data to be transmit over the phone lines.

Name - Set of unique characters used to extend the meaning of a point.

Offset - Adjustment of a value to return the correct amount.

Operating System - Internal workings of a microprocessor-controlled device. Much like the human brain.

PID - Abbreviation for 'Proportional Integral Derivative.' An algorithm to calculate a position based upon historical trends.

Point - A single entity of programming.

Priorities - Facility to order a decision making process.

Qualifier- Digital point used to allow different statements to be processed under only certain conditions. If the qualifier is not true, the statement would not be evaluated.

Setpoint - User defined value used in a comparison or as a target.

Time Schedule - Facility to compare a collection of times to the current time and return a digital value.