Quest Controls, Inc.
Monitoring, Control & Test Solutions for Telecom

TELSEC® RM/WM
Models 800, 1500 & 2000
(Web Enabled Version)

User's Manual

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Chapter 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.

Chapter 2 - Product Specifications

2.1 Scope

Chapter 3 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 to32 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 can also be powered from +24 VDC. The green LED on the lower right of the back panel will be lighted continuously to indicate the system is connected to the source voltage. Standard 2-position screw terminal provides interconnection of the power source and a built-in re-settable fuse provides surge and overload protection.

2.3.6 Expansion Module:

The TELSEC® 2000 expansion module is a remote module that will expand a basic TELSEC® input and output capability. The module provides an additional 32 universal inputs and 16 control contacts. This unit comes in either rack mount or wall mount configuration and plugs into the TELSEC® RM or WM through a 3 wire network connection. The Expansion module can be located up to 1000 feet (300M) from the main TELSEC® system and can be either Rack mounted (RME) or wall mounted (WME).

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/dry 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 10Base-T Ethernet port for alarming via SNMP traps. All status can be viewed by either a Web Browser (HTTP), SNMP Gets or command line via a Telnet session.

2.4.4 Alarm Reporting:

The TELSEC® has the ability to dial out to as many as four pre-selected phone numbers whenever an alarm or an alarm clear message must be reported. The modem card also has the ability to receive a call from a remote modem and function as the local alarm port. Once the connection is established (either by receiving a call or initiating a call), the modem card provides an asynchronous communications link where TL1 commands can be entered and alarm/clear messages can be received.

2.4.5 Dial-in Password Security:

In order to prevent unauthorized access to the TELSEC® through modem connection, a password prompt will appear anytime a successful connection is made. In response to the prompt, the user must enter a correct password followed by a carriage return. If the user fails to enter a valid password in one attempt, the modem will be disconnected. The user has 10 seconds to enter a valid password, otherwise the TELSEC® will consider the lack of response to be an invalid password and the modem card will disconnect. When a valid password is entered, the TELSEC® will respond with a login message and will be ready to accept commands.

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	±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	One asynchronous db9 RS232 serial port. Programmable for speed, parity, and bit format			
Network Interface (option) ***LAN*** ***Protocols Supported*** ***Serial Pass through***	 Ethernet 10BaseT with RJ45 connector TCP/IP, Telnet, HTTP, SMTP, SNMP v1, v2c, Sets, Gets, Traps & Informs Provides Telnet connectivity over Ethernet for three RS232 asynchronous serial devices.			
Logging	Logs all inputs, outputs, and alarms, up to 16,000 points			
Software	Supports any off-the-shelf terminal communication software (e.g. Procomm®, HyperTerminal®) or Web browser (e.g. Internet Explorer® 6+, Firefox® 1.5+)			
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			

2.5.2 TELSEC® 800:

Specifications	*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) ***LAN*** ***Protocols Supported*** ***Serial Pass through***	 Ethernet 10BaseT with RJ45 connector TCP/IP, Telnet, HTTP, SMTP, SNMP v1, v2c, Traps/Informs Provides Telnet connectivity over Ethernet for three RS232 asynchronous serial devices.
Logging	Logs all inputs, outputs, and alarms, up to 16,000 points
Software	Supports any off-the-shelf terminal communication software (e.g. Procomm®, HyperTerminal®) or Web browser (e.g. Internet Explorer® 6+, Firefox® 1.5+)
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), temp sensor s
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 Module:

Specifications	***TELSEC®*** Expansion Module
Part Number	150640 for Rack Mount , 150724 for Wall Mount
Mounting	Rack mount 19" and 23" or Wall Mount
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.)

Chapter 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 Chapter 2 - 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 1) is a wall-mounted unit designed to mount to any type of wall surface that can support the product.

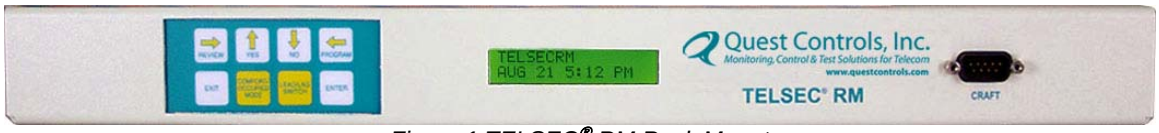


Figure 1 TELSEC® RM Rack Mount

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.
- One Ferrite coil for incoming power noise suppression.
- Humidity/Temp sensor with enclosure and mounting hardware.
- Phone cords. Optional: one for each modem provided with the unit.
- User's Manual on Tech Doc CD.
- 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.
- One Ferrite coil 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.
- User's Manual on Tech Doc CD.
- 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, (See Figure 3.) 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. (See Figure 4.)

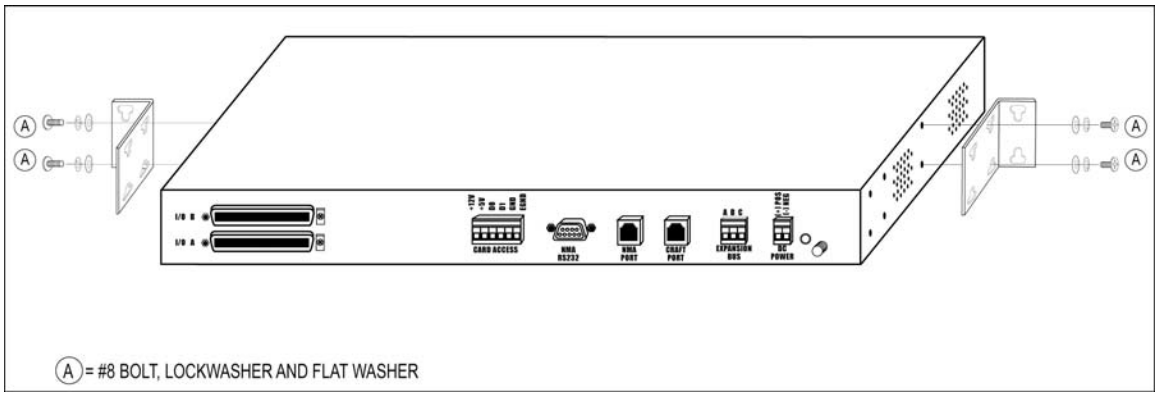


Figure 3 Bracket Orientation for 19-inch Equipment Rack

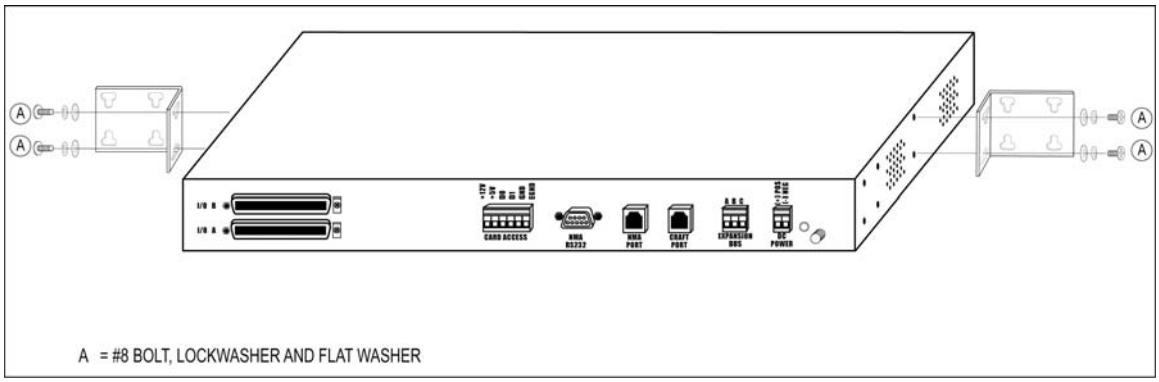


Figure 4 Bracket Orientation for 23-inch Equipment Rack.

3.4.1 Connecting Mounting Brackets

There are three (3) sets of two (2) holes on each side of the System console. (See Figure 4 above.) 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 Field Terminal Devices:

The TELSEC® RM/WM supports four methods for field wiring of inputs and outputs. The wire wrap block and Krone 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 application 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 5

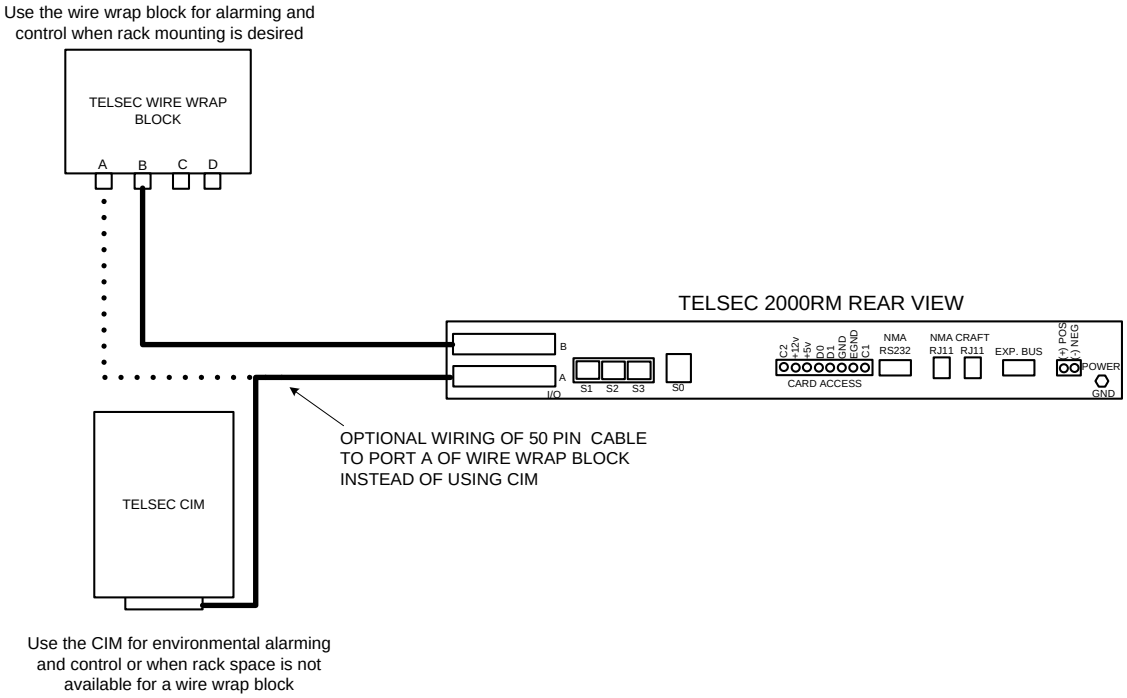


Figure 5 Field wiring options.

3.6.1 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 connecter is seated properly into the connector at each end and secured with the locking screw and tie wrap.

WIRE WRAP BLOCK FOR TERMINATION OF FIELD WIRING

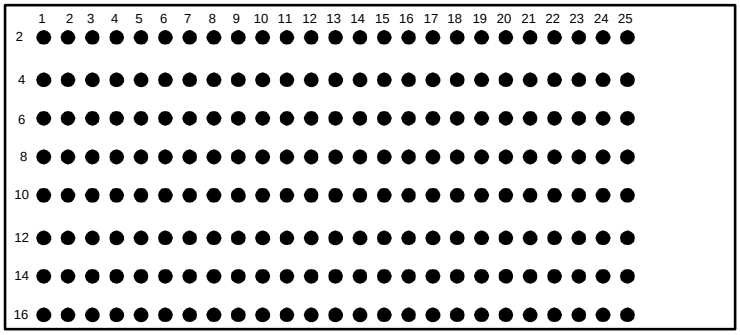


Figure 6 Wire Wrap Block

3.6.2 Krone Punch Block

A punch block (p/n 300158) can be used for either wall or rack mounting of field terminations. Use the included mounting bar for mounting to a rack or mount with appropriate anchors (not provided) to a wall. Each block can support two ports for a total of 32 inputs and 16 outputs. Connect the punch block to the TELSEC® with 25 pair cable (p/n 300705). Make sure the connector is seated properly into the connector at each end and secured with the locking screw and tie wrap. See figure 7.

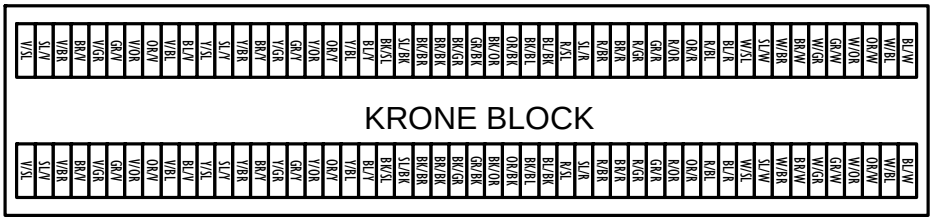


Figure 7 Krone Punch Block

3.6.3 Control Interface Module (CIM)

The CIM (p/n 150642) is used for when wall mount mounting of field wiring is desired or if the field wiring being used is stranded or larger gauge (12AWG to 22AWG) wire. Each CIM supports 16 inputs and 8 outputs, and has a 50 pin amphenol connector on the bottom to allow for connection to the TELSEC® via a 25 pair cable (p/n 300705). Make sure the connecter is seated properly into the connector at each end and secured with the locking screw and tie wrap. See figure 8.

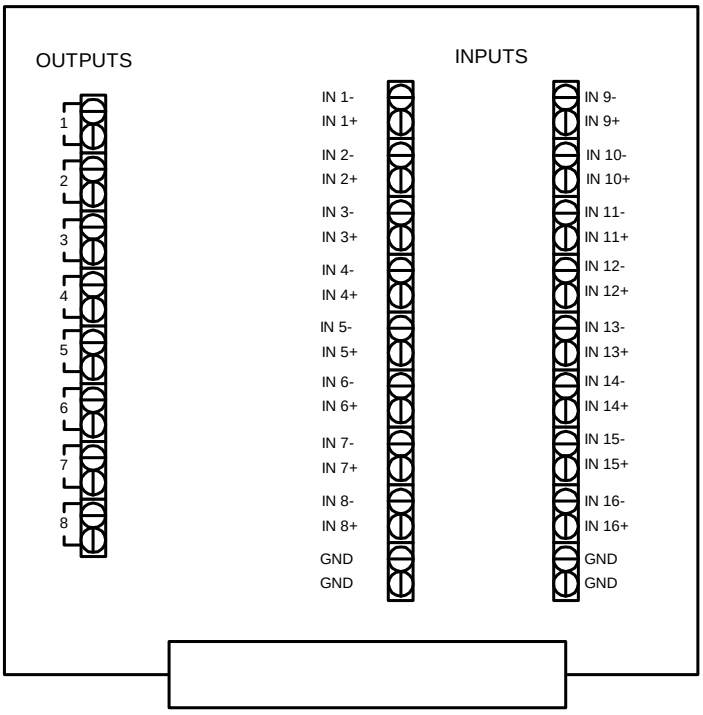


Figure 8 CIM Board

3.6.4 Input/Output Matrix

Figure 9 below is a matrix showing the wire color for each input and output and the pinout for the wire wrap block. Use this chart to determine where to land each field wire whether you are using a CIM (look at input/output number), wire wrap (row/column pin number, Krone block (match wire color) or direct termination to cable (match wire color).

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

*R-C = Row and Column number on wire wrap block

Figure 9 Input/Output Matrix

3.7 Connecting to the COM Ports

The TELSEC® comes standard with two RS232 ports for serial communications and has the option of up to two modems. The ports can be configured for lease line communications, dial up or direct connect (RS232).

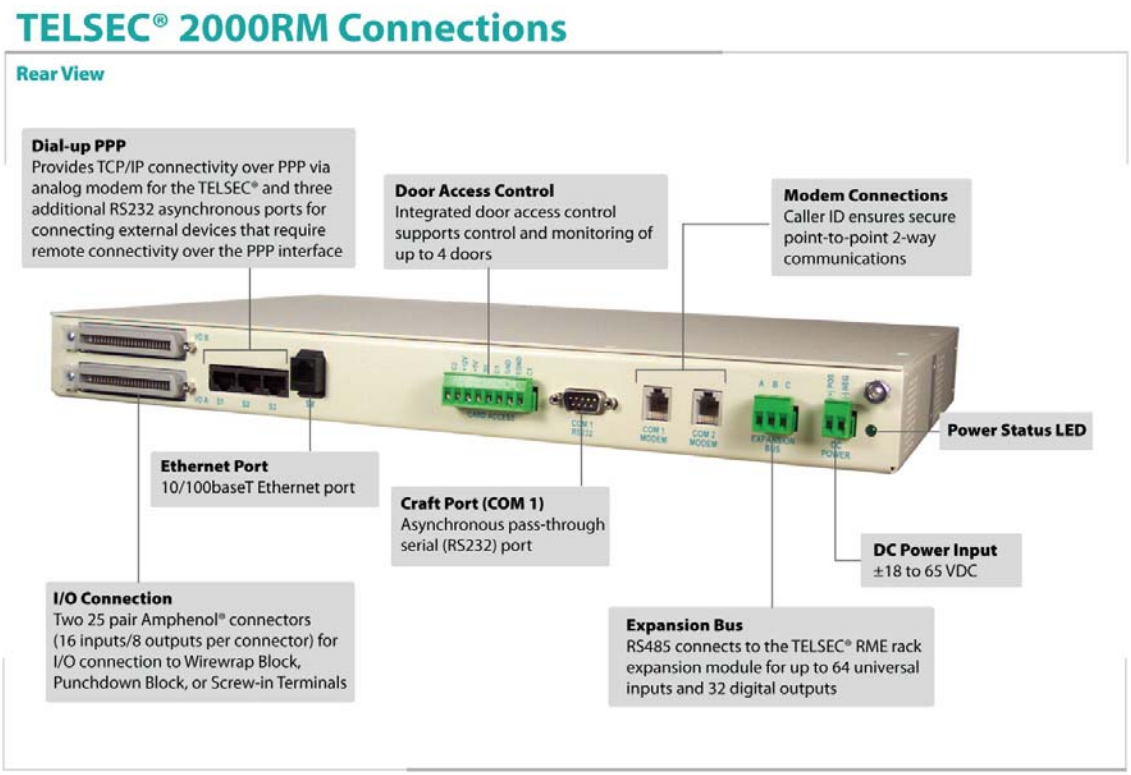


Figure 10 - TELSEC® Ports

3.7.1 RS232 Connection

The DB9 RS232 ports are set up as DCE devices 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. Either RS232 port can be directly connected to a terminal server or be used for a Craft interface

3.7.2 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) the modem is in.

3.8 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.

3.8.1 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®.

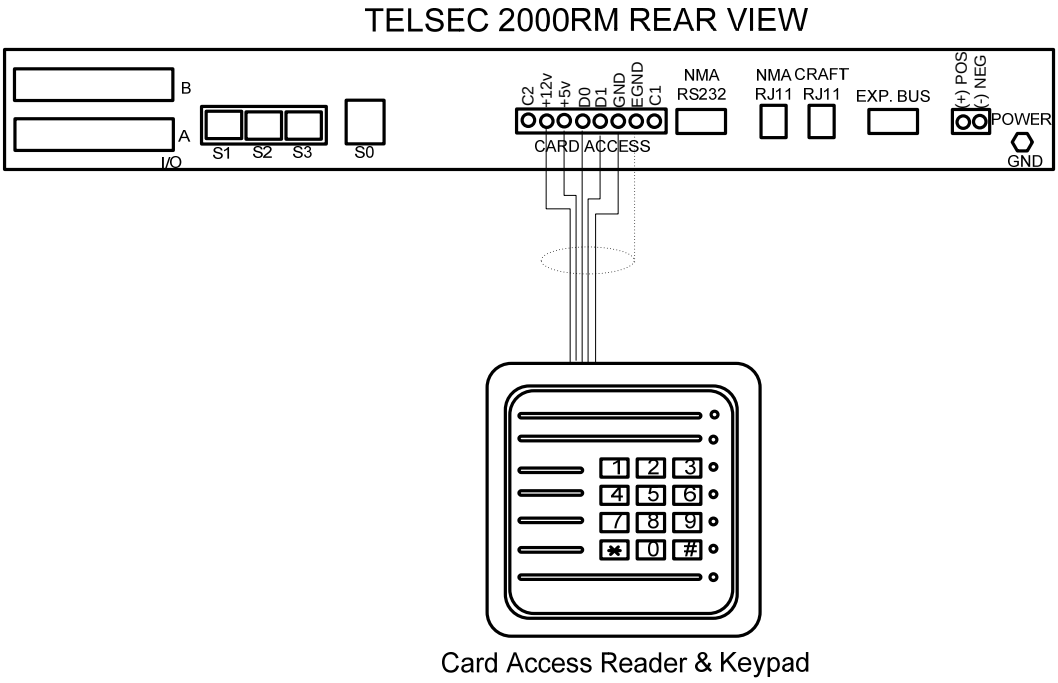


Figure 11 Wiring the Card Reader

3.9 Connecting To DC Power Supply

Power is supplied to the system from the –48 VDC power source located in the facility. Attach the two screw terminals located on the rear of the TELSEC® shelf to the power source with 14–20 gauge wire (See Figure 12).

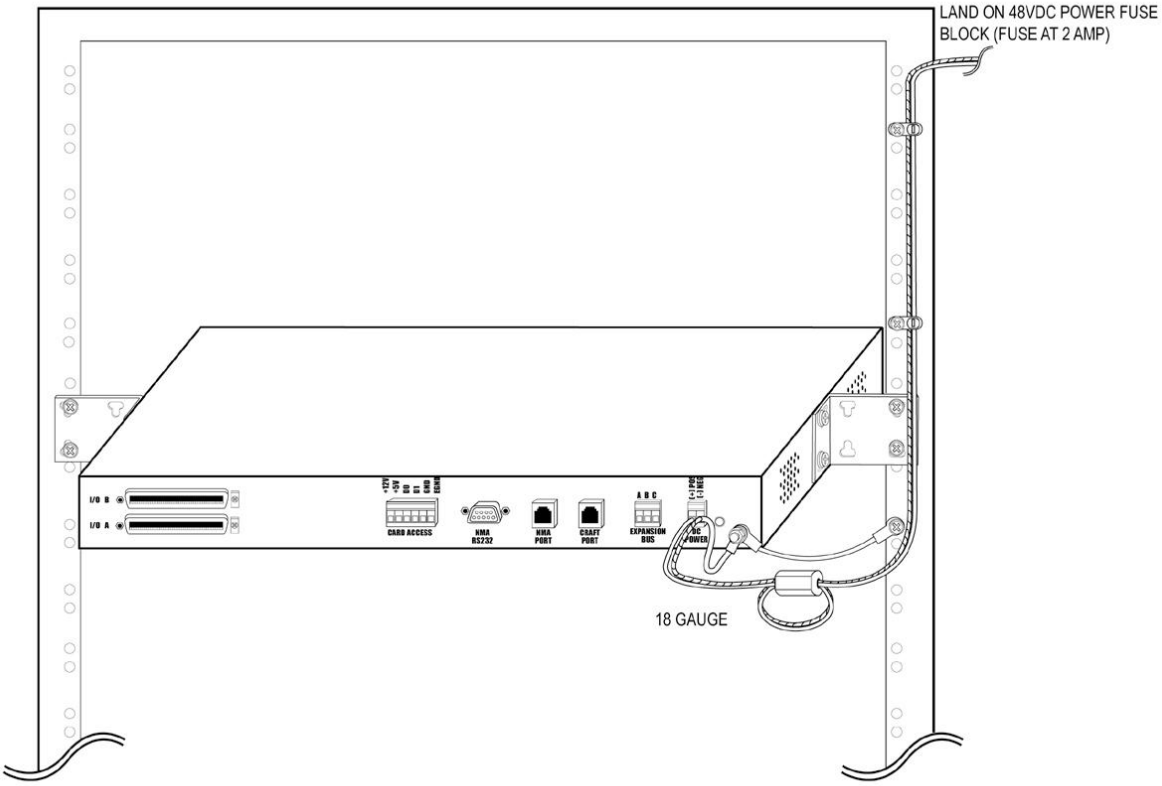


Figure 12 Power Connection

3.9.1 Power Wiring

Connect the negative power lead to the negative terminal (the one on the right). Connect the positive lead from the power source to the positive terminal. Finally connect the earth ground strap to the positive terminal for systems with the positive as ground (-48V typical) or connect to the negative terminal for power supplies that have the negative grounded (+24V typical). Make sure that the system is fused externally with a two (2) amp fuse. The system does have an internal resetable fuse, but it is still advisable to fuse externally. The green power LED will be illuminated when power is present to the system.

3.9.2 Install Ferrite Coil

Each TELSEC® comes with a ferrite coil that needs to be installed on the incoming power cable. The ferrite coil should be located as close to the incoming power terminals as possible. Clamp the coil around the incoming power leads. Note make a loop in the power cable and clip the coil into the loop to prevent the coil from sliding (see Figure 12).

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

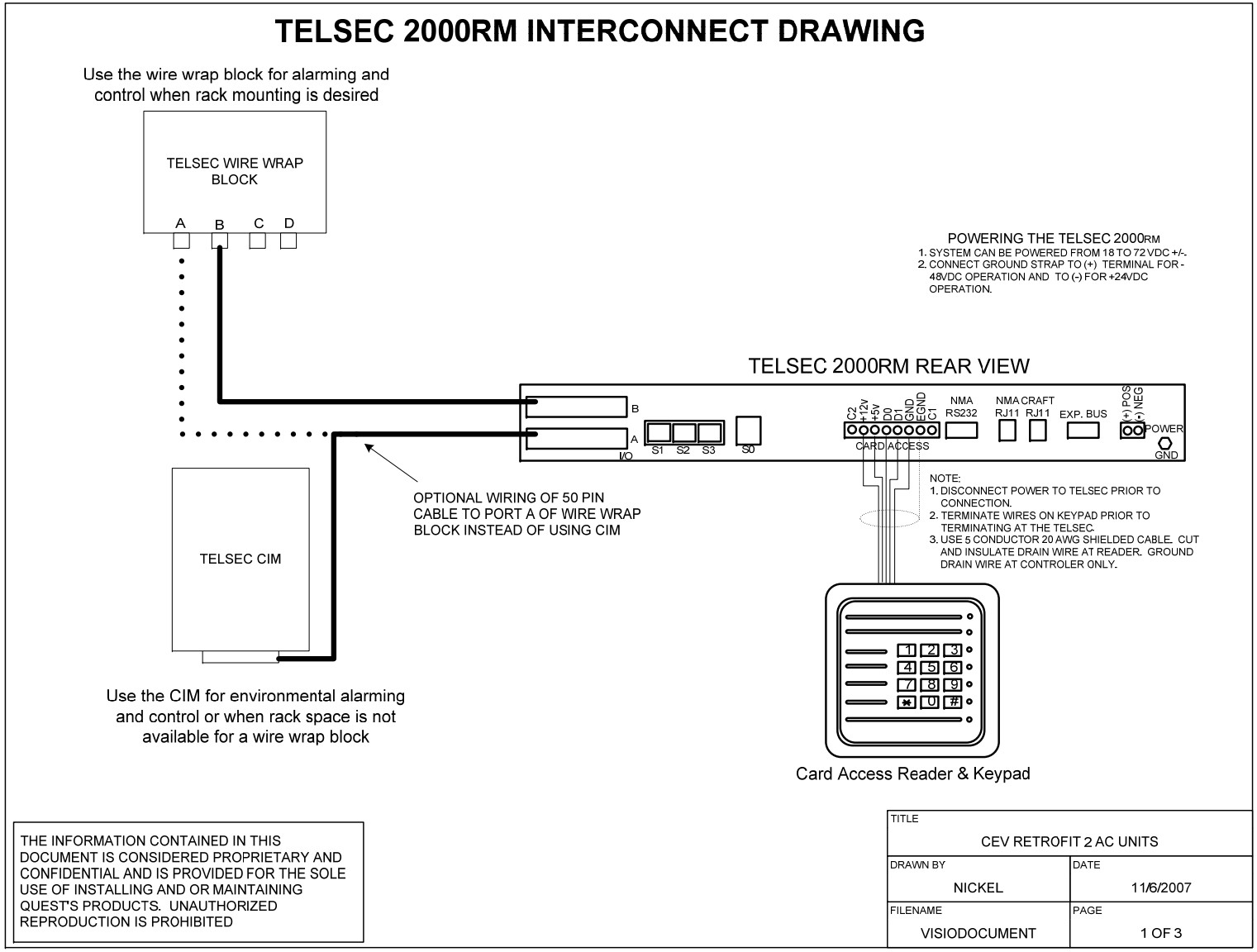
3.9.3 Powering-up The TELSEC®

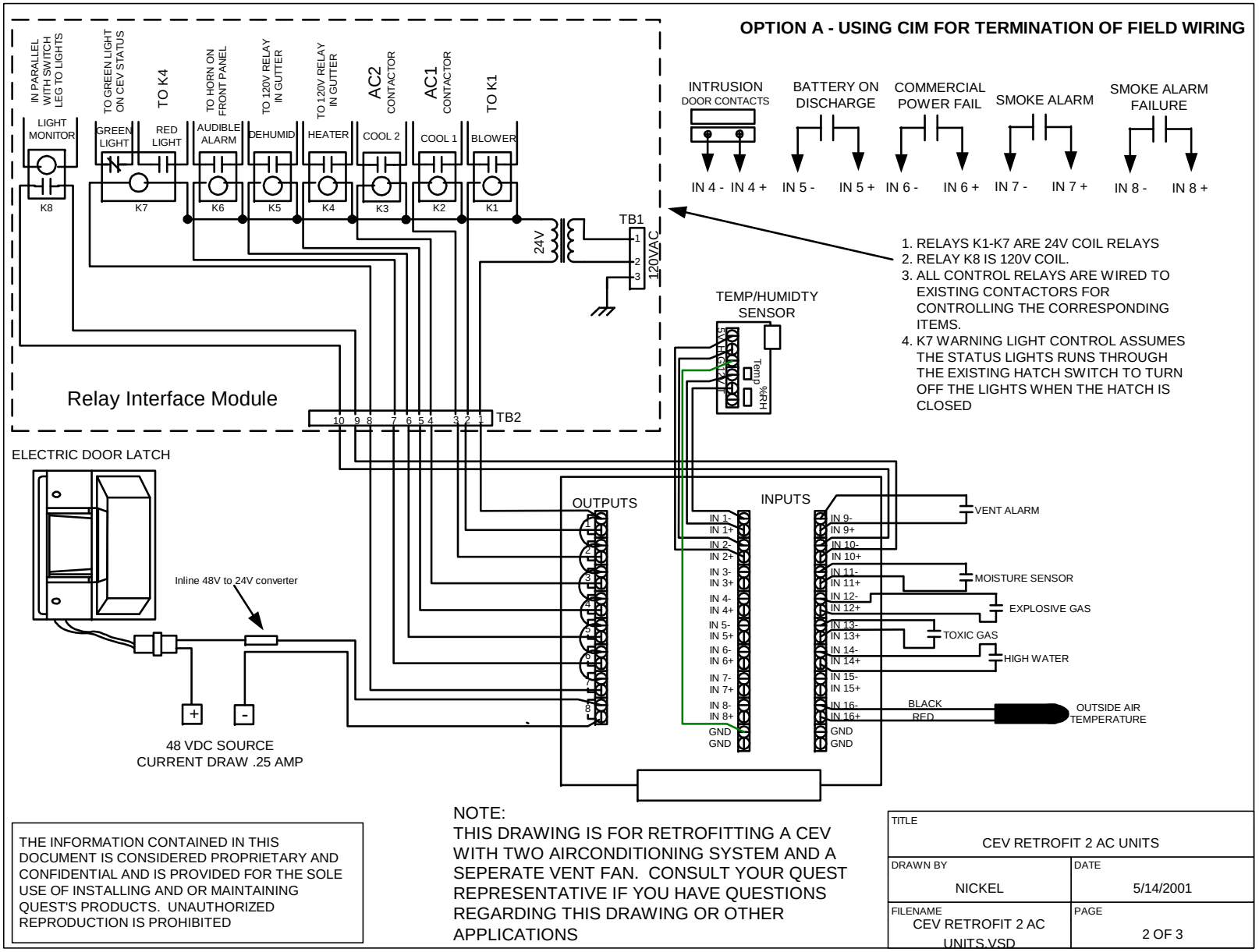
When the TELSEC® has been completely installed, power should be supplied to the system by replacing the rack fuse. If stable power is being supplied to the system, the green LED indicator will light steadily. A series of sign-on messages will appear on the display as the system comes on-line. After successful initialization, the system should 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®. Refer to *Chapter 6 – Programming* for more detailed configuration procedures.

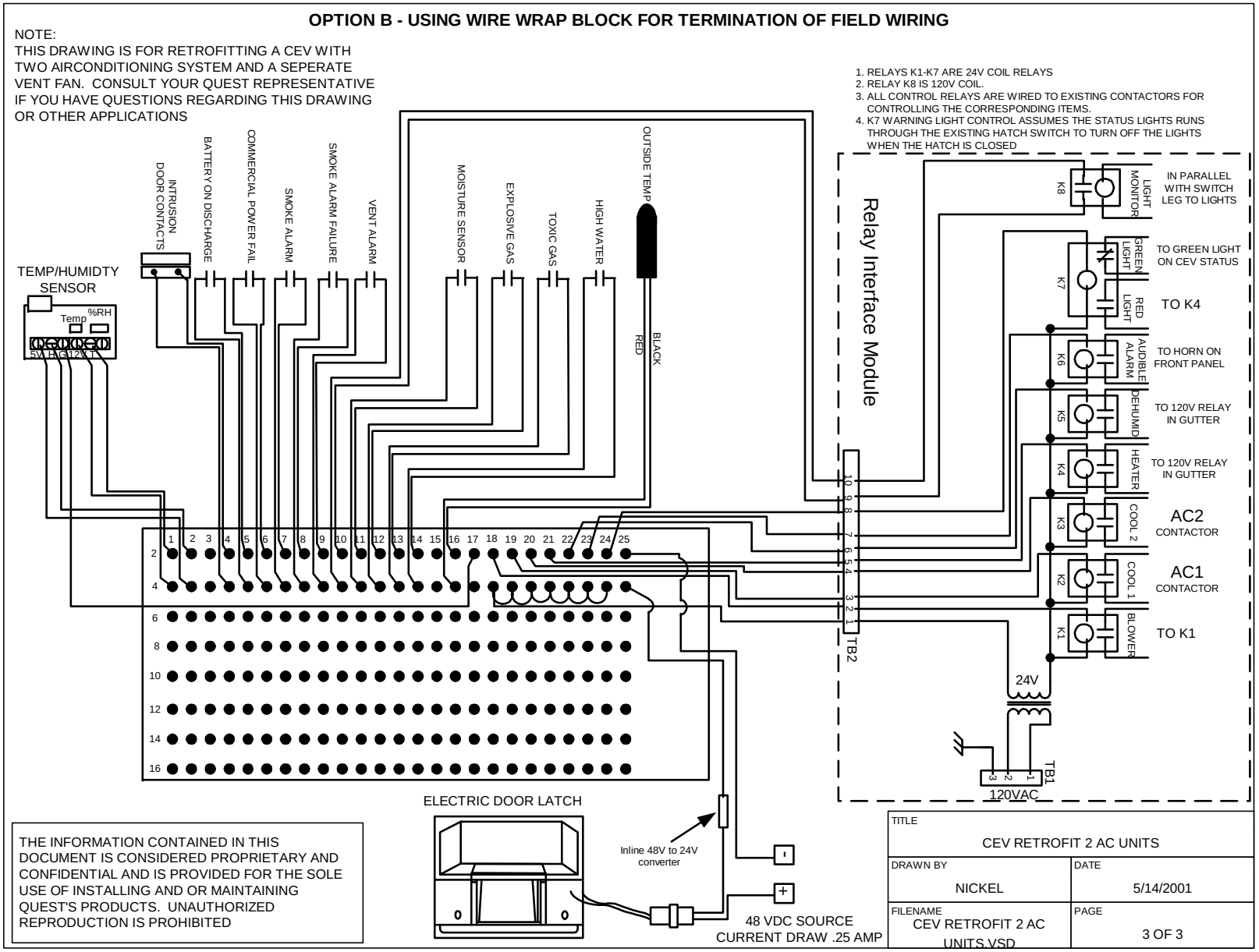
3.10 Typical Control Diagrams

This section contains various wiring diagrams showing how to wire different components to the TELSEC®. Refer to the individual wiring instructions that come with each component for detail installation and operating instructions.

3.10.1 Typical CEV Control and Monitoring




OPTION A - USING CIM FOR TERMINATION OF FIELD WIRING
IN PARALLEL WITH SWITCH LEG TO LIGHTS
TO GREEN LIGHT ON CEV STATUS
TO K4
TO HORN ON FRONT PANEL
TO 120V RELAY IN GUTTER
TO 120V RELAY IN GUTTER
AC2 CONTACTOR
AC1 CONTACTOR
TO K1
LIGHT MONITOR
GREEN LIGHT
RED LIGHT
AUDIBLE ALARM
DEHUMID
HEATER
COOL 2
COOL 1
BLOWER
K8
K7
K6
K5
K4
K3
K2
K1
24V
TB1
120VAC
Relay Interface Module
TB2
INTRUSION DOOR CONTACTS
BATTERY ON DISCHARGE
COMMERCIAL POWER FAIL
SMOKE ALARM
SMOKE ALARM FAILURE
IN 4 - IN 4 +
IN 5 - IN 5 +
IN 6 - IN 6 +
IN 7 - IN 7 +
IN 8 - IN 8 +
1. RELAYS K1-K7 ARE 24V COIL RELAYS
2. RELAY K8 IS 120V COIL.
3. ALL CONTROL RELAYS ARE WIRED TO EXISTING CONTACTORS FOR CONTROLLING THE CORRESPONDING ITEMS.
4. K7 WARNING LIGHT CONTROL ASSUMES THE STATUS LIGHTS RUNS THROUGH THE EXISTING HATCH SWITCH TO TURN OFF THE LIGHTS WHEN THE HATCH IS CLOSED
TEMP/HUMIDTY SENSOR
ELECTRIC DOOR LATCH
Inline 48V to 24V converter
48 VDC SOURCE
CURRENT DRAW .25 AMP
OUTPUTS
INPUTS
VENT ALARM
MOISTURE SENSOR
EXPLOSIVE GAS
TOXIC GAS
HIGH WATER
BLACK
RED
OUTSIDE AIR TEMPERATURE
GND
NOTE:
THIS DRAWING IS FOR RETROFITTING A CEV WITH TWO AIRCONDITIONING SYSTEM AND A SEPERATE VENT FAN. CONSULT YOUR QUEST REPRESENTATIVE IF YOU HAVE QUESTIONS REGARDING THIS DRAWING OR OTHER APPLICATIONS
THE INFORMATION CONTAINED IN THIS DOCUMENT IS CONSIDERED PROPRIETARY AND CONFIDENTIAL AND IS PROVIDED FOR THE SOLE USE OF INSTALLING AND OR MAINTAINING QUEST'S PRODUCTS. UNAUTHORIZED REPRODUCTION IS PROHIBITED
TITLE
CEV RETROFIT 2 AC UNITS
DRAWN BY
NICKEL
DATE
5/14/2001
FILENAME
CEV RETROFIT 2 AC UNITS.VSD
PAGE
2 OF 3


OPTION B - USING WIRE WRAP BLOCK FOR TERMINATION OF FIELD WIRING
NOTE:
THIS DRAWING IS FOR RETROFITTING A CEV WITH TWO AIRCONDITIONING SYSTEM AND A SEPERATE VENT FAN. CONSULT YOUR QUEST REPRESENTATIVE IF YOU HAVE QUESTIONS REGARDING THIS DRAWING OR OTHER APPLICATIONS
1. RELAYS K1-K7 ARE 24V COIL RELAYS
2. RELAY K8 IS 120V COIL.
3. ALL CONTROL RELAYS ARE WIRED TO EXISTING CONTACTORS FOR CONTROLLING THE CORRESPONDING ITEMS.
4. K7 WARNING LIGHT CONTROL ASSUMES THE STATUS LIGHTS RUNS THROUGH THE EXISTING HATCH SWITCH TO TURN OFF THE LIGHTS WHEN THE HATCH IS CLOSED
INTRUSION DOOR CONTACTS
BATTERY ON DISCHARGE
COMMERCIAL POWER FAIL
SMOKE ALARM
SMOKE ALARM FAILURE
VENT ALARM
MOISTURE SENSOR
EXPLOSIVE GAS
TOXIC GAS
HIGH WATER
OUTSIDE TEMP
RED
BLACK
TEMP/HUMIDTY SENSOR
Temp
%RH
5V HG12XT
Relay Interface Module
K8
LIGHT MONITOR
IN PARALLEL WITH SWITCH LEG TO LIGHTS
K7
GREEN LIGHT
TO GREEN LIGHT ON CEV STATUS
RED LIGHT
TO K4
K6
AUDIBLE ALARM
TO HORN ON FRONT PANEL
K5
DEHUMID
TO 120V RELAY IN GUTTER
K4
HEATER
TO 120V RELAY IN GUTTER
K3
COOL 2
AC2 CONTACTOR
K2
COOL 1
AC1 CONTACTOR
K1
BLOWER
TO K1
TB2
24V
TB1
120VAC
ELECTRIC DOOR LATCH
Inline 48V to 24V converter
48 VDC SOURCE
CURRENT DRAW .25 AMP
THE INFORMATION CONTAINED IN THIS DOCUMENT IS CONSIDERED PROPRIETARY AND CONFIDENTIAL AND IS PROVIDED FOR THE SOLE USE OF INSTALLING AND OR MAINTAINING QUEST'S PRODUCTS. UNAUTHORIZED REPRODUCTION IS PROHIBITED
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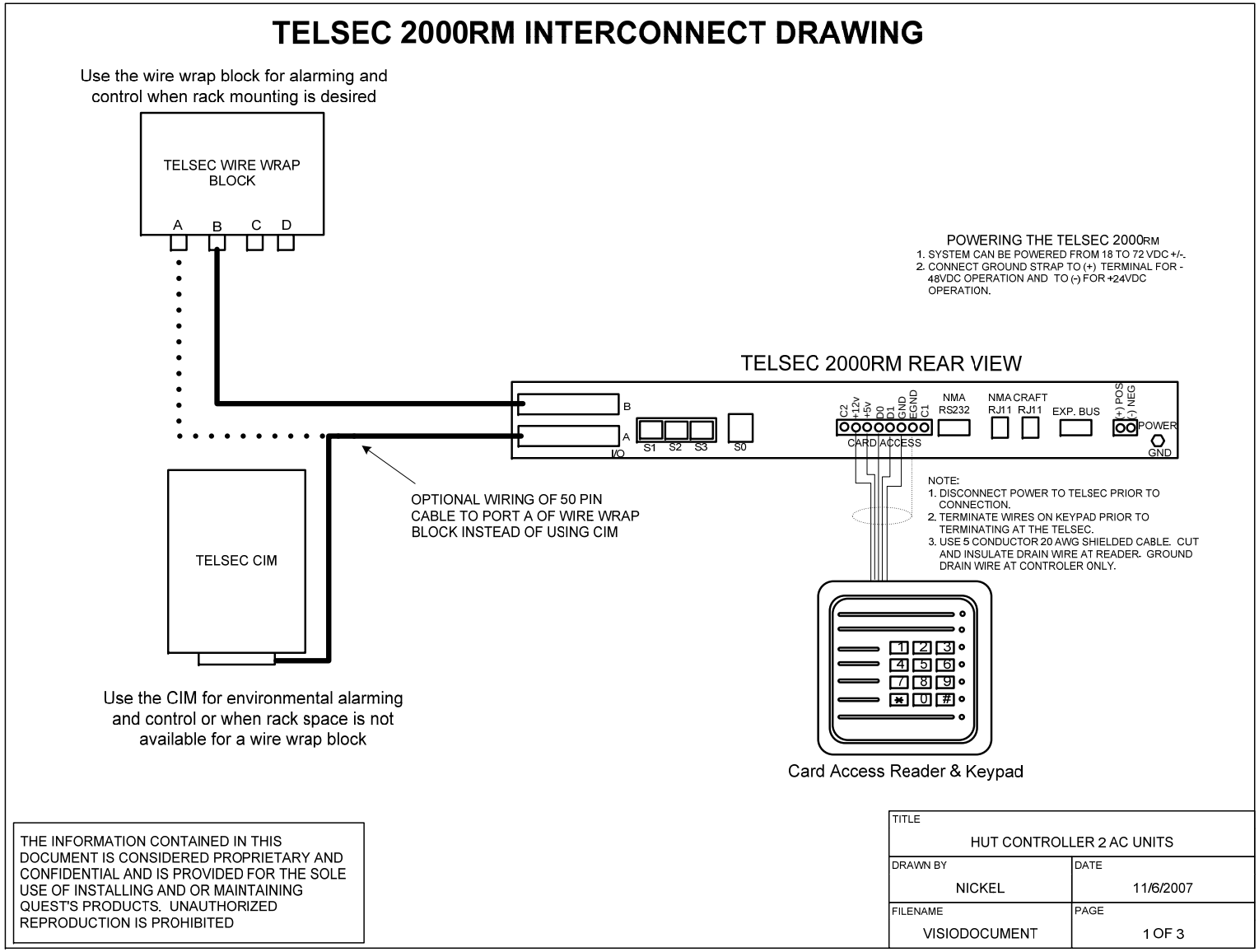
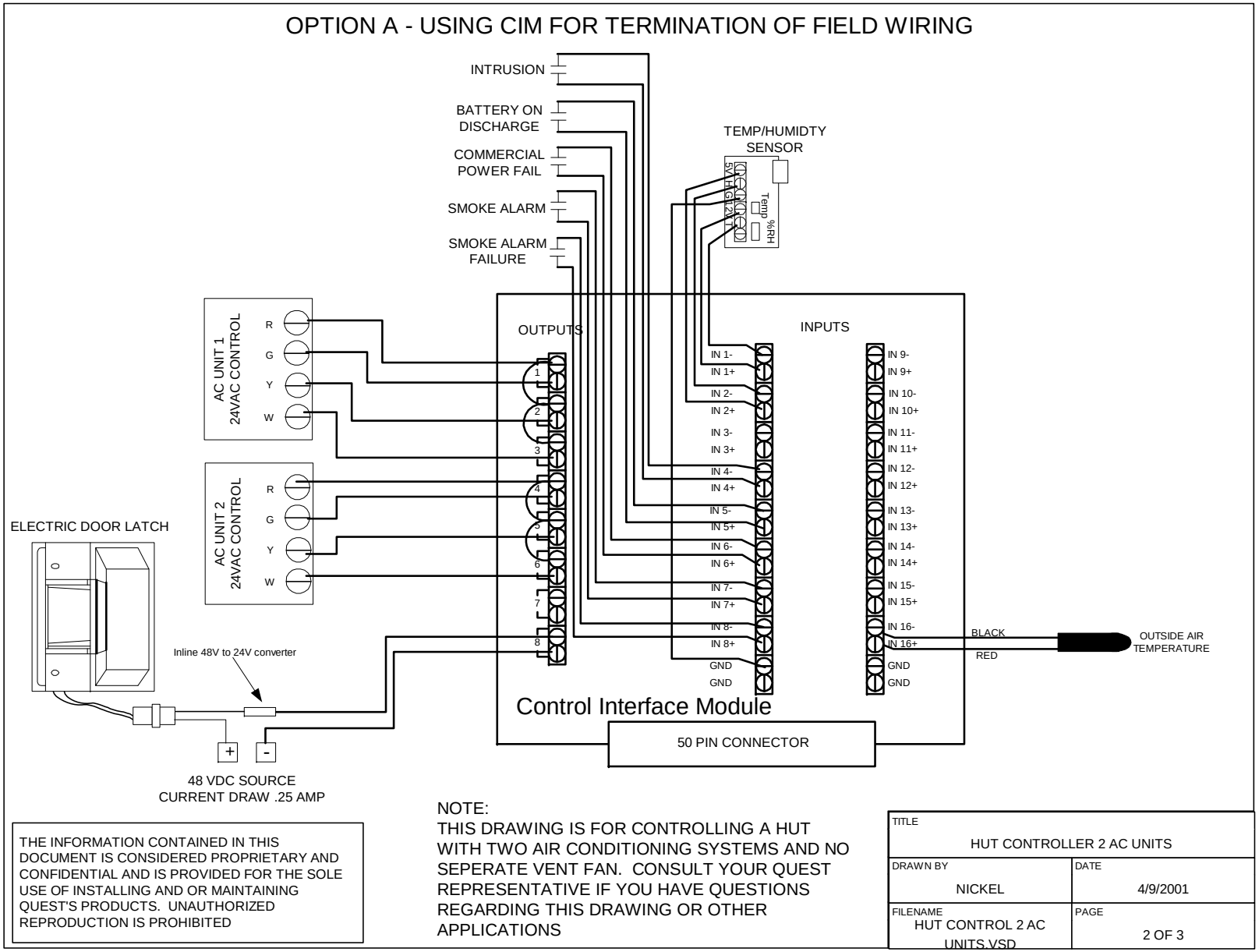
DRAWN BY
NICKEL
DATE
5/14/2001
FILENAME
CEV RETROFIT 2 AC UNITS.VSD
PAGE
3 OF 3

3.10.2 Hut Control and Monitoring




OPTION A - USING CIM FOR TERMINATION OF FIELD WIRING
INTRUSION
BATTERY ON DISCHARGE
COMMERCIAL POWER FAIL
SMOKE ALARM
SMOKE ALARM FAILURE
TEMP/HUMIDTY SENSOR
5V
GND
2
1
Temp
%RH
AC UNIT 1
24VAC CONTROL
R
G
Y
W
AC UNIT 2
24VAC CONTROL
R
G
Y
W
OUTPUTS
INPUTS
IN 1-
IN 1+
IN 2-
IN 2+
IN 3-
IN 3+
IN 4-
IN 4+
IN 5-
IN 5+
IN 6-
IN 6+
IN 7-
IN 7+
IN 8-
IN 8+
GND
GND
IN 9-
IN 9+
IN 10-
IN 10+
IN 11-
IN 11+
IN 12-
IN 12+
IN 13-
IN 13+
IN 14-
IN 14+
IN 15-
IN 15+
IN 16-
IN 16+
GND
GND
BLACK
RED
OUTSIDE AIR TEMPERATURE
ELECTRIC DOOR LATCH
Inline 48V to 24V converter
+
-
48 VDC SOURCE
CURRENT DRAW .25 AMP
Control Interface Module
50 PIN CONNECTOR
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NOTE:
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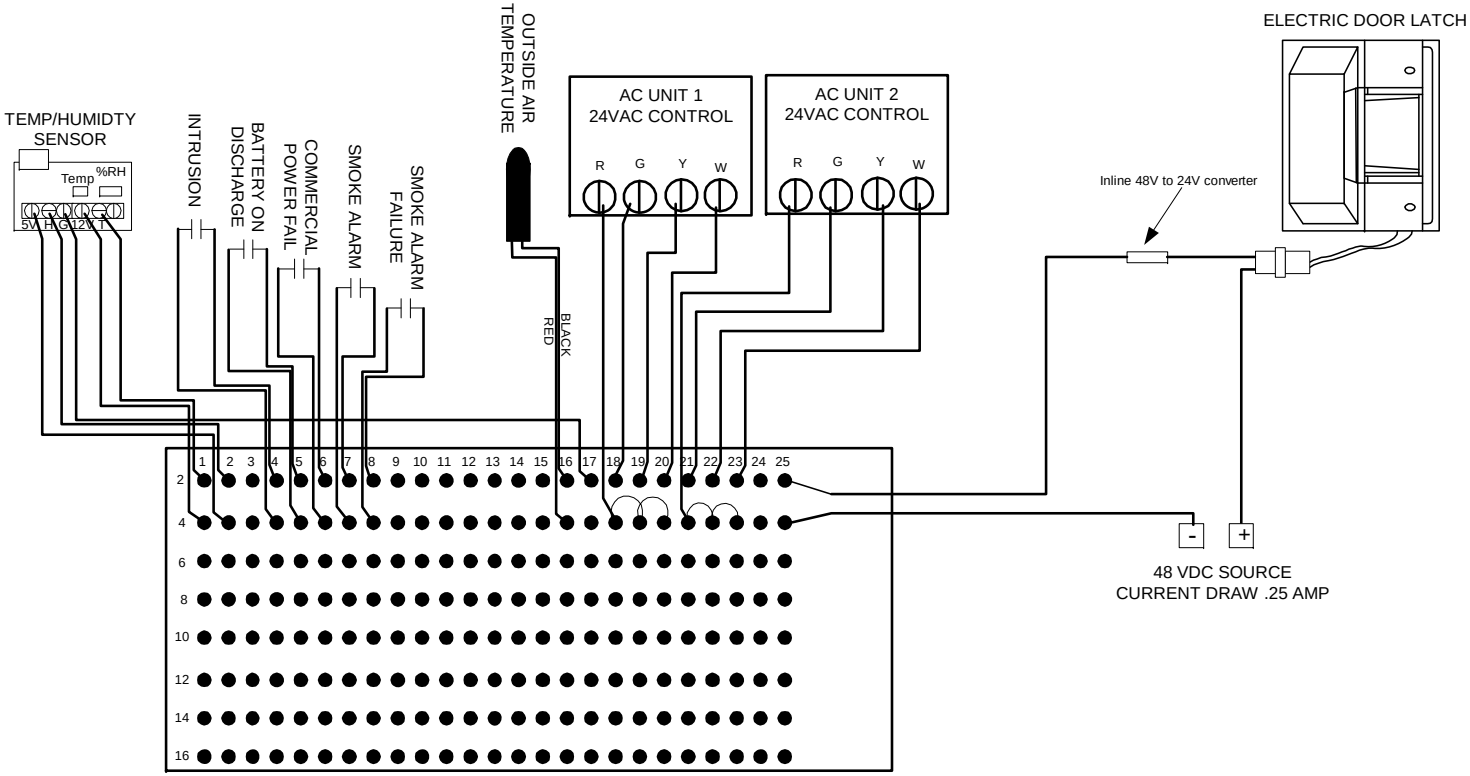
TITLE
HUT CONTROLLER 2 AC UNITS
DRAWN BY
NICKEL
DATE
4/9/2001
FILENAME
HUT CONTROL 2 AC UNITS.VSD
PAGE
2 OF 3

OPTION B - USING WIRE WRAP BLOCK FOR TERMINATION OF FIELD WIRING



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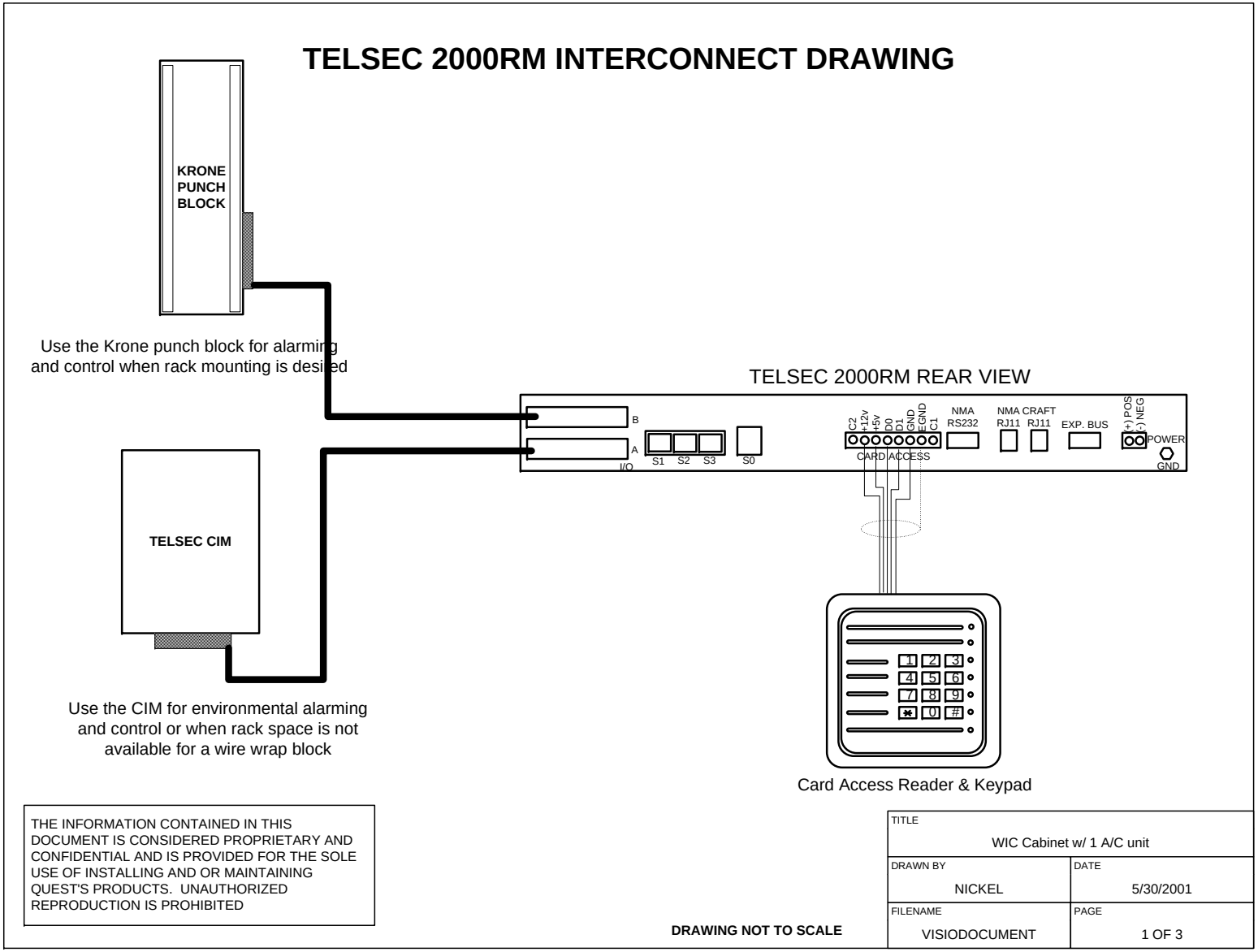
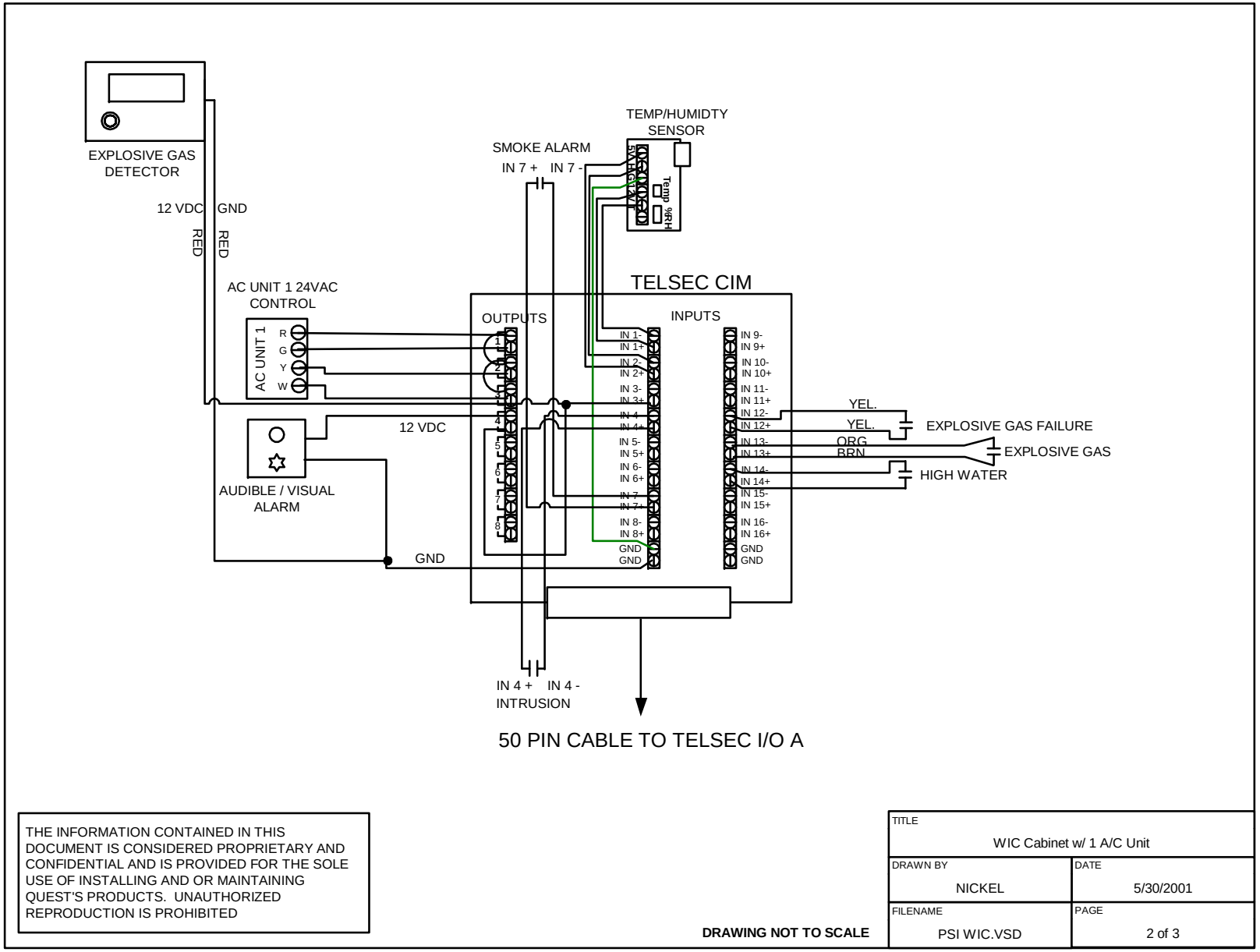
TITLE	
HUT CONTROLLER 2 AC UNITS	
DRAWN BY: NICKEL	DATE: 6/29/2001
FILENAME: HUT CONTROL 2 AC UNITS.VSD	PAGE: 3 OF 3

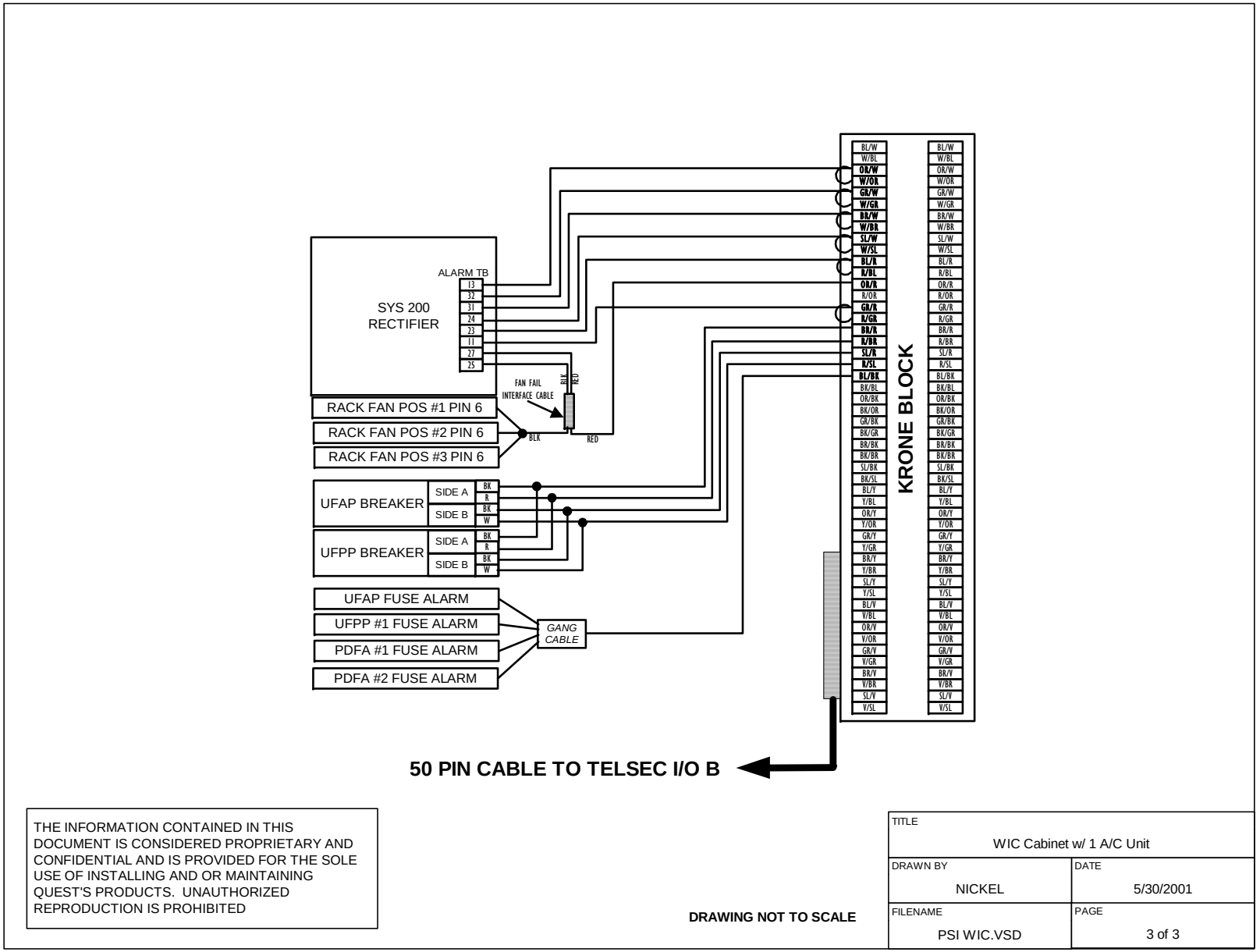
3.10.3 Walk In Cabinet (WIC)





DRAWING NOT TO SCALE

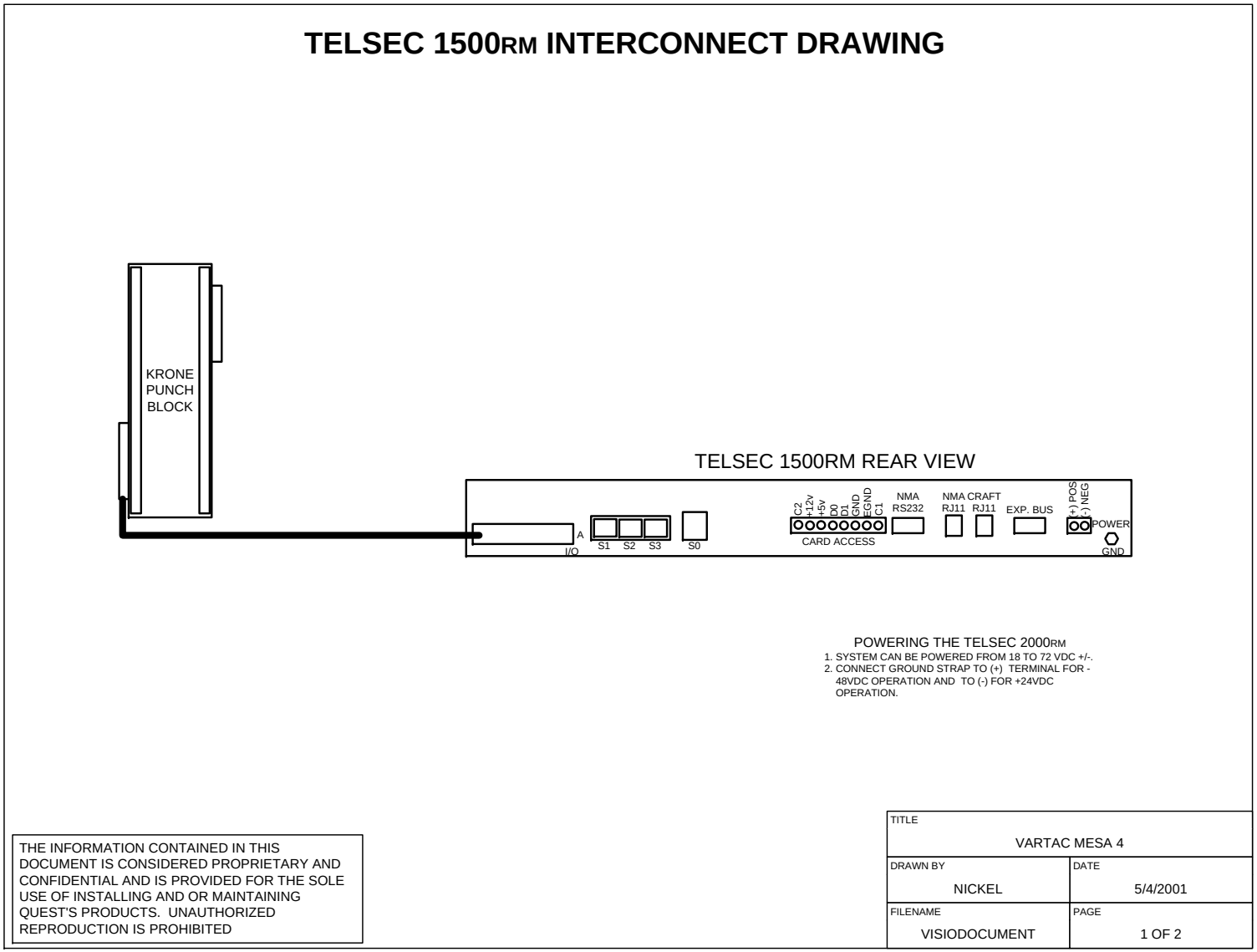
TITLE: WIC Cabinet w/ 1 A/C Unit	
DRAWN BY: NICKEL	DATE: 5/30/2001
FILENAME: PSI WIC.VSD	PAGE: 2 of 3

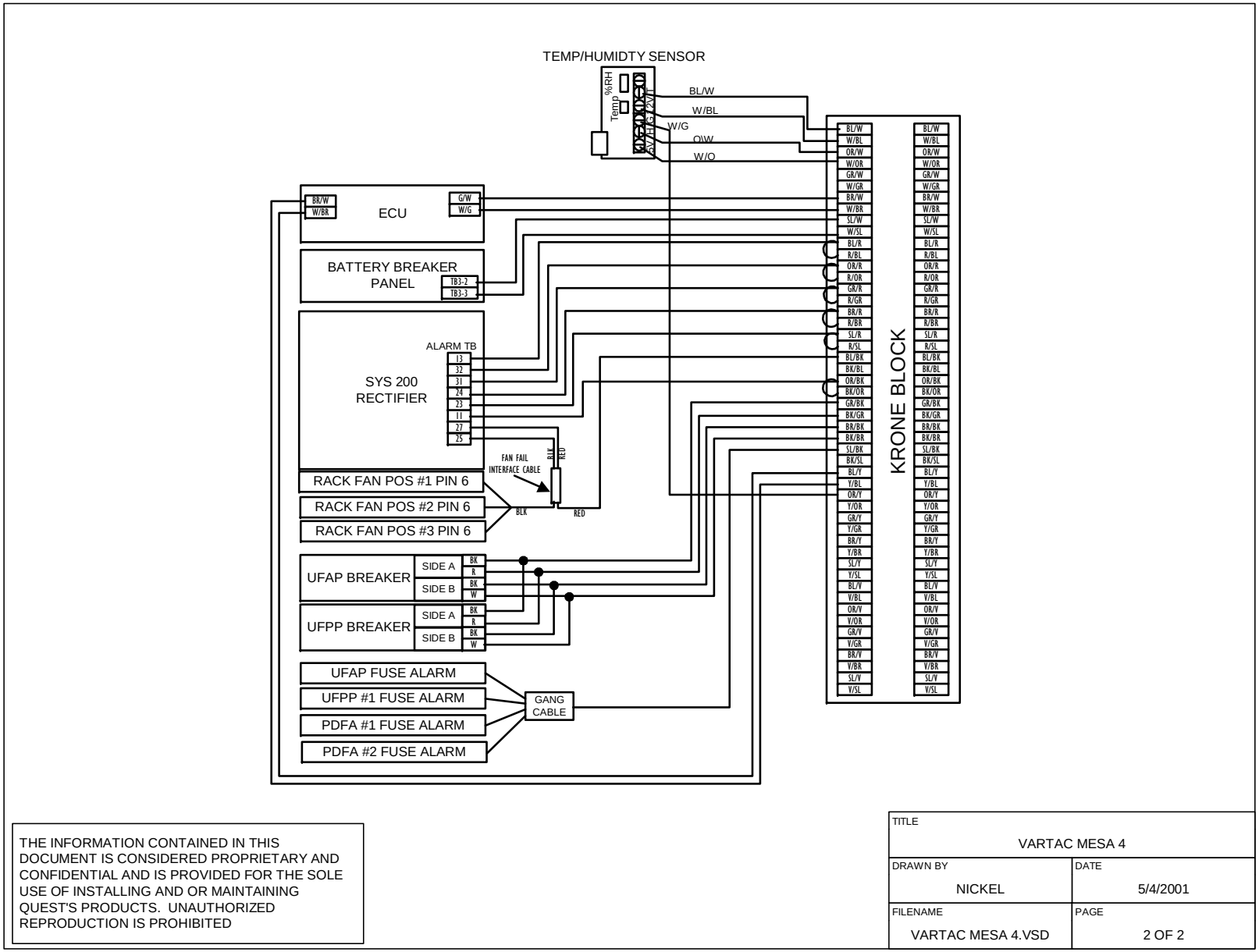


DRAWING NOT TO SCALE

TITLE: WIC Cabinet w/ 1 A/C Unit	
DRAWN BY: NICKEL	DATE: 5/30/2001
FILENAME: PSI WIC.VSD	PAGE: 3 of 3

3.10.4 Remote Cabinet Monitoring

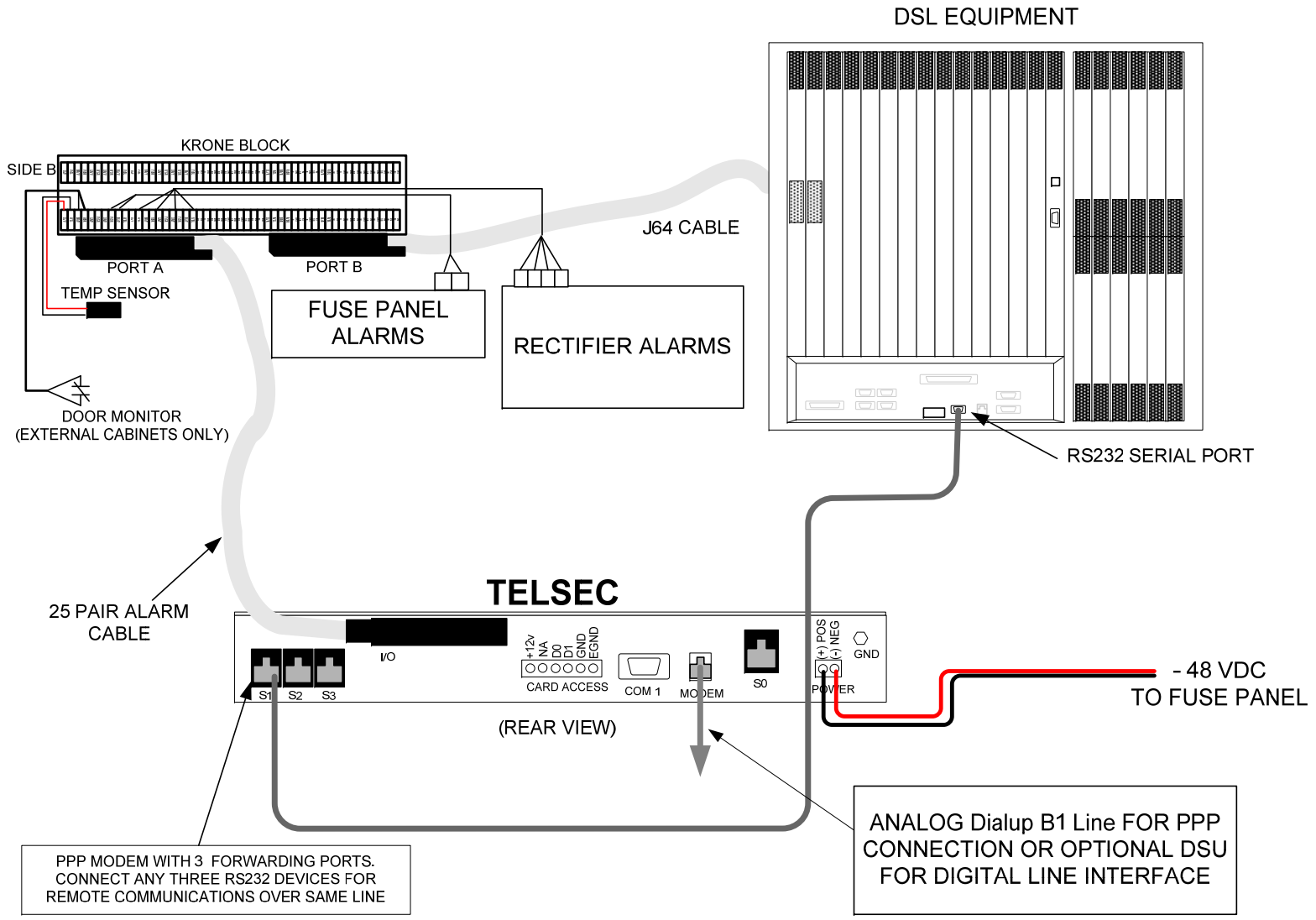




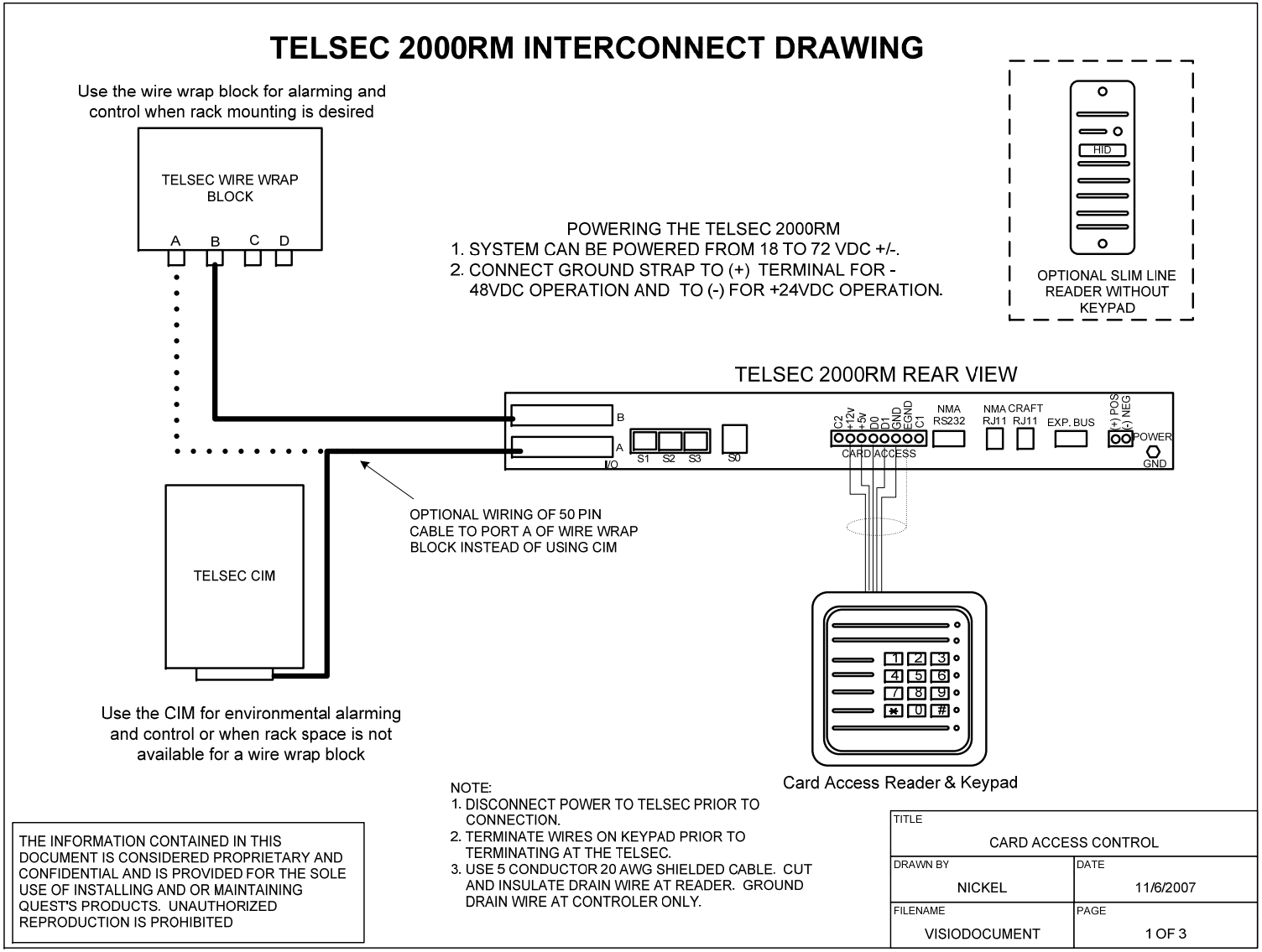
TITLE	
VARTAC MESA 4	
DRAWN BY: NICKEL	DATE: 5/4/2001
FILENAME: VARTAC MESA 4.VSD	PAGE: 2 OF 2

3.10.5 TELSEC 800 with 4 Port Serial Bridge

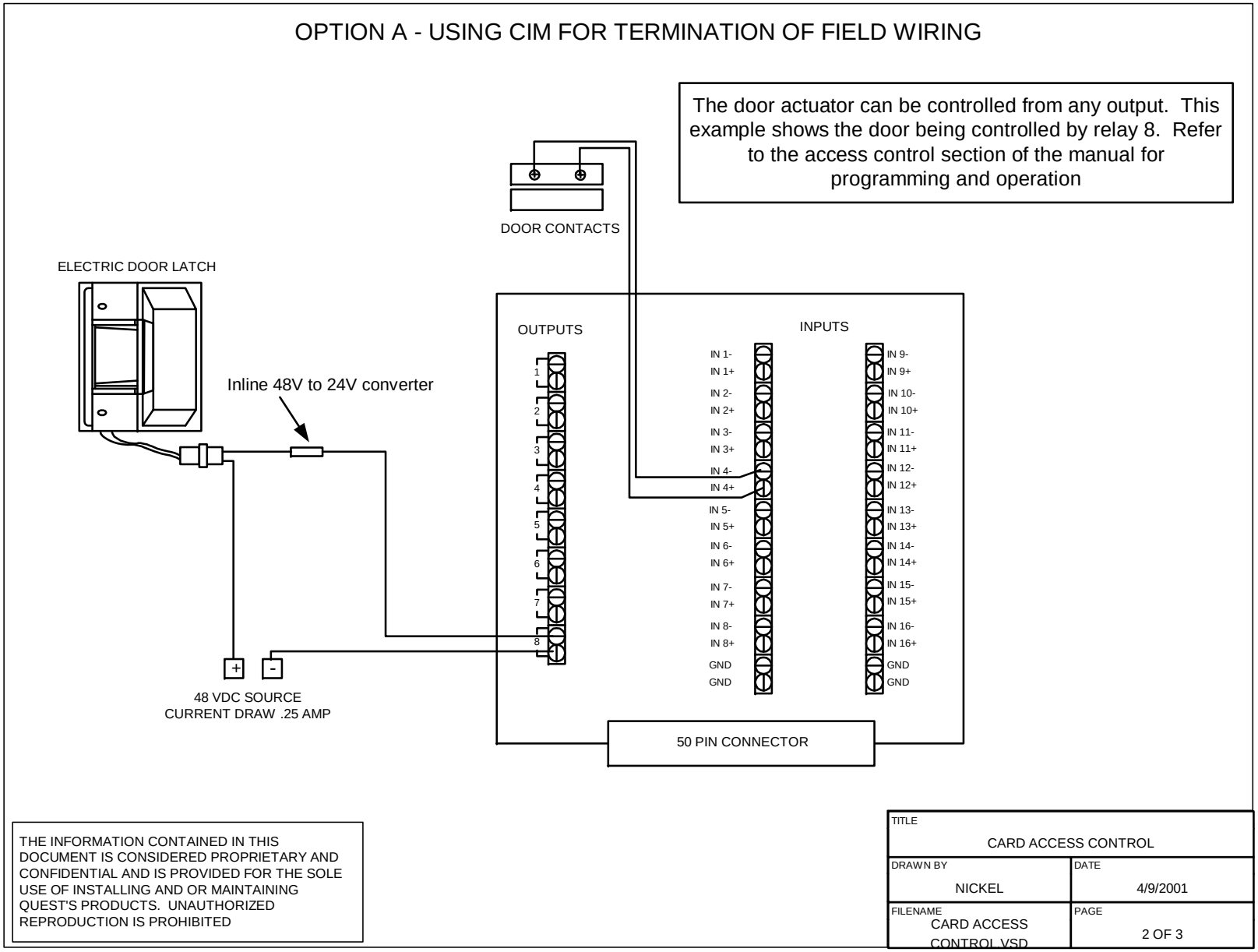
TELSEC ENVIRONMENTAL MONITORING WITH PASSTHROUGH COMMUNICATIONS FOR DSL EQUIPMENT AT THE RT



3.10.6 Card Access Control



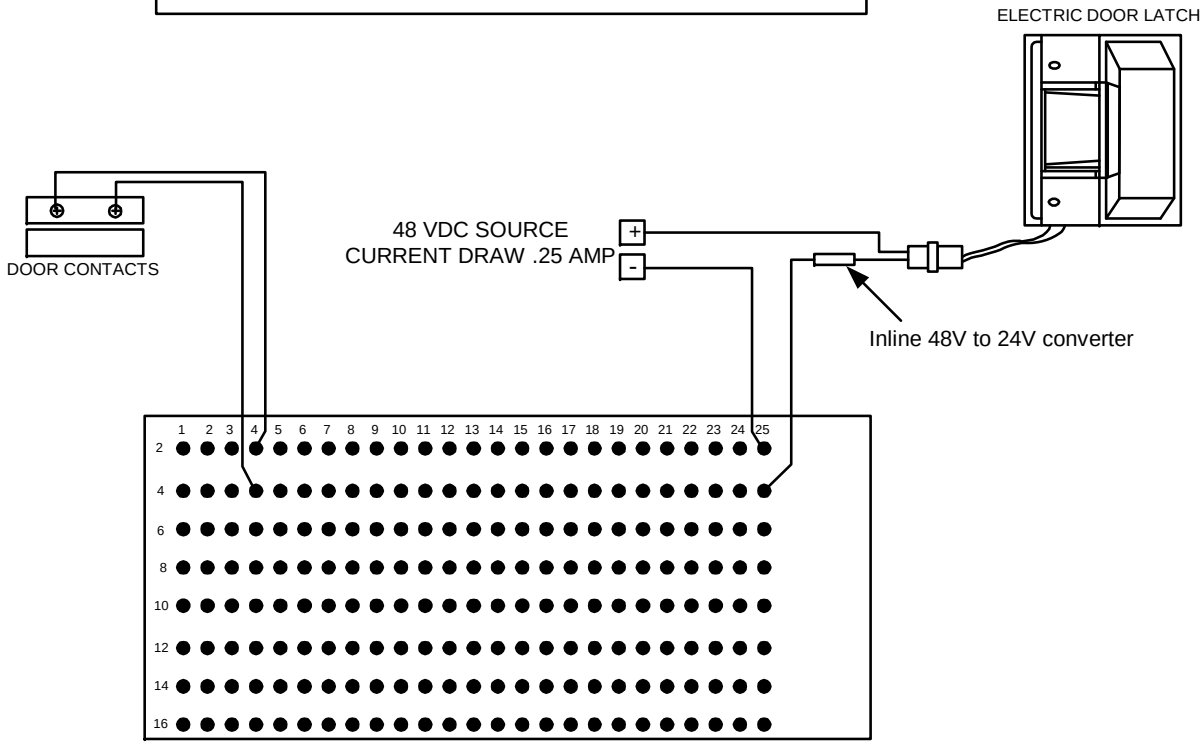
OPTION A - USING CIM FOR TERMINATION OF FIELD WIRING



TITLE	
CARD ACCESS CONTROL	
DRAWN BY: NICKEL	DATE: 4/9/2001
FILENAME: CARD ACCESS CONTROL.VSD	PAGE: 2 OF 3

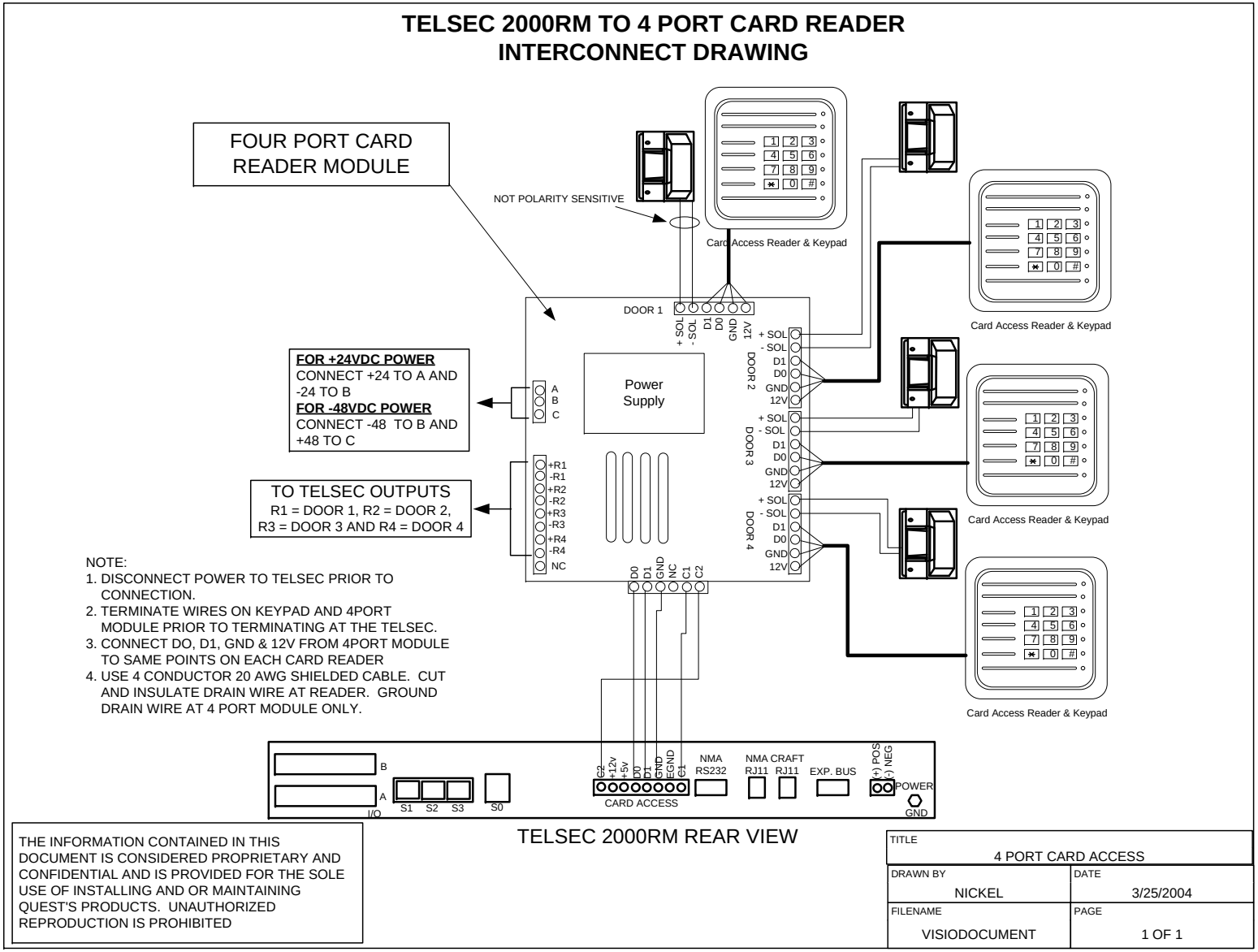
OPTION B - USING WIRE WRAP BLOCK FOR TERMINATION OF FIELD WIRING

The door actuator can be controlled from any output. This example shows the door being controlled by relay 8. Refer to the access control section of the manual for programming and operation



TITLE: CARD ACCESS CONTROL	
DRAWN BY: NICKEL	DATE: 5/14/2001
FILENAME: CARD ACCESS CONTROL.VSD	PAGE: 3 OF 3

3.10.7 Four Port Card Access Control



Chapter 4 - Application

4.1 Overview

This section provides sample points lists for different applications that the TELSEC® product can be installed in. The TELSEC® product is extremely flexible which allows the user to monitor and control a wide variety of items in many different facilities. Contact your Quest representative if you have questions about applications that are not covered by this section. Each application in this section will have a Points List identifying the various points to be monitored and controlled. There are blank Points List pages in the back of this section that you can use for your specific facility.

4.2 CEV with Two Air Conditioners

DIGITAL OUTPUTS			
1	VENT FAN	9	
2	AIR CONDITIONER #1	10	
3	AIR CONDITIONER #2	11	
4	HEATER	12	
5	DEHUMIDIFIER	13	
6	AUDIBLE ALARM (HORN)	14	
7	RED/GREEN WARNING LIGHTS	15	
8	HATCH CONTROL	16	

UNIVERSAL INPUTS					
#	Input Name	Sensor Type	#	Input Name	Sensor Type
1	CEV TEMPERATURE	TEMP ºF	17	SPARE INPUTS FOR MORE INPUTS	
2	CEV HUMIDITY	%RH	18		
3	DC POWER PLANT VOLTAGE	VDC power to unit	19		
4	INTRUSION - DOOR MONITOR	DRY CONTACT	20		
5	BATTERY ON DISCHARGE	Terminal Strip	21		
6	COMMERCIAL POWER FAIL	DRY CONTACT	22		
7	SMOKE/FIRE DETECTOR	DRY CONTACT	23		
8	FIRE DETECTOR FAILURE	DRY CONTACT	24		
9	VENT FAN PROOF OF RUN	DRY CONTACT	25		
10	LIGHT SWITCH (OCCUPIED) MONITOR	DRY CONTACT	26		
11	DUCT MOISTURE SENSOR	Terminal Strip	27		
12	EXPLOSIVE GAS SENSOR	DRY CONTACT	28		
13	TOXIC GAS SENSOR	DRY CONTACT	29		
14	HIGH WATER FLOAT	DRY CONTACT	30		
15		DRY CONTACT	31		
16	OUTSIDE AIR TEMPERATURE	DRY CONTACT	32		

4.3 Hut with 2 AC Units

DIGITAL OUTPUTS			
1	AC#1 FAN	9	
2	AC#1 COOLING	10	
3	AC#1 HEATING	11	
4	AC#2 FAN	12	
5	AC#2 COOLING	13	
6	AC#2 HEATING	14	
7		15	
8		16	

UNIVERSAL INPUTS					
#	Input Name	Sensor Type	#	Input Name	Sensor Type
1	TEMPERATURE	TEMP ºF	17		
2	HUMIDITY	%RH	18		
3	DC POWER PLANT VOLTAGE	VDC power to unit	19		
4	INTRUSION - DOOR MONITOR	DRY CONTACT	20		
5	BATTERY ON DISCHARGE	DRY CONTACT	21		
6	COMMERCIAL POWER FAIL	DRY CONTACT	22		
7	SMOKE/FIRE DETECTOR	DRY CONTACT	23		
8	FIRE DETECTOR FAILURE	DRY CONTACT	24		
9		DRY CONTACT	25		
10		DRY CONTACT	26		
11		DRY CONTACT	27		
12		DRY CONTACT	28		
13		DRY CONTACT	29		
14		DRY CONTACT	30		
15		DRY CONTACT	31		
16	OUTSIDE AIR TEMPERATURE	TEMP ºF	32		

4.4 Cable Head End

DIGITAL OUTPUTS			
1	TRANE FAN CONTROL	9	BARD WA372 FAN CONTROL
2	TRANE COMPRESSOR #1 CONTROL	10	BARD WA372 HEAT CONTROL
3	TRANE COMPRESSOR #2 CONTROL	11	BARD WA372 COMPRESSOR
4	BARD WA372 FAN CONTROL	12	BARD WA372 FAN CONTROL
5	BARD WA372 COMPRESSOR	13	BARD WA372 COMPRESSOR
6		14	BARD WA372 HEAT CONTROL
7	SYSTEM FAIL ALARM OUTPUT	15	
8	EQUIPMENT ROOM DOOR MAGLOCK	16	POWER ROOM DOOR STRIKE

UNIVERSAL INPUTS					
#	**Input Name**	**Sensor Type**	**#**	**Input Name**	**Sensor Type**
1	TEMP EQUIP ROOM HI	TEMP ºF	17	ADC DV6911 ALARM	DRY CONTACT
2	HUMIDITY EQUIP ROOM	%RH	18	ADC DV6911 ALARM	DRY CONTACT
3	HI FLOAT VOLTAGE ALARM	VDC power to unit	19	ADC DV6016 ALARM	DRY CONTACT
4	TEMP POWER ROOM	TEMP ºF	20	ADC DV6016 ALARM	DRY CONTACT
5	HUMIDITY POWER ROOM	%RH	21	HARMONIC RETURN ALARM	DRY CONTACT
6	INTRUSION - EQUIP ROOM DOOR#1	DRY CONTACT	22	HARMONIC RETURN ALARM	DRY CONTACT
7	INTRUSION - EQUIP ROOM DOOR#2	DRY CONTACT	23	HLP4200 CHASSIS #1 ALARM	DRY CONTACT
8	MOTION SENSOR	DRY CONTACT	24	HLP4200 CHASSIS #1 ALARM	DRY CONTACT
9	TAMPER - EXTERNAL KEY BOX	DRY CONTACT	25	HLP4200 CHASSIS #2 ALARM	DRY CONTACT
10	FIRE SYSTEM ALARM - TROUBLE	DRY CONTACT	26	HLP4200 CHASSIS #2 ALARM	DRY CONTACT
11	FIRE SYSTEM ALARM - MINOR	DRY CONTACT	27	HLP4200 CHASSIS #3 ALARM	DRY CONTACT
12	FIRE SYSTEM ALARM - MAJOR	DRY CONTACT	28	HLP4200 CHASSIS #3 ALARM	DRY CONTACT
13	AC POWER FAILURE - COMMERCIAL	DRY CONTACT	29	HLP4200 CHASSIS #4 ALARM	DRY CONTACT
14	GENERATOR RUNNING	DRY CONTACT	30	HLP4200 CHASSIS #4 ALARM	DRY CONTACT
15	ATS IN EMERGENCY POSISTION	DRY CONTACT	31		
16	TAMPER - EXTERNAL KEY BOX	DRY CONTACT	32		

Cable Head End Cont.

DIGITAL OUTPUTS			
17		25	
18		26	
19		27	
20		28	
21		29	
22		30	
23		31	
24		32	

UNIVERSAL INPUTS					
#	Input Name	Sensor Type	#	Input Name	Sensor Type
33	INVERTER #1	DRY CONTACT	49	BATTERY DISCONNECT #1	DRY CONTACT
34	INVERTER #1 ALARM	DRY CONTACT	50	RR24 FUSE PANEL ALARM	DRY CONTACT
35	INVERTER #1 ALARM	DRY CONTACT	51	RR## FUSE PANEL ALARM	DRY CONTACT
36	INVERTER #2	DRY CONTACT	52	RR## FUSE PANEL ALARM	DRY CONTACT
37	INVERTER #2 ALARM	DRY CONTACT	53	RR## FUSE PANEL ALARM	DRY CONTACT
38	INVERTER #2 ALARM	DRY CONTACT	54	RR## FUSE PANEL ALARM	DRY CONTACT
39			55	RR## FUSE PANEL ALARM	DRY CONTACT
40			56		
41	RECTIFIER	DRY CONTACT	57		
42	RECTIFIER SYSTEM ALARM	DRY CONTACT	58		
43	RECTIFIER SYSTEM ALARM	DRY CONTACT	59		
44	RECTIFIER	DRY CONTACT	60		
45	RECTIFIER	DRY CONTACT	61		
46	RECTIFIER	DRY CONTACT	62		
47	RECTIFIER	DRY CONTACT	63		
48	BATTERY DISCONNECT #1	DRY CONTACT	64		

4.5 OTN Hub with 2 AC Units

DIGITAL OUTPUTS			
1	A/C 1 FAN CONTROL	9	
2	A/C 1 COOLING CONTROL	10	
3	A/C 1 HEATING CONTROL	11	
4	A/C 2 FAN CONTROL	12	
5	A/C 2 COOLING CONTROL	13	
6	A/C 2 HEATING CONTROL	14	
7		15	
8		16	

UNIVERSAL INPUTS					
#	Input Name	Sensor Type	#	Input Name	Sensor Type
1	TEMPERATURE ZONE 1	TEMP ºF	17	HI ENGINE TEMPERATURE	DRY CONTACT
2	HUMIDITY	%RH	18	GENERATOR FUEL LEVEL LOW	DRY CONTACT
3	*TELSEC POWER INPUT VOLTAGE*	VDC power to unit	19	GENERATOR OVERCRANK	DRY CONTACT
4	TEMPERATURE ZONE 2	TEMP ºF	20	GENERATOR OVERSPEED	DRY CONTACT
5	HVAC#1 FAILURE	DRY CONTACT	21	GENERATOR NOT IN AUTO	DRY CONTACT
6	HVAC#2 FAILURE	DRY CONTACT	22		
7	INTRUSION - DOOR OPEN	DRY CONTACT	23		
8	FIRE PANEL TROUBLE	DRY CONTACT	24		
9	FIRE/SMOKE ALARM	DRY CONTACT	25		
10	ATS IN EMERGENCY POSISTION	DRY CONTACT	26		
11	AC POWER FAIL	DRY CONTACT	27		
12	UPS ON BYPASS	DRY CONTACT	28		
13	UPS NOTICE ALARM	DRY CONTACT	29		
14	UPS SUMMARY ALARM	DRY CONTACT	30		
15		DRY CONTACT	31		
16	GENERATOR RUNNING	DRY CONTACT	32		

4.6 CEC/CUE With 2AC

DIGITAL OUTPUTS			
1	VENT FAN	9	
2	AIR CONDITIONER #1	10	
3	HEATER #1	11	
4	AIR CONDITIONER #2	12	
5	HEATER #2	13	
6	AUDIBLE ALARM (HORN)	14	
7	HVAC FIRE LOCKOUT #1	15	
8	HVAC FIRE LOCKOUT #2	16	

UNIVERSAL INPUTS					
#	Input Name	Sensor Type	#	Input Name	Sensor Type
1	TEMPERATURE	TEMP ºF	17		
2	HUMIDITY	%RH	18		
3	DC POWER PLANT VOLTAGE	VDC power to unit	19		
4	INTRUSION - DOOR MONITOR	DRY CONTACT	20		
5	BATTERY ON DISCHARGE	DRY CONTACT	21		
6	COMMERCIAL POWER FAIL	DRY CONTACT	22		
7	SMOKE/FIRE DETECTOR	DRY CONTACT	23		
8	FIRE DETECTOR FAILURE	DRY CONTACT	24		
9		DRY CONTACT	25		
10		DRY CONTACT	26		
11		DRY CONTACT	27		
12	GAS MONITOR FAILURE	DRY CONTACT	28		
13	TOXIC GAS SENSOR	DRY CONTACT	29		
14	HIGH WATER FLOAT	DRY CONTACT	30		
15		DRY CONTACT	31		
16		DRY CONTACT	32		

4.7 Remote Cabinet Monitoring

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	HIGH TEMPERATURE	TEMP ºF	17		
2	HIGH HUMIDITY	%RH	18		
3	FLOAT VOLTAGE	VDC power to unit	19		
4	INTRUSION - DOOR OPEN	DRY CONTACT	20		
5	BATTERY CIRCUIT BREAKER	DRY CONTACT	21		
6	COMMERCIAL POWER FAIL	DRY CONTACT	22		
7	RECTIFIER FAILURE MAJOR	DRY CONTACT	23		
8	RECTIFIER FAILURE MINOR	DRY CONTACT	24		
9	POWER PLANT FUSE	DRY CONTACT	25		
10	LOW VOLTAGE DISCONNECT	DRY CONTACT	26		
11	RACK COOLING FAN FAILURE	WET CONTACT	27		
12	TEMP COMPENSATOR UNIT FAIL	DRY CONTACT	28		
13	UFAP/UFPP SIDE A CIRCUIT BREAKER	DRY CONTACT	29		
14	UFAP/UFPP SIDE B CIRCUIT BREAKER	DRY CONTACT	30		
15	UFAP/UFPP FUSE & PDFA FUSE	WET CONTACT	31		
16	SYSTEM ALARM FROM ECU	DRY CONTACT	32		

4.8 CEV With Telephony and Battery Temperature Monitoring

DIGITAL OUTPUTS			
1	VENT FAN	9	EMERGENCY LIGHTS
2	OUTSIDE AIR DAMPER	10	AUDIBLE ALARM (HORN)
3	AIR CONDITIONER #1	11	RED WARNING LIGHT CONTROL
4	AIR CONDITIONER #2	12	GREEN WARNING LIGHT CONTROL
5	HEATER	13	HATCH/DOOR CONTROL
6	DEHUMIDIFIER	14	
7	SUMP PUMP	15	
8	WORK LIGHTS	16	

UNIVERSAL INPUTS					
#	Input Name	Sensor Type	#	Input Name	Sensor Type
1	CEV TEMPERATURE	TEMP ºF	17	LIGHT (OCCUPIED) MONITOR	DRY CONTACT
2	CEV HUMIDITY	%RH	18	RECTIFIER MAJOR ALARM	DRY CONTACT
3	DC POWER PLANT VOLTAGE	VDC	19	RECTIFIER MINOR ALARM	DRY CONTACT
4	OUTSIDE AIR TEMPERATURE	TEMP ºF	20	FUSE FAILURE MAJOR ALARM	DRY CONTACT
5	VENT FAN PROOF OF RUN	DRY CONTACT	21	FUSE FAILURE MINOR ALARM	DRY CONTACT
6	INTRUSION - DOOR MONITOR	DRY CONTACT	22	MUX FAILURE MAJOR ALARM	DRY CONTACT
7	EXPLOSIVE GAS SENSOR	DRY CONTACT	23	MUX FAILURE MINOR ALARM	DRY CONTACT
8	TOXIC GAS SENSOR	DRY CONTACT	24	LITE SPAN CRITICAL ALARM	DRY CONTACT
9	SMOKE/FIRE DETECTOR	DRY CONTACT	25	LITE SPAN MAJOR ALARM	DRY CONTACT
10	SMOKE DETECTOR FAILURE	DRY CONTACT	26	LITE SPAN MINOR ALARM	DRY CONTACT
11	COMMERCIAL POWER FAIL	DRY CONTACT	27		
12	GAS DETECTOR FAILURE	DRY CONTACT	28		
13	MOISTURE SENSOR	DRY CONTACT	29	BATTERY STRING TEMPERATURE 1	TEMP ºF
14	HIGH WATER FLOAT	DRY CONTACT	30	BATTERY STRING TEMPERATURE 2	TEMP ºF
15	SUMP PUMP HIGH FLOAT	DRY CONTACT	31	BATTERY STRING TEMPERATURE 3	TEMP ºF
16	SUMP PUMP LOW FLOAT	DRY CONTACT	32	BATTERY STRING TEMPERATURE 4	TEMP ºF

4.9 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 ºF	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		

Chapter 5 Ethernet Interface

The Ethernet module option for the TELSEC RM/WM product will provide IP connectivity through a standard 10Base Ethernet connection. The module has a built-in web server for programming and status, SNMP v1 and v2c support, Telnet connectivity and Email alarm generation. This manual will provide the operator with the necessary information to operate the TELSEC system over a network connection.

5.1 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. Proceed to section 5.3 for web server log-in and setup procedures. If you cannot access the TELSEC in this method, proceed to section 5.2 for using ARP and PING to change the IP address on the TELSEC.

5.2 Setting the TELSEC IP Address

The default IP address for the system is 192.168.1.31. This address can be changed by logging onto the system using this address or the user can set a temporary address using the ARP and PING commands. In either case you will use your web browser to connect to the system and go to the Web Server setup page to set the new permanent address. See section 5.3.17 for instructions on setting the permanent address.

5.2.1 Setting the IP Address with the PING Command

The TELSEC Ethernet module supports the ARP protocol and PING command to set a temporary IP address. You will need to know the physical (or MAC) address of the module in order to use the PING function. The MAC address will be on a label affixed to the TELSEC near the Ethernet port and is also on the Configuration Sheet shipped with each unit. Use the following procedure to set a temporary address:

1. Connect the TELSEC to the local hub/switch. Or you can use a Crossover cable for direct connection to the TELSEC from your PC instead of going through a hub or switch.
2. Connect your laptop to the same hub/switch.
3. Open up the command prompt window and issue the command IPCONFIG. Verify that your laptop has an IP address in the same subnet as the address you will be assigning to the TELSEC.
4. Use the ARP command to enter the TELSEC IP address into your ARP table. The command is ARP –S <IP address> <MAC address><enter>
   Example: ARP –S 192.168.0.31 00-90-c2-c4-bb-f7
5. Type ARP –A and verify that the address is entered in as static.
6. Ping the Address by typing ping <IP address> and verify that the TELSEC responds to the ping. This address is temporary; you will need to set the address permanently by completing the rest of the steps.
   Example: ping 192.168.0.31

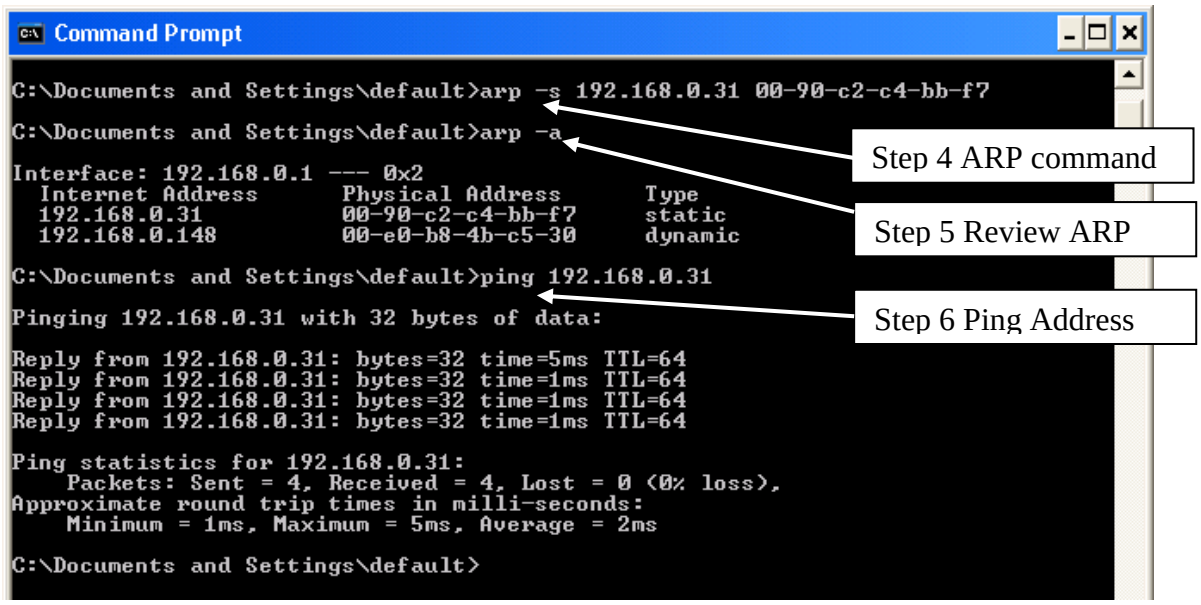


Figure 13 - Using the Arp and Ping Commands

7. Open your browser and connect to the new address. Follow the instructions in the Web Server Setup (section 5.3.17) to complete the programming of a Permanent IP address.

5.3 TELSEC Web Server

The built in Web Server is a small footprint server designed to provide status and simple programming of the TELSEC system. It optimized to operate over connections with limited bandwidth.

5.3.1 Security

The Web Server uses a username and password combination to authenticate the user and allow access. No information will be shown without proper authorization. The User Level default username is **User** and the password is **user.** The username and password are case sensitive so make sure your caps lock key is turned off. In addition to the user level, there is an Admin level password that must be entered in order to gain access to any Admin functions, program changes and bypassing outputs. The default Admin username/password is Admin and admin.

Figure 14 - Log in Screen

5.3.2 Web Page Navigation

Once you login into the web server, the TELSEC will present the main page. All pages use frames where the top and left navigation side remains the same and the center section changes depending on the screen requested. This minimizes the amount of data that has to be sent in order to render the page chosen. All available page choices will be listed in the blue navigation bar on the left of the page. On some pages you will have the option of an additional link in the center section for action specific to the data you are reviewing. An example would be a link to change the set points when you are reviewing the status of set points. All pages are static, but the values are current readings when you press the link. To update a page, click on the link again. This causes your browser to request the current status.

5.3.3 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 or at any point that you press the Refresh button on your browser. The home page will show Active Alarms, Battery Data and Site Information. See Figure 15 - The TELSEC Home Page.

5.3.3.1 Active Alarms

The first table on the Home page is Active Alarms. Any 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.

5.3.3.2 Battery Data

The Battery Data table will show the status of the TELSEC built in battery monitoring algorithm. The data will show the current battery plant voltage along with the Time remaining and capacity figures in hours. Time Remaining and Capacity are calculated when the battery plant is in discharge. The Time Remaining will be the estimated amount of time before the low voltage disconnect is reached. The Capacity is the total amount of estimated time it will take from the time the power went out to when the batteries will reach low voltage disconnect. A value of 0 for both the Capacity and Time Remaining means that the system has not experienced a discharge to do a calculation. Once a discharge occurs, the system will update its estimate every 15 minutes. This table will not be present if your system is not configured for battery monitoring. Note if you are not using the battery monitoring algorithm, you can turn this display off by naming the battery point with the name BAT001. Log onto the system via telnet and issue the command NAME BAT001 = BAT.1<enter>. Then save to flash with the SET PRO DEF command.

5.3.3.3 Site Information

A teal colored box is provided to put site specific information such as the site name, address, phone number and contact number. In addition a user programmable Universal Record Locator (URL) is available to allow you to link to another web page. This might be maintenance page; directions to the facility via a mapping site or connectivity to other Ethernet enable devices such as Web Cameras. This information gets programmed through the Web Server Setup page (see Figure 31).

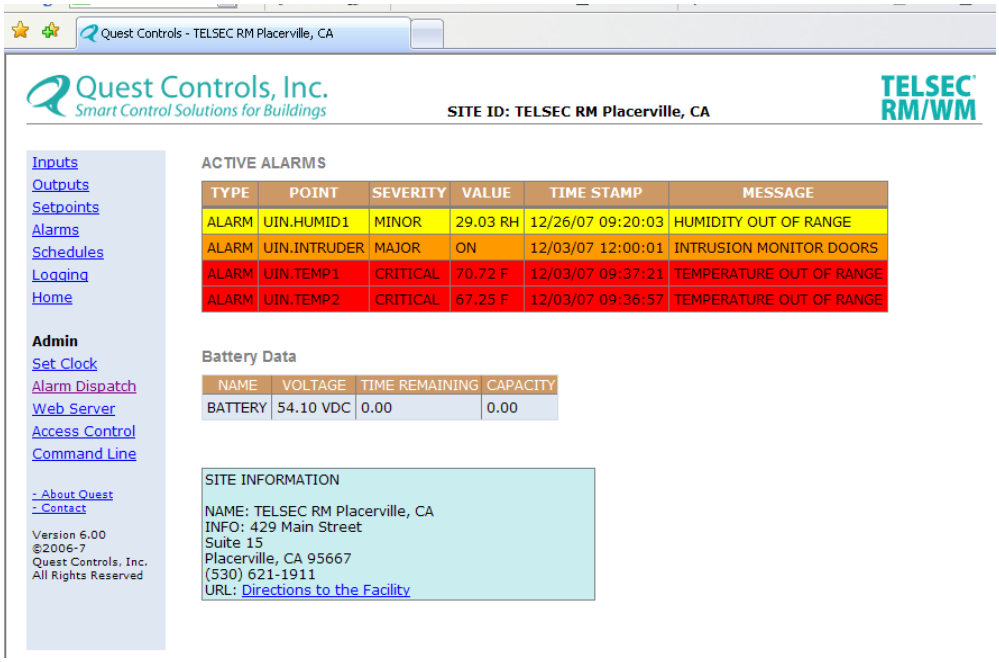


Figure 15 - The TELSEC Home Page

5.3.4 Input Status Page

The input status page will 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 and Description of the point if defined. The web server will update the status of the inputs every time the Inputs link is selected or every 60 seconds while on this page.

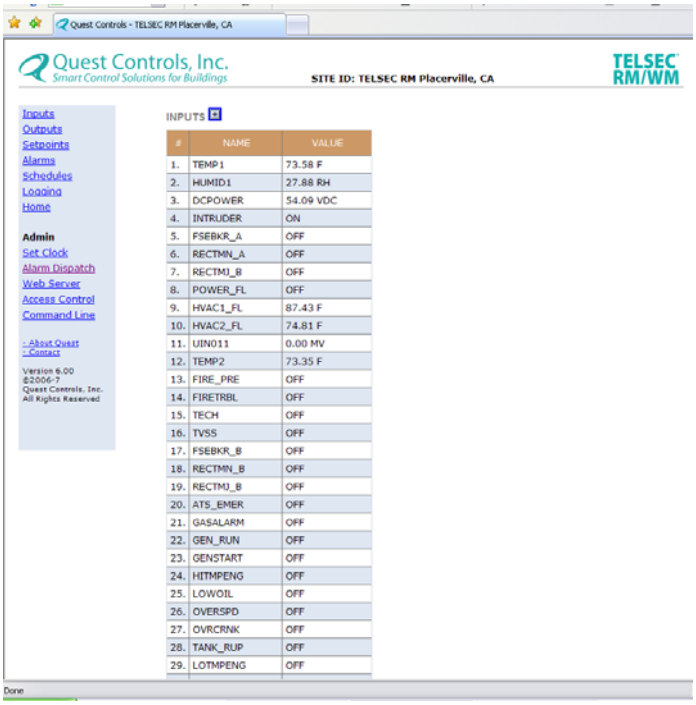
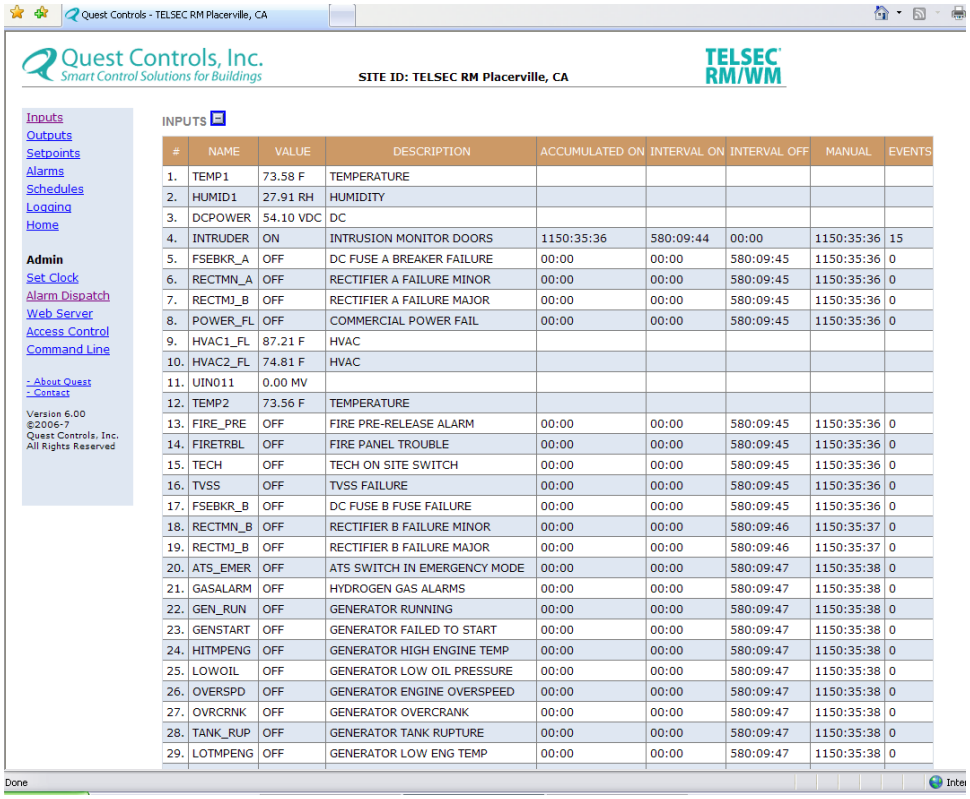


Figure 16 - Input Status

5.3.4.1 Input Status Page Expanded

Click on the ⊞ link above the status columns to show the expanded input status. The TELSEC will now show all of the timers associated with any input defined as digital. The timer definitions are as follows:

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.



#	NAME	VALUE	DESCRIPTION	ACCUMULATED ON	INTERVAL ON	INTERVAL OFF	MANUAL	EVENTS
1.	TEMP1	73.58 F	TEMPERATURE					
2.	HUMID1	27.91 RH	HUMIDITY					
3.	DCPOWER	54.10 VDC	DC					
4.	INTRUDER	ON	INTRUSION MONITOR DOORS	1150:35:36	580:09:44	00:00	1150:35:36	15
5.	FSEBKR_A	OFF	DC FUSE A BREAKER FAILURE	00:00	00:00	580:09:45	1150:35:36	0
6.	RECTMN_A	OFF	RECTIFIER A FAILURE MINOR	00:00	00:00	580:09:45	1150:35:36	0
7.	RECTMJ_B	OFF	RECTIFIER A FAILURE MAJOR	00:00	00:00	580:09:45	1150:35:36	0
8.	POWER_FL	OFF	COMMERCIAL POWER FAIL	00:00	00:00	580:09:45	1150:35:36	0
9.	HVAC1_FL	87.21 F	HVAC					
10.	HVAC2_FL	74.81 F	HVAC					
11.	UIN011	0.00 MV						
12.	TEMP2	73.56 F	TEMPERATURE					
13.	FIRE_PRE	OFF	FIRE PRE-RELEASE ALARM	00:00	00:00	580:09:45	1150:35:36	0
14.	FIRETRBL	OFF	FIRE PANEL TROUBLE	00:00	00:00	580:09:45	1150:35:36	0
15.	TECH	OFF	TECH ON SITE SWITCH	00:00	00:00	580:09:45	1150:35:36	0
16.	TVSS	OFF	TVSS FAILURE	00:00	00:00	580:09:45	1150:35:36	0
17.	FSEBKR_B	OFF	DC FUSE B FUSE FAILURE	00:00	00:00	580:09:45	1150:35:36	0
18.	RECTMN_B	OFF	RECTIFIER B FAILURE MINOR	00:00	00:00	580:09:46	1150:35:37	0
19.	RECTMJ_B	OFF	RECTIFIER B FAILURE MAJOR	00:00	00:00	580:09:46	1150:35:37	0
20.	ATS_EMER	OFF	ATS SWITCH IN EMERGENCY MODE	00:00	00:00	580:09:47	1150:35:38	0
21.	GASALARM	OFF	HYDROGEN GAS ALARMS	00:00	00:00	580:09:47	1150:35:38	0
22.	GEN_RUN	OFF	GENERATOR RUNNING	00:00	00:00	580:09:47	1150:35:38	0
23.	GENSTART	OFF	GENERATOR FAILED TO START	00:00	00:00	580:09:47	1150:35:38	0
24.	HITMPENG	OFF	GENERATOR HIGH ENGINE TEMP	00:00	00:00	580:09:47	1150:35:38	0
25.	LOWOIL	OFF	GENERATOR LOW OIL PRESSURE	00:00	00:00	580:09:47	1150:35:38	0
26.	OVERSPD	OFF	GENERATOR ENGINE OVERSPEED	00:00	00:00	580:09:47	1150:35:38	0
27.	OVRCRNK	OFF	GENERATOR OVERCRANK	00:00	00:00	580:09:47	1150:35:38	0
28.	TANK_RUP	OFF	GENERATOR TANK RUPTURE	00:00	00:00	580:09:47	1150:35:38	0
29.	LOTMPENG	OFF	GENERATOR LOW ENG TEMP	00:00	00:00	580:09:47	1150:35:38	0

Figure 17 - Expanded Input Status

5.3.5 Output Status Page

The output status page will show the current status of all outputs in the system. 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. To bypass an output, click on the (Bypass) link. This will bring up a new page to allow you to bypass an output. See Figure 20

#	NAME	PROGRAM	STATUS	BYPASS TIME
1.	DCPOWER	OFF	AUTO	00:00
2.	HVACFAIL	ON	AUTO	00:00
3.	FIRE_PRE	OFF	AUTO	00:00
4.	FIRETRBL	OFF	AUTO	00:00
5.	TVSS	OFF	AUTO	00:00
6.	ATS_EMER	OFF	AUTO	00:00
7.	GEN_RUN	OFF	AUTO	00:00
8.	GENSTART	OFF	AUTO	00:00
9.	HITMPENG	OFF	AUTO	00:00
10.	LOWOIL	OFF	AUTO	00:00
11.	OVERSPD	OFF	AUTO	00:00
12.	OVERCRNK	OFF	AUTO	00:00
13.	TANK_RUP	OFF	AUTO	00:00
14.	GEN_AUTO	OFF	AUTO	00:00
15.	CHGRFAIL	OFF	AUTO	00:00
16.	LOWFUEL	OFF	OFF	FOREVER

Figure 18 - Output Status Page

5.3.5.1 Output Status Expanded Page

Click on the ⊞ link above the status columns to show the expanded output status. The TELSEC will now show all of the timers associated with digital outputs. The timer definitions are as follows:

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.

#	NAME	PROGRAM	STATUS	BYPASS TIME	ACCUMULATED ON	INTERVAL ON	INTERVAL OFF	MANUAL	EVENTS
1.	DCPOWER	OFF	AUTO	00:00	00:01	00:01	1150:36:13	1150:36:14	1
2.	HVACFAIL	ON	AUTO	00:00	833:45:32	006:14:26	00:04	1150:36:14	2682
3.	FIRE_PRE	OFF	AUTO	00:00	003:00:00	002:59:59	620:21:08	1150:36:14	3
4.	FIRETRBL	OFF	AUTO	00:00	00:01	00:01	1150:36:13	1150:36:14	1
5.	TVSS	OFF	AUTO	00:00	00:01	00:01	1150:36:13	1150:36:14	1
6.	ATS_EMER	OFF	AUTO	00:00	00:01	00:01	1150:36:13	1150:36:14	1
7.	GEN_RUN	OFF	AUTO	00:00	00:01	00:01	1150:36:13	1150:36:14	1
8.	GENSTART	OFF	AUTO	00:00	00:01	00:01	1150:36:13	1150:36:14	1
9.	HITMPENG	OFF	AUTO	00:00	00:01	00:01	1150:36:13	1150:36:14	1
10.	LOWOIL	OFF	AUTO	00:00	00:01	00:01	1150:36:14	1150:36:15	1
11.	OVERSPD	OFF	AUTO	00:00	00:01	00:01	1150:36:14	1150:36:15	1
12.	OVERCRNK	OFF	AUTO	00:00	00:01	00:01	1150:36:14	1150:36:15	1
13.	TANK_RUP	OFF	AUTO	00:00	00:01	00:01	1150:36:14	1150:36:15	1
14.	GEN_AUTO	OFF	AUTO	00:00	00:01	00:01	1150:36:14	1150:36:15	1
15.	CHGRFAIL	OFF	AUTO	00:00	00:01	00:01	1150:36:14	1150:36:15	1
16.	LOWFUEL	OFF	OFF	FOREVER	00:01	00:01	1150:36:14	1150:36:15	1

Figure 19 - Expanded Output Status

5.3.6 Bypassing Outputs

Clicking on the **(BYPASS)** link will bring up the bypass web page. The system will present a Username/password prompt if you previously have not entered the Admin level password. You can choose to bypass an output for up to 23 hours and 59 minutes or you can select the Forever checkbox. First use the drop down relay number box to select the output you want to bypass and then select the state and duration. If you select FOREVER, you must manually set the output back to AUTO to clear the bypass condition. Once you enter the appropriate information, click on the DO BYPASS button to affect the change. The system will do the bypass and then refresh the output status page.

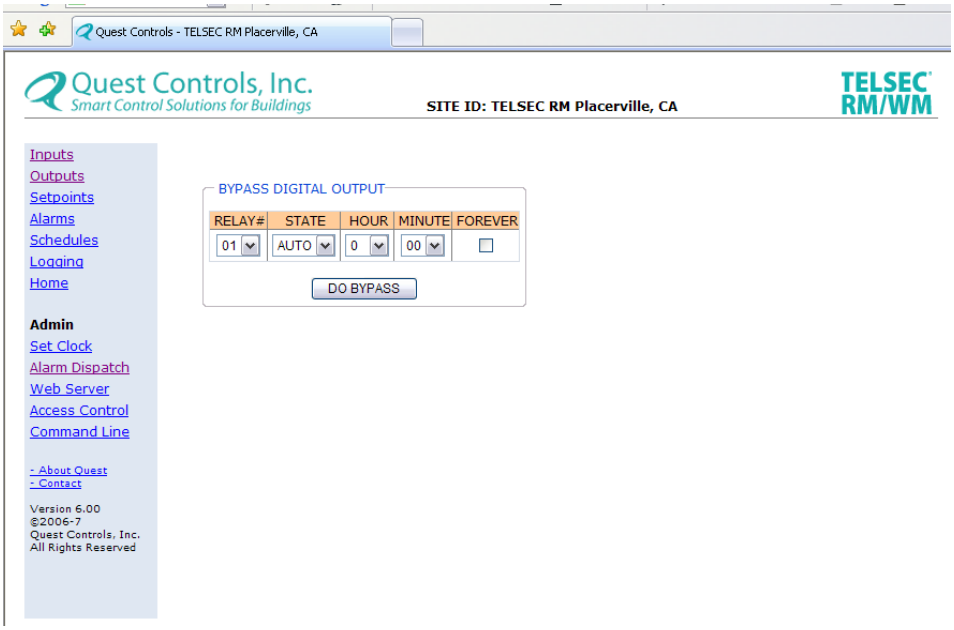
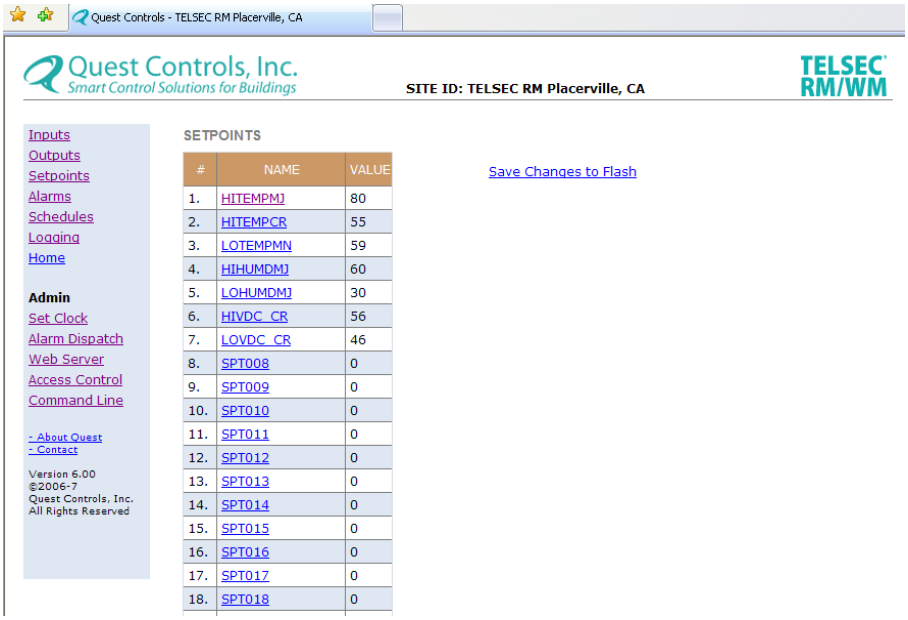


Figure 20 - Bypass Output Page

5.3.7 Set point Status Page

Click on the Setpoints link to see the status of the 32 available set points in the system. Each set point will have a reference number, a name and current value. All set points will appear even if they are not used in your application. Unused set points will have their default name along with a value of 0. Set points can be changed by clicking on the name of the Setpoint. See Figure 22 - Change Set Point. Click on the Save Changes to Flash link after you have made all the desired changes, to write the settings to non-volatile flash memory.



#	NAME	VALUE
1.	HITEMPMJ	80
2.	HITEMPCR	55
3.	LOTEMPMN	59
4.	HIHUMDMJ	60
5.	LOHUMDMJ	30
6.	HIVDC_CR	56
7.	LOVDC_CR	46
8.	SPT008	0
9.	SPT009	0
10.	SPT010	0
11.	SPT011	0
12.	SPT012	0
13.	SPT013	0
14.	SPT014	0
15.	SPT015	0
16.	SPT016	0
17.	SPT017	0
18.	SPT018	0

Figure 21 - Set Point Status Page

5.3.8 Change Set Point

Clicking on the name of the Set point link will bring up the change set point page to allow the operator to change the set point. The system will present a Username/password prompt if you previously have not entered the Admin level password. Select the number for the set point you want to change and then enter the new value. Click on the change button to send the new setting to the TELSEC. Some application programs limit the amount of change for a set point. While the change you entered may be accepted, there may be a program running in the TELSEC that will keep the set point within a certain range. After the change is submitted, the TELSEC will refresh the Setpoint Status page. See Figure 22

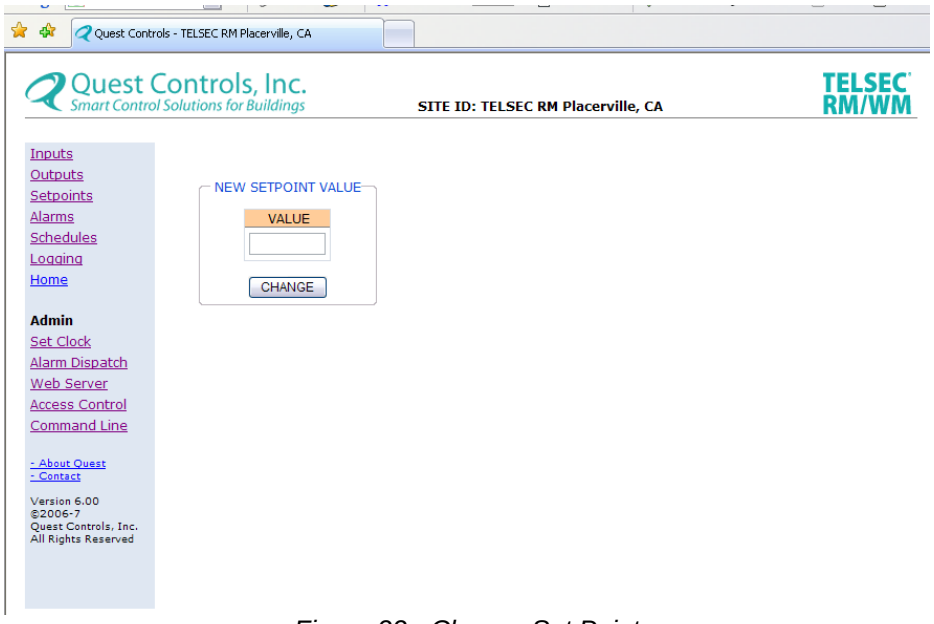


Figure 22 - Change Set Point

5.3.9 Alarm Status

Clicking on the Alarms link will show the Active Alarms table on a separate page. 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 dependant 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. The Alarm page has an Alarm History link that will show the history log in a separate window. See Figure 24.

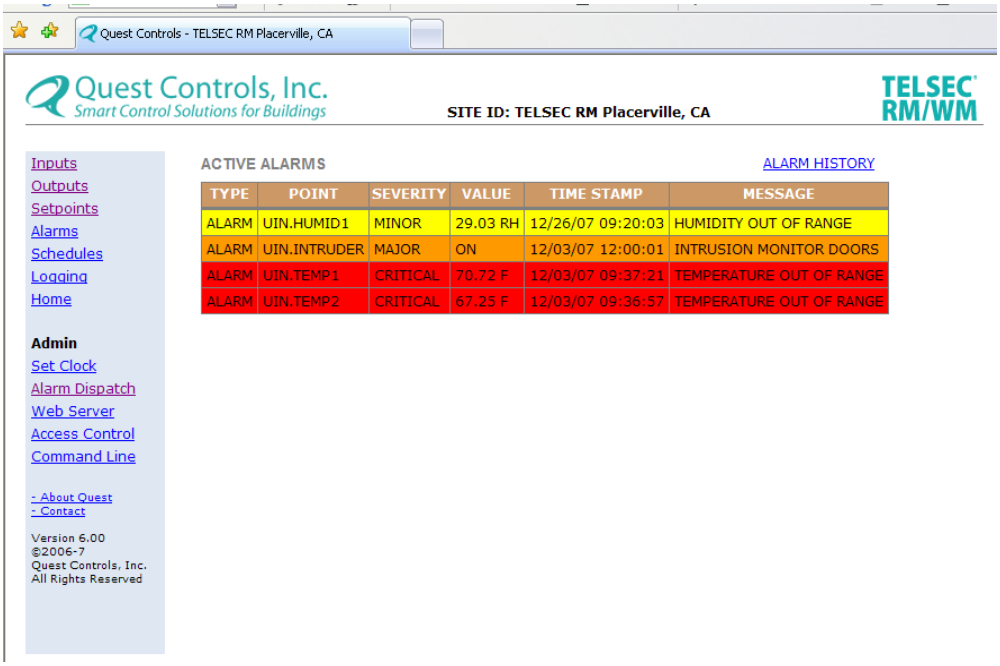
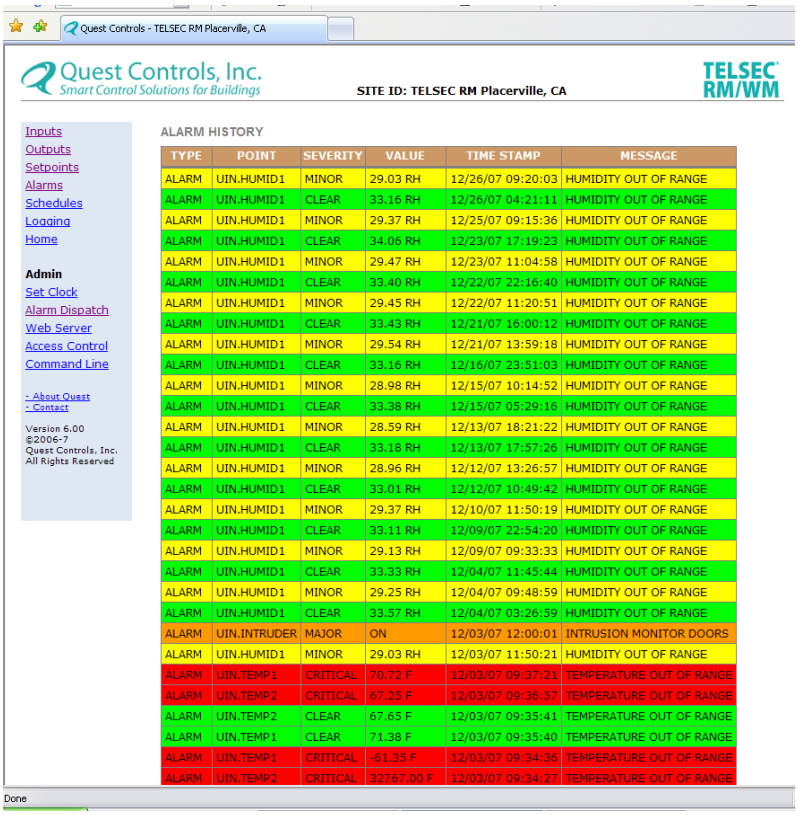


Figure 23 - Active Alarms

5.3.10 Alarm History

The history log shows the most recent ninety nine 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 and local port logons with a white background. 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.



TYPE	POINT	SEVERITY	VALUE	TIME STAMP	MESSAGE
ALARM	UIN.HUMID1	MINOR	29.03 RH	12/26/07 09:20:03	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.16 RH	12/26/07 04:21:11	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	29.37 RH	12/25/07 09:15:36	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	34.06 RH	12/23/07 17:19:23	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	29.47 RH	12/23/07 11:04:58	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.40 RH	12/22/07 22:16:40	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	29.45 RH	12/22/07 11:20:51	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.43 RH	12/21/07 16:00:12	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	29.54 RH	12/21/07 13:59:18	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.16 RH	12/16/07 23:51:03	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	28.98 RH	12/15/07 10:14:52	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.38 RH	12/15/07 05:29:16	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	28.59 RH	12/13/07 18:21:22	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.18 RH	12/13/07 17:57:26	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	28.96 RH	12/12/07 13:26:57	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.01 RH	12/12/07 10:49:42	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	29.37 RH	12/10/07 11:50:19	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.11 RH	12/09/07 22:54:20	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	29.13 RH	12/09/07 09:33:33	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.33 RH	12/04/07 11:45:44	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	MINOR	29.25 RH	12/04/07 09:48:59	HUMIDITY OUT OF RANGE
ALARM	UIN.HUMID1	CLEAR	33.57 RH	12/04/07 03:26:59	HUMIDITY OUT OF RANGE
ALARM	UIN.INTRUDER	MAJOR	ON	12/03/07 12:00:01	INTRUSION MONITOR DOORS
ALARM	UIN.HUMID1	MINOR	29.03 RH	12/03/07 11:50:21	HUMIDITY OUT OF RANGE
ALARM	UIN.TEMP1	CRITICAL	70.72 F	12/03/07 09:37:21	TEMPERATURE OUT OF RANGE
ALARM	UIN.TEMP2	CRITICAL	67.25 F	12/03/07 09:36:57	TEMPERATURE OUT OF RANGE
ALARM	UIN.TEMP2	CLEAR	67.65 F	12/03/07 09:35:41	TEMPERATURE OUT OF RANGE
ALARM	UIN.TEMP1	CLEAR	71.38 F	12/03/07 09:35:40	TEMPERATURE OUT OF RANGE
ALARM	UIN.TEMP1	CRITICAL	-61.35 F	12/03/07 09:34:36	TEMPERATURE OUT OF RANGE
ALARM	UIN.TEMP2	CRITICAL	32767.00 F	12/03/07 09:34:27	TEMPERATURE OUT OF RANGE

Figure 24 - Alarm History

5.3.11 Schedule Status Page

The schedule page will show the on and off status of the time of day schedules and the date schedules. Time schedules are used to create and on and off condition based upon time and day of the week such as on at 8 am Monday through Friday and off at 5 pm. Date schedules are used to provide an on/off status for specific date such as OFF on Christmas. Click on the name of the schedule to bring up the change page. See Figure 26 for TOD and Figure 27 for Date Schedules. The system will present a Username/password prompt if you previously have not entered the Admin level password. Click on the Save Changes to Flash link once you have made all the desired schedule changes.

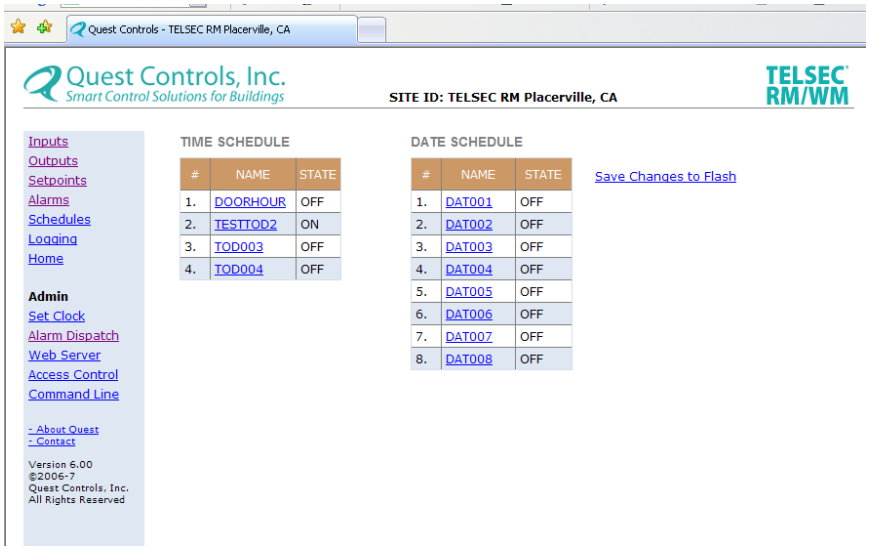


Figure 25 - Schedule Status

5.3.12 Changing/Viewing Time Schedules

Clicking on the name of the Time Schedule link will open a page with the current schedule settings. The system will present a Username/password prompt if you previously have not entered the Admin level password. Use the drop downs for the action and time columns and select the days of the week you want the action to occur. If you want the action to occur on a specific date then select the date schedule under ALT DAY. Don't forget to program the specific date using the change Date Schedule function. You can change the name of the schedule by entering a new name, or press CLEAR to clear the form completely. Press the SEND button once all of your changes are entered to send the new program to the TELSEC. The web server will accept the changes and then bring you back the Schedules status page.

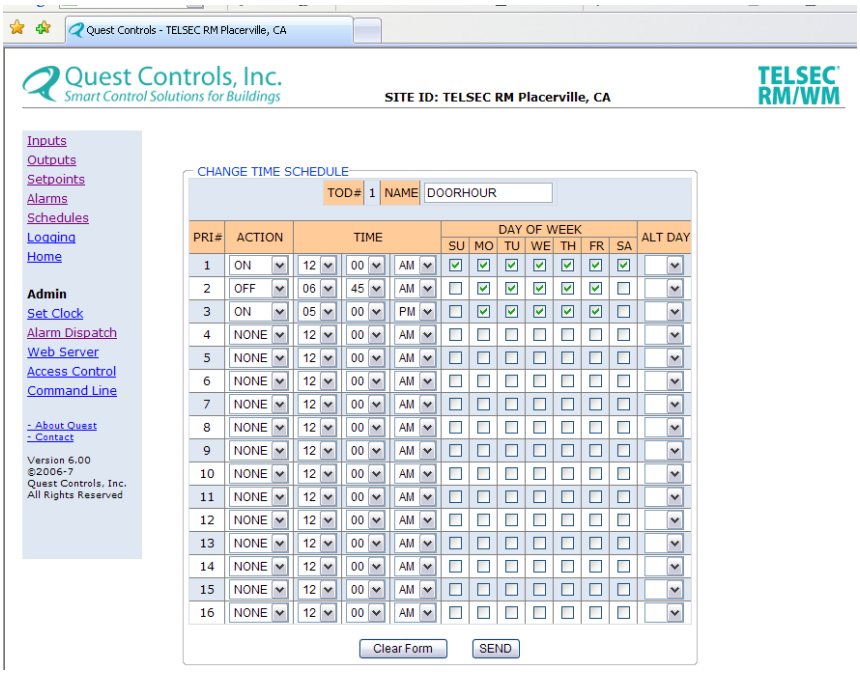


Figure 26 - Change Time Schedule

5.3.13 Change/View Date Schedules

Click on the name of the Date Schedule bring up the change Date Schedule page. The system will present a Username/password prompt if you previously have not entered the Admin level password. Use the drop downs to select the date(s) you want the schedule active. Press the SEND button to send your changes to the TELSEC. The schedule will have an ON value during the days you selected.

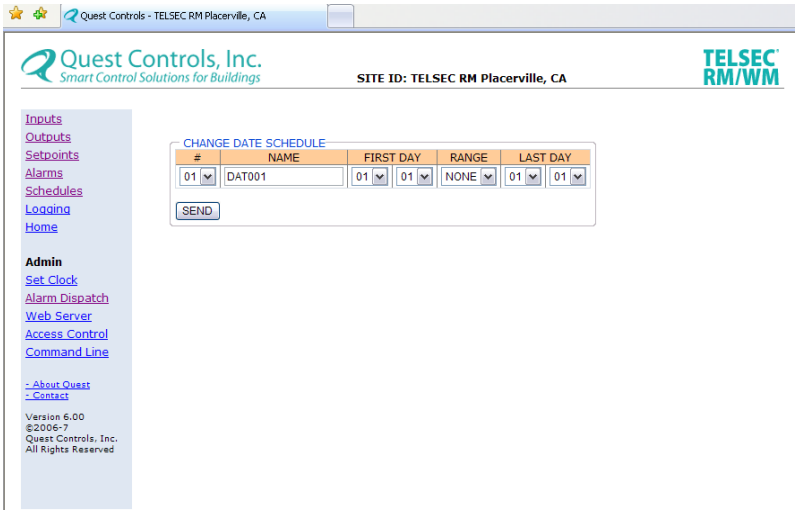


Figure 27 - Change Date Schedule

5.3.14 Logging Page

The built in web server will allow you to generate a graph or down load a log file of up to four inputs. The built in logging supports graphing of logs for the last 6 hours, 24 hours or 7 days. Additionally you can down load a comma delimited file that instead of those same ranges and also the entire log file. This file can then be archived or viewed in another program such as Excel©. There is an approximate 20KB file limitation on the downloads. If this limit is reached then the file is truncated. For large log pullbacks, it is recommended to use a Telnet session to retrieve all of the data. Chose your point to be logged using the drop down menus, select the graph range and then click on Show Graph or Download File.

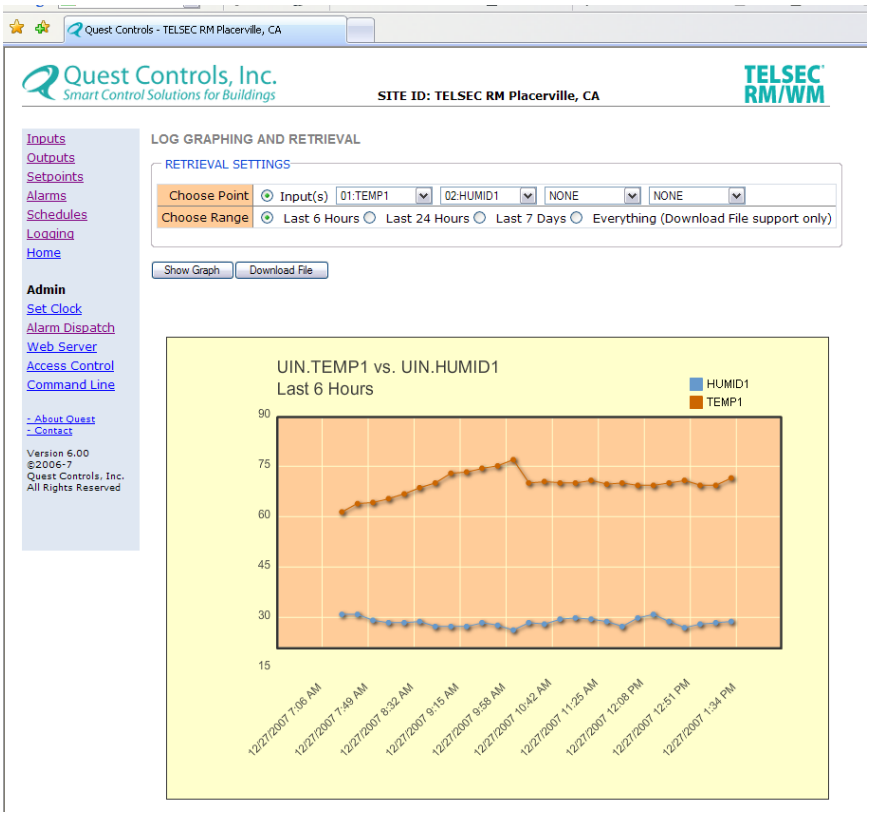


Figure 28 - History Logging Page

5.3.15 Setting the System Clock

The Set Clock link allows you to set the TELSEC system clock. The system will present a Username/password prompt if you previously have not entered the Admin level password. The clock is used for all time schedule functions and for date stamping events such as alarms and historical log data. Use the drop down boxes to set the date and time and then click on the SET button to send your changes to the TELSEC.

Figure 29 - System Clock

5.3.16 Alarm Dispatch Page

This page is used by the administrator to setup the alarm dispatching of the TELSEC system. The system will present a Username/password prompt if you previously have not entered the Admin level password. The TELSEC can send alarms via Email and SNMP. This page will allow you to setup the global parameters and then the specific locations and filters for sending alarms. Refer to Figure 30 for setting up the alarm dispatching.

5.3.16.1 Global Settings

The global settings are the settings that are used by all of the specific address parameters when sending the alarms. These settings must be entered so the TELSEC will know how to delivery the alarms.

5.3.16.2 SMTP Server Name or IP Address

The TELSEC uses Simple Mail Transport Protocol (SMTP) for sending emails to the appropriate people. Enter the IP address of the SMTP server so the TELSEC can send the emails for deliver. The system will support a DNS name instead of IP address. Make sure you enter a DNS server address under the Web Server Setup page (Figure 31 - Web Server Setup).

5.3.16.3 SMTP Domain Name

Some servers require you to enter a domain name for proper operation. Enter the SMTP domain name if needed otherwise leave this field blank.

5.3.16.4 SMTP Authentication

Some mail servers require a username and password to log in prior to sending the email. Enter the username and password in the appropriate fields if required, otherwise leave the fields blank. Note the web page will not display the characters you enter in the password field.

5.3.16.5 Email "From" Address

Enter the email From address for the TELSEC. This address is typically the Site ID@<domain name>. Example: TELSEC100@questcontrols.com. Try to pick an address that will be unique for this site so the people receiving the email will be able to reference the alarm by the From Address.

5.3.16.6 SNMP Version

The TELSEC system supports sending alarms via SNMP traps in either v1 or v2c. Select the version your trap alarm receiver will use.

5.3.16.7 Incoming SNMP Port

The incoming SNMP port is 161 by default, but can be changed to another IP port number if required. Setting the port number to 0 will cause the system to not respond to any SNMP queries. This in affect turns off the SNMP get function for status. You can still send alarms via SNMP, but the system will not respond to queries.

5.3.16.8 Outgoing SNMP Port

The outgoing IP port number for traps is 162. You can change this to another port number if your trap server requires a different port number.

5.3.16.9 SNMP Community

The community variable is used for SNMP gets (reads) and sets (writes). This variable needs to match with your SNMP server in order to allow access to the system. The TELSEC uses the same variable for gets and sets.

5.3.16.10 Outgoing SNMP Type

The TELSEC supports either trap or Inform notifications when sending alarms via SNMP. If you select Informs, the TELSEC expects to get a response back from the trap receiver confirming the receipt of the alarm message. The TELSEC will resend the alarm if it does not get an acknowledgement of receipt from the trap receiver. Only select inform if your SNMP trap receiver supports this function.

5.3.16.11 Email Specific Parameters

This next section is for entering specific data and filters to customize your alarming via email. You can setup for different user groups and specify which alarm types will be sent to each group.

5.3.16.11.1 Distribution List

Each group can contain multiple email addresses. There is room for 120 characters per group. Enter each email address desired and separate them with a comma. Make sure you do not add any additional spaces before and after the comma used to separate the individual email addresses.

5.3.16.11.2 Subject Field

A programmable subject line is available so you can program additional information you want sent with the alarm message. The subject field in the actual alarm sent will always have the alarm Severity followed by the information you program in the subject field.

5.3.16.11.3 Severity Filter

These check boxes allow you to apply filters to only send the appropriate alarm level. CR is for Critical, MJ for Major, MN for minor, IN for information and CL for cleared alarm conditions. Check the boxes for the alarm severities you want to send. No alarms will be sent unless you check at least one of the severity boxes.

5.3.16.11.4 Type Filter

In addition to the alarm severity you can filter based upon the Alarm Type. ENV is for any alarm defined as an environmental alarm, EQPT is for an alarm defined as either equipment service affecting or non service affecting. ACC is for access control notifications. You must select at least one type of alarm for the alarms to be emailed to the programmed address. For access control notices, you must select ACC and also IN under the severity to email the messages.

5.3.16.11.5 Time Schedule

A time schedule can be added to only send email alarms when the schedule is active (ON). Assign the schedule number you want by using the drop down menu. Program the time schedule from the Schedules link.

5.3.16.12 SNMP Specific Parameters

The TELSEC can send SNMP traps to four different servers. Each server address can be segregated based upon severity and alarm type.

5.3.16.12.1 Trap Server IP address

Under the Manager IP column enter the IP address of the trap receiver. You can enter either an IP number or DNS name. To use the DNS name function, you must enter a DNS server ip address under the Web Server setup page.

5.3.16.12.2 Severity Filter

These check boxes allow you to apply filters to only send the appropriate alarm level. CR is for Critical, MJ for Major, MN for minor, IN for information and CL for cleared alarm conditions.

Check the boxes for the alarm severities you want to send. No alarms will be sent unless you check at least one of the severity boxes.

5.3.16.12.3 Type Filter

In addition to the alarm severity you can filter based upon the Alarm Type. ENV is for any alarm defined as an environmental alarm, EQPT is for an alarm defined as either equipment service affecting or non service affecting. ACC is for access control notifications. You must select at least one type of alarm for the alarms to be sent to the programmed address. For access control notices, you must select ACC and also IN under the severity column.

5.3.16.12.4 Time Schedule

A time schedule can be added to only send email alarms when the schedule is active (ON). Assign the schedule number you want by using the drop down menu. Program the time schedule from the Schedules link.

5.3.16.13 Saving Alarm Dispatch Information

After you enter the appropriate information you must click on the SAVE ALL button for your changes to take affect. All changes will be discarded if you navigate away from this page without saving first.

5.3.16.14 Testing Email Addresses

The web page has an Alarm TEST button that can be used to send a test email and trap to all programmed addresses. You must save the settings first by pressing the SAVE button and then you can use the test function. Once you have pressed the test button, you can verify that a test email was sent to everyone in your distribution list. Also verify that a test trap was received at all programmed trap servers. Correct any errors, press save again and then retest until all test messages are received. Note that SMTP Email servers can often delay the delivery and/or receipt of emails.

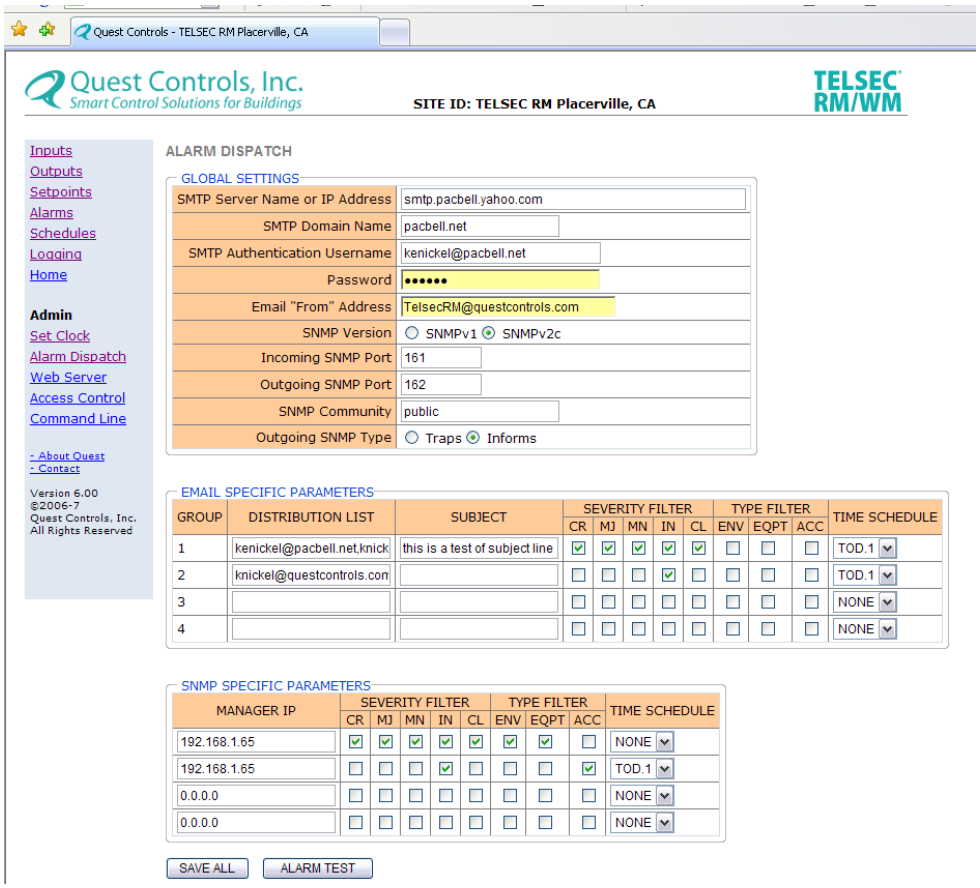


Figure 30 - Alarm Dispatch

5.3.17 Web Server Setup

The Web Server link is used to display the current settings for the TELSEC's web server and Ethernet connectivity. This page is used by the system administrator to set the IP and site specific information for the system. Refer to Figure 31 for the fields described in this section. The system will present a Username/password prompt if you previously have not entered the Admin level password.

5.3.17.1 IP Address

The TELSEC supports DHCP to get an address assigned automatically or you can enter in a Static IP address and appropriate information. If you use DHCP, the system will request and address from your server. If no DHCP activity is detected, the TELSEC will default to what is loaded in the static settings. For a static address, enter the IP address, Subnet Mask, Gateway address and DNS sever address (if using domain names for SMTP and SNMP). Additionally the setup page allows you to change the IP port number for web browser. Port 80 is the default HTTP address and should only be changed if you require a different port number for your network scheme.

5.3.17.2 Telnet

The Ethernet module supports Telnet for terminal access to the system. This is typically used for loading application programs, upgrading the TELSEC system and issuing commands via the command line interface. This page allows you to change the Telnet port number which is 23 by default and also program a time out delay. The time out delay is in minutes and will disconnect

the Telnet port if no activity is sensed within the timeout period. A value of 0 deactivates the timeout function.

5.3.17.3 Password

The password field is case sensitive and is used to change the username and password for logging into the TELSEC system. The default values are **User** for the username and **user** for the User level password. The ADMIN level username and password is Admin and admin. Note that the Password and Confirm Password fields will not echo the characters you typed.

5.3.17.4 Site Information

This section is used to enter site specific data that appears on the home page in the teal box. Additionally the Site ID field will be displayed in the top section (mast area) of all TELSEC web pages. Enter the site identification to be displayed in the ID field. In the Info box enter any site specific data you want displayed on the Home Page. Items such as the address, Site phone number, and contact person are entered in this section. The URL name is a user programmable field where you can enter a description of the hyperlink displayed in the teal box. The final field is the actual URL address. Enter it exactly as needed in order to access the site. The best way to do this is to open a separate browser window and navigate to the desired location and then copy the address from the address bar to this box. Examples of links would be directions to the facility, other IP connected devices such as a Network Camera Page, or a maintenance log page.

5.3.17.5 Saving Information

After you enter the appropriate information you must click on the SAVE button for your changes to take affect. All changes will be discarded if you navigate away from this page without saving first. When you click on the save button, the system will accept your changes and then present a "system restarting, reconnect in 30 seconds" message. Note if you change the IP address to another subnet, the system will be unable to send the Restarting message. Your browser will timeout and show an error page. Reconnect to the TELSEC at the new address after waiting 30 seconds. If the same page appears after pressing save then one of the fields you entered was not accepted. Correct the error and resubmit the changes.

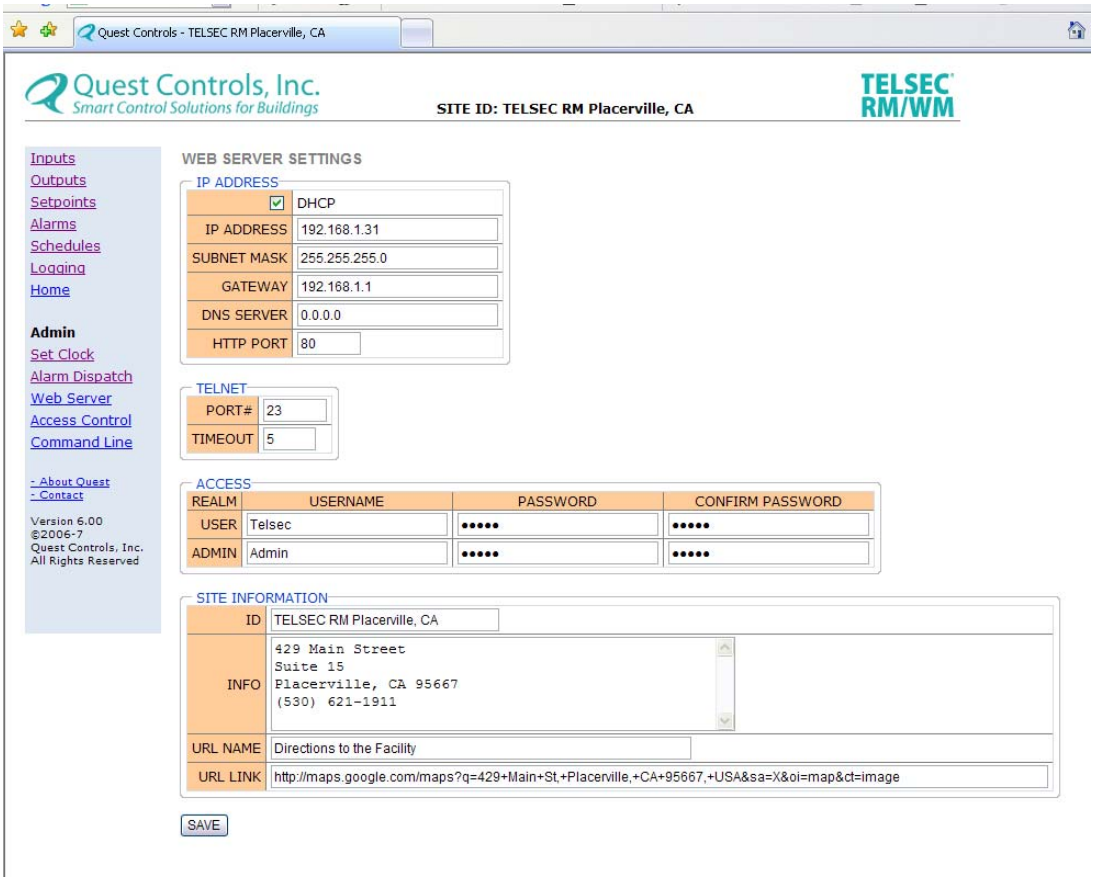


Figure 31 - Web Server Setup

NOTE: If you have accessed the TELSEC using a cross-over cable and your laptop, you must change your laptop static IP settings to compliment the new address of the TELSEC. For instance, if you set the TELSEC to address 10.10.10.51 with a subnet of 255.255.255.124 and gateway of 10.10.10.50, then you must assign your laptop to an address close to the TELSEC address to continue to communicate (you could use 10.10.10.50 for your IP with the same subnet).

5.3.18 Access Control

The access control web page will show the access transaction log, allow you remotely open doors, list, add and delete access cards. The Access log will be displayed in color with Green for acceptable access and Red for denied entries.

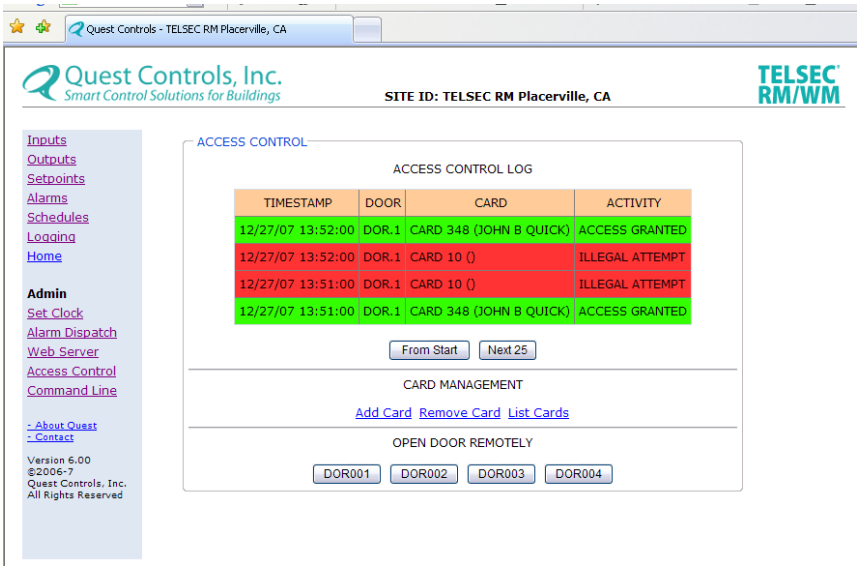


Figure 32 - Access Control Log

5.3.18.1 Access Control log

From the main Access Control page you will see the most recent 25 access entries in the log. Entries can be viewed in groups of 25 by pressing the Next 25 button. Click on the From Start button to go back to the beginning of the log.

5.3.18.2 Open Door Remotely

Each programmed door will be displayed with the name of the door in the button. Clicking on the button will cause the door solenoid to be energized for the same length of time as when a card is presented to the reader. The delay is set with the DEF DOR command (see section 9.2.3). the system will but an entry in the log for the door followed by card 0 as the card # used.

5.3.18.3 Card Management

Clicking on the Add Card, Remove Card and List Card links will provide the appropriate web page for viewing or manipulating the data.

5.3.18.3.1 Add Card

The TELSEC will provide a web page to add a new card. This form can also be used to update and existing card by entering a number already in the database. Enter the card number the associated name for the user (up to 16 characters), the Door or Doors the card can be used on and a time schedule if you want to limit the access to a certain time schedule. See Figure 33.

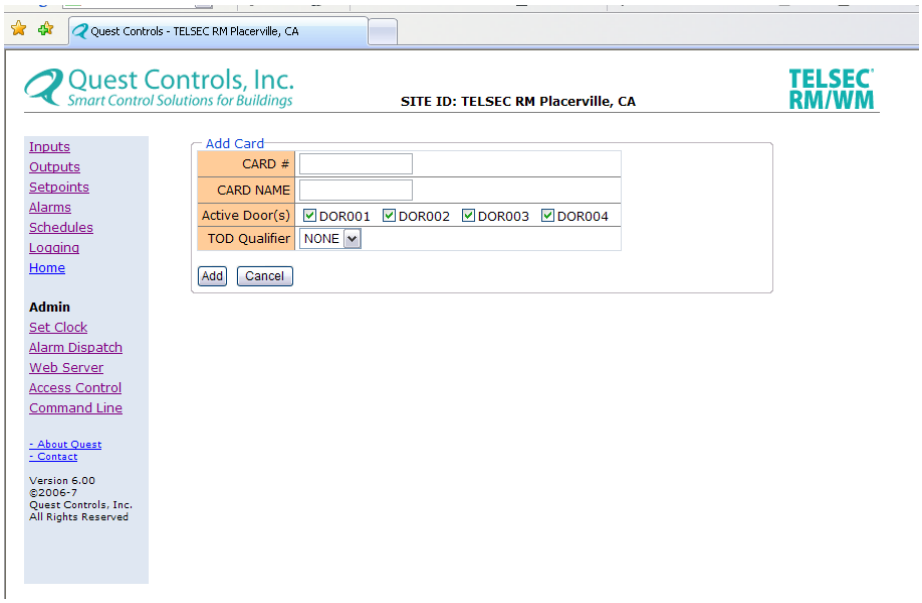


Figure 33 - Adding an Access Card

5.3.18.3.2 Remove Card

The TELSEC will provide a web page to delete a card. Enter the card number you want to delete and press the Delete button. See Figure 34

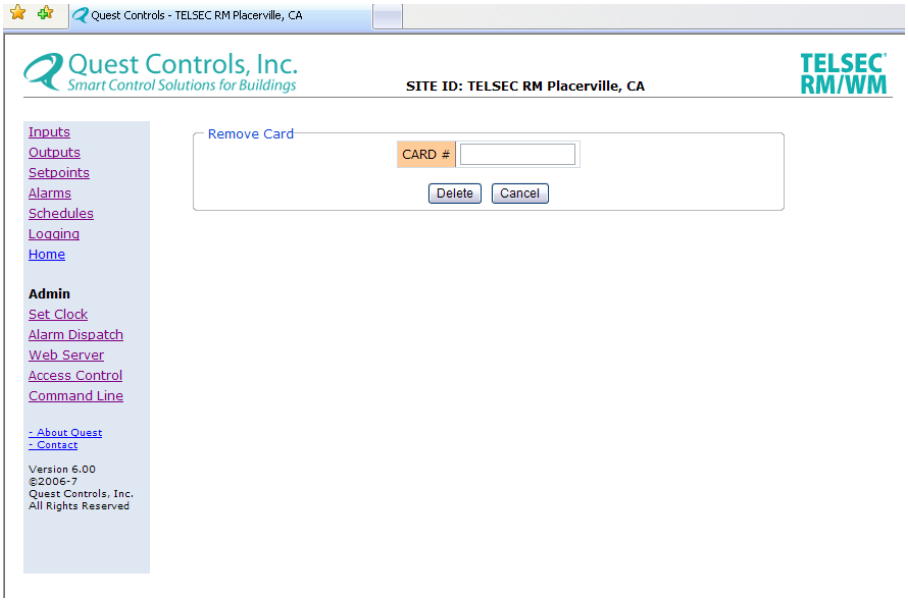


Figure 34 - Remove Access Card

5.3.18.3.3 List Cards

Clicking on the List Cards link will provide a complete list of all cards found in the TELSEC systems database. Use the scroll bars on the right of the browser to see all cards. Additionally there are links available to Add Card or Remove Card. See Figure 35.

Figure 35 - Card Access Database

5.3.19 Command Line

The command line link (Figure 36) will initiate a telnet session using your default Telnet client on your PC. Consult Microsoft's knowledge base for changing the default client. For IE7 or Windows Vista®, you will need to make a registry edit in order to launch a Telnet client. Consult Microsoft's Knowledge base for making the registry change. Caution: Make sure you backup your registry before making any changes and you are comfortable with making these changes.

The TELSEC will ask for a username and password in order to log on to the system via Telnet. Use the Admin level username and password (default is Admin/admin) to gain access. You can now enter every command available to the system that is outlined in Chapters 6-9 of this manual. Log off by closing the Telnet session or if you have a time delay programmed then the system will logoff once the delay has expired.

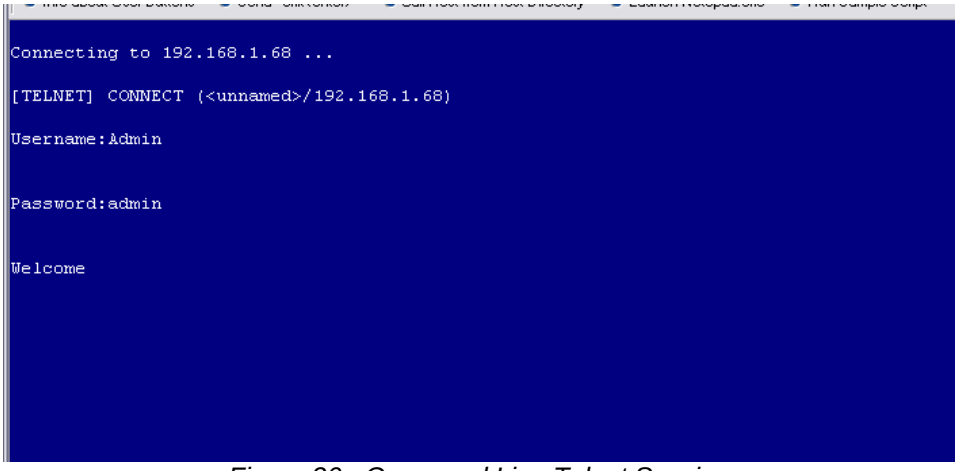


Figure 36 - Command Line Telnet Session

5.4 SNMP Overview

The TELSEC RM/WM system has a unique MIB for use in receiving traps and doing Sets and Gets via SNMP commands. Contact Quest Controls to receive a copy of the TELSEC RM/WM MIB (file name QuestRmWmMib.mib). This section describes how the MIB operates for receiving traps from TELSEC systems and for retrieving and setting information. Refer to Figure 37 below for listing of the branches.

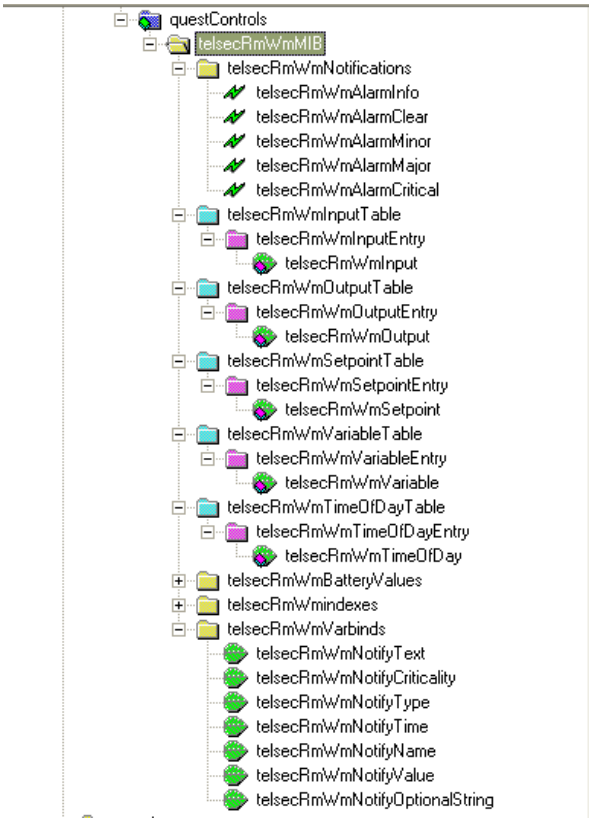


Figure 37 - TELSEC RM/WM MIB

5.4.1 SNMP Sets and Gets

The TELSEC RM/WM MIB supports the following functions for data retrieval and for setting specific information. Refer to the following table and Figure 37for what is available to review and set:

Branch Name	Description	Read/Write	Value
MIB-2 sysDescr	System Name and revision level	Read	Text String
MIB-2 sysObjectId	System object identifier	Read	Text String
MIB-2 sysUpTime	System up time	Read	Time ticks
MIB-2 sysContact	System contact email name for service	Read/write	Text string
MIB-2 sysName	System name identification	Read/write	Text string
MIB-2 sysLocation	System location field	Read/write	Text string
MIB-2 sysServices	System services	Read	Integer
telsecRmWmInputTable	TELSEC input status (UIN)	Read	Integer (32bit)
telsecRmWmOutputTable	TELSEC output status (RLY)	Read	Integer (32bit)
telsecRmWmSetpointTable	TELSEC set point status (SPT)	Read/write	Integer (32bit)
telsecRmWmVariableTable	TELSEC memory variable status (VAR)	Read/write	Integer (32bit)
telsecRmWmTimeOfDatTable	TELSEC Time of day status (TOD)	Read	Integer (32bit)
telsecRmWmBatteryValues	TELSEC battery monitor status (BAT)	Read	Integer (32bit)

5.4.2 SNMP Traps

The TELSEC generates alarm conditions by sending traps in v1 or v2c format. Additionally the TELSEC can send v2c traps as notifications or Informs. Refer to section 5.3.16 for programming the system trap operation and alarm dispatching.

5.4.2.1 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 9 bindings with the first binding being the system up time and the second binding being the trap OID.

5.4.2.1.1 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

5.4.2.1.2 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

5.4.2.1.3 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

5.4.2.1.4 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

5.4.2.1.5 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

5.4.2.2 Trap Variable bindings

Every Alarm trap will have the same variable bindings associated with it. Figure 38 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, where as v1 traps do not use this function. This section will focus on the seven bindings unique to the TELSEC system.

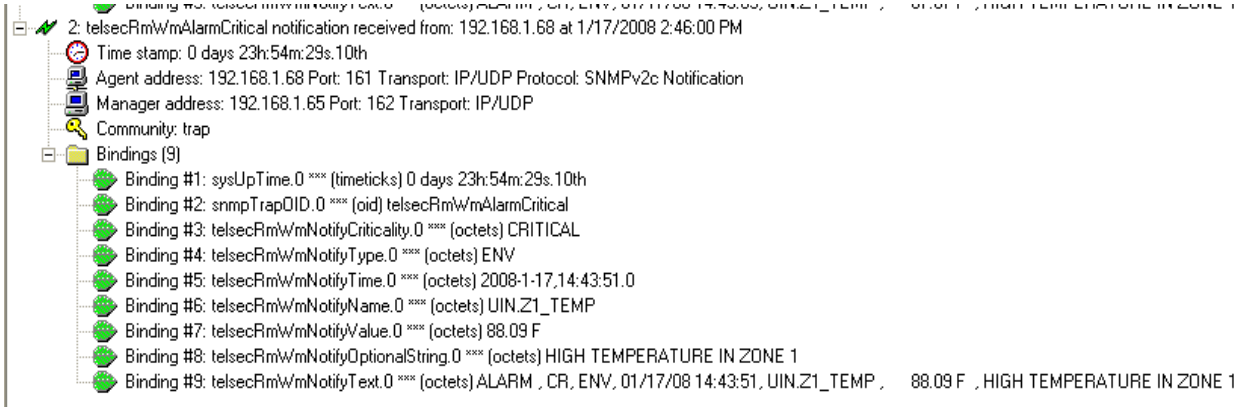


Figure 38 - SNMP v2c Critical Alarm

5.4.2.2.1 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.

5.4.2.2.2 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.

5.4.2.2.3 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

5.4.2.2.4 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. Access control message will detailed further below.

5.4.2.2.5 telsecRmWmNotifyTime

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

5.4.2.2.6 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.

5.4.2.2.7 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.

5.4.2.2.8 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.

5.4.2.2.9 telsecRmWmNotifyText

This binding contains the complete text message of the alarm in comma separate format. Use this binding if your software has the ability to parse the string for the appropriate values. The remaining variables will have each piece of the alarm message separated out.

5.4.3 Card Access Notifications

The TELSEC can send notifications to a trap receiver when activity occurs on the access control portion of the system. This feature of sending access control traps must be enabled through the Alarm Dispatch web page on the TELSEC system (see section 5.3.16.12). The same OID and variable bindings are used for the card access traps. Card Access activity is informational only and will always appear with the Info OID. Refer to Figure 39 below for a sample access control trap.

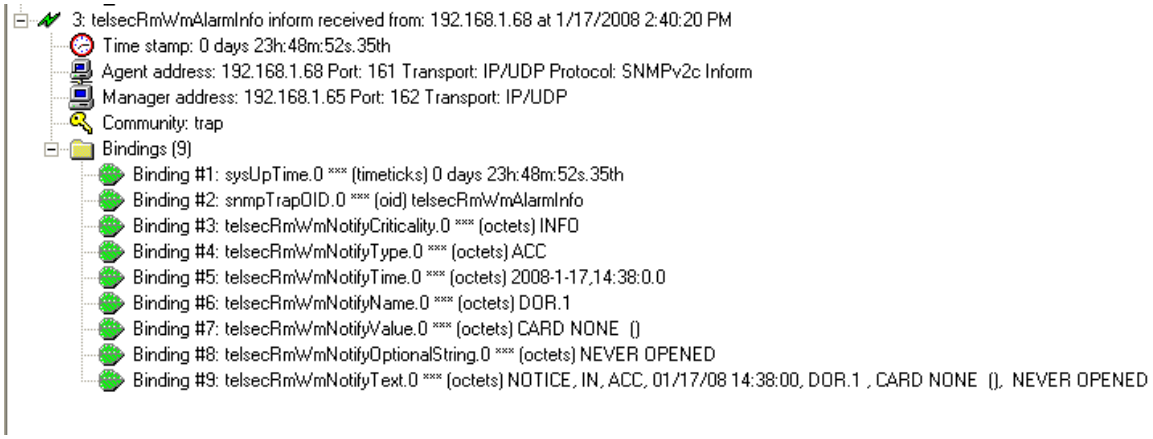


Figure 39 - Card Access Trap

5.4.3.1.1 sysUpTime

The sysUpTime variable 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. This value will be reset when the Ethernet cable is disconnected or if the system is reset or power cycled.

5.4.3.1.2 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 value is telsecRmWmInfo since all card access traps are sent as INFO.

5.4.3.1.3 telsecRmWmNotifyCriticality

For card access transactions the criticality will have the value of INFO

5.4.3.1.4 telsecRmWmNotifyType

The notify type value will be ACC for all access control traps.

5.4.3.1.5 telsecRmWmNotifyTime

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

5.4.3.1.6 telsecRmWmNotifyName

this binding will show the door point that received the transaction. The TELSEC can support up to 4 doors so the point name will be a three character value of DOR (for door) followed by the door number. I.e. DOR.1, DOR.2, DOR.3 AND DOR.4.

5.4.3.1.7 telsecRmWmNotifyValue

The value will be the word CARD followed by the card number or the word NONE if it is an event that occurred without a card. For example if card 351 is used then the value will be CARD 351

5.4.3.1.8 telsecRmWmNotifyOptionalString

This binding will contain the actual message that occurred with the card access transaction. The available messages are:

5.4.3.1.9 telsecRmWmNotifyText

This binding contains the complete text message of the card access message in comma separated format.

Message	Occurs when:
ACCESS XMT ERR	1. With an error on the reader port.
ILLEGAL ATTEMPT	1. When the card is not in the database. 2. If card is in the database for another door and someone enters the code on the keypad when the optional keypad facility code is programmed in the bit format. 3. The card is in the database, but not for the door that the card was presented at 4. If a TOD is assigned and the schedule is in the OFF condition.
ILLEGAL SITE CODE	1. Card/key doesn't match the programmed bit format.
DOOR OPENED WITHOUT CARD	1. If the feedback digital is programmed with the def dor command and the input goes on without a card presented.
NEVER OPENED	1. If the feedback digital is programmed in the def dor command and the input doesn't go ON, for the programmed delay, after a valid card is presented.
ACCESS GRANTED	1. access granted with valid card, door location and time of day qualifier

5.5 Serial Pass-through

The TELSEC RM/WM has three RS232 ports labeled S1 through S3 for connecting serial devices to the system. These ports will allow legacy systems to have Ethernet access by allowing a Telnet session to access each serial port. The TELSEC serial ports are setup as DTE devices and will need a RJ45 to DB9 (or DB25) connector to connect your equipment. Consult your Quest Controls representative for proper cabling instructions.

Each serial port is fixed at 9600 baud, 8 data bits no parity and 1 stop bit. Adjust the serial port settings on your device to match these settings. To connect to the device remotely, establish a Telnet session using your Telnet client. You will need to Telnet to the IP address of the TELSEC and then the specific port for the serial port desired. Up to 4 Telnet sessions can be established simultaneously using the following chart:

IP Port #	Connects To:
23 (default Telnet port)	TELSEC command line interface
3001	Serial device connected to port S1
3002	Serial device connected to port S2
3003	Serial device connected to port S3

Format:
Telnet <ipaddress> <port#>

Example:
Telnet 192.168.1.66 3001
Establishes a telnet session to IP address 192.168.1.66 using port number 3001

When connecting to a serial device, the TELSEC will act as a conduit and pass through all data back and forth. The TELSEC will not do any pacing or filtering. These functions are up to your Telnet client and end device you are communicating with.

Chapter 6 – Reviewing Information and General Operation

6.1 Getting On-line:

There are four methods of communicating with the TELSEC®:

- Ethernet Connection
- A dial up modem
- Direct connect RS232 port
- The front panel keypad

The front panel keypad is designed to allow a user to modify and examine his environment. 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. After entering either the MASTER or PROGRAM password you are ready to begin programming.

6.1.1 A Word about Passwords:

Before we begin learning more about the TELSEC®, let us first review system security. The TELSEC® has five levels of security: 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.

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 same Admin level password used in the Web Browser interface.

6.1.2 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 user names 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.

6.1.3 Communications Terminal:

To get on-line using a communications (dumb) terminal, connect a 9-pin serial cable to the terminal port on the front of the TELSEC®. Set your terminal 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 user names 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.

6.1.4 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 the same Admin level password used for the Web Server.

6.1.5 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, pressing the EXIT key two times in succession will log the user off the front panel. If no keys are pressed for a period of ten (10) minutes, the TELSEC® will automatically log off the user.

6.2 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

6.2.1 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.

6.2.2 REVIEW UIN:

```
# NAME  VALUE     DESCRIPTION  ACCUM  INT ON  INT OFF  TIMER   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.
ACCUM	Accumulated ON time. The timer runs when the input is ON.
INT ON	Interval ON time (rests to 0 every time the input goes on and then counts ON time for this cycle).
INT OFF	Interval OFF time (resets to 0 every time the input goes OFF and then counts off time for this cycle).
TIMER	Digital event timer. This is the total time since the timers were cleared
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 8.4.)

6.2.3 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 where cleared).
EVENT	Relay event counter. Increments when RLY changes state (ON or OFF).

6.2.4 REVIEW DAT

```
#      NAME   STATUS
```

STATUS	Shows the DAT schedule status of ON or OFF.

6.2.5 REVIEW TOD

```
#      NAME   STATUS
```

STATUS	Shows the TOD state (ON or OFF)

6.2.6 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.

6.2.7 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.

6.2.8 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.

6.2.9 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 value means that a valid card has been presented and the system has energized the door control point to allow access.

6.2.10 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 in 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.

6.2.11 REVIEW ALARM

This command will output all active alarms in the system. The active alarms will be shown with the most recent alarm at the begging. If there are now active alarms, the system will return the command prompt so you enter your next command.

6.2.12 REVIEW ALARM LOG

This command will cause a list back of the alarm history log. There are no headers for this log. The most recent 99 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.

6.2.13 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 3/31/96
REVIEW LOG UIN 1 UIN 2 RLY 1 RLY 2 3/31/96 3:00 AM
REVIEW LOG UIN 1 UIN 2 RLY 1 RLY 2 3/31/96 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.

6.2.14 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.

6.3 BYPASS Command:

Use the `BYPASS` command to toggle `RLY`s to a specified state or to override programming for a `RLY`. 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.

Every time the BYPASS command is issued successfully, an entry will be recorded in the alarm log reflecting the result

Syntax: BYPASS RLY.# <BYPASS STATE> <BYPASS TIME>

<BYPASS STATE>:
ON Bypasses the RLY ON.
OFF Bypasses the RLY OFF.
AUTO Clear any bypass of the RLY.

<BYPASS TIME>: From 00:01 to 23:59 using HH:MM. Entering a zero (0) will bypass the RLY forever and will require the user to reset the RLY to automatic manually.

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.)

6.4 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 DAC DNO DNF DTM 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 DAC DNO DNF DTM DEC are the individual Digital input timers

6.5 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

6.6 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.

6.7 Special Command Characters:

The TELSEC® accepts a few additional special function characters.

6.7.1 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.

6.7.2 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.

6.8 Setting Up a Modem Alarm Receiver

For the TELSEC® to call out alarms 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.

6.9 TELSEC® Point Acronyms and Quantities

The numbers in parenthesis show the maxim 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 (64)
ANM Alarm Phone Number (4)
UIN Universal Input Point
TELSEC®1500 (16), 2000 (32), with expansion module (64)
RLY Digital Output Point
TELSEC®1500 (8), 2000 (16), with 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)
DAC Digital Input Accumulating ON Timer (1 per Digital UIN)
DNO Digital Input Interval ON Timer (1 per Digital UIN)
DNF Digital Input Interval OFF Timer (1 per Digital UIN)
DTM Digital Input Event Timer (1 per Digital UIN)
DEC Digital Input Event Counter (1 per Digital UIN)
CARD Access Control Cards (600)

Chapter 7 – Basic Programming Commands

7.1 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 when system uses it. Ie reading inputs in a certain engineering units, how an output operates etc.

7.2 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 Chapter 8 – Equation Language.

7.2.1 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.

7.2.2 A Word about Names:

The TELSEC® associates an eight-character, alphanumeric name with every point. The name must start with an alpha (A-Z) character followed by up to seven 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.

7.2.3 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:

```
DEFINE      CLEAR       REVIEW      LIST        NAME        SET
REMOVE      BYPASS      COPY        HELP        HANGUP      SEARCH
```

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.

7.2.4 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.

7.3 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
```

7.3.1 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 7.4.7)

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 point name. (ie. 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.

7.3.1.1 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 (lbs 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.
PSI1	resistive cable pressure transducers 0-9.5 PSIG

PSI2	resistive cable pressure transducers 5-14.5 PSIG
CFH1	resistive cable flow transducers 0-9.5 SCFH
CFH2	resistive cable flow transducers 0-19.0 SCFH
CFH3	resistive cable flow transducers 0-47.5 SCFH
CFH4	resistive cable flow transducers 0-95.0 SCFH
SCALE #	Use a manual scaling factor for this input. (See section 7.4.7)

<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.

7.3.1.2 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
```

7.3.1.3 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 64 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.
```

7.3.2 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
```

7.3.3 DEFINE KEY:

The DEF KEY can be used to program specific functions for the two yellow buttons on the TELSEC®keyboard. 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
```

7.3.4 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
```

7.3.5 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 it the time is after 12:01 AM and the DAT schedule XMASDAY is ON.)

Default: None

7.3.6 DEFINE EQU:

Chapter 8 – Equation Language

7.3.7 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`

7.3.8 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`

7.3.9 DEFINE DOR:

See Chapter 9 – Access Control

7.3.10 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 amount 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 7.4.10). 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
```

7.3.11 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 Chapter 8 – 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'
```

7.3.12 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.

7.3.13 DEFINE CARD:

See Chapter 9 – Access Control

7.4 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
```

7.4.1 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 call-outs. 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'
```

7.4.2 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. Ie 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.

7.4.3 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
PORT	Allows pass through access to the COM4 serial port. Use this if you have a device connected to the optional serial port on the TELSEC®. The settings for COM4 are set with the SET COM command. Note once you access the port, you will have to disconnect and reconnect to access information on the TELSEC®.
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. The PORT is autonomous to the other levels. Passwords with PORT in them only have access to the pass through port which is COM4

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’
```

7.4.4 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 11, 2007  2:00:00 AM
DLS FALL  : SUNDAY, NOV 4, 2007  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.

7.4.5 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). Additionally if communications fails 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
```

7.4.6 SET MAIL:

SET MAIL is used to store information about the site or to communicate with other techs. This information is displayed with the LIST MAIL command.

Syntax: SET MAIL <MAILNUMBER> <'MAIL STRING'>

<MAILNUMBER>: A number from one (1) to four (4).

<'MAIL STRING'>: A string of alphanumeric characters used for this particular mailbox. The MAIL strings are displayed during all call-ins after the ID strings. The maximum length is 80 characters and the string must be enclosed within single quotes (').

Example:
```
SET MAIL 1 'DISPATCH - CHANGE AIR FILTERS NOW'
SET MAIL 2 'KEN I TOLD YOU TO CHANGE THE LIGHT FIXTURE YESTERDAY!'
```

Default: None.

7.4.7 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 7.3.1.1)

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.

7.4.8 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

7.4.9 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.

7.4.10 SET COM:

The SET COM command sets the communications functions for the two COM ports plus the pass through port of COM 4. The expansion bus port is COM 3 and there are no user configurable settings. 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, 2 or 4. 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 7.3.10).

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 perameter 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 persons 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
SET COM 4 DIRECT 9600 7 1 E OFF
```

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'
SET COM 4 DIRECT 9600 8 1 N OFF
```

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

7.4.11 SET FALSE:

NOTE: this command is only available in the TL1 version of the TELSEC.

The SET FALSE command is used to let the TELSEC® mimic a Sparton 5354 system so it can be polled with customer specific polling programs. Refer to Technote 1033 for use and operation. Quest recommends that you do not set this mode on unless you are sure it is required for compatibility with your alarm center.

Syntax: SET FALSE <ON|OFF>
ON = Mimic Sparton 5354.
OFF = Normal TELSEC® operation.

Example:

SET FALSE OFF
Default: = OFF

7.4.12 SET APPEND:

NOTE: this command is only available in the TL1 version of the TELSEC.

The set append command is used to append the first 20 characters of ID string 2 to the message portion of the TL1 alarm. The total length of the message portion can be 40 characters per the TL1 spec. The first 20 characters of the MSG text will be displayed followed by the first 20 characters of ID 2.

Syntax: `SET APPEND <ON|OFF>`
`<ON|OFF>:`
`ON` = Append ID 1 to the MSG section of the TL1 alarm.
`OFF` = Normal TL1 alarm message..

Example:
`SET APPEND ON`

Default:
`OFF`

7.4.13 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.

7.5 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.
MAIL	Shows the four mail box lines for user messages.
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.
FALSE	Status of the Sparton Mimic mode
APPEND	Shows if ID 2 is being appended to the alarm message.
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)

7.6 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.

7.7 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 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 as many as eight characters.

`<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`

7.8 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.)

Chapter 8 – Equation Language

8.1 General Remarks

Equations are the heart of the TELSEC®'s programming. Chapter 7 – 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 8.9.3 gives more detailed information about the exact sequence in which the TELSEC® runs equations.)

8.2 The Components of Equations

8.2.1 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 8.3.6)

8.2.2 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: `VAR.4 = VAR.4 + 1.`

8.2.3 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.

8.3 The Form of Equations

Every equation consists of its 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.

8.3.1 General Format:

The general format for writing equations is as follows:
DEFINE <EQUNAME> = EQU.#<cr>
<STATEMENT>,<cr>
<STATEMENT><cr>
<cr>

<EQUNAME>: EQUNAME 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.

8.3.2 Conditional Equations:

Conditional equations (see Section 8.3.10) 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
```

8.3.3 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)

8.3.4 Typing numbers:

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

For example: 15000
-25
0

8.3.5 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.

8.3.6 Arithmetic:

The TELSEC® uses formulas to perform arithmetic. Formulas combine program elements discussed in Chapter 7 – 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.

8.3.7 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.

8.3.8 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.TEMP2, 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 parenthesis. The TELSEC will evaluate the MIN function first and then evaluate the MAX function.

8.3.9 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 ie 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.

8.3.10 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.

8.3.11 Comparisons:

The operators and functions in Section 8.3.7 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.

8.3.12 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.TEMPSENS > 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. So 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.

8.3.13 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`

8.3.14 Waiting:

The WAIT statement indicates that any remaining statements in the equation should not run until some time 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
```

8.3.15 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
```

8.3.16 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.

8.3.17 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
```

8.3.18 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 8.3.10. 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.

8.3.19 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.

8.3.20 Additional ways to change values:

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

8.3.20.1 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.

8.3.20.2 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.

8.3.20.3 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
```

8.4 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 carries 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.

8.4.1 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).

8.4.2 Digitally defined Input Points (UIN):

DAC Accumulated ON time (counts total on time).
DNO Interval ON time (resets to 0 when UIN goes on and counts on time).
DNF Interval OFF time (resets to 0 when UIN goes off and counts on time).
DTM Digital event timer (time since timers were cleared).
DEC Digital event counter (increments when UIN changes State).

8.5 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

8.6 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>:

ENV	Used for environmental alarms.
EQPTSA	Equipment service affecting.
EQPTNSA	Equipment non-service affecting.

<severity>:

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

[list of ANM]: Optional - Like the digital alarms in section 7.3.1.3, 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.TEMP2 > VAR.SETPOINT THEN
ALARM UIN.TEMP2 ENV MJ, WAIT UNTIL
UIN.TEMP2 < 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.TEMP2 > VAR.SETPOINT THEN
ALARM UIN.TEMP2 ENV MJ ANM 1 ANM 3, WAIT UNTIL
UIN.TEMP2 < VAR.SETPOINT, ALARM UIN.2 ENV CLEAR ANM 1 ANM 3
```

If the TELSEC® can not 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.

8.7 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 6.2.13). 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 8.3.9) and then logs variable 1. The equation then waits 10 minutes before running again.

8.8 Advanced Equation Functions:

8.8.1 Enable/Disable:

When an equation is first defined it becomes enabled. This means it is set to operate continually. (Section 8.9.3 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`

8.8.2 Returning Values:

Section 8.3.16 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 ...
```

8.8.3 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, 8.8.4, 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.

8.8.4 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.

8.8.5 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.

8.8.6 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 and equation is DISABLEd, these computations end.)

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

```
RATE(UIN.TEMP2, 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.

8.8.7 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.

8.8.8 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.

8.8.9 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 connect to a local alarm device.

8.9 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.TEMP2 THEN VAR.LOWER = UIN.TEMP1
```

```
ELSE VAR.LOWER = UIN.TEMP2
```

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.TEMP2)
```

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.

8.9.1 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.

8.9.2 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 occurance.

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.

8.9.3 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.

8.9.4 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®.

8.9.5 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.

8.10 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 ENERGON
DEFINE COOL_1  = RLY.2 OFF STAGED ENERGON
DEFINE COOL_2  = RLY.3 ON STAGED ENERGON
DEFINE HEATING = RLY.4 ON STAGED ENERGON
```

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 8.3.9).

```
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 Chapter 10 - Front Panel Display and Keypadto 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.1SEND UIN.2,SEND UIN.3
```

8.11 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 7.4.2). The TELSEC® supports two methods for uploading programs the first and preferred method is using Xmodem protocol:

8.11.1 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 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 accept 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.

8.11.2 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.

8.11.3 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.

Chapter 9 – Access Control

9.1 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 (HID, Indala, Sensor, Diester, etc.) 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.

9.2 Using the Access Control System

We will discuss the software portion of the TELSEC® Access Control system here. For Hardware installation, see Chapter 3 - Installation I. Once the card reader and door have been wired into the TELSEC®, you are ready for programming.

9.2.1 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 7.3.1.3):

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

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

9.2.2 Define your Digital Output:

Typically you will define your relay output with this command line (section 7.3.2):

```
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.

9.2.3 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 that 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.

9.2.4 Define valid access cards:

The syntax to define your cards is:

```
DEFINE CARD <# | NEXT> <CARD NUMBER> [<TOD.#>]
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 7.3.5 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 not 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.

9.2.5 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 ENERGON <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 ENERGON 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.

9.2.6 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 in to 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.

9.3 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.

9.3.1 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.

9.4 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.)

9.5 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.

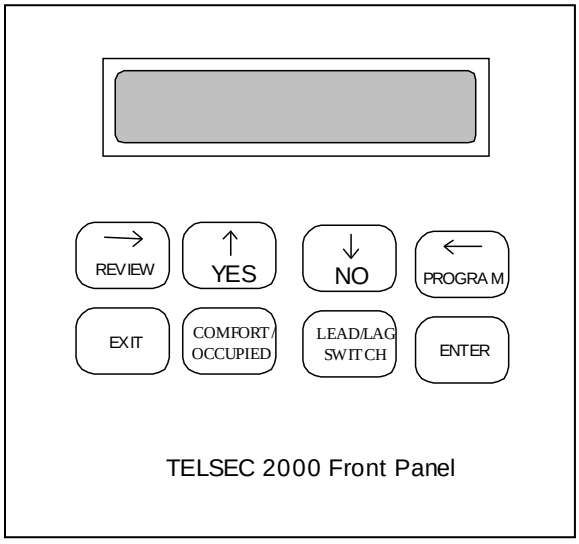
Chapter 10 - Front Panel Display and Keypad

10.1 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.



TELSEC 2000 Front Panel

10.2 Basic Principles

10.2.1 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.

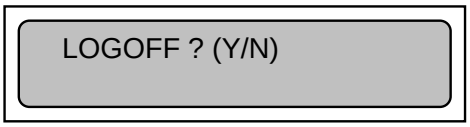
The passwords here are the same as those discussed in section 7.4.3. If the MASTER or PROGRAM passwords are entered, program changes can be made through front panel access. If the password is READ level only, the front panel will not be accessible for changes.

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.

10.2.2 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.

10.2.3 Choices:

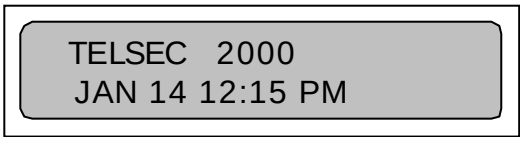
The front panel and display provide an interactive environment for the TELSEC® user. The TELSEC® will provide the user a menu of choices from which to choose. The TELSEC® question will be posed on the first line of the display and the menu will be on the second line. All menu selections are made using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

10.2.4 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.



10.2.5 Equation Generated SENDs:

In Chapter 8 – 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.

10.2.6 Automatic Digital Input Alarms:

Any UIN defined as a digital alarm point (see section 7.3.1.3) 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.

10.2.7 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 6.2.1.

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

10.3 Program Modification:

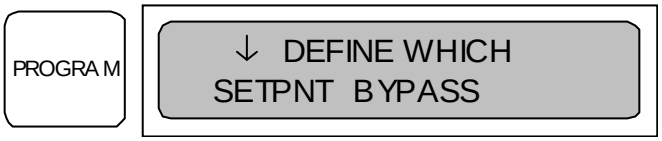
The next few sections review altering TELSEC® program information. If you are unsure of what you are doing stop now and get further instruction.

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.

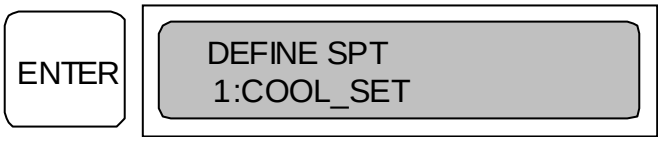
Each step will show a key followed by a sample display. The user should press the corresponding TELSEC® key and the sample display will appear on the TELSEC® display.

10.3.1 Set Point Modification:

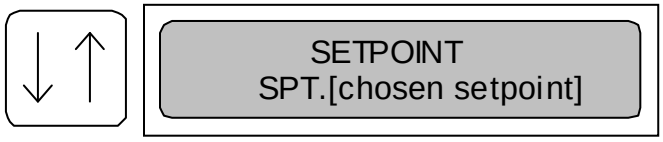
The TELSEC® allows a front panel user to modify the current value of setpoints (SPT). In order for this to have any affect, the TELSEC® equations must be designed with the SPTs in mind. (For example equations, see Chapter 8 – Equation Language.) To modify a setpoint, follow these directions:



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.

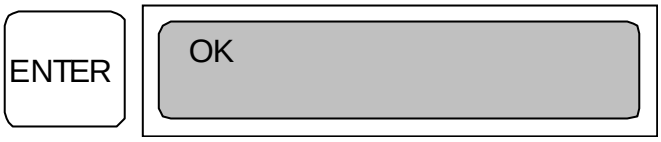


Once at the proper setpoint, press ENTER to modify it

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.

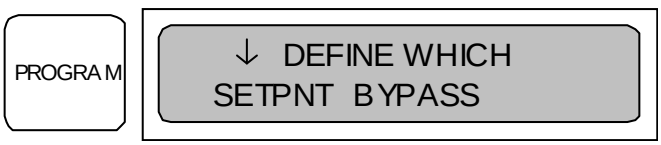
Press ENTER now to make your change active.



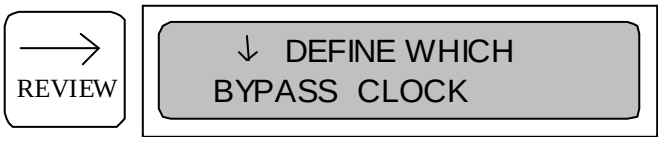
You have now modified a setpoint. The display will return to the setpoints list. The up/down arrow keys can be used to select another setpoint or press 'EXIT' to return to the main screen.

10.3.2 Bypassing Outputs:

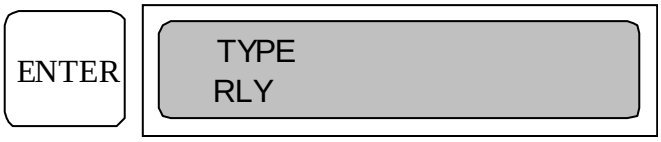
The TELSEC® allows a front panel user to bypass digital (RLY) outputs. To do so, follow these directions:



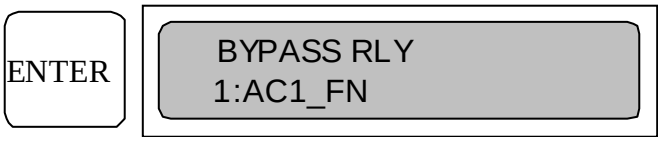
SETPNT has the cursor on it so it is necessary to press the RIGHT arrow once to scroll to BYPASS.



Press ENTER to activate BYPASS.

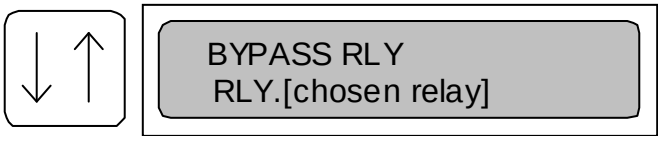


Choose which output type to bypass. The current choice is RLY. Press enter again.

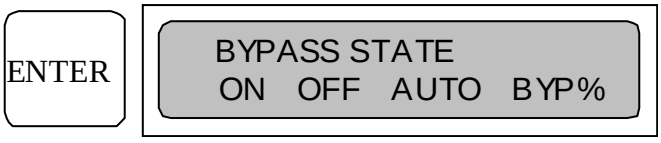


We currently display RLY.RLY001, which is the default name for relay one. If you have named relay one differently, the defined name will appear instead. Choose which RLY to bypass. Use the UP and DOWN arrow keys to scroll to the proper RLY.

Once at the proper RLY, press ENTER to bypass it

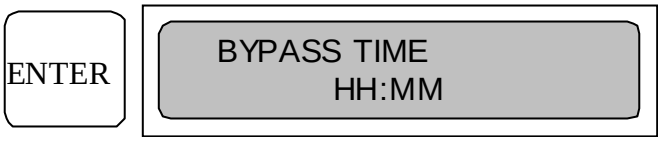


Choose how to bypass the RLY. ON and OFF are self-explanatory. Choose AUTO to clear any bypass active at this time.



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.



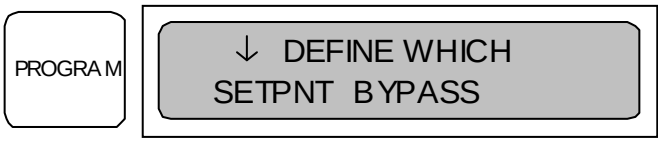
Now enter the RLY bypass time. Use the UP/DOWN arrow keys to input the time. Use the LEFT/RIGHT arrow keys to move to each field. The maximum time allowed is 23 hours and 59

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.

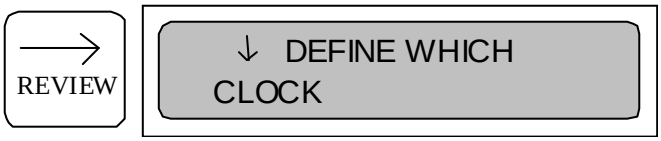
Once time is entered, press the ENTER key to bypass the RLY. the information was entered incorrectly, an ERROR message will be displayed. Check to make sure you entered a valid time. The BYPASS procedure is now completed.

10.3.3 Setting the Clock:

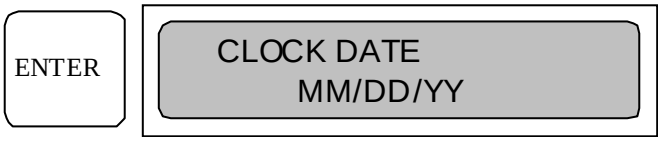
The TELSEC® allows a front panel user to set the internal clock. To do so, follow these directions:



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.

Chapter 11 - SERVICE

11.1 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

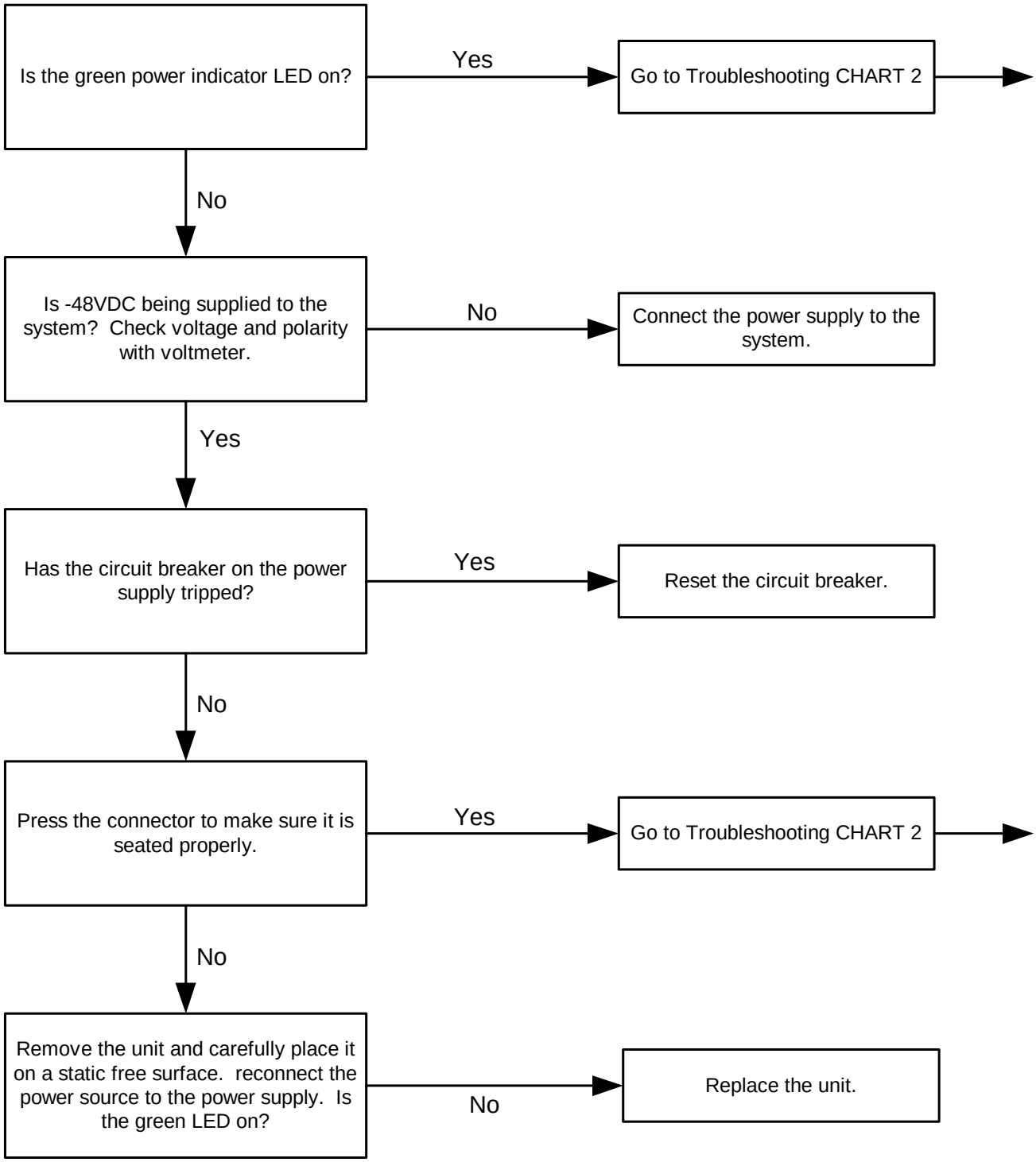
Chart 3 – No Diagnostic Output

Chart 4 – Modem Output

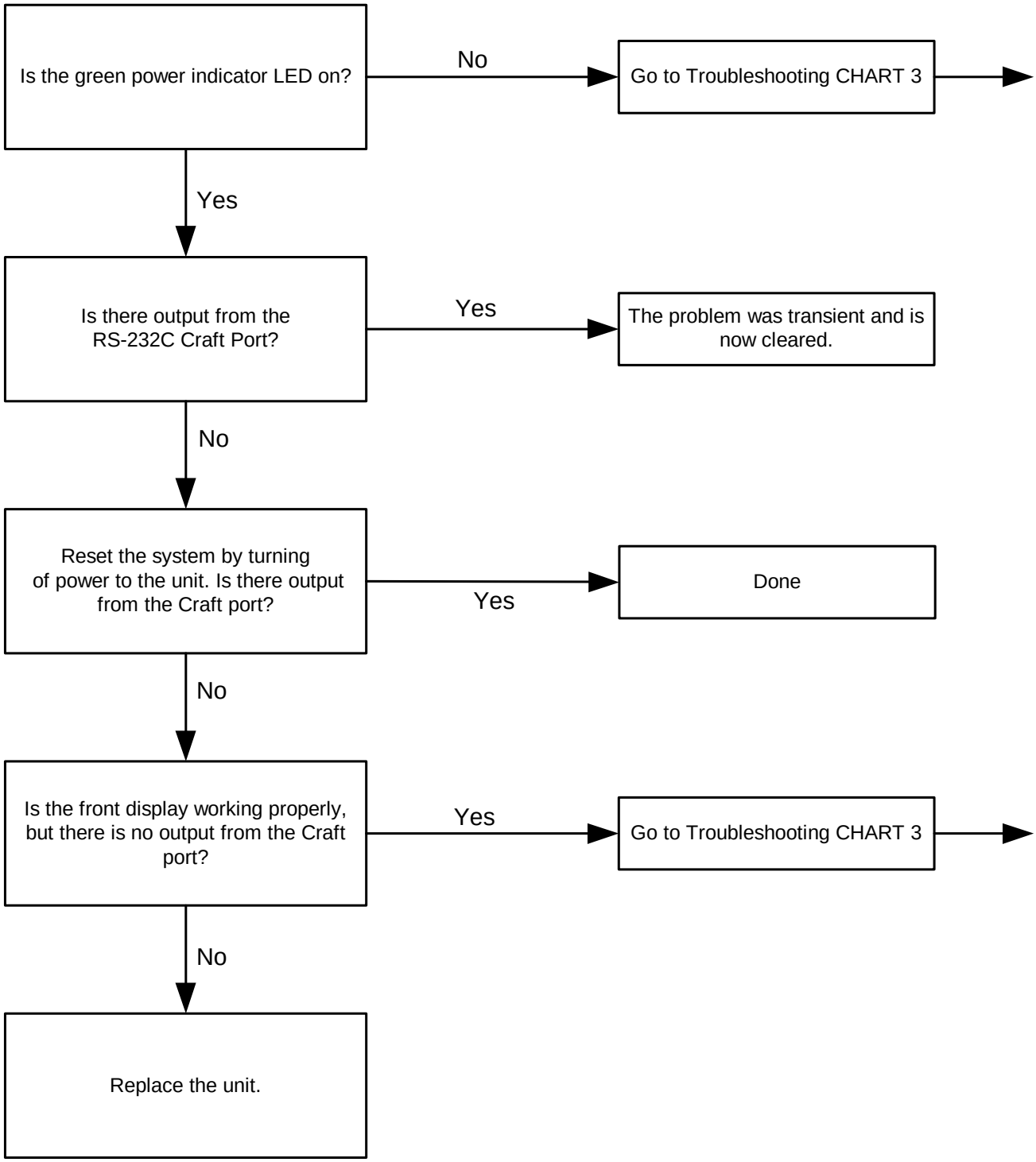
Chart 5 – Erroneous Trouble Reports

Chart 6 – Other Problems

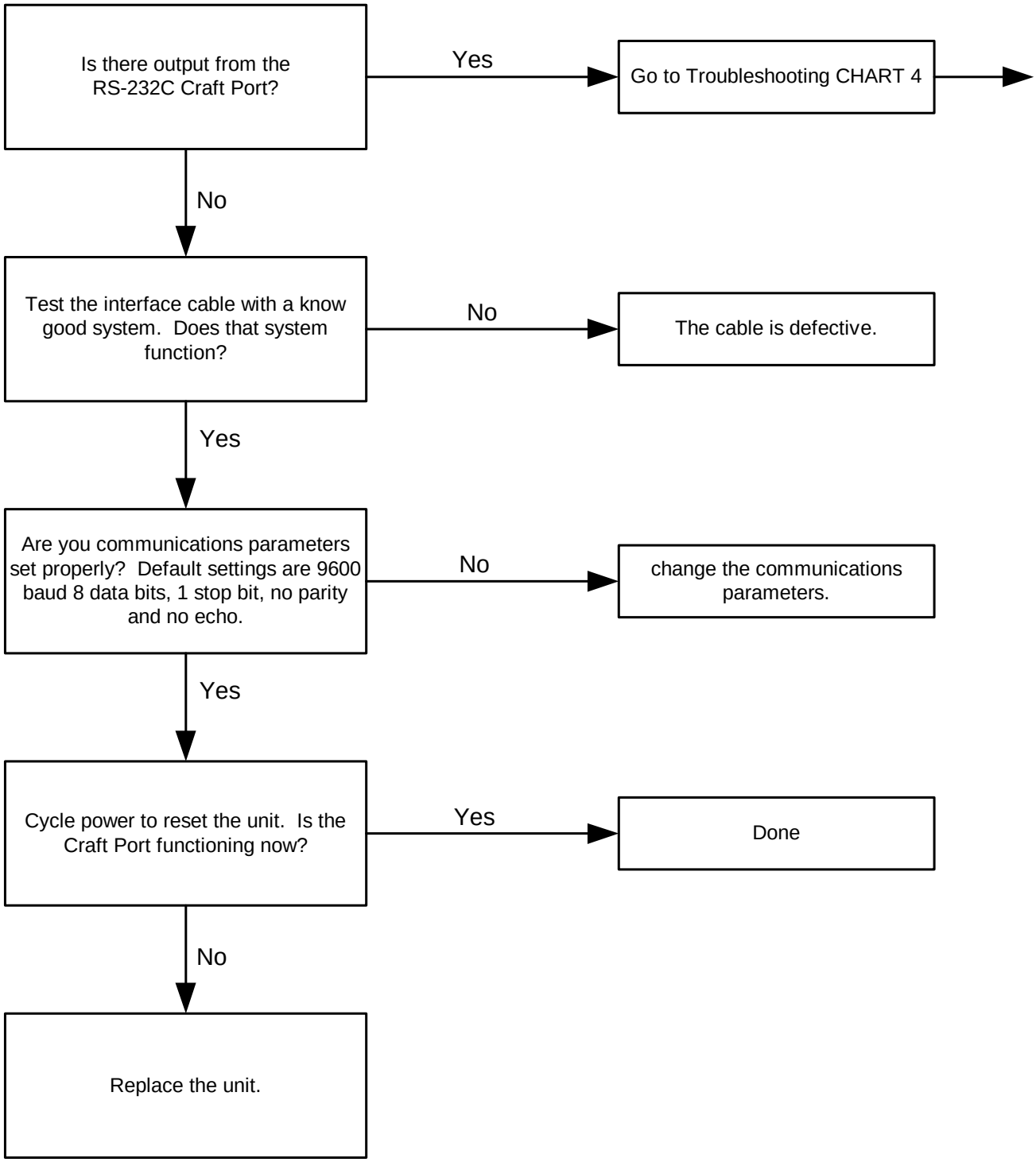
11.2 Chart 1 – Power Problems



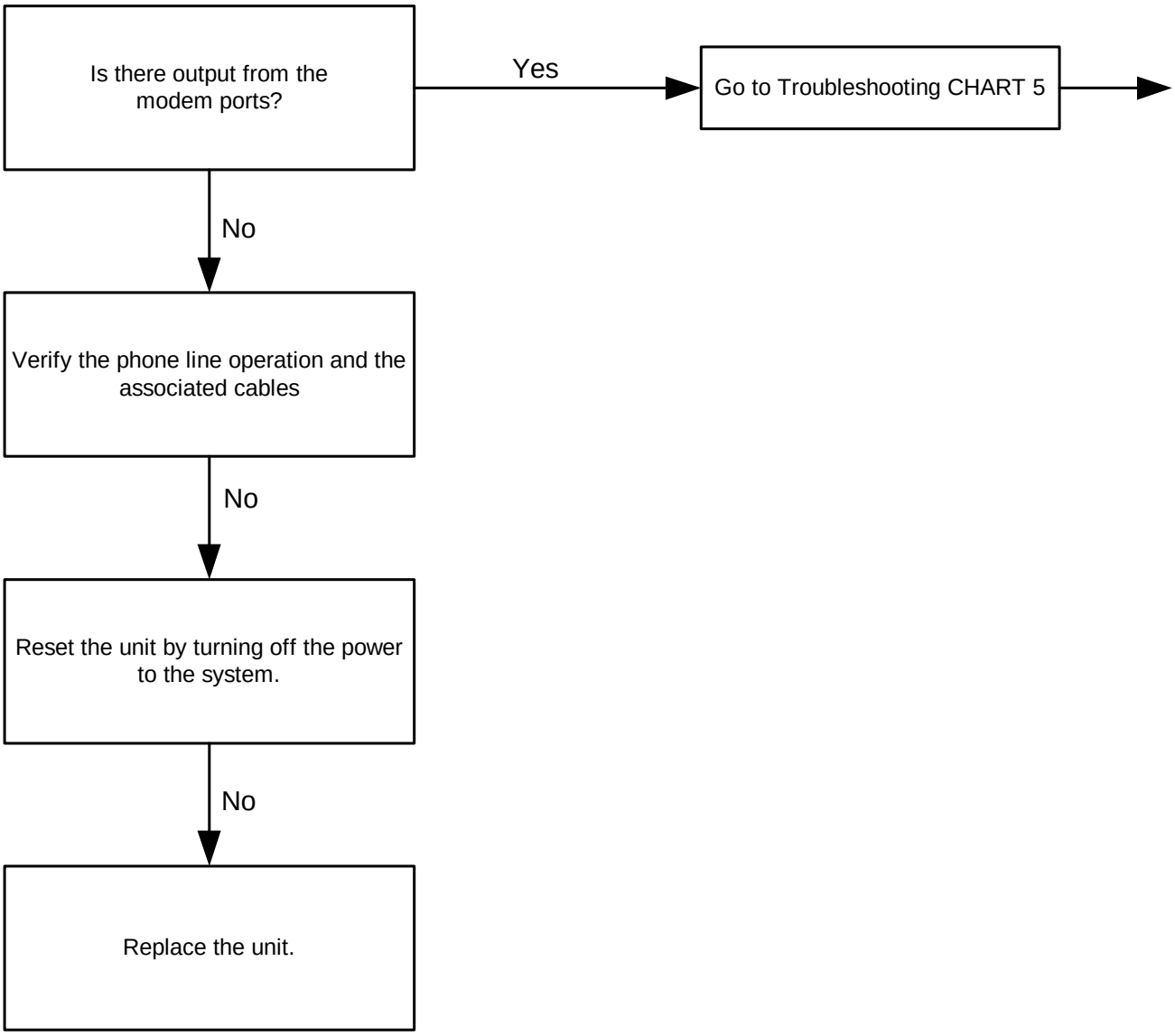
11.3 Chart 2 – System Failure



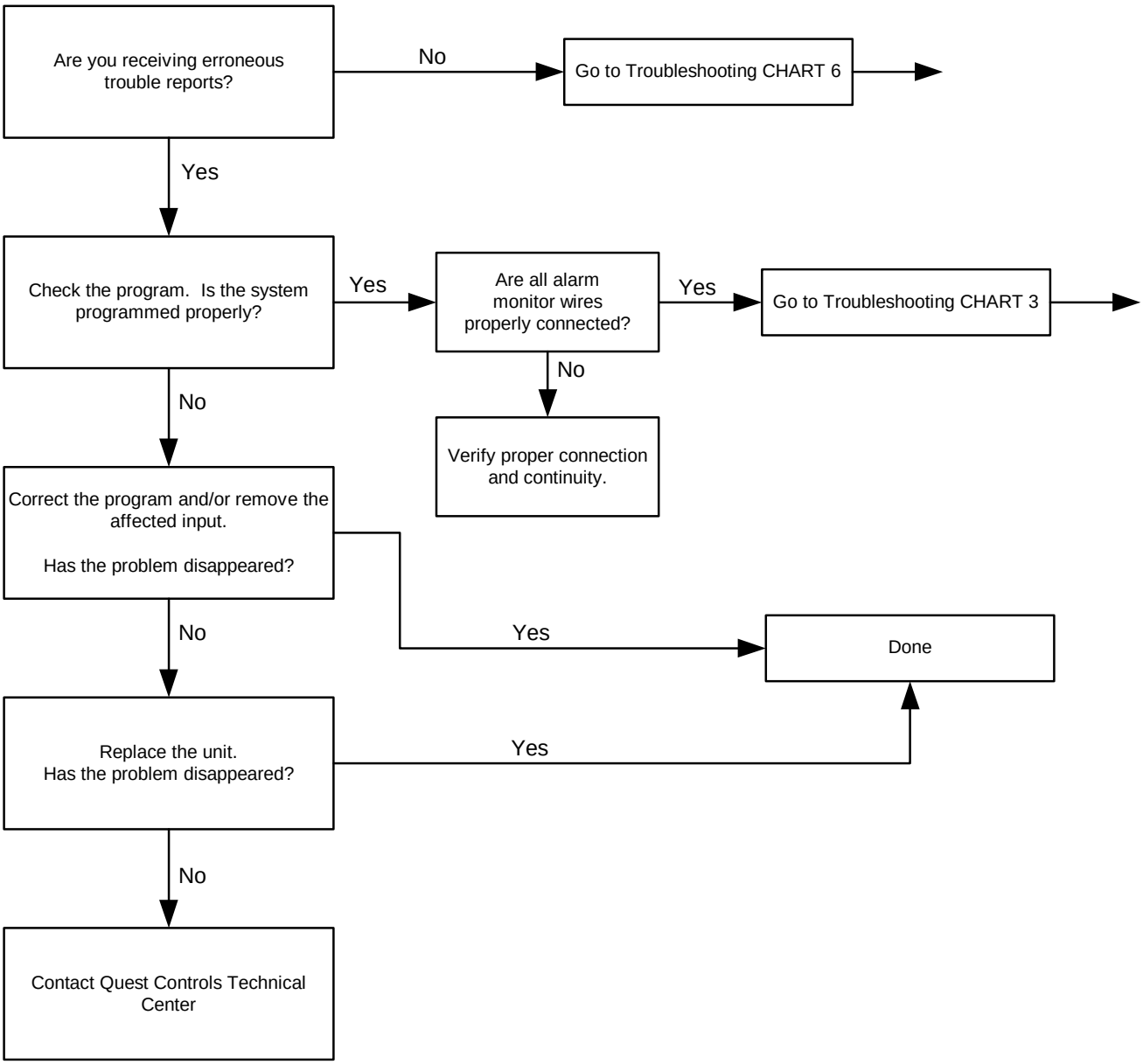
11.4 Chart 3 – No Diagnostic Output



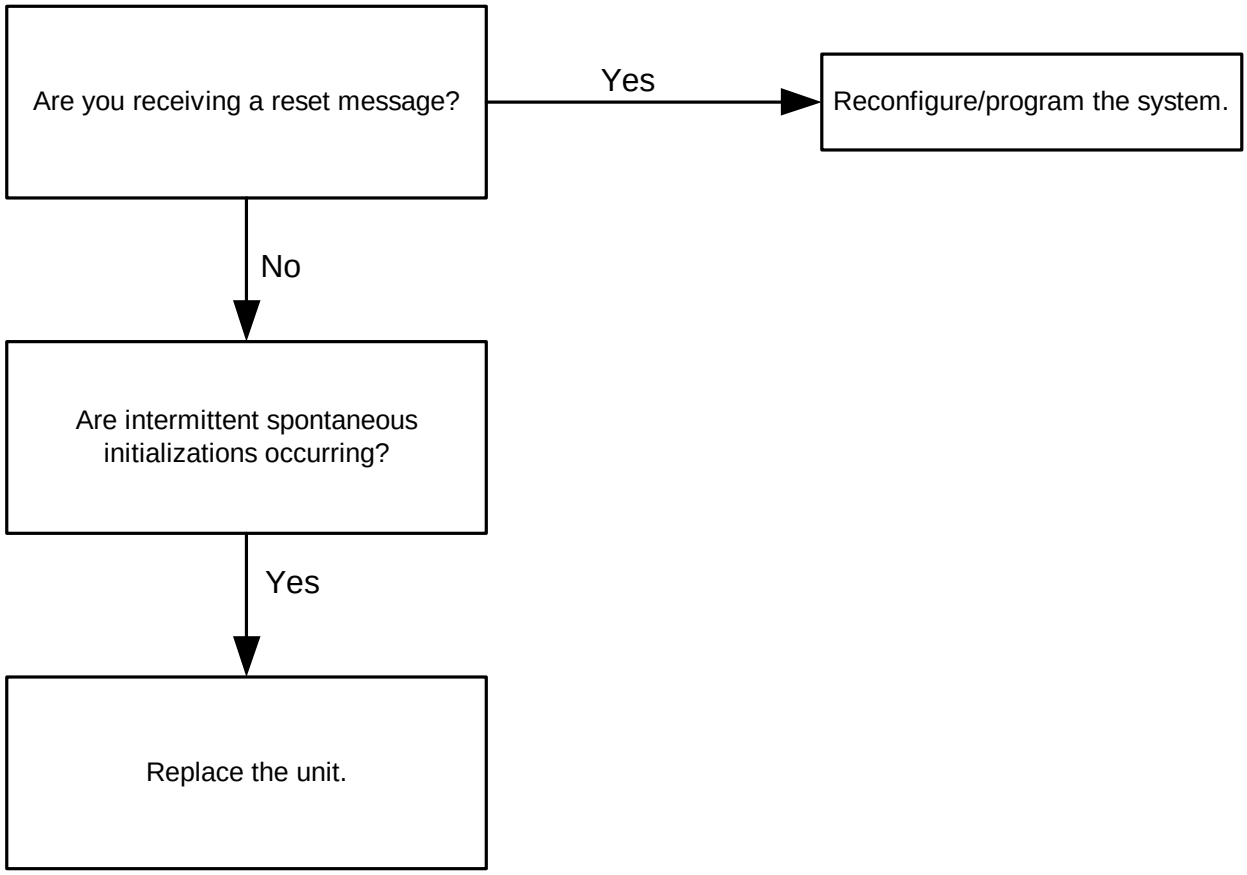
11.5 Chart 4 – Modem Output



11.6 Chart 5 –Erroneous Trouble Reports



11.7 Chart 6 - Other Problems



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.