

24+

PageTek

The Monitoring & Control Experts

Installation &
Operations Manual

24+ FIRMWARE VERSION 4.16 AND LATER

Installation & Operations Manual

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The ProTek 24+

An Overview

The ProTek 24+ provides system monitoring and control of critical equipment at unattended remote sites. Located with the equipment to be managed, the ProTek communicates with support personnel over the Public Switched Telephone Network or by radio link.

System Features

The fully expanded ProTek 24+ can monitor up to 48 analog inputs, 56 digital inputs, and 24 audio inputs using a maximum of six Station Interface Modules (SIMs). Other SIM configurations are available for customization of I/O configurations. Each analog input has separate user-defined upper and lower limits, time delay, qualifier, and scale factors and can measure voltages from 0 to 40 volts DC. Measurement of voltages of 0 to -80 volts DC is possible with negative station interface modules. Each digital input has user-defined active level, time delay, and qualifier parameters and can accept from -12 to +12 volts DC. The 24+ automatically maintains a cumulative count of the time each digital input is active for the current day and the previous 24 hours and logs these times in the `Event history report` at the end of each day. The status of any input can be determined using a DTMF capable telephone and/or modem. Any analog or digital input can be specified as a major, major with return to normal notification, or minor alarm, or as a qualifier. Digital inputs also support the special intrusion (`INT`) and local acknowledgement (`ACK`) types.

There are 12 relay drivers and four internal relays available for control of equipment at the site. Each relay or driver can be programmed by the user to function as normal or latching, and can be remotely controlled or can respond automatically as programmed by the user.

All digital inputs provide for activity testing and can, if so programmed, attempt to force activity on an input that has been inactive beyond user-programmable duration. All digital input active times are logged to the history file and may be used to provide airtime counts for transmitters. The activity test may also be used to schedule periodic activity such as tower light control or generator exercise. An on-board thermometer measures ambient rack temperature without tying up an analog input with an external sensor.

The user can interact with the ProTek on-site by local RS-232C port and remotely by modem or DTMF-capable telephone. A sampled voice vocabulary provides appropriate verbal prompts and responses to DTMF commands, allowing the user to retrieve status reports, control relay outputs, or listen to the site audio inputs over a POTS telephone. The 24+ will automatically generate alert calls to any combination of person, VDT, printer, and voice, numeric, and alphanumeric pagers. The ProTek can also send a daily status message at a time programmed by the user. This allows all ProTek's in a system to "report in" automatically to confirm continued operation.

The standard 24+ can be powered by 115 VAC with automatic fallback to 12 VDC in case of an AC mains failure. The 12VDC supply may be externally supplied or optionally use an internal gel-cell battery bank. An 80ma trickle charge of this backup power source is standard.

Installation

Unpacking the ProTek

Carefully unpack and inspect your ProTek for any damage. You should have one each of the following:

- ProTek 24+
- Station Interface cable (Molex connector)
- Site Interface Cable (RJ-21 connector)
- Wall mount AC power supply
- External DC power cable (omitted if optional internal battery backup is installed)
- This manual

Optionally you may receive one or more of the following:

- Internal backup battery
- RF Power Sensor and associated connectors
- Other sensors as required

Pre-installation Inspection

Inspect your 24+ for any physical damage. Unfasten the four captive thumbscrews at the rear of the ProTek 24+ cabinet and slide the top off. Confirm that all socketed components are fully seated and that all jumpers and dipswitches are set in accordance with your particular installation needs. The factory defaults should be adequate for most users.

The following conditions may require reconfiguration:

- If internal counter-EMF suppression is desired for *external* relays
- If opto-isolation of digital inputs 0D6 or 0D7 is required.
- If the ProTek is not to answer an incoming PSTN call on the first ring.
- If a local VDT baud rate other than 9600 baud is required.
- If the serial port(s) are to function in other than a DCE mode.
- If blind (timed) dump of the voice alert messages is required

The following tables will aid in configuring for these conditions.

Pre-installation Setup

Jumper Switches

All jumper positions are as viewed from the front of the cabinet.

Jumper	Function	Default
JU1	Install if internal counter-EMF suppression is required for the external alarm relays. The relay coil voltage must not exceed 12 VDC with the jumper installed. With the jumper removed, up to 32 volts DC may be switched, but the user must install a counter-EMF protection diode across any external relay.	open <i>no internal suppression diodes applied</i>
JU2	Install if internal counter-EMF suppression is required for relay drivers 5-8. The relay coil voltage must not exceed 12 VDC with the jumper installed. With the jumper removed, up to 32 volts DC may be switched, but the user must install a counter-EMF protection diode across any external relay on drivers 5-8.	open <i>internal relays 32V suppression always present</i>
JU3	Install if internal counter-EMF suppression is required for relay drivers 9-16. The relay coil voltage must not exceed 12 VDC with the jumper installed. With the jumper removed, up to 32 volts DC may be switched, but the user must install a counter-EMF protection diode across any external relay.	open <i>no internal suppression diodes applied</i>
JU4	To reinitialize the 24+ memory move this jumper toward the cabinet front and cycle power. The 24+ will begin its internal diagnostics and, if a failure is sensed, display a blinking diagnostic code on the front panel LEDs. Upon completion of the reset all memory will be cleared or hold default values. Failure to clear memory after service or prior to programming may cause erratic operation.	rear <i>in run state</i>
JU5	Reserved for factory use	rear
JU6	Disables the memory test & forces flash download. <i>Default: test enabled</i>	rear
JU7	Enables 2400-baud local port. <i>Default: disabled</i>	rear
JU8	Disables leading asterisk on numeric page. <i>Default: asterisk enabled</i>	rear
JU9	Enables truncated alpha message. <i>Default: disabled</i> To accommodate those paging terminals that limit a message to under 80 characters, a less verbose message may be generated by setting JU9 to the ON (toward the front of the cabinet). The shorter message is achieved by using variable length fields for the descriptor fields and omitting the ALERT-SITE or STATUS-SITE labels in the alert page. While there may still be a truncated message when multiple simultaneous alarms are active, the alert regarding the specific input that initiated the alert will be transmitted in its totality and any truncation will affect only the following status information. An alert message indicating one major alarm, with no site name or input descriptor programmed will have a length of approximately 41 characters. One major alarm with 16-character site and input names will have a length of approximately 73 characters. With JU9 not enable, an alert message indicating 16 or more major alarms, each with a 16-character input descriptor and a 16-character site name, will have a length of approximately 89 characters. These values may vary slightly due to programming, terminal, and pager characteristics. The average alert call message would generally be somewhere in the 70 character range, assuming an average site and input descriptor length of approximately 7 to 9 characters. This should be within the 80 character message size usually permitted by paging carriers.	rear
JU10-11	Reserved for factory use.	rear
JU12	Enables opto-isolation on 0D6 input. <i>Default: disabled</i>	right
JU13	Enables opto-isolation on 0D7 input. <i>Default: disabled</i>	right
JU14	Removed if second SIO installed. <i>Default: installed</i>	open
JU15-26	Reserved for factory use.	open

Dip switches DSW1 through DSW8

DSW1 and DSW2 set the baud rate for the Local VDT port. While the higher baud rates significantly improve screen refresh times, the unit is shipped at 9600 baud for compatibility with older ProTeks. **Default: 9600**

DSW1	DSW2	VDT Baud Rate
OFF	OFF	38400
ON	OFF	19200
OFF	ON	9600
ON	ON	1200

DSW4 and DSW5 set the number of rings before the 24+ answers inbound calls. **Default: one ring.**

DSW4	DSW5	Rings
OFF	OFF	1
ON	OFF	3
OFF	ON	5
ON	ON	7

DSW6 enables parity checking for the internal modem. **Default: disabled**

DSW6	Parity Checking
OFF	Disabled
ON	Enabled

DSW8 enables timed dump of voice message **Default: disabled**

This supports outbound calls to be initiated even if the dial tone is absent or delayed beyond the standard two-second wait time window. With a standard phone number having no preceding control characters, the monitor will go off-hook, wait two seconds and begin sending DTMF. This behavior is exhibited with or without a dial tone being present.

The interval between the time the monitor goes off-hook and when it begins sending the DTMF dial string may be adjusted by adding commas prior to the telephone number. Each comma equals adds an additional two seconds to the interval.

With a standard phone number having a W control character preceding the phone number, the monitor will go off-hook, wait up to 45 seconds and begin dialing. JU9: Shortened Alpha page length

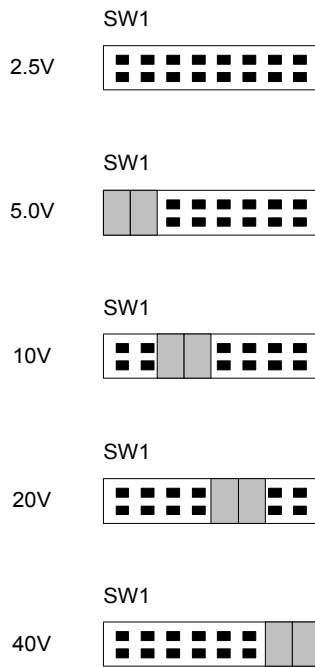
DSW8	Timed Message Dump
OFF	Disabled
ON	Enabled

DSW3, DSW7, and are for factory use only. **Default: OFF**

SIM setup

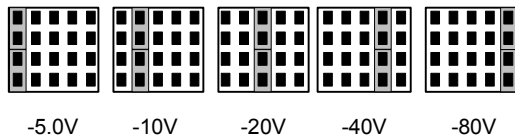
Setting SIM Analog Scaling Jumpers

Prior to installation of the 24+ in the equipment rack, set the analog input scaling as required for your specific installation. The System Initialization Worksheet should be helpful in preplanning the SIM configuration.



Setting Positive SIM Analog Jumpers

There are eight scaling jumper fields numbered SW1 through SW8. Each configures the attenuation and scaling for the analog input of the same number. Using the SW label as a reference set the input to the appropriate scale as indicated to the left. Default scaling is the 10V scale, which may prove adequate for most uses. Remember the RF sensor and temperature sensor require the 10V scale. While the two jumpers will normally remain adjacent to each other, special applications may require the jumpers to be separated as outlined in the appendix.



Setting Negative SIM Analog Jumpers

There are eight scaling jumper fields numbered SW1 through SW8 on the negative SIM, though their configuration varies as indicated in the figure to the left. Each field configures the attenuation and scaling for the analog input of the same number. Using the SW label as a reference set the input to the appropriate scale as indicated to the left. Default scaling is the 10V scale. The -80V scale would be used for measuring a -48V supply.

Site Audio Level Adjustment

Use of the audio inputs may require level adjustments as covered on page 8 of the Post-installation Adjustments section.

D5 & D7 Latching

If short duration logic transitions must be monitored, digital inputs D5 and D7 may be set to enable onboard latches as indicated in the table below. The latches will capture pulses of 20 nanoseconds or longer duration and are automatically reset after each sampling. This may be used to verify a data stream or to capture short pulses. Refer to the SIM layout drawing in the appendix.

Input	Jumper	Default
D5	JU7	Rear (disabled)
D7	JU8	Rear (disabled)

On-Site Installation

Cabinet Installation

The standard cabinet may either be mounted on a standard 19" rack or table supported. When rack mounted, the chassis may be easily slipped out of the rack by unscrewing the four captive screws at the cabinet rear, leaving the cabinet top in the rack.

Power Cable Installation

The 24+ can operate from an AC or DC power source. AC power is provided by an external 12 VAC wall mount transformer. The 24+ may also be powered from an external 12 VDC source by connecting the supplied 10 foot cable to the DC IN connector also at the rear of the ProTek. The red lead is positive. The 24+ will trickle charge the backup battery at approximately 80 ma maximum when AC power is present. If an external 12 VDC UPS is used, disable the ProTek's internal charger by removing the 130 ohm 2 watt resistor R20 from the main board. Always externally fuse the 12 VDC supply with a 1A fuse.

Site Interface Cable Installation

The rear panel RJ-21 connector allows access to the eight digital inputs, four relays, and eight relay driver outputs present on the motherboard. Please note that the 24+ now has 12 VDC on pin 25 for powering of external active sensors drawing no more than 25 ma of current. Be sure to externally fuse this line with a 1/10 amp quick acting fuse. Exceeding this current may damage the monitor power supply. Up to 1/4 amp of current may be derived from the 12VDC POWER IN connector if this is not being used for connection to an external battery back up. Again, externally fuse any load on this connection with a 1/4 amp quick acting fuse. Conductor assignments may be found on page 40 and 41. On the site connector, relays 1 through 4 and opto-isolated D6 & D7 are paired by Telco color code. However, due to the number of functions present on this cable, the digital inputs and relay drivers share returns and therefore do not consistently map functional pairs to Telco pairs.

Station Interface Cable Installation

A 25-pair station interface cable is provided for each SIM ordered. The unterminated end of this cable may be connected directly to the equipment to be monitored or to a Type 66 punch down block. A table documenting the conductor function may be found on page 42 and 43. Notice that when punched down to a type 66 block, a functional pair—such as a digital input and its associated return—adhere to standard Telco pair color code.

Optional Equipment Installation

Telewave RF Power Sensor

Telewave™ bi-directional RF Power Sensors are used for measuring forward and reflected RF power. Three models are available. Call the factory regarding additional sensor needs.

Model	Frequency Range
PM-2A-50	30 to 88 MHz
PM-2A-300	118 to 512 MHz
PM-2A-900	806 to 960 MHz

The Telewave™ sensor is installed in the transmission line at the point where power is to be measured. This may be the output of the transmitter or the output of any isolators or resonant cavities. Each sensor has phono jacks for forward and reflected power measurement, and associated sensitivity adjustment potentiometers. The sensor outputs will be monitored by the ProTek analog inputs. Remember that unless the transmitter has a 100% duty cycle the analog inputs must be qualified by a digital input monitoring the transmitters PTT line. If Return-to-Normal notification for RF power is required, ensure that the alarm type is set to MA3. Further details regarding appropriate alarm types may be found in the initialization section of this manual. Each SIM can support bi-directional RF power measurement of up to four transmitters as specified in the table below:

RF Power	Analog input	Wire Color	Phono Plug
XMTR 1 Forward	Input 1	white/blue	Red Center Pin
XMTR 1 Forward	Return 1	red/brown	Red Outer Shell
XMTR 1 Reflected	Input 2	white/orange	Black Center Pin
XMTR 1 Reflected	Return 2	red/brown	Black Outer Shell
XMTR 2 Forward	Input 3	red/orange	Red Center Pin
XMTR 2 Forward	Return 3	white/green	Red Outer Shell
XMTR 2 Reflected	Input 4	red/green	Black Center Pin
XMTR 2 Reflected	Return 4	white/green	Black Outer Shell
XMTR 3 Forward	Input 5	black/green	Red Center Pin
XMTR 3 Forward	Return 5	black/slate	Red Outer Shell
XMTR 3 Reflected	Input 6	black/brown	Black Center Pin
XMTR 3 Reflected	Return 6	black/slate	Black Outer Shell
XMTR 4 Forward	Input 7	yellow/brown	Red Center Pin
XMTR 4 Forward	Return 7	violet/blue	Red Outer Shell
XMTR 4 Reflected	Input 8	yellow/slate	Black Center Pin
XMTR 4 Reflected	Return 8	violet/blue	Black Outer Shell

Tower Light Sensor

The tower light sensors are AC current sensing loops through which the supply line to the lights must be passed. Available in a range of values, 10 and 15 amp sensors are most commonly used. With suitable programming, a technician can determine if all lights are out or only a single lamp when a common feed is used. If the activity test is needed, the sensor input should be qualified by a photocell on an odd digital input. Program the associated input using the V token as specified in the table on page 14. For specialized tower light applications refer to the appendix.

Internal Backup Battery

Up to three sealed lead acid batteries may optionally be supplied by the factory for internal installation. Each 2.0 amp hour battery yields a backup time of approximately 4 hours. An external battery may also be used. The battery bank is trickle charged by the internal power supply at an 80ma rate. To avoid possible charging imbalance, do not simultaneously use internal and external battery banks.

Serial Port Option

If the auxiliary serial port option has been requested, two DB-9 connectors will be visible on the back panel. Depending upon the firmware, these provide interface capabilities for serial devices. The documentation of these devices will be found in the appendix. The use of a compact male-to-male adapter may be required to allow use of some larger molded plug cables.

Post-installation Adjustments

When the I/O cable installation is complete, any audio levels and RF power sensors must be calibrated. The Beep-tone detector may also require adjustment. The remaining adjustments do not normally need attention at installation.

SIM Audio Port Level Adjustments

Audio level potentiometers RX1, RX2, RX3, and RX4 control the level of SIM audio inputs 1, 2, 3, and 4 respectively. Test points are provided for the adjustment of each input's level at test point TP. The pin closest to RX4 is for input 1. The remaining test points are assigned sequentially from pin 1. Connect an audio voltmeter to the appropriate test point and adjust the corresponding audio level potentiometer for a -30 dBm level with a 1 kHz tone connected to the station audio input at the desired amplitude. The test level should be within 3 dB of the actual level expected from the source of the audio being monitored.

RF Power Sensor Calibration

Each RF power sensor must be calibrated after installation. Program one analog input to measure station forward power. If desired, program another to monitor reflected power. (Make sure you have set the appropriate jumpers to provide a scale factor of 10 volts.) Insert a wattmeter in line with the power sensor and, with the station keyed, adjust the forward power potentiometer located on the sensor to obtain the same reading as the wattmeter. Dekey the station and reverse the coax cables connected to the sensor (not the sensor phono plugs) and key the station. Adjust the sensor reflected power pot to match the wattmeter reading. Dekey the station and restore the coax cables to their original state. This completes the sensor calibration.

Paging Terminal Beep-tone Detect Adjustment

If the 24+ is to send alert calls to a voice or numeric pager and go-ahead beep-tone control is desired, the 24+ tone detector must be adjusted to match the tone given by the paging terminal. Adjust R7 so that the frequency of the square wave at U5 pin 5 is equal to that of the paging terminal beep-tone. The range of adjustment is approximately 900 Hz to 1500 Hz. If other beep-tone frequencies are required for your specific applications, the value of R8 may be adjusted. The center frequency varies inversely with the value of R8. *The beep-tone detector is factory adjusted to detect 1000 Hz.* Please note that the detector may not reliably detect a series of short beeps as used by some terminals. It is recommended that field K of screen 5 be set to timed dump if the detector proves unreliable.

Reference for Analog to Digital Conversion

This value is set at the factory and should not need adjustment. However, if voltage and wattage are inaccurately reported by all inputs of the 24+, adjust R18 for 2.56 VDC +/- 0.01 VDC at U19 pin 7.

Local VDT Set Up

Connect the VDT to the local VDT port on the front panel. Since the ProTek is shipped configured for DCE operation, a VDT or laptop computer should not require reconfiguration of the ProTek when using a one-to-one cable. However, the port may be configured as either Data Terminal Equipment (DTE) or Data Communication Equipment (DCE) to allow any interfaced equipment to use a standard one-to-one RS-232C cable. If a modem or other DCE device is to be connected to the local port, or if you routinely use a null modem cable to connect to the local VDT port, then the ProTek should be configured as a DTE. When the configuration plug is inserted such that the pins that are soldered together are to the front of the ProTek the port is configured as a DCE. If the plug pin rotated 180 degrees, then the configuration is DTE.

Set the communications port parameters of the external data device to match those of the ProTek:

- 1 Start Bit
- 8 Data Bits
- 1 Stop Bit
- 1 Mark Parity (or Parity-None)
- XON-XOFF Flow Control

The Local VDT Baud Rate is set with switches DSW1 and DSW2. *Default: 9600 baud.*

Switch	1200	9600	19200	38400
DSW-1	ON	OFF	ON	OFF
DSW-2	ON	ON	OFF	OFF

The local VDT default is 9600 to maintain backward compatibility with the ProTek Classic series. The local port may be accessed remotely via any modem, including RF modems supporting terminal emulation. The physical pin out of the RS-232C connector for DTE and DCE configurations is as follow:

Signal Name	Pin #	DTE	DCE
Shield Ground	1		
Transmit Data (TD)	2	Output	Input
Receive Data (RD)	3	Input	Output
Clear To Send (CTS)	5	Input ¹	Output
Signal Ground	7	Ground	Ground
Data Carrier Detect (DCD)	8	Input ²	Output
Data Terminal Ready (DTR)	20	Output	Input ²

¹ CTS has an internal pull up and thus is normally asserted.

² DCD and DTR have internal pull down resistors and are normally negated.

Programming

Initial Login

With the VDT properly configured, press the <RETURN> (ENTER) key once or twice. After the prompt YOUR PASSWORD PLEASE appears, enter the default password of four zeros (0000) followed by ENTER. If the password for a unit is forgotten or unknown, the monitor memory must be re-initialized with a JU4 and the monitor reprogrammed.

After the Enter type of Terminal prompt appears, enter the appropriate choice. Generally, 7) ANSI will give the best results with modern communications software running on a laptop. The System Parameters Menu will appear on the screen in single line mode. Remember that a type 2) DUMB terminal will not update any screen unless command to do so by the user with a command of Z <RETURN> .

During subsequent log-ons the full-screen Main Menu will automatically be displayed after VDT Type selection is complete.

System Initialization

The following section covers the basic set up in preparation for installation of the unit. Use the work sheet provided in the appendix of this manual to document system programming. To erase an incorrect entry from any field, enter <control y <return>.

System Parameters Menu

This menu will automatically appear after the VDT Type entry is completed during the initial log on procedure. During this sequence only, the cursor will automatically sequence through the parameter fields. Any field may be reset to unprogrammed by entering control Y, followed by return. Each Systems Parameter field is described in the following sections.

A) PASSWORD

This is the user's protection against unauthorized access of the ProTek. Log-in using 0000 as the password when programming the 24+ for the first time. If a password is forgotten or corrupted, the 24+ must be reset using JU4, and first time programming repeated. An acceptable password can be from four to eight digits.

B) SITE NAME

Up to 16 characters, including spaces can be entered in this field. This data will appear in the header section of all screens and will identify the site during alphanumeric and VDT alert calls.

C) SITE ID

A four-digit value must be entered here. If no value is entered, the ProTek defaults to 0000 (four zeros). This ID appears in the header section of all screens and will identify the site on all alert calls. The voice synthesizer speaks the four digits. The SITE ID is sent in all alert pages and spoken on voice alerts. Some paging terminals

may interpret a leading 0 such as in a SITE ID of 0111 as a command when processing a numeric page. Such systems demand that the first digit of the SITE ID be something other than zero. Though it may appear that the ProTek paging task is malfunctioning, this *is not* a ProTek error.

D) TIME

The time in 24-hour format is initialized in this field and displayed in the header section of all screens. The time is entered as HH:MM (00:00 through 23:59). Leading zeros need not be entered, but will be accepted.

Site Name: Test	Time: 01:22
Site ID: 0003	Date: 04/08/97
System Parameters Menu	
Present value	Description

A 1590	Password - 4 to 8 digits
B test	Site name - 16 alphanumeric characters
C 0003	Site ID - 4 digits
D 01:22	Time in 24 hour format - HR:MM - (00:00 - 23:59)
E 04/08/97	Date - MM/DD/YY
F 2,3,4	Alert call seq-0 = NONE, for 1-4, see next screen
G 1	Alert call attempts per type - 1-4 attempts
H 1	Alert call attempt interval - 1-9 minutes
I 04:00	Status report time
J 1	Status interval - 1-9 days
K 3	Terminal answer detect - 1=beep tone, 2=timed, 3=either
L 2	- timed value, (0-9) in 2.5 second increments
M 0	Number of alert calls, 0 = unlimited, 1-9 # of calls

RETURN Key = Main Menu, "Z" = repaint, "N" = next screen, or parameter letter:	

E) DATE

The date is initialized in this field and displayed in the header section of all screens. Enter the date as MM/DD/YY. Leading zeros are not necessary, but will be accepted if entered.

F) ALERT CALL SEQ

Up to eight alert call phone numbers from the ALERT CALL TELEPHONE NUMBER screen may be entered, separated by commas. The order of the digits entered will be the order in which the ProTek will call the numbers. If a zero is entered, no alert call will be made, even if there are numbers programmed in the ALERT CALL TELEPHONE NUMBER screen. *ProTek will default to zero if no entry is made.*

G) ALERT CALL ATTEMPTS PER TYPE

This field defines the number of attempted calls to a given number before sequencing to the next number. For example, if a person and a VDT were specified, and two attempts was selected, the ProTek would make two unanswered or busy attempts to alert the person before making two attempts to contact the VDT. The ProTek will continue to cycle through the sequence until the alert call is acknowledged. Only digits 1 through 4 are accepted as entries in this field. If the INT alert type is used, phone entry 8 will be dedicated for intrusion notification. *ProTek will default to two attempts if no entry is made.*

H) ALERT CALL ATTEMPT INTERVAL

This field defines the amount of time in minutes the ProTek will wait between alert call attempts. *ProTek will default to a value of 5 minutes if no entry is made.*

I) STATUS REPORT TIME

This field sets the time of day that the ProTek will make a status report. The status report is sent to the phone number in slot 1 of the ALERT CALL TELEPHONE NUMBERS screen. This phone number must be programmed as a Person (TYPE = 1), a VDT/PRINTER (TYPE = 2), or Alphanumeric (Type =5). The spoken **Daily Status Report** is identical to the report verbalized in response to the DTMF command 10#. If the status call is to be defeated enter control Y followed by return or enter. *ProTek will default to no status report if no entry is made.*

J) STATUS REPORT INTERVAL

This field defines the length of time between each Status Report in days. An interval from 1 to 9 days can be specified.

K) TERMINAL ANSWER DETECT

This field allows the user to send voice or numeric only pages to a paging terminal upon detection of the go-ahead beep-tone, or blindly after a delay, or either way. If option 2 or 3 is chosen, an entry in the Timed Value field is required. As the terminal go-ahead tone used varies, option 3 is the most reliable setting. *ProTek will default to 3 if no entry is made.*

L) TIMED VALUE

This field determines how long after the last detected ringback the ProTek waits before sending the numeric page. Since the ProTek cannot detect paging terminal answer, it waits for 7 seconds after ringing ends to see if another ring is detected. If another ring is detected the ProTek waits seven more seconds. If no ring is detected, then the ProTek waits the Timed Value before sending the numeric page. (Typically a value of 0 or 1 works on most paging terminals.) *ProTek defaults to a value of zero if no entry is made.*

M) ALERT CALL LIMIT

This field defines any limit placed on the number of alert calls generated for each major alarm. If a zero is entered, alert calls will continue until an Alert Call Acknowledge command is received. If 1 through 9 is entered, the ProTek will automatically halt the alert call sequence after sending the specified number of messages. *ProTek defaults to a value of 0 if no entry is made.* After completing this screen, go to the Alert Call Telephone Numbers screen by using the N (for next) key.

Alert Call Telephone Numbers

Site Name: Test	Time: 01:22		
Site ID: 0003	Date: 04/08/97		
Alert call telephone numbers			
Type	Telephone number	Alpha-pager number	Alpha-password
-----	-----	-----	-----
1 2	5551111		
2 1	5552222		
3 1	5553333,, ,		
4 3	5554444		
5 5	5554444	5553333	
6			
7			
8			
Types: 1 = person,	2 = VDT/printer		
Pager types: 3 = voice,	4 = digital,	5 = alpha	
-----	-----	-----	-----
RETURN key = main menu, "Z" = repaint, "N" = next screen, or parameter number:			

The Alert Call Telephone Numbers screen provides for entry of up to eight telephone numbers that the ProTek can call during a major alarm. Phone number 1 will be used for the daily status report. Note that unlike the 24 classic, any phone slot may be designated as an alphanumeric pager. Further note that the telephone number in entry 8 will be dedicated to the INT type alert, if any inputs are so programmed.

TYPE

This field defines the type of alert call. The user enters a single digit to define the type of call. Valid entries are:

1. Person
2. VDT / printer
3. Voice Pager
4. Digital Pager
5. Alphanumeric Pager

TELEPHONE NUMBER

Up to 24 characters may be entered. Do not enter dashes to separate the exchange or area code. Commas may be used to generate a two-second delay per comma. Remember to precede the number with a 1 for long distance dialing if required by your local telephone company. Valid characters include numerals 0 through 9, *, #, !, W, @, and &.

ALPHA-PAGER NUMBER

Up to 16 digits may be entered for the pager subscriber number.

ALPHA-PASSWORD

Up to six alphanumeric characters may be sent to the terminal in the Telocator Alphanumeric Protocol (TAP). Note that the entire field may be cleared by positioning the cursor in the TYPE field and entering CTRL Y. There is rarely a need for an entry in this field.

Entering N will advance the user to the System logging configuration screen shown below.

System logging configuration

Site Name: 24+ QA test	Time: 23:17	
Site ID: 1111	Date: 04/03/97	
System logging configuration		
#	EVENT TYPE	STATE

1	Major alarm	ON
2	Minor alarm	ON
3	Input enable/disable/unprogram	ON
4	Relay force/release	ON
5	AC Power on/off	ON
6	Alert call enable/disable/ack	ON
7	Alert call fail/retry	ON
8	Time log	ON
9	Reset, history clear	ON

RETURN key = Main Menu, "Z" = repaint, "N" = next screen, or parameter number:		

The System logging configuration screen allows the user to specify what events are logged in the Event History Log that is accessed from the Main Menu. The state of any particular event type may be toggled by entering the appropriate menu #. This facility may be used to filter out routine messages to extend the life span of the history file or to present only true alarms if the history is monitored by non-technical personnel.

When all System Parameters have been initialized, enter RETURN and the Main Menu screen will be displayed. Enter 71 RETURN and the SIM Parameter Menu for SIM 1 will appear on the screen. The SIM Parameter screens consist of three menus: Analog inputs, Digital Inputs, and Input Activity. The Analog inputs screen appears first.

I/O Parameters Menu - Analog inputs

Site Name: test		Time: 01:23							
Site ID: 0003		Date: 04/08/97							
I/O Parameters Menu - Analog inputs									
INP #	INPUT DESCRIPTION	LOWER LIMIT	UPPER LIMIT	VLT SCL	QLFD BY	TIME DELY	ALRM TYPE	PGM STAT	CONTROLLED RELAYS
A1	XMTR1 FWD PWR	200W	256W	10	D1	0.1	MA3	ENB	1
A2	XMTR1 RVS PWR	0W	10W	10	D1	0.1	MIN	ENB	
A3	XMTR2 FWD PWR	200W	256W	10	D1	0.1	MA3	ENB	2
A4	XMTR2 RVS PWR	0W	10W	10	D1	0.1	MIN	ENB	
A5							MIN	UPG	
A6	TOWER LIGHTS	3.4V	4.4V	5.0	D3	0.1	MAJ	ENB	
A7	12VDC SUPPLY	12.0V	4.0V	20	D8	0.1	MA2	ENB	3
A8	PROTEK TEMP	0C	50C				MIN	ENB	

RETURN key = main menu, "N" = next screen, "Z" = repaint, or inp # (1-5):									

INP

Enter 1-8 to select the desired input.

INPUT DESCRIPTION

Use this field to enter up to a 16 character alphanumeric descriptor of the analog input. Since this string is displayed in an alert sent to an alphanumeric pager, the user may wish to provide a description of the failure rather than of the input itself.

UPPER and LOWER LIMIT

These two fields are used to specify the nominal range for this input. If the input level varies outside this range, the input becomes active. Valid entries in either field are shown below. Spaces are accepted between characters but ignored. The upper limit when entered as volts cannot exceed the value of the VLT SCL factor. Note that the lower limit value must be smaller than (or equal to) the upper limit value or the input will always be in the alarm state. Valid entries are outlined in the table below, which indicates the input scaling set by the hardware jumpers on the SIMs).

PSIM voltage	NSIM voltage	Valid watt entries	Valid temp entries	Valid humidity entries
xxV	-xxV	xW	-xxC	x%
x.xV	-x.xV	xxW	-xC	xx%
x.xxV	-x.xxV	xxxW	xC	
xx.xV	-xx.xV		xxC	
Where x=0.00 to 40.0 V	Where x=-80.0 to 0 V	Where x =0 to 999 and W defines the value as Watts	Where x = -55 to +99 and C defines the value as degrees Celsius	Where x =0 to 99 and % defines the value as humidity

VLT SCL

The Voltage Scale field is for display only. The user selects the desired voltage scale with jumpers on the motherboard. The ProTek automatically scans all of these jumpers and displays them in this field. Allowed scales are 2.5, 5, 10, 20, and 40 volts for the positive SIM. The negative SIM supports 0 to -80 volts in five steps. Invalid jumper settings are indicated by the ProTek as INV.

QLFD BY

Any analog input can be qualified by any other analog or digital input. The qualifying input must be active (outside its normal range if analog, or at its active level if digital) before the analog input being qualified can be active. Thus even though the analog input is outside its range it will not be active itself until the qualifier is also active. No entry means this input is not qualified. An incorrect entry can be cleared by entering two spaces (two space bars) and RETURN or CONTROL Y <RETURN>.

TIME DELY

Any analog input may also be qualified by a time delay. The input must vary outside its specified range continuously for longer than the specified time delay before becoming active. No entry is the same as 0.0 seconds. Valid values range from 0.1 second to 999 seconds.

ALRM TYPE

Eight entries are possible. Each determines what action is taken by the ProTek when this input becomes active.

ACK A digital input designated as ACK will, if active, perform the same action as entering the ACK command.

INT Sends an intrusion alert to the phone number specified in the telephone list slot 8.

MIN A minor alarm will be logged in the Event history report and the minor alarm front panel indicator will light. The input may qualify other inputs.

MAJ A major alarm will be logged in the Event history report and the major alarm front panel indicator will light. An alert call sequence is also initiated, if programmed. The input remains in the alarm state until its level returns to within the programmed limits or the qualifier (if programmed) goes inactive.

MAQ A major alarm will be logged in the Event history report and the major alarm front panel indicator will light. An alert call sequence is also initiated, if so programmed. The input remains in an alarm state until its level is within the programmed limits while the qualifier (if programmed) is active. Note that the alarm remains in effect even if the qualifier returns to an inactive state. Essentially this is a latching alarm type.

MA2 Equivalent to MAJ except that a Return-to-Normal alert call sequence is initiated when the input returns to normal if no alert call is already active.

MA3 Equivalent to MAQ, except that a Return-to-Normal alert call sequence is initiated when the input returns to normal if no alert call is already active. Use the MA3 to prevent a false Return-to-Normal alert when a PTT qualifying an abnormal RF level goes inactive. If the analog input monitoring the RF sensor were to be designated as an MA2, a failing transmitter would falsely generate a Return-to-Normal whenever the PTT qualifying it returned to an inactive level.

QLF The input, when active, will be used only to qualify other inputs. While it will not generate an alarm, it may be used to control relays. The qualifier may be thought of as a Boolean AND in that both the input qualified and the qualifier must be active for an alert to be generated.

PGM STAT

This field is used both to display the program status and to change program states. This field will initially display UPG for unprogrammed. Three entries are possible in this field:

UPG The input is not programmed. If UPG is entered for a previously programmed input, all input fields are automatically cleared whether the data in those fields was displayed or not. The lower and upper limits and alarm type fields must be set before the input can be removed from the UPG state. If the user makes no entry when initializing an input, the other field entries will be stored but not displayed. Subsequent entry of ENB or DIS will cause this previously entered data to be displayed.

ENB Enabled; the input is in a normal state.

DIS Disabled; the input will be disabled. In this state the input level can still be read but, if out of range, will not be active.

The user may quickly remove prior input programming by entering UPG in this field.

CONTROLLED RELAYS

This field is used to indicate any relay outputs that this input will control. Up to three relay output numbers can be entered (separated by space, comma, period, or slash). Relay numbers followed by the letter L will latch on and stay on until released by the user with the Release relay command. Any combination of three relay outputs can be programmed as (L)atched. Care must be taken to enter the delimiter between relay numbers. The Relay Configuration screen shows all controlled relays. If a relay output is on, it will stay on until all controlling inputs leave their active state or until the inputs are disabled (unless the relay has been designated as latching).

I/O Parameters Menu - Digital Inputs

Site Name: Test							Time: 01:23
Site ID: 0003							Date: 04/08/97
I/O Parameters Menu - Digital Inputs							
INP INPUT	ACT	QLFD	TIME	ALRM	PGM	CONTROLLED	
# DESCRIPTION	LVL	BY	DELY	TYPE	STAT	RELAYS	

D1 DIGITAL KEY	L			QLF	ENB		
D2					UPG		
D3 TOWER LTS ON	L		0.1	QLF	ENB		
D4					UPG		
D5					UPG		
D6 SITE SECURITY	L		1.0	MAJ	ENB	3	
D7 FIRE	L			MAJ	ENB	3	
D8 PROTEK AC	L			MIN	ENB		

RETURN key = main menu, "N" = next screen, "Z" = repaint, or inp # (1-8):							

The **Digital inputs** screen is used to initialize each of the eight digital inputs. This screen is similar to the analog inputs screen and only the differences will be described in this section.

INP

Identifies the specific inputs. Enter 1-8 to select the input.

ACT LVL

Active Level replaces the upper and lower limits fields of analog inputs. The field defines the state of the digital input the ProTek is to treat as active.

H = High an open input or a DC voltage in the range +2.4 to +12 volts.

L = Low a contact closure to digital ground or a DC voltage in the range -12 to +0.8 volts.

The remaining fields have the same meaning as the analog inputs in the previous screen.

To get a digital input out of the UPG (Unprogrammed) state, the fields active level and alarm type must be initialized and either ENB or DIS must be entered in the PGM STATUS field. Note that if a digital input is disabled, its level can still be read and the time count of its active state continues, the input simply does not generate an alert nor activate relays or any associated activity alarms.. The Time Active and Previous Day counts are cleared when a Digital input is unprogrammed.

The user may record the loss and return of AC power by entering either MIN or MAJ in the ALRM TYPE field and ENB in the PGM STAT field. The last three fields are the only fields the user can program. The ProTek will sense a loss of AC mains in approximately five to ten seconds. This delay lessens the chance of falsing due to a transient brownout.

The Site ID and Site Name are displayed followed by the present time. The second line is identical to what is logged in the Event history report for this major alarm event

I/O Parameters Menu – Input Activity

Site Name: Test							Time: 18:57
Site ID: 111							Date: 04/06/97
I/O Parameters Menu - Input activity							
INP	TELEPHONE	INACT	WAIT	MAXACT	ALRM	PGM	CTLD
#	NUMBER	TIME	TIME	TYPE	STAT	RELAYS	
	(OR RELAY)	(MIN)	(MIN)	(MIN)	(MIN)		

I1	5550000	30	5	55	MIN	UPG	
I2						UPG	
I3						UPG	
I4						UPG	

RETURN key = Main Menu, "N" = next screen, "Z" = repaint, or stn # (1-4):							

The input activity screen is used to enter the required parameters for the ProTek to execute the no activity test and the stuck active test.

INP #

Identifies the specific input test (I1-I4). Enter 1-4 to select the desired station.

TELEPHONE NUMBER (OR RELAY)

Used to enter up to a 21-digit telephone number or a relay output number that the ProTek will use to activate the input for test purposes. For paging systems, this number could be a tone only pager number. Do not enter dashes between the exchange and the area code. If the first character entered is a CTRL Y <RETURN>, the contents of the field will be deleted. To allow the ProTek to dial through a PBX/PABX, commas may be used to separate the access code from the telephone number. Each comma provides a two second delay. Multiple commas may be used to achieve longer delays, but the field is limited to 21 characters, including commas. A relay may be specified to force a PTT or other control line active. A maximum delay of approximately 9999 minutes (6.94 days) may be programmed.

INACT TIME

Also called the “no activity test”, this defines how long the ProTek will wait without seeing input activity before attempting to force the input active. The ProTek attempts to force activity by calling the telephone number or activating the relay output number specified in the TELEPHONE NUMBER field. The time is entered in minutes (1-9999). A zero (0) entry will disable both input activity tests. Note that if no phone number or relay output number is programmed in the TELEPHONE NUMBER field, the ProTek will alarm once this time has elapsed with no activity.

WAIT TIME

Defines the additional time the ProTek will wait for activity after dialing out the specified telephone number or activating the relay output before an alarm condition is recorded. This value is the amount of time in minutes (1-9) and should exceed all system delays expected from the time of the call until the input is forced active. If a zero is entered in this field, no dial out is attempted nor is any relay output activated.

MAXACT TIME

Also call the “stuck active test”, this field defines the maximum amount of time in minutes (1-9999) that the input must be continuously active before the ProTek alarms. A zero (0) entry will disable the stuck active test.

ALARM TYPE

Determines whether the failure of either the no activity test or the stuck active test generates a major or a minor alarm. QLF is not a valid entry.

PGM STAT

This field performs the same function as the that used with the analog and digital inputs. To remove an input test from the UPG (Unprogrammed) state, the inactive time interval and alarm type fields must be programmed, and either ENB or DIS must be entered in the PGM STATUS field.

CONTROLLED RELAYS

Used to enter any relay output numbers that this input test will control in its active state. Up to three relay outputs can be entered (separated by space, comma, period, or slash). Relay numbers followed by the letter L will latch on and stay on until released by the user with the Release relay command. Any combination of three relay outputs can be programmed as latched. Note that other inputs can be programmed to control these same relay outputs. The Relay Configuration screen shows all controlled relays. The failure of either activity test will cause any controlled relays to turn on.

Note that if more Digital Inputs are needed, any Analog input can be programmed to act as a digital input as follows:

- If the desired Active Level is High: Program the Upper Limit = 2.4 V and the Lower Limit = 0 V.
- If the desired Active Level is Low: Program the Upper Limit = the high level voltage and the Lower Limit = 0.8 V.

Following this procedure allows digital inputs with high level voltages from 2.4 to 40 VDC to be accepted. The Voltage Scale factor dipswitches (or jumpers) must be set to a range to correspond to the voltage expected.

Relays controlled by this entry are actuated when the alarm state is active. The relay(s) that may be specified in the telephone list field actuate prior to the alert being sent, but during the alarm state, i.e., when the monitor has noticed an anomaly and is attempting to force activity prior to sending the alert message.

System Relay Output Programming

The screen shown in the following page is used to enter descriptions of Relay Outputs. Enter up to 16 alphanumeric characters (spaces count) in the DESCRIPTION field to describe Relay Outputs in use. The CONTROLLING INPUTS field is for display. To change a controlling input, the user must enter the appropriate SIM Parameter menu. Press RETURN when completed to display the Main Menu.

Site Name: Test	Time: 01:22
Site ID: 0003	Date: 04/08/97
System Relay Configuration	
Description	Controlling Inputs

R1	1D1, 2D3
R2	0D2
R3	
R4	
R5	
R6	
R7	
R8	1A3
R9	
R10	
R11	
R12	
R13	
R14	
R15	
R16	

RETURN key = main menu, "Z" = repaint, "N" = next screen, or parameter number:	

Pushbutton Telephone Operation

Any standard push-button tone telephone may be used to control the ProTek 24+. Since the * and # keys are required for communications with the ProTek make sure these characters are transmitted to the Public Switched Telephone Network (PSTN). Some PBXs may use these characters for internal functions and may not forward them to the PSTN. Such systems cannot be reliably used by the ProTek for communications.

The ProTek will immediately answer all incoming calls with a short beep. The caller should press the # key immediately to access the ProTek in the DTMF mode. If no # entry is detected or modem communications is not established within 20 seconds, the 24+ will disconnect. Upon hearing the # key, the ProTek will prompt "Password Please." If an incorrect entry is made the 24+ will give the prompt "Error, try again." If three consecutive incorrect passwords are entered, the ProTek will disconnect. Once the correct password is entered the 24+ will respond with "Ready", and await further commands. If no commands are given for 30 seconds, and the ProTek is in the Ready state, disconnection will occur. The user may clear any erroneous digits entered prior to the # key with the * key.

DTMF Commands

Entry	Command	24 + Action	Prompt	User Action
00#	Command Summary	24+ will recite each command code and a brief description of its function		
01#	Disable Input	Any programmed response to an active input is blocked. The input level can still be monitored.	"To Disable Input, Enter Input Number"	Enter a three digit number followed by # to specify the input. Use the format STX where S is the SIM #, T is the input type (2 for analog, 3 for Digital), and X is the input number (1-8) desired.
02#	Enable Input	This command allows the specified input to respond to an event as previously programmed.	"To Enable Input Enter Input Number"	
03#	Disable Input Activity Test	This command disables activity testing on the specified input.	"To Disable Activity Test, Enter Input Number"	Enter the input number (1 or 2) followed by #.
04#	Enable Input Activity Test	This command re-enables a previous Disable Input Activity Test command.	"To Enable Activity Test, Enter Input Number"	Enter the Input number (1 or 2) and #.
05#	Force Relay On	This command causes the specified Relay Output to turn on (thereby overriding any controlling input).	"To Force Relay On, Enter Relay Number"	The user enters the Relay Output number (1 to 16) followed by #.
06#	Force Relay Off	This command causes the specified Relay Output to turn off (thereby overriding any controlling input).	"To Force Relay Off, Enter Relay Number"	The user enters the Relay Output number (1 to 16) followed by #.

Entry	Command	24 + Action	Prompt	User Action
07#	Release Relay	The specified Relay Output is released from user control (or from the latched state) and returns control to the programmed controlling inputs.	"To Release Relay, Enter Relay Number"	The user enters the Relay Output number (1 to 16) followed by #.
08#	Disable Alert Call	Prevents the ProTek from making an Alert Call or halts any such call in progress.	"Alert Call Disabled".	Input next command
09#	Enable Alert Call	Cancels a previously entered Disable Alert Call command.	"Alert Call Enabled".	Input next command
10#	Status Report	The Status Report lists the following anomalies: Alert Call Active Alert Call Disabled The 3 most recent unacknowledged major or minor alarms Any input presently in a minor or major alarm state Any input disabled by the user Any Input Activity Test disabled by the user Any input in an Alarm state as a result of No Activity test or Stuck Active test If none of these events has occurred, the ProTek responds with: "Site ID, Status O.K. – Ready." (where ID is the four digit Site ID)		
11#	Monitor Input	This command enables the user to monitor any input level.	"To Monitor Input Enter Input Number"	Enter a three digit number followed by # to specify the input. Use the format STX where S is the SIM #, T is the input type (2 for analog, 3 for Digital), and X is the input number (1-8) desired.
12#	Monitor Audio	This command enables the user to listen an audio input for 5 minutes or until Cancel (99#) is entered. After 5 minutes, the ProTek will again prompt "To Monitor Audio. . .".	"To Monitor Audio, Enter Input Number"	Enter the Input Number (X1, X2, X3, X4) where X indicates the SIM desired.
13#	Report Relay Status	Reports Relay Status		
22#	Acknowledge Alert	This command entered in response to an alert call (caused by a major alarm) resets the lights on the front panel, clears the prior alarms on the Status Report, and aborts any alert call sequence.	"Alert Call Acknowledged, Ready".	Input next command
88#	Terminate Call	This command causes the ProTek to immediately disconnect.	"End Call".	Hang up phone
99#	Cancel	Cancels any incomplete command or halts the Monitor Input or Monitor Audio processes.	"Ready".	Input next command

VDT Operation

Password screen

This screen is automatically displayed first during the log on procedure. A four to eight-digit number is required (0000-99999999). If the incorrect password is entered, the screen is repeated. After three unsuccessful tries, the ProTek disconnects. Prior to System Parameter password initialization, the ProTek accepts the password 0000.

Terminal Type Select screen

```
Enter type of terminal . . .
2 = Dumb
5 = QUME-QVT102, Televideo-TV910 / TV950, ADDS-3A+
6 = ADDS-VP1 / VP2
7 = ANSI / VT100
```

The terminal type screen is used to select the type of VDT used. This screen is automatically displayed following the successful password entry. A single digit is required to specify the type. The Main Menu screen will appear. (If this is the first entry following a JU4 reset, the System Parameters Menu will appear.)

Main Menu

```
Site Name: Test                               TIME: 14:21
Site ID: 0003                                DATE: 04/08/97

                               ProTek 24+ Alarm and Monitoring System
                               PageTek   Version 4.0

                               Main Menu

1      System status report
2      I/O status report
3      Event history report
4      Commands menu
5      System parameters menu
6      System relay configuration
7      I/O parameters menu
TC     Terminate call

-----
Enter desired screen number (or Z to repaint):
```

The **Main Menu** screen is normally displayed after password entry and VDT type selection is completed. This screen is used to access all other screens by entering the desired screen number followed by RETURN. To terminate the connection, enter TC.

System Status Report

```
Site Name: Test                               Time: 14:21
Site ID: 0003                                Date: 04/08/97

                                System Status Report

** Alert Call Sequence Active **

Prior alarms:
I1 Maj 5550000

Major alarms:
I1 5550000

Minor alarms:      ** NONE **

Disabled:   ** NONE **

Relays on:
R2 Backup 12vdc

Relays forced:    ** NONE **

-----
RETURN key = Main Menu, "N" = I/O Status, "Z" = repaint:
```

The System Status Report displays a summary of the operational status of the ProTek at the time of the request.

ALERT CALL SEQUENCE ACTIVE

If the alert call sequence is active, this message will be displayed as seen in the screen capture above. If the user has disabled the alert call sequence, the message `ALERT CALL DISABLED` will be displayed. If the sequence is not enabled, or if the sequence is enabled but not in an alarm state, no message is displayed.

PRIOR ALARMS

Displays the input number and the alphanumeric descriptor of the three most recent inputs in an unacknowledged major or minor alarm state. The input is identified as follows:

- 1st character: 1-6, representing the appropriate SIM
- 2nd character: A (Analog), D (Digital), or I (Inactivity), indicating the input type
- 3rd character: 1-8, representing the specific input identifier
- Alarm Level: MAJ, MAQ, MA2, MA3, or MIN - The user programmed alarm level
- Descriptor: The user programmed alphanumeric description of this input

Once the alarm is acknowledged it no longer appears on this list. The input may still be in an anomalous state however.

MAJOR ALARMS

Displays the input number and the alphanumeric descriptor of any input currently in a major alarm state. The input is identified with two characters as follows:

- 1st character: 1-6, representing the desired SIM
- 2nd character: A (Analog), D (Digital), or I (Inactivity)
- 3rd character: 1-8, representing the specific input identifier
- Descriptor : NAME - The user programmed alphanumeric description of this input

For input activity tests the activity test telephone number or the relay output number is displayed instead of an alphanumeric descriptor.

MINOR ALARMS

Displays the input number and the alphanumeric descriptor of any input in a minor alarm state.

INPUT DISABLED

Displays the input number and the alphanumeric descriptor of any input that has been disabled by the user with the **Disable Input** command.

RELAYS ON

Displays the relay output number (R1-R16) and the alphanumeric descriptor of any relay outputs that are on.

RELAYS FORCED

Displays the relay output number and the alphanumeric descriptor of any relay output that has been forced on or off by the user with the **Force Relay** commands. The data displayed is current when requested but the screen is not automatically updated. The user can view the most recent data by pressing the **Z** key and **RETURN**. Remember that a forced relay is no longer responsive to its controlling input. The relay must be released (*not* disabled) to return control to the system.

I/O Status Report - Analog inputs

Site Name: Test	Time: 01:21						
Site ID: 0003	Date: 04/08/97						
I/O Status Report - Analog inputs							
ANALOG INPUTS	CURRENT STATUS	CUR LVL	LOWER LIMIT	UPPER LIMIT	QLFD BY	TIME DELY	ALRM TYPE
A1 XMTR FWD PWR	NORMAL	00W	200W	256W	D1	0.1	MAJ
A2 XMTR RVS PWR	NORMAL	00W	0W	10W	D1	0.1	MIN
A3 TOWER LIGHTS	NORMAL	0.00V	3.4V	4.4V	D3	0.1	MAJ
A4 12VDC SUPPLY	NORMAL	00.0V	12.0V	14.0V	D8	0.1	MAJ
A5 PROTEK TEMP	NORMAL	26C					MIN

RETURN Key = Main Menu, "N" = next screen, or "Z" = repaint							

ANALOG INPUTS

Shows the analog input number and the alpha descriptor assigned by the user. Since the alphanumeric descriptor will be sent to a modem-equipped device or to an alpha pager, the user may wish to enter a phrase indicating the nature of the problem if non-technical personnel will be recipients of the alert. "Low RF power" would be more easily understood in such a case than would "XMTR1 VSWR", for instance.

CURRENT STATUS

Contains the status of the input on the last scan by the ProTek prior to screen display.

NORMAL indicates an input is enabled and not in an alarm or active state.

ACTIVE indicates a qualifier input is enabled and in an active state.

MINOR indicates an input is enabled and in a minor alarm state.

MAJOR indicates an input is enabled and in a major alarm state.

DISABLE indicates an input has been disabled by the user.

CUR LVL

Contains the value of the input in volts (V), watts (W), degrees Celsius (C), or percent humidity (%). Note that the input is read even when disabled.

LOWER LIMIT

Contains the lower limit in volts, watts, degrees Celsius, or percent humidity programmed by the user in the **I/O Parameters** screen. An input falling below this level will go active.

UPPER LIMIT

Contains the upper limit in volts, watts, degrees Celsius, or percent humidity programmed by the user in the I/O Parameters screen. An input rising above this level will go active.

QLFD BY

Indicates that the input will go active only when the qualifier specified is also active.

TIME DELY

Indicates the delay assigned by the user. The input must fall outside of the nominal value for at least this period of time before an alert call is generated.

ALRM TYPE

Displays the alarm type assigned by the user (ACK, INT, MAJ, MAQ, MA2, MA3, MIN, or QLF).

I/O Status Report - Digital Inputs

Site Name: Test		Time: 01:21						
Site ID: 0003		Date: 04/08/97						
I/O Status Report - Digital inputs								
DIGITAL INPUTS	CURRENT STATUS	CUR LVL	ACT LVL	QLFD BY	TIME DELY	ALRM TYPE	TIME ACTIVE	PREVIOUS DAY
D1	DIGITAL KEY	NORMAL	H	L		QLF	00:00:00	02:12:23
D3	TOWER LIGHTS ON	NORMAL	H	L	0.1	QLF	00:00:00	00:00:05
D6	SITE SECURITY	NORMAL	H	L	1.0	MAJ	00:00:00	00:00:00
D7	FIRE	NORMAL	H	L		MAJ	00:00:00	00:00:00
D8	PROTEK AC	NORMAL	H	L		MIN	00:00:00	00:00:00

RETURN Key = Main Menu, "N" = next screen, or "Z" = repaint								

DIGITAL INPUTS

Displays the input number and the 16 character alphanumeric descriptor assigned by the user.

CURRENT STATUS

Shows the current status of the input. The possible states are the same as for the analog inputs described above.

CUR LVL

Displays the current level of the input. L = Low (-12 to +0.8 VDC) and H = High (+2.4 to +12 VDC). Note that this level is read by the ProTek even if the input is disabled. Further note that equipment not adhering to TTL or EIA standards may not be properly read by the ProTek. This is a failure of the monitored equipment to provide standard logic levels and may require modification of that equipment. In some causes, especially those where the external equipment does not supply a true logic low, an analog input may be programmed to function reliably in the place of a digital input

ACT LVL

Shows the active level (H or L) assigned by the user.

QLFD BY

Displays any qualifying input link to this input by the user. This qualifier must also be active for an alarm to be generated for this input.

TIME DELY

Shows any time delay assigned by the user.

ALRM TYPE

Displays the alarm type assigned by the user.

TIME ACTIVE

Shows how long the input has been active since midnight of the current day.

PREVIOUS DAY

Displays how the input was active the previous 24 hours (midnight to 23:59:59).

I/O Status Report - Input Activity

Site Name: Test				Time: 01:21					
Site ID: 0003				Date: 04/08/97					
I/O Status Report - Input activity									
INP #	NUMBER	TEL/RELAY STATUS	CURRENT TYPE	ALRM TYPE	EVENT TIME	TIME	INACT TIME	WAIT	MAXACT
I1	5550000	MAJOR	MAJ	NO ACTIVITY	0030	2	0060		
I2		NORMAL	MAJ		0600	1	0900		
I3									
I4									

RETURN Key = Main Menu, "N" = next screen, or "Z" = repaint:									

INP

I1, I2, I3, and I4 monitor digital inputs D1, D3, D5, and D7 respectively. Unprogrammed inputs are not displayed.

TEL/RELAY NUMBER

Displays the telephone number or relay output number assigned by the user to activate the input. A numeric pager number may be entered to forced terminal activity. A relay may be specified to force a PTT or other control line active. A relay may also be used to enable a device according to a schedule using the INACT FIELD and MAXACT TIME fields.

CURRENT STATUS

Four states are possible:

NORMAL indicates that the test is enabled and not in an alarm state.

MINOR indicates that the test is enabled and in a minor alarm state.

MAJOR indicates that the test is enabled and in a major alarm state.

DISABLE indicates that the test has been disabled by the user.

ALRM TYPE

Displays the alarm type (major or minor only).

EVENT TYPE

Displays NO ACTIVITY or INPUT STUCK if either test has failed.

INACT TIME

Displays the length of time in minutes the ProTek will wait without seeing input activity before attempting to force the input active with a call to the telephone number or by turning on the relay output defined in the TEL/RELAY NUMBER field above.

WAIT TIME

Displays the system delay time in minutes the ProTek will wait after the activity call before checking the input's status. If this value is 0 and no parameter is programmed in the Telephone Number field, an immediate alarm will occur upon test failure.

MAXACT TIME

Displays the number of minutes the input can stay on continuously without alarm.

I/O Status Report - Relay Outputs

Site Name: Test	Time: 17:29	
Site ID: 1111	Date: 04/06/97	
I/O Status Report - Relay outputs		
Relay outputs	Status	Controlling inputs

R1	Relay 1	OFF D1
R2		OFF A2
R3		OFF A3
R4		OFF A4
R5		OFF D5
R6		OFF D6
R7		OFF D7
R8		OFF D8
R9		OFF
R10		OFF
R11		OFF
R12		OFF
R13		OFF
R14		OFF
R15		OFF
R16		OFF

RETURN key = Main Menu, "N" = next screen, or "Z" = repaint:		

The relay outputs screen summarizes any relays controlled by inputs as follows:

RELAY OUTPUT

Lists the relay output number and the 16 character alpha description assigned by the user.

STATUS

Displays the current status of each output as follows:

- OFF** Output is in a normal off state.
- ON** Output has been turned on by a controlling input.
- FCD-OFF** The user has forced the output off with the Force Relay Off command.
- FCD-ON** The user has forced the output on with the Force Relay On command.
- LTCH-ON** The relay is latched on and will stay on until released by the user.

CONTROLLING INPUTS

For informational purposes only, no entry can be made. To change a controlling input, the user must use the **Parameter Menu** screen. The input descriptor is identical to that previously described. Relay outputs programmed for latched operation by that controlling input are shown with an "L" following the number.

Event History Report

Site Name: Test	Time: 01:21			
Site ID: 0003	Date: 04/08/97			
Event History Report				
04/04/97-00:36:38	D3	DIGITAL INPUT 3	MAJ ALARM	L
04/04/97-00:36:37	D1	DIGITAL INPUT 1	MAJ ALARM	L
04/04/97-00:36:36	D2	DIGITAL INPUT 2	MAJ ALARM	L
04/04/97-00:36:33	SYS	SYSTEM MESSAGE	RESET UNIT	
04/04/97-00:36:33	SYS	SYSTEM MESSAGE	AC-PWR-ON	
04/04/97-00:36:27	SYS	SYSTEM MESSAGE	AC-PWR-OFF	
04/04/97-00:36:24	D3	DIGITAL INPUT 3	RTN-TO-NRM	H
04/04/97-00:36:24	D2	DIGITAL INPUT 2	RTN-TO-NRM	H
04/04/97-00:36:23	D1	DIGITAL INPUT 1	RTN-TO-NRM	H
04/04/97-00:36:21	D2	DIGITAL INPUT 2	MAJ ALARM	L
04/04/97-00:35:11	D1	DIGITAL INPUT 1	MAJ ALARM	L
04/04/97-00:34:38	D3	DIGITAL INPUT 3	MAJ ALARM	L
04/04/97-00:34:32	USR	COMMAND	ALERT-ACK	
04/04/97-00:34:29	D3	DIGITAL INPUT 3	RTN-TO-NRM	H
04/04/97-00:34:28	USR	COMMAND	ALERT-ACK	
04/04/97-00:34:02	D3	DIGITAL INPUT 3	MAJ ALARM	L
04/04/97-00:33:58	D1	DIGITAL INPUT 1	RTN-TO-NRM	H
***More to come, press RETURN to continue or "ctrl-c" to exit				

The **Event history report** lists all significant ProTek events in their order of occurrence. The ProTek records the 511 most recent events in non-volatile memory and lists the most recent event first. When the log is full, the oldest event is overwritten. If the number of events exceeds the screen's capacity, and the VDT is "smart", the message MORE TO COME, PRESS RETURN TO CONTINUE, OR CNTL-C TO EXIT: will be displayed at the bottom of the screen. If the VDT is "dumb", the data will scroll off the screen. CTRL S and CTRL Q may be used to stop and restart the scrolling.

The fields are described in the following sections:

DATE-TIME

Displays the date and time to the nearest second, in 24-hour format the event occurred.

ID

Identifies the cause of the event. There are five classes of Identifiers:

Inputs	A1 – A8 and/or D1 – D8
Outputs	R1 – R16
Input activity tests	I1 – I4
User	USR
System	SYS

NAME

Shows the alpha descriptor for inputs and outputs. If the event is caused by input inactivity, the telephone number or relay output number for that input activity test is displayed. If the event is caused by the user, the field contains **COMMAND**. If the event is caused by the system, the field shows **SYSTEM MESSAGE**. Events that may be reported by the **SYSTEM MESSAGE** are: **RESET UNIT**, **AC-PWR-ON**, **AC-PWR-OFF**, **CALL RETRY**, **CALL FAIL**, and **TIME LOG**. A **RESET UNIT** is performed following a loss of AC power in the ProTeks without DC back up.

EVENT describes the actual event that occurred as follows:

MAJ ALARM	major alarm
MIN ALARM	minor alarm
RTN-TO-NRM	The input described has returned to normal from an alarm state.
DISABLED	The input described has been disabled by the user.
ENABLED	The input described has been enabled by the- user.
UNPROGRAM	The input described has been Unprogrammed by the user.
FORCED ON	The relay output described has been forced on by the user.
FORCED OFF	The relay output described has been forced off by the user.
RELEASED	The relay output has been released from user control or unlatched.
ALERT-DIS	The alert call sequence has been disabled by the user.
ALERT-ENB	The Alert Call Disable command has been canceled by the user.
ALERT ACK	The alert call sequence has been acknowledged by the user.
RESET UNIT	The system has been reset.
HIST CLRD	The Event history report has been cleared by the user.
MAJ-NO ACT	The input activity test failed and is a major alarm.
MAJ-STUCK	The input stuck active test failed and is a major alarm.
MIN-NO ACT	The input activity test failed and is a minor alarm.
MIN-STUCK	The input stuck active test failed and is a minor alarm.
AC-PWR-ON	AC Power has gone from off to on.
AC-PWR-OFF	AC Power has been lost.
CALL RETRY	An outbound call did not complete and was reattempted.
CALL FAIL	An outbound call and its retry did not complete.
TIME LOG	A digital input active time count placed in the Event history report at midnight.

LEVEL

Shows the input level at the time the event was logged. Digital inputs are shown as either H (High) or L (Low) levels. Note that events are logged regardless of their consequences. Some events may cause no action; for example, forcing a relay off that is already off. To clear the log of all events, you may either enter the command CLR from the Command Menu or while in this screen.

Command Menu

Site Name: Test	Time: 01:22
Site ID: 0003	Date: 04/08/97

Command Menu

1XYY	Disable input for SIM X, Input YY (YY = A1-A8, D1-D8)
2 XYY	Enable input for SIM X , Input YY (YY = A1-A8, D1-D8)
3XY	Disable inp activity test (X = 1 or 6), Station Y (Y = 1-4)
4XY	Enable inp activity test (X = 1 or 6), Station Y (Y = 1-4)
5RYY	Force relay on where YY = relay output number (1-16)
6RYY	Force relay off where YY = relay output number (1-16)
7RYY	Release relay where YY = relay output number (1-16)
8	Disable alert call
9	Enable alert call
ACK	Acknowledge alert call
CLR	Clear the event history log

RETURN key = Main Menu or enter command:

The **Command Menu** allows the user to control the ProTek remotely. The commands and the required entries are listed on the screen. Execution of these commands is logged in the **Event history report**. Note that inputs and input activity tests can not be enabled or disabled if they are in the UPG (unprogrammed) state.

Disable Input

This command (1XYY) disables any activity that may be caused by that input. The input level out of limits (or at an active level, if digital) will not cause an alarm, turn on a controlled relay, or qualify another input if it is a qualifier. Note that an unprogrammed input cannot be disabled. When an input or input activity test is disabled, the ProTek resets its status to Normal. If the input is active when it is subsequently enabled, it must go through a full qualification cycle before the ProTek will put it in the active state.

Enable Input

This command (2XYY) cancels the **Disable Input** command.

Disable Input Activity Test

The **Disable Input Activity Test** command (3XY) disables the no activity test and the stuck input test.

Enable Input Activity Test

This command (4XY) cancels the **Disable Input Activity Test** command.

Force Relay

The **Force Relay** commands (5RYY and 6RYY) will override any controlling input and force the relay to the state commanded.

Release Relay

The **Release Relay** command (7RYY) returns control of the relay to its programmed controlling input(s). This is the only way to clear a previously latched relay.

Disable alert call

The **Disable alert call** command abort any alert calls in progress and prevents any future alerts from causing such calls.

Enable alert call

The **Enable alert call** command cancels the **Disable alert call** command. If an alert call was in progress when the **Disable alert call** command was issued, it will be resumed following the **Enable alert call** command.

ACK

The ACK command is entered in response to an alert call, and causes the ProTek to halt the alert call sequence. This command also resets the front panel major and minor alarm indicators. Remember that any digital input may be designated as an ACK type. An input so designated will, when driven active, acknowledge all alerts currently in effect. Depending upon the user programming, users artificially generating a manual alert call for testing purposes may not be able to acknowledge the alert quickly enough to prevent one alert call being sent. Users wishing to avoid any outbound alert calls in such a situation should disable the alert call using the command found on the command menu (screen 4). In practice the best way of using this input will be to use a momentary pushbutton switch across the digital input designated as an ACK type.

CLR

The CLR command causes the Event history log to be cleared of all previously stored events. The log is cleared of all events except the CLR command just executed. This command may also be executed from the Event history report screen.

Telco Auto-answer delay

This allows the user to place a second telephone device on the POTS line shared with the ProTek monitor. The second device should be set to answer on a ring greater than that set in the ProTek. In other words, if the ProTek is set to automatically answer an inbound call on the first ring, the secondary device should be set to answer no earlier than the second ring. To allow the secondary device to be accessed, the user would log in by modem, type DLY at the command prompt of the command menu (screen 4), and log off. The ProTek will ignore any inbound call for the next three minutes and so allow the secondary device to answer the inbound call. The ProTek will return to its normal auto-answer behavior at the end of the three-minute period. The DLY command is not in the existing menu structure but will be included as space permits.

Hidden Commands

The following “hidden” commands may be entered on the command menu (screen 4). The commands are documented here primarily as an aid for technicians supporting the ProTek. Their availability and operation may change without notice.

DLY	Discussed above under Telco Auto-answer delay. Will be on the menu eventually.
RST	A soft reset of the unit such as is done at power up. This command initializes all working registers but does not erase the user programming. The unit will disconnect the local and modem communication links during the reset.
XST	Forces a status call. This command may be used to confirm communications to the device in phone slot one, and the Telco path in general. This command may be given during either a modem or local VDT connection. If given during a modem connection, the status call will go out when the modem is available again.
XCE, XCM	A monitor's memory may now be remotely reinitialized by entering XCE <return>, XCM <return> at the Commands menu prompt.
XTO	Provides for a nailed-up modem connection. This command defeats the communications timeout that would normally disconnect any inactive comm link after three minutes. The ProTek will disconnect if the carrier is lost. The XTO command toggles the parameter. The present state will be indicated after the command is given. The nailed-up state is valid only during the connection in which XTO command is given.

System Relay Configuration

Site Name: test	Time: 01:22
Site ID: 0003	Date: 04/08/97

System Relay Configuration

#	Description	Controlling inputs			
R1	BACK UP XMTR	A1			
R2	BACKUP 12VDC	A4			
R3	SITE ALARM	D6	D7		
R4				I2L	
R5					
R6					
R7					
R8					
R9					
R10					
R11					
R12					
R13					
R14					
R15					
R16					

RETURN key = main menu, "Z" = repaint, or the desired relay # (1-8):

The System Relay Configuration menu allows the user to enter up to a 16 character alphanumeric descriptor for each of the eight relay outputs as part of the system initialization. Note that only the description field can be edited on this screen. Controlling inputs are programmed on the appropriate I/O Parameters screen. Description of the individual fields and their contents are the same as those for the Relay Status screen previously discussed.



General VDT Guidelines

The Video Display Terminal (VDT) provides the user the primary means of controlling the ProTek operation. While the ProTek supports several types of VDTs, the following general guidelines should be noted:

All data entries must be terminated by pressing the RETURN or ENTER key. Throughout the manual, this key is always implied if not specifically stated.

The ProTek responds to entry errors by sending the BEL code to the VDT, which usually will result in a beep. An error message will be displayed on the bottom line of the screen for some entry errors.

All information screens represent the state of the ProTek at the time the screen is requested, but may be updated by pressing Z RETURN while the cursor is on the last line of the screen.

- The user can return to the Main Menu from any screen at any place on the screen by entering CTRL C.
- When a major alarm occurs a BEL code will be sent to the VDT every minute until the VDT operator acknowledges the alarm. Acknowledging by telephone will stop alert calls to the person, but not the BEL code to connected and active VDTs.

Smart Terminal Operation

The cursor is positioned in the field of interest and the user enters data directly in this field. The RETURN key is used to skip fields. The BACKSPACE key can be used to correct entry errors prior to pressing the RETURN key. To empty previously entered programming from a field enter <control> y followed by a <retu rn>.

The System Status Report and Event history report are presented a full screen at a time. If more data is available for display the last line will display the message: MORE TO COME, PRESS RETURN TO CONTINUE. On some terminals, the user can type CTRL S to temporarily stop the data flow to the screen. The data flow can be restarted by CTRL Q.

Whenever the ProTek detects an entry error in a data field, the BEL code is sent to the VDT, the erroneous entry is erased, and the cursor is repositioned to the end of the field.

Dumb Terminal Operation

For input screens 5, 6, or 7 the cursor is positioned on the last line of the screen where the field descriptor and field contents are displayed. As data is entered in each field, that line is scrolled up and the next field appears on the last line. The RETURN key is used to skip fields. The BACKSPACE key can be used to correct entry errors prior to pressing the RETURN key

The time is updated only when the screen is refreshed.

When changing from one screen to another, some of the last lines of the previous screen may be displayed at the top of the screen along with the new screen.

When the ProTek detects an entry error in a data field, the BEL code is sent to the VDT. The entry is not accepted but still displayed. The user may now enter the correct data; however, the invalid data will remain until the screen is refreshed

The System Status Report and Event history **report** may require multiple screens to display all the information. In this case, the data will scroll off the screen until all information has been sent by the ProTek. Entering CTRL S will temporarily stop the data scrolling. CTRL Q will resume the scrolling

B

Special Applications Programming

Programming ProTek to monitor tower lights is complicated by the number of different lighting methods used and their associated controllers. The simplest installation is one with a tower light controller that has built in monitoring with contact-closure alarm outputs. Simply connect the dry contact closures to ProTek's digital inputs. Systems without built in monitoring require the use of PageTek's Tower Light Sensors. The sensor requires the power lead to the lights be routed through the sensor. The specific model sensor used is a function of the maximum AC current drawn. Each sensor provides a linear output of 0-5 VDC. To translate AC current flow to DC voltage measured by ProTek at the Analog input, use the following formula:

$$\text{AC Current Flow (in amperes)} = \text{DC Volts}/5$$

The sensor is connected to one of ProTek's analog inputs set to the 5V scale. The Upper Limit should be programmed to a value slightly larger than the maximum current flow with all lights on. The Lower Limit must be programmed to a value slightly higher than the maximum current flow with the lowest wattage light out. The limits programming is the same regardless of the type of light. Flashing Lights and Photocell-Controlled Lights will require additional programming described later.

Steady Burning Lights

This type of light is on all of the time at the same intensity and is the simplest to program. After installation of the sensor in the power lead to the lights, calculate or measure the normal current flow with all lights operational. Add 10% to this value and program it as the Upper Limit. Calculate or measure the current flow with the lowest wattage light out. Add 5% to this value and program it as the Lower Limit. No qualifiers are required for lights that are always on at the same intensity. Program a Time Delay value of 1.0 seconds. Set the Alarm Type to Major and anytime a single (or multiple) light failure occurs you will be alarmed.

For example, if the normal current flow with all lights on is 20 amperes, a sensor rated at 25 amperes is required. Program the Upper Limit to 22 amperes/S = 4.4V. If the current flow with the lowest wattage light out is 16 amperes, program the Lower Limit to 17 amperes/S = 3.4V. If a suitable trigger signal is not available, the analog input's Time Delay field is used to insure false alarms are not created during the off period. Calculate or measure the time of one period (the time required to complete one full on and one full off cycle). This time is typically 3 seconds (20 flashes/minute). To insure some leeway, program a value of 3.5 seconds in the Time Delay field. The analog input must go out of limits and remain out of limits continuously for 3.5 seconds to cause an alarm. With this scheme, any one light out will cause the Analog input to go active. The I/O Parameters -Analog inputs screen programming is shown on the next page.

Site Name: test		Time: 01:23							
Site ID: 0003		Date: 04/08/97							
I/O Parameters Menu - Analog inputs									
INP INPUT		LOWER	UPPER	VLT	QLFD	TIME	ALRM	PGM	CONTROLLED
#	DESCRIPTION	LIMIT	LIMIT	SCL	BY	DELY	TYPE	STAT	RELAYS

A1	TOWERLIGHTS	3.4V	4.4V	5		1.0	MIN	ENB	1
A2	TOWERLIGHTS	3.4V	4.4V	5		3.5	MIN	ENB	1
A3									
A4									
A5									
A6									
A7									
A8									

RETURN key = main menu, "N" = next screen, "Z" = repaint, or inp # (1-5):									

Flashing Lights

After installation of the sensor in the power lead to the flashing lights, program the Upper and Lower Limits with the values calculated (or measured) just as shown above for the steady burning lights case. Since the AC current flow is periodic, care must be taken to insure the Analog input does not alarm during the time the light is off and the Lower Limit is exceeded. The preferred method of accomplishing this is to use the trigger signal to qualify the Analog input. If the trigger signal is available from the controller at a level compatible with ProTek's Digital Input, connect this signal to a digital input and program the appropriate Active Level, with a Time Delay of 0.1 seconds, and the Alarm Type as a qualifier. Program the tower light sensor Analog input's QLFD BY field with this digital input number.

Site Name: test		Time: 01:23							
Site ID: 0003		Date: 04/08/97							
I/O Parameters Menu - Analog inputs									
INP INPUT		LOWER	UPPER	VLT	QLFD	TIME	ALRM	PGM	CONTROLLED
#	DESCRIPTION	LIMIT	LIMIT	SCL	BY	DELY	TYPE	STAT	RELAYS

A1	TOWERLIGHTS	3.4V	4.4V	5	D1	1.0	MIN	ENB	1
A2									
A3									
A4									
A5									
A6									
A7									
A8									

RETURN key = main menu, "N" = next screen, "Z" = repaint, or inp # (1-5):									

Photocell-Controlled Lights

If the tower lights are controlled by a photocell, the photocell state signal must be connected to either D1, D3, DS, or D7 in order to use the Input Activity Tests (I1, I2, I3, or I4) to confirm proper photocell operation. Connect this signal to an odd digital input and program the appropriate Active Level, a Time Delay of 0.1 seconds, and the Alarm Type as a qualifier. Go to the Input Activity screen and program the Inactive Time field to a time greater than the time the photocell will normally be off (typically the length of daylight, 8 to 12 hours or 480 to 720 minutes). Optionally the Maxactive Time field may be programmed to detect photocell stuck on failure. (Note that the photocell may be on during daylight hours if visibility is restricted.) Program the Maxactive Time field to a time greater than the time the photocell will normally be on (typically the length of darkness). Program the Alarm Type as Major so an Alert Call will occur if the photocell fails to come on, or if

the photocell remains stuck on. Program the Controlled Relays field with a Relay Output number latched (L). This relay driver output should be connected to a relay that is wired in such a way as to force the photocell on signal active thus insuring the tower lights are activated even if the photocell fails. Typical programming is shown below:

Site Name: Test							Time: 18:57	
Site ID: 111							Date: 04/06/97	
I/O Parameters Menu - Input activity								
INP	TELEPHONE	INACT	WAIT	MAXACT	ALRM	PGM	CTLD	
#	NUMBER	TIME	TIME	TYPE	STAT	RELAYS		
	(OR RELAY)	(MIN)	(MIN)	(MIN)				

I1	600			900	MAJ	UPG	ENB	R1L
I2							UPG	
I3							UPG	
I4							UPG	

RETURN key = Main Menu, "N" = next screen, "Z" = repaint, or stn # (1-2):								

In this example, Relay Output R1 is used to drive an external relay that will force the tower lights on continuously in case of photocell failure. Note that the relay is latched and the user will have to input a release relay command after the problem has been corrected.



Alert Call Message Structure

The following alert calls are representative of the formats possible for the five types of reporting devices supported by the 24+. These were sent by Site 1111, site name Raleigh, NC and are reporting a low on the D7 and D8 inputs or a stuck on activity input I1. Exact formatting may vary depending upon the characteristics of your devices, especially when using an alphanumeric pager.

Type 1, Voice

This is the format of alert calls sent to a voice telephone number. The following messages are spoken by the ProTek 24+:

“Alert Call - Site 1111, Input D8, Major Alarm, Present Status: Input D8 Major Alarm”

“Alert Call - Site 1111, Activity Test 1, Off, MAJOR ALARM”

“Alert Call - Site 1111, Activity Test 1, On, MAJOR ALARM”

Type 2, VDT / Printer

*Alert Call - Site: 1111 Raleigh, NC **Call Time: 07/19/97-12:23:22
07/19/97-12:20:22 D8 Protek AC Power Major L
MAJOR ALARM = D8

*Alert Call - Site: 1111 Raleigh, NC **Call Time: 07/19/97-12:23:22
07/19/97-12:20:22 555-0000 Major Stuck

Type 3, Voice pager

Identical to the type 1 voice call above.

Type 4, Numeric pager

The first four digits are the numeric site ID. The two-digit number following the hyphen indicates the failed input. The first digit represents the input type as follows:

X-2Y Analog input Y on SIM X

X-3Y Digital input Y on SIM X

X-7Y Input activity Y on SIM X

The second digit indicates the input number.

1111-1-21 means Site 1111 analog input A1 of SIM 1

1111-1-32 means Site 1111 digital input D1 of SIM 1

1111-1-71 means Site 1111 Activity Test I1 of SIM 1

No notification of a Return-to-Normal is possible in the numeric pager format. The alert call generated will simply indicate an alarm on the input that returned to normal.

Type 5, Alphanumeric pager

*Alert-Site: 1111 - Raleigh, NC * D8 PROTEK AC * MAJ ALARM * L MAJ=D78

The above alert call indicates major alarms occurring on D7 and D8. Notice that only the first input to alarm, in this case D8 PROTEK AC, is designated in the main body of the message. Notice that the final field indicates any additional alarm states at the time of the alert call. If D8 was programmed as a MA2 type, and the input returned to normal before the above alert call was acknowledged the following alert would be generated:

*Alert-Site: 1111 - Raleigh, NC * D8 PROTEK AC * MAJ ALARM * L MAJ=D7

The above message indicates at the time of the alert call only D7 was in a major alarm state. One can therefore infer that D8 has returned to its nominal state. If D7 and D8 had both returned to normal the final tag would read "MAJ = None".

If the first alert call had been acknowledged or had completed its calling sequence as dictated by the System Parameters programming, and D8 returned to its nominal state, the following alert call would be sent instead.

*Alert-Site: 1111 - Raleigh, NC * D8 PROTEK AC * RTN - TO - NRM * H MAJ=D7

This indicates that D8 has returned to normal, but that D7 is still in an alarm state.

The following alert is in response to excessive activity on activity input I1:

*Alert-Site: 1111 - Raleigh, NC * I1 5550000 * MAJ-Stuck

A status report to an alphanumeric pager will look like this:

STATUS-SITE: 1111- Raleigh, NC MAJ=D7 MIN=A1234 RLY=1 FRC=2

In this example the D7 input is in a major alarm condition, analog inputs A1 through A4 are in a minor alarm state, Relay 1 is active, and Relay 2 has been forced on by the user.



24+ Aux Serial Ports

The two optional auxiliary serial ports may be set to terminal mode or pass-through mode. The characteristics of either port may be independently configured in terms of function, speed, character size and parity. Occasionally the characteristics of the external client devices may require adjustment of local echo, line feeds or other characteristics for best operation. To program the ports, access the monitor either by the front panel local VDT port or remotely by modem and go to the I/O Parameters Menu - Serial ports (type 70, N, N, N from the 24+ main menu). All configurations are immediately enabled after entry.

Mode

Choose 1 for pass-through mode or 2 for terminal mode.

Speed

The port speed defaults to a baud rate of 9600 bps. Valid entries are 38400, 19200, 9600, 1200, and 300. Generally, the aux port speed should be equal to or slower than the inbound user connection. Though the 14400 modem connection with compression will handle the aux port speed of 38400 bps with ease, the front port speed may need to be adjusted higher if the traffic is higher than the buffer can handle. In practice, most messages are relatively terse and should give no problems.

Character size and parity

Designate the character size in bits and the parity (N for none, E for even, or O for odd). Generally 8N or 7E is expected here.

Operation

The command screen (Screen 4) has a command Px, where x is the port to be connected to. After connection use the client device as if connected directly. While connected, only the following commands will be recognized by the 24+:

- ~~ Send a tilde out the serial port
- ~. Disconnect from the port
- ~# Send a 500ms break

Special cases

When using an aux port in terminal mode, it is possible to command pass-through operation of the port back to itself. To recover from the loop back mode and regain interactive operation the user must terminate the connection at the aux terminal and then log back into the 24+. This is because the ~. disconnect sequence is ignored in terminal mode.

The front port can successfully connect in pass-through mode to either auxiliary port, even those configured as terminal ports. The pass-through connection may be terminated from the front port (but not from the port that accepted the connection).

One aux port may connect to the other aux port in pass-through mode when the initiating port has been programmed as a terminal port and the other is configured as a pass-through. The connection may be terminated only by the initiating port.

Pass-through operation to the front port cannot be initiated nor terminated by the rear ports. Pass-through operation to the modem port cannot be initiated nor terminated by any serial port.

All ports, including the virtual port supporting the modem may function concurrently. Modem operation, either in interactive connection or during an alert calling sequence, will operate in the background while any serial port is active.

The auxiliary ports may be independently configured as either DCE or DTE by appropriate orientation of the configuration plugs DTE1 and DTE 2 found on the main PCB. Placing the plug so that the jumpers face outward place the port in DTE mode. Reverse the orientation for DCE mode.



24+ Firmware Upgrade Procedure

The firmware of the 24+ is generally upgraded by transfer of a new firmware image to the monitor using an xmodem transfer. It may, however, occasionally be required that the EPROM be physically changed if certain portions of the code are revised.

Firmware images are distributed either as binary images (filename extension BIN or FSH) or as PKZIP-compatible files (extension ZIP). If you have a ZIP file, you will need to first uncompress it with WinZip or PKUNZIP to obtain the BIN file.

Replacing the firmware EPROM:

1. Loosen the four thumbscrews securing the cabinet and separate the chassis from the top.
2. Locate U33, which is located roughly in the center of the PCB.
3. Remove the existing U33 and replace with the new EPROM.
4. Perform a JU4 reset. (Place jumper JU4 in the forward position with the power off, turn on power, wait for self test to complete, and replace JU4 in the original position.)
5. Reinstall the cabinet top and reprogram the monitor to your requirements.

Upgrading the firmware by xmodem transfer:

1. Obtain a PC or laptop running communications software capable of XMODEM or 1K-XMODEM transfers. ProComm Plus and other commonly available software support this protocol, as do the later versions of Microsoft HyperTerminal.
2. Copy the firmware BIN file to a working directory of the PC.
3. If the monitor firmware is to be upgraded locally, connect the PC to the monitor's local VDT port. If the ProTek Alarm LED is on and the unit is sending characters to the programming PC, set the port speed of the PC to 38400 bit/s and skip to step 5. If no characters are being displayed on the PC, continue to step 4. If the monitor firmware is to be remotely upgraded via modem, establish a modem connection to the monitor in the same manner for normal operation and continue to step 5.
4. Enter your password, select a terminal type, go to the command menu (option 4 from the main menu), and enter the command "XFL" followed by the return or enter key. After a few seconds, the message "Begin flash file transfer now" should appear.
5. Begin the transfer of the firmware file using XMODEM or 1K-XMODEM protocol (1K-XMODEM is preferred if available).

Refer to your communication software user's guide for specific instructions regarding the file transfer process. Immediately after the last block of the file is received, the ProTek will reset. The ProTek Alarm LED will turn off after this reset to indicate that the load was successful. If the transfer failed, the "Begin flash file transfer now" message will appear and you should reinitiate the transfer.

Under normal circumstances, a flash load will either succeed or fail in such a way that the transfer can be restarted. If not, move JU6 toward the back panel of the unit and cycle power. The ProTek Alarm LED will

remain on, the “Begin flash file transfer now” message will appear, and a load can be started. This procedure may also be followed to reload programming after it has been lost due to servicing, corruption, or keep alive battery failure.



Front and Rear Panel Features

Front Panel

Local VDT On Indicator

This indicator is on whenever there is an active VDT connection.

Major Alarm Indicator

This indicator lights when an input programmed as a major alarm is in the active state and is unacknowledged.

Minor Alarm Indicator

This indicator lights when an input programmed as a minor alarm is in the active state and is unacknowledged.

ProTek Alarm Indicator

This indicator blinks, usually with another LED, when the internal diagnostics indicates a failing function.

Dial Line In Use Indicator

This indicator is on when the Telco interface is off hook or is being commanded by the firmware to go off-hook.

Power On Indicator

This indicator is on when the power switch on the rear panel is on and internal 5 volts D.C. is present.

Local VDT Connector

This DB-25 connector is used to interface to a local VDT.

Rear Panel

Modular RJ11 Jack

This connector (labeled DIAL LINE) provides the interface to the Public Switched Telephone Network (PSTN).

Site Interface Connector

This 50 pin female connector labeled contains all the relay contacts, relay drivers, site digital inputs, site audio, and major and minor alarm relay driver outputs. A 50-row punch block may be provided to facilitate access to the various signals.

Station Interface Module (SIM) Connector

Each SIM card has one connector located on the rear of the card that accepts a 25 pair cable. Each SIM card has a designated number (1-6) left to right when viewed from the rear of ProTek.

Aux Serial Ports

There are two optional serial communications ports accepting male DB-9 connectors. Both ports can be designated as either DCE or DTE with configuration plugs on the main P.C. board.

DC Input

A two-position Molex connector labeled DC INPUT is used to connect an external 12VDC power source. The 24+ will automatically switch to this input if 120VAC is not present.



Interfacing guidelines

Analog inputs

Since the PSIM card has common analog returns, it is not possible to measure both negative and positive voltages with the same card since all equipment must be at the same ground potential. In normal use the voltage scale used by the ProTek is automatically changed to match the attenuation selected with the scaling jumpers. It is possible however to offset scaling and attenuation to decrease attenuation when using certain sensors. Since the tokens and algorithms for some sensors expect specific scaling the 24+ will not accept a W token on an input set to a 5V scale.

Digital inputs

The digital inputs are designed for TTL or EIA logic levels. Some equipment, including transmitter controller PTT lines, may not adhere to these standards. Specifically, some equipment using solid state switching may be improperly biased due to the pull-up voltage supplied by the ProTek digital input. Frequently such equipment will hang in transmit after the PTT attempts to dekey because the line does not truly sink to a logic low, but instead draws biasing current from the ProTek internal 5V pull-up. Removal of the internal pull-up is possible but then the ProTek frequently can not sense a key from the equipment. This is not a failure of the ProTek or necessarily of the equipment monitored. It is, however, a design shortcoming of the monitored equipment that can be circumvented by one of the following methods:

1. The most common approach would be to drive an external relay with the PTT line. The resulting contact closure would drive the digital input to a logic LOW and yield the further advantage of complete isolation from the monitored equipment.
2. Alternatively, the input can be configured to respond appropriately to the PTT by replacement of the existing 5V pull-up with a pull down to ground and reversal of the series input diode. The printed circuit board itself would not be modified or damaged by the reconfiguration and could be later reconfigured to the original specs if needed.
3. The PTT can be correctly sensed by a standard analog input that is in turn used to qualify the RF sensor, but analog inputs may be required for other uses.

Relay drivers

Each relay driver will sink up to 100ma of current supplied by an external supply not to exceed 32VDC.

Physical Interconnection

The following tables indicate pin-outs for the various interface connections.

RJ-21 Site Interface Connector Pin-out. (J19)

Pin	Signal	Color
01	Relav 1 NO Contact	Blue/White
02	Relav 1 NC Contact	Orange/White
03	Relav 2 NO Contact	Green/White
04	Relav 2 NC Contact	Brown/White
05	Relav 3 NO Contact	Gray/White
06	Relav 3 NC Contact	Blue/Red
07	Relav 4 NO Contact	Orange/Red
08	Relav 4 NC Contact	Green/Red
09	Opto-isolated Input D6 Low	Brown/Red
10	Site Digital Input 1	Gray/Red
11	Site Digital Input 2	Blue/Black
12	Site Digital Input 3	Orange/Black
13	Site Digital Input 4	Green/Black
14	Site Digital Input 5	Brown/Black
15	Site Digital Input 6	Gray/Black
16	Site Digital Input 7	Blue/Yellow
17	Digital Ground	Orange/Yellow
18	Digital Ground	Green/Yellow
19	Digital Ground	Brown/Yellow
20	Digital Ground	Gray/Yellow
21	Major Alarm Relay Driver	Blue/Purple
22	Opto-isolated input D7 Low	Orange/Purple
23	Digital Ground	Green/Purple
24	Unused	Brown/Purple
25	12VDC	Gray/Purple
26	Relav 1 NO Contact	White/Blue
27	Relav 1 NC Contact	White/Orange
28	Relav 2 NO Contact	White/Green
29	Relav 2 NC Contact	White/Brown
30	Relav 3 NO Contact	White/Gray
31	Relav 3 NC Contact	Red/Blue
32	Relav 4 NO Contact	Red/Orange
33	Relav 4 NC Contact	Red/Green
34	Opto-isolated Input D6 High	Red/Brown
35	Relav Driver 5	Red/Gray
36	Relav Driver 6	Black/Blue
37	Relav Driver 7	Black/Orange
38	Relav Driver 8	Black/Green
39	Relav Driver 9	Black/Brown
40	Relav Driver 10	Black/Gray
41	Relav Driver 11	Yellow/Blue
42	Relav Driver 12	Yellow/Orange
43	Relav Driver 13	Yellow/Green
44	Relav Driver 14	Yellow/Brown
45	Relav Driver 15	Yellow/Gray
46	Relav Driver 16	Purple/Blue
47	Opto-isolated Input D7 High	Purple/Orange
48	Minor Alarm Relay Driver	Purple/Green
49	Unused	Purple/Brown
50	12VDC Return	Purple/Gray

RJ-21 Site Interface Connector Pin-out by Function

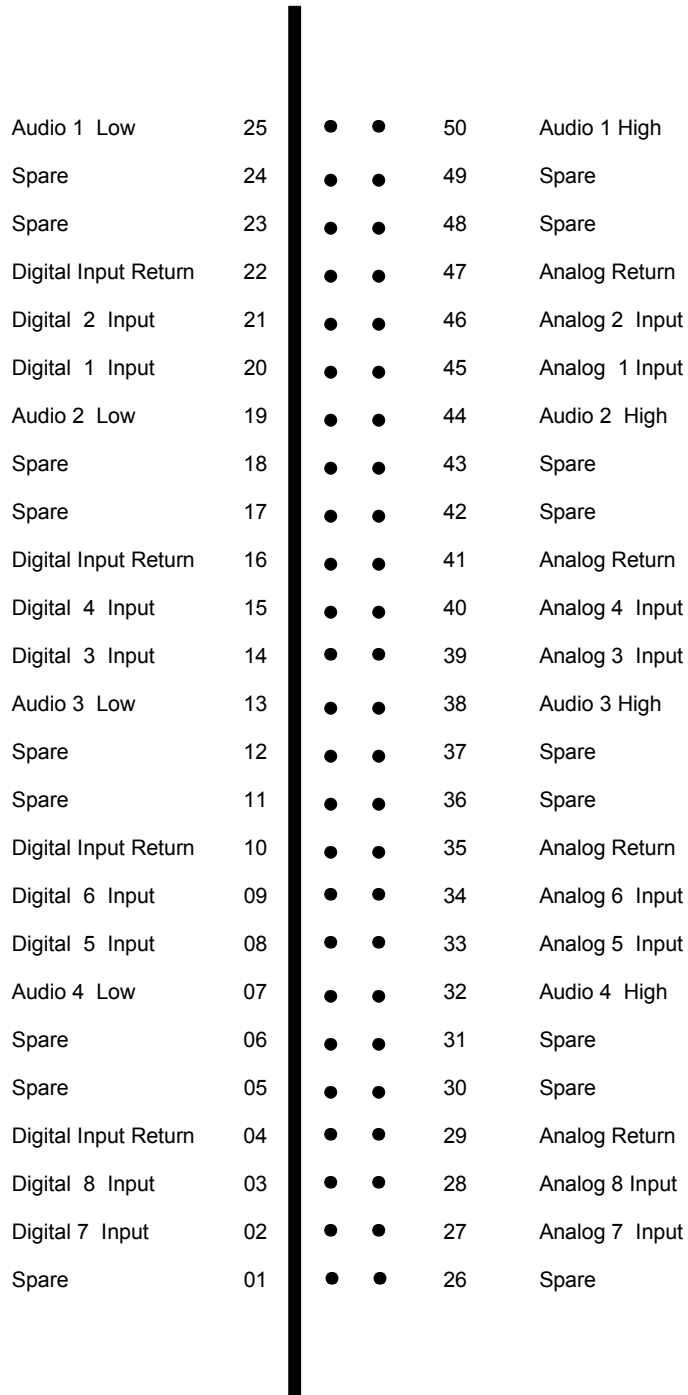
Signal	Pin	Color
12VDC	25	Gray/Purple
12VDC Return	50	Purple/Gray
Digital Ground	17	Orange/Yellow
Digital Ground	18	Green/Yellow
Digital Ground	19	Brown/Yellow
Digital Ground	20	Gray/Yellow
Digital Ground	23	Green/Purple
Major Alarm Relay Driver	21	Blue/Purple
Minor Alarm Relay Driver	48	Purple/Green
Opto-isolated Input D6	34	Red/Brown
Opto-isolated Input D6	09	Brown/Red
Opto-isolated Input D7	47	Purple/Orange
Opto-isolated input D7	22	Orange/Purple
Relay 1 NC Contact	02	Orange/White
Relay 1 NC Contact	27	White/Orange
Relay 1 NO Contact	01	Blue/White
Relay 1 NO Contact	26	White/Blue
Relay 2 NC Contact	04	Brown/White
Relay 2 NC Contact	29	White/Brown
Relay 2 NO Contact	03	Green/White
Relay 2 NO Contact	28	White/Green
Relay 3 NC Contact	06	Blue/Red
Relay 3 NC Contact	31	Red/Blue
Relay 3 NO Contact	05	Gray/White
Relay 3 NO Contact	30	White/Gray
Relay 4 NC Contact	08	Green/Red
Relay 4 NC Contact	33	Red/Green
Relay 4 NO Contact	07	Orange/Red
Relay 4 NO Contact	32	Red/Orange
Relay Driver 10	40	Black/Gray
Relay Driver 11	41	Yellow/Blue
Relay Driver 12	42	Yellow/Orange
Relay Driver 13	43	Yellow/Green
Relay Driver 14	44	Yellow/Brown
Relay Driver 15	45	Yellow/Gray
Relay Driver 16	46	Purple/Blue
Relay Driver 5	35	Red/Gray
Relay Driver 6	36	Black/Blue
Relay Driver 7	37	Black/Orange
Relay Driver 8	38	Black/Green
Relay Driver 9	39	Black/Brown
Site Digital Input 1	10	Gray/Red
Site Digital Input 2	11	Blue/Black
Site Digital Input 3	12	Orange/Black
Site Digital Input 4	13	Green/Black
Site Digital Input 5	14	Brown/Black
Site Digital Input 6	15	Gray/Black
Site Digital Input 7	16	Blue/Yellow
Unused	24	Brown/Purple
Unused	49	Purple/Brown

SIM Interface Connector Pin out

Pin Number	Function	Wire Color Code
01	Spare	Gray/Purple
02	Digital Input 7	Brown/Yellow
03	Digital Input 8	Gray/Yellow
04	Digital Ground	Blue/Purple
05	Spare	Orange/Purple
06	Spare	Green/Purple
07	Audio low, Station 4	Brown/Purple
08	Digital Input 5	Green/Black
09	Digital Input 6	Brown/Black
10	Digital Ground	Gray/Black
11	Spare	Blue/Yellow
12	Spare	Orange/Yellow
13	Audio low, Station 3	Green/Yellow
14	Digital Input 3	Orange/Red
15	Digital Input 4	Green/Red
16	Digital Ground	Brown/Red
17	Spare	Gray/Red
18	Spare	Blue/Black
19	Audio low, Station 2	Orange/Black
20	Digital Input 1	Blue/White
21	Digital Input 2	Orange/White
22	Digital Ground	Green/White
23	Spare	Brown/White
24	Spare	Gray/White
25	Audio low, Station 1	Blue/Red
26	Spare	Purple/Gray
27	Analog Input 7	Yellow/Brown
28	Analog Input 8	Yellow/Gray
29	Analog Ground	Purple/Blue
30	Spare	Purple/Orange
31	Spare	Purple/Green
32	Audio high, Station 4	Purple/Brown
33	Analog Input 5	Black/Green
34	Analog Input 6	Black/Brown
35	Analog Ground	Black/Gray
36	Spare	Yellow/Blue
37	Spare	Yellow/Orange
38	Audio high, Station 3	Yellow/Green
39	Analog Input 3	Red/Orange
40	Analog Input 4	Red/Green
41	Analog Ground	Red/Brown
42	Spare	Red/Gray
43	Spare	Black/Blue
44	Audio high, Station 2	Black/Orange
45	Analog Input 1	White/Blue
46	Analog Input 2	White/Orange
47	Analog Ground	White/Green
48	Spare 1	White/Brown
49	Spare 3	White/Gray
50	Audio high, Station 1	Red/Blue

SIM Pin-out Diagram

SIM PCB Connector as viewed from outside cabinet



System Initialization Worksheet

System Parameters Screen

FIELD	DESCRIPTION	VALUE	NOTES
A	Password		Any four to eight digit combination
B	Site Name		up to 16 Alphanumeric Characters
C	Site ID		Any four digits combination
D	Time		Use 24 hour format: HH:MM
E	Date		Use the MM/DD/YY
F	Alert Call Sequence		Up to 4 entries separated by commas
G	Alert Call Attempts Per Type		Acceptable entry: 0-4, <i>default 2</i>
H	Alert Call Attempt Interval		Acceptable entry: 1-9 minutes, <i>default 5</i>
I	Status Report Time		Use 24 hour format, <i>default none</i>
J	Status Interval		Acceptable entry: 1-9 days, <i>default none</i>
K	Terminal Answer Detect		Suggested entry: 3, <i>default 3</i>
L	Timed Value		Suggested entry: 0-9 2.5 seconds units, <i>default 0</i>
M	Number of Alert Calls		Suggested entry: 0-9, <i>default 0 (for unlimited calls)</i>

Telephone Number Screen

	TYPE	TELEPHONE #	ALPHA PAGER #	ALPHA PASSWORD
1				
2				
3				
4				
5				
6				
7				
8				

1 = Voice, 2 = VDT/Printer, 3 = Voice Pager, 4 = Numeric Pager, 5 = Alphanumeric Pager

System Logging Configuration Screen 5.3

#	EVENT TYPE	STATE
1	MAJOR ALARM	
2	MINOR ALARM	
3	INPUT ENABLE/DISABLE/UNPROGRAM	
4	RELAY FORCE/RELEASE	
5	AC POWER ON/OFF	
6	ALERT CALL ENABLE/DISABLE/ACK	
7	ALERT CALL FAIL/RETRY	
8	TIME LOG	
9	RESET, HISTORY CLEAR	

Site Interface Digital Input Screen

INP #	INPUT DESCRIPTION	ACT LVL	QLFD BY	TIME DELY	ALRM TYPE	PGM STAT	CONTROLLED RELAYS
1							
2							
3							
4							
5							
6							
7							
8							

Activity Screen

INP #	TELEPHONE NUMBER (OR RELAY)	INACT TIME (MIN)	WAIT TIME (MIN)	MAXACT (TIME) MIN	ALRM TYPE	PGM STAT	CTLD RELAYS
I1							
I2							
I3							
I4							

System Relay Configuration Screen

#	DESCRIPTION	CONTROLLING INPUT*
R1		
R2		
R3		
R4		
R5		
R6		
R7		
R8		
R9		
R10		
R11		
R12		
R13		
R14		
R15		
R16		

*For Reference only, controlling inputs to be programmed on I/O screens

SIM Configuration

Analog input Screen

INP #	INPUT DESCRIPTION	LOWER LMT	UPPER LIMIT	VLT SCL	QLFD BY	TIME DELY	ALRM TYPE	PGM STAT	CONTROLLED RELAYS
1									
2									
3									
4									
5									
6									
7									
8									

Digital Input Screen

INP #	INPUT DESCRIPTION	ACT LVL	QLFD BY	TIME DELY	ALRM TYPE	PGM STAT	CONTROLLED RELAYS
1							
2							
3							
4							
5							
6							
7							
8							

Activity Screen

INP #	TELEPHONE NUMBER (OR RELAY)	INACT TIME (MIN)	WAIT TIME (MIN)	MAXACT (TIME) MIN	ALRM TYPE	PGM STAT	CTLD RELAYS
11							
12							
13							
14							

Copy this page as needed for additional SIMs.

SPECIFICATIONS

Mechanical

Cabinet Dimensions: 19" Wide x 5.25" High x 12.25" Deep

Weight: 10 lbs.

Mounting: 19 inch rack or tabletop

Operating Temperature: -30° to 60° Celsius

Electrical

Interface Connectors

50 pin RJ-21 connector for analog inputs, digital inputs, audio inputs, and relay driver outputs

DB-25 connector for local port RS232C communications.

RJ-11 modular telephone jack

2 Pin Molex connector for D.C. Power Input

3 Pin Molex connector for A. C. Power Input.

DB-9 (2) for optional 2nd and 3rd serial I/O ports

Power

AC Power Input: 115 VAC Wall Mount Transformer, 12 VAC output

DC Power input 12 VDC nominal (10.5 - 18 volts)

Power Consumption: 3 Watts maximum

Ram & Clock Battery Backup: 3.5 volt Lithium cell

VDTs Supported

ANSI / VT-100, Qume QVT102, Televideo TV910/950, ADDS 3A+, ADDS VP1/VP2. Any 'dumb' VDT (one with no cursor positioning capability).

Interface Specifications

Analog inputs

Each input has 5 selectable voltage ranges; 0-2.5, 0-5, 0-10, 0-20, and 0-40 VDC

Input impedance: 100K ohms

Maximum input voltage: ± 50 VDC.

Resolution is $\pm 0.4\%$ of full scale.

Accuracy for DC volts.

Accuracy for Watts: $\pm 5\%$.

Digital Inputs

Each input accepts TTL or EIA levels.

Low level -12 volts to +0.8 volts D.C.

High level +2.4 to +12 volts D.C.

Undriven state is high (pulled up through an internal resistor to +12 VDC)

The input is diode protected internally against negative voltages

Active level is user programmable.

Audio Inputs

Input level: -20 dBm to + 11 dBm for 300-3000 Hz.

Input impedance: 10K ohms

Relay Drivers

Each driver is an open collector capable of sinking 100 milliamps @ 32 volts D.C. maximum. (An internal jumper must be removed for any driver switching voltages greater than 12 volts.)

Relays

Each relay is a 4PDT relay with contact rating of 1 amp. In practice, current capacity will be limited by the interface wiring.

RS-232C Ports

Asynchronous Serial RS-232C interface, DCE or DTE.

1 Start, 8 Data, 1 Stop Bits (No parity).

XON-XOFF Flow Control.

Internal Modem Port Baud Rate: 14.4 KBPS V.32bis

Local Serial Port(s) 1200, 9600, 19200, 38400

Telco Coupler

Standard Loop Start Interface with Tone Signal.

Meets Part 68 of FCC Requirements for Network Interface

Ringer Equivalence Number: 0.2

Document revisions

Date	Page(s)	Changes made to document	New Doc Number
2003.11.11	21-22	Corrected error in DTMF commands for input enabling, disabling, and monitoring.	2003111101