GLOBAL
MONITORING

Messenger 560

Remote Monitoring System

USER'S GUIDE

*It's never been
so easy, fast, or
inexpensive to
monitor remote sites*

Congratulations on your acquisition of the Messenger 560 Remote Monitoring System.

Installation and operation of the Messenger 560 system have been designed so that you can easily, effortlessly realize the remote possibilities placed at your fingertips by this state-of-the-art telemetry unit.

This User's Guide outlines the handful of easy, straightforward steps you need to take to prepare the Messenger 560 system for its monitoring, alarm, control, and other assignments.

We are committed to helping you realize the "remote possibilities." If there is a question that cannot be answered quickly and completely in our documentation please call our Technical Support Hotline.

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Installation

This section describes the procedure for installing the Messenger 560 system. It includes details on how to mount the unit in a suitable location, connect it to a phone line and power source; and attach sensors or instrumentation to it to meet your specific monitoring, alarm, and control needs.
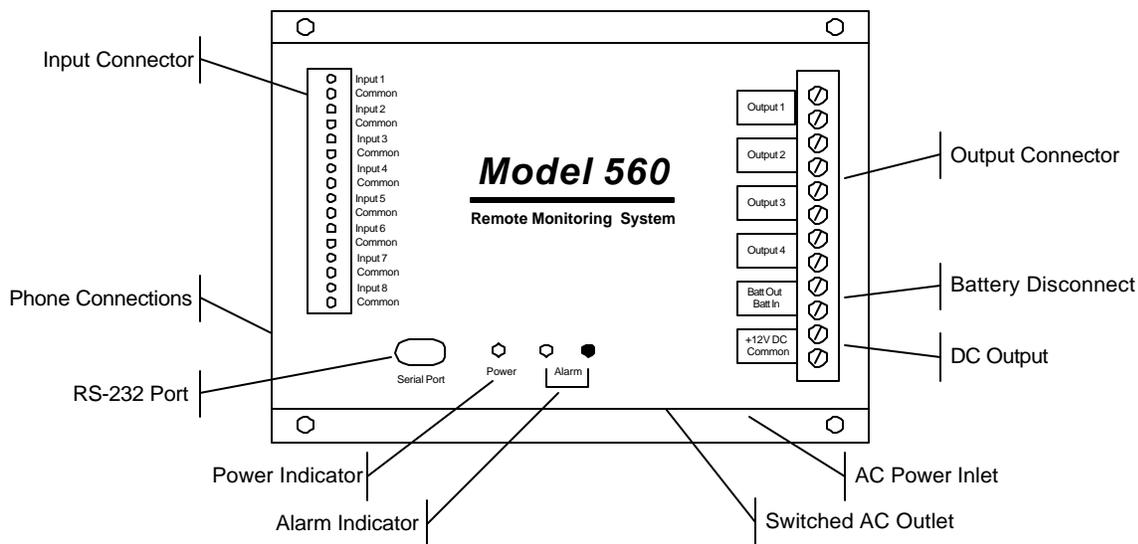
A "home" for your Messenger 560

Your new Messenger 560 should be located in a convenient location close to the conditions being monitored - in a warehouse, basement, utility closet or other work area, mounted on a wall, or mounted inside an equipment cabinet.

When mounted in an optional NEMA-4X weatherproof enclosure, the Messenger 560 can be used in damp or dusty environments or placed outdoors.

If the outputs of the Messenger 560 are used to switch voltages in excess of 30 volts, the unit must be mounted in an approved electrical equipment enclosure.

Connecting a Phone Line

The Messenger 560 is designed to work on most public phone systems found throughout the world. It will also work on most office PBX phone systems. With optional equipment, it will also work on cellular phone systems and with low-orbiting satellites.

■ **Standard Phone Lines**

For your convenience, the Messenger 560 has a dual phone jack. You <u>*must*</u> attach the telephone line to the jack labeled "LINE". You can also attach a standard telephone to the jack labeled "PHONE". It is recommended that you use this standard telephone to check the phone line for dial tone and the ability to make incoming and outgoing phone calls.

■ **Cellular Phones**

The Messenger 560 will also work with North American analog cellular phones equipped with a dial-tone adapter. Contact technical support for details.

Connecting a Power Source

The Messenger 560 is factory configured to operate on 110 VAC 50/60 Hz <u>OR</u> 220 VAC 50/60 Hz. It can also operate from 12 VDC.

■ **AC Operation**

Plug the Messenger 560's power cord into a properly grounded (three-wire) electrical outlet. The power required by the Messenger 560 is 20 watts plus the wattage of the load (if any) attached to the "AC Switched Output" connector.

■ **DC Operation**

Connect the positive lead of a 9 to 15 VDC source to the "DC IN" terminal and connect the negative lead to the "Common" terminal.

IMPORTANT: When using DC power, the Messenger 560's AC power cord MUST be disconnected AND its backup battery MUST be disabled by removing the jumper from between the "BATT OUT" and "DC IN" terminals.

■ **Solar Operation**

The Messenger 560 can be powered by a properly sized solar panel. Contact technical support for details.

Backup Battery

The Messenger 560 system has an internal rechargeable battery that maintains full operation in the event of a power outage. This battery must be enabled when the unit is put into service and disabled when taken out of service. All information programmed into the Messenger 560 system will be retained whether or not the battery is connected to the system.

NOTE: An auxiliary DC power output on the Messenger 560 system can be used to power external sensors and accessories. It provides 12 volts DC (nominal) at up to 200 mA. This power is taken from the Messenger 560 system's backup battery and will provide uninterruptible power, even during a power outage.

■ **Enabling the Backup Battery**

Attach the shorting clip (included with the unit) between the "BATT OUT" and "DC IN" terminals. If the shorting clip is lost, a short length of wire can be used. Once enabled, the battery will require up to 24 hours to fully charge.

■ **Disabling the Backup Battery**

To disable the backup battery, remove the shorting clip from between the "BATT OUT" and "DC IN" terminals.

■ **Testing the Backup Battery**

When operating from AC power, the power light on the front panel of the Messenger 560 system is green. When operating from battery, the power light is red.

Test the battery at least once per year by removing the Messenger 560's AC power source for 10 to 15 minutes and verifying that the power light changes to red and that the unit responds to an incoming phone call.

Attaching the Inputs

The Messenger 560 system supports eight universal inputs that can accept a variety of input types.

Inputs 1 through 4 are factory pre-configured to accept 4-20 mA signals while inputs 5 through 8 are factory pre-configured to accept dry-contact signals. It is easy to re-configure an input to accept 4-20 mA, 0-5 VDC, thermistor, logic-level, dry-contact or other signal types in any combination.

■ **DIP Switch Settings**

Removing the input connector reveals two banks of DIP switches as illustrated in the figure below. Each bank has eight switches labeled 1 through 8 corresponding to inputs 1 through 8. The upper bank controls 200-ohm shunt resistors (required for current monitoring applications) while the bottom bank controls pull-up resistors (required for temperature monitoring and dry-contact applications.

Shunt Resistors — 1 2 3 4 5 6 7 8

Pull-Up Resistors — 1 2 3 4 5 6 7 8

OFF ◄—► ON

Input 1 / Common / Input 2 / Common / Input 3 / Common / Input 4 / Common / Input 5 / Common / Input 6 / Common / Input 7 / Common / Input 8 / Common
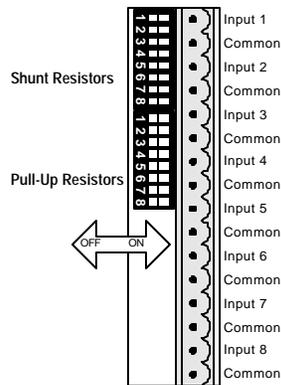
■ **Input Wiring**

Inputs should be wired with 14 to 20 gauge wire. Twisted pair cable is recommended for runs in excess of 20 feet. Input devices requiring 12 VDC can be powered from the Messenger 560's 12 VDC auxiliary output terminal.

When wiring the inputs, keep in mind that they share a common ground and that the input signals must not exceed 5 VDC or 25 mA.
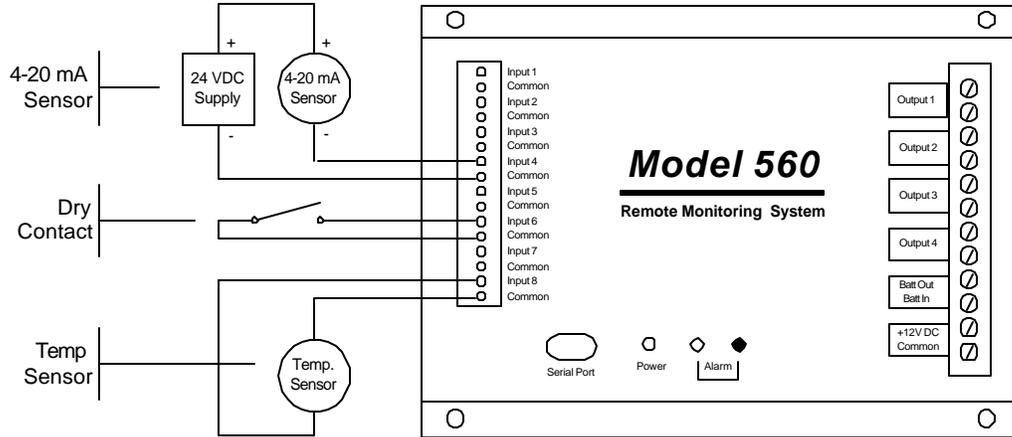
Temperature Sensor

Flip to OFF the shunt resistor DIP switch for the input you want to modify and flip to ON the pull-up resistor DIP switch.

Attach the temperature sensor to the input screw terminals (contact technical support for a list of compatible thermistor temperature sensors). Use the INP S command to set the scaling and alarm parameters (refer to the Command Reference section).

0-5 VDC Sensor

Flip to OFF the shunt resistor DIP switch for the input you want to modify and flip to OFF the pull-up resistor DIP switch.

Attach the 0-5 VDC sensor to the input screw terminals. Use the INP S command to set the scaling and alarm parameters (refer to the Command Reference section).

4-20 mA Sensor

Flip to ON the shunt resistor DIP switch for the input you want to modify and flip to OFF the pull-up resistor DIP switch.

Attach your 4-20 mA sensor to the input screw terminals. Keep in mind that the Messenger 560's internal shunt resistor is referenced to common and that no other device in the loop can be referenced to ground. If it is impossible to isolate the other devices in the loop, a signal isolator may be required.

Use the INP S command to set the scaling and alarm parameters (refer to the Command Reference section).

Dry Contact Switch

Flip to OFF the shunt resistor DIP switch for the input you want to modify and flip to ON the pull-up resistor DIP switch.

Attach your dry contact sensor to the input screw terminals. Use the INP S command to configure the input for a dry-contact sensor (refer to the Command Reference section).

TTL Logic

Flip to OFF the shunt resistor DIP switch for the input you want to modify and flip to OFF the pull-up resistor DIP switch.

Attach the TTL sensor to the input screw terminals. Use the INP S command to configure the input for a dry-contact sensor (refer to the Command Reference section).

<u>**Open Collector**</u>

Flip to OFF the shunt resistor DIP switch for the input you want to modify and flip to ON the pull-up resistor DIP switch.

Attach the open-collector sensor to the input screw terminals. Use the INP S command to configure the input for a dry-contact sensor (refer to the Command Reference section).

<u>**110/220 VAC**</u>

Caution: An interposing relay MUST be used to monitor 110/220 VAC signals.

Flip to OFF the shunt resistor DIP switch for the input you want to modify and flip to ON the pull-up resistor DIP switch.

Wire the 110/220 VAC signal to the coil of a suitably rated relay. Wire the relay contacts to the input screw terminals. Use the INP S command to configure the input for a dry-contact sensor (refer to the Command Reference section).

<u>**Other**</u>

To connect a thermocouple, millivolt or other type sensor to the Messenger 560, use an appropriate signal conditioner. Contact technical support for assistance.

Connecting the Outputs

The Messenger 560 has four outputs that can be controlled remotely or automatically in response to alarm conditions or input parameters. The control capabilities of these outputs are described in the "Control" section of this manual.

■ Output Relays

Each of the four outputs is capable of switching 5 amp loads. Note: When switching voltages in excess of 30 volts, the Messenger 560 must be placed in an approved enclosure.

■ Switched AC Outlet

You can also plug equipment (seven amp maximum load) into the "Switched AC" power outlet located on the side of the unit (110 VAC units only). This switched outlet works in unison with the output 1 relay on the front panel.

Communications

This section describes the procedure for establishing communication with a Messenger 560 system. It includes details on how to use the RS-232 port, a phone line for data, voice and pager communication, and how to put data into the web.

Using a Phone Line

Data, voice or pager? It's your decision!

The Messenger 560 system can communicate over a standard phone line with a computer or pager. It also offers a powerful, easy-to-use voice mode for ready-access to information from your equipment anytime, from any standard telephone.

The data mode will allow you to review inputs, set up and reconfigure any Messenger 560 system from a remote location, retrieve stored information, and perform diagnostics from your PC.

The voice mode offers the convenience of inquiry into condition status from any standard telephone, and provides a high-quality, clear, consistent voice without the need for set up, programming, or recording.

IMPORTANT ☏	*Information intended exclusively for voice-mode users is highlighted in this guide by a telephone icon and use of this different type face*

■ **Voice Mode**

☏ *The Messenger 560 will respond to your call by generating a carrier tone - indicating that the system is attempting to communicate with a data terminal. The tone will eventually stop after a few seconds and the Messenger 560 will switch to voice mode and speak in a synthesized voice:*

"Hello, this is telephone number five, five, five, one, two, one, two. Enter security code."

Enter your eight-digit security code on the touch-tone keypad (initially set at the factory to 1, 1, 1, 1, 1, 1, 1, 1). The Messenger 560 system will respond "OK."

The voice mode of the Messenger 560 system utilizes a built-in voice enunciator that responds to commands entered from any standard push-button tone-dialing telephone. You enter command codes from the telephone keypad and response messages are spoken in English.

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*Voice Mode commands consist of a three-letter code followed by either the # or * key. The following commands are available in the Voice Mode:*

> *ALM#   = Alarm acknowledge*
> *B Y E #   Terminate on-line session*
> *I N P #   Input report*
> *O U T #   Output report*
> *P H O #   Change dial-out phone number*
> *T I M #   System time report*

For example, typing INP# initiates an INPut report:
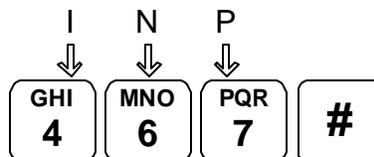
To end a voice mode session, simply type BYE#.

■ **Modem Mode**

You can communicate with the Messenger 560 system using a PC with a modem and any popular communications program having terminal emulation capability. One such communications program is "Hyperterminal", a program that is included free with the Microsoft Windows 95, 98, 2000 & NT 4.0 operating systems.

Since HyperTerminal is used throughout this manual to illustrate data mode operation, detailed instructions on its use are included in this section.

Defining a HyperTerminal Connection

To use HyperTerminal, you must first define a few parameters including the phone number of the Messenger 560. To start HyperTerminal, click **Start**, and then click **Programs**, **Accessories** and **Hyperterminal**. Look for an icon labeled **HyperTerminal** or **Hypertrm.exe** and click on it.

In the **Connect Description** box, type a name for the connection, choose an icon, then click **OK**.

In the **Connect To** box, enter the country/region, area code and phone number of the unit to be called and choose your computer's modem from the **Connect Using** list (Note: if your modem is not listed in the **Connect Using** list, it may not be installed properly). Click **OK**.

Click the **Dialing Properties** button to view information about the location of your computer. You may not have to make any changes to this box, but make sure the information is correct. If your modem is attached to an office phone system, you may need to enter a code (such as "9") to access an outside line. Verify that the **Number to be dialed** in the lower left corner of the box appears *exactly* as it would if you were to dial the Messenger 560 from your telephone. It *must not* include any extraneous numbers. Click **OK**.

Click **Properties**, **Configure**, **Connection, Advanced** and make sure that **Use Error Control** *is not* checked.

In the **Connect** box, click **Cancel**. It is now time to save your settings and exit the program. On the HyperTerminal menu bar, select **File**, **Save** and then **File**, **Exit**.

Establishing Communication

Once you've defined a connection to your Messenger 560, establishing communications with it is as simple as clicking on an icon.

Start HyperTerminal by clicking **Start**, **Programs**, **Accessories** and **Hyperterminal**. Look for the Messenger 560 connection that you've created and click on it.

When HyperTerminal starts, you will see the connection information in the **Connect** box. Click **Dial**. You may hear dialing tones or pulses followed by a "ring" sound, followed by modem tones, then a connection. Once a connection is established, the **Connect** box will close and the main HyperTerminal screen will become active.

If HyperTerminal fails to connect, re-check your settings (making sure that **Use Error Control** *is not* checked) and try again.

The Messenger 560 will prompt you to enter a security code. You must enter a valid security code within 30 seconds or the Messenger 560 will terminate the connection. If you don't know the security code, try the factory default security code, "11111111" (eight ones) followed by **Enter**.

Once you have gained access, you can enter commands and the Messenger 560 will respond. The commands to access the system are simple three-letter codes (e.g. INP = input, ALM = alarm, PHO = telephone), generally followed by a fourth letter (e.g. R = report, S = set).

You may enter a command whenever the "COMMAND>" prompt is displayed.

If you press **Enter** at the command prompt, you'll get a complete listing of commands. The most common commands are INP R (input status report), ALM R (alarm report) and SEC R (security report).

If an incorrect command is entered, you will receive an "Invalid Command" message.

In the following sections of this manual are step-by-step procedures that will help you prepare the Messenger 560 system to work for you - describing how to designate individuals you want to receive alarm messages, set low and high alarm set-points, etc.

Internet Access

An optional internet service is available that will generate detailed daily reports based on information collected by your Messenger 560 and post those reports to a website. Contact customer service for additional information.

Using the RS-232 Port

Attach a "straight-through" serial cable from your PC's COM port to the RS-232 port on the front panel of the Messenger 560 system.

Follow the procedure outlined in "Modem Mode" (above) to define a HyperTerminal connection, substituting your PC's COM port for the modem in the **Connect Using** list then click **Configure** and enter the following settings:

Bits per second: 4800
Parity: none
Stop bits: 1
Flow control: None.

Commissioning Checklist

The commissioning process tailors the Messenger 560 system to your unique remote monitoring application. This section outlines the <u>minimal</u> commissioning tasks required for many applications. Complete details relating to the commands mentioned in this section are discussed in further detail in the COMMAND REFERENCE section later in this manual.

IMPORTANT: The Messenger 560 remote monitoring system has many time and money-saving capabilities that can only be realized after having a thorough working knowledge of all of the commands described in the COMMAND REFERENCE section in this manual.

☑ Identify the System

The Messenger 560 has several programmable fields to help identify it in both voice and data modes. These fields include "site name" and "code number" (for data mode identification) and "unit phone number" (for voice mode identification).

The information that you enter in these fields will not affect the operation of the unit but will help you manage information from your remote sites.

Use the **SEC S** command to enter system identification information (refer to the Command Reference section).

☑ Configure the Inputs

The Messenger 560 accepts a variety of different input types.

Use the **INP S** command to instruct the Messenger 560 as to how to interpret and report this input data (refer to the Command Reference section).

☑ Configure the Data Logger

The Messenger 560's data logger can be configured to take periodic "snapshots" of designated inputs and/or record system events and alarm conditions.

Use the **LOG S** command to set logging parameters (refer to the Command Reference section).

☑ Configuring the Alarm Dialer

The Messenger 560 system continually monitors all inputs for alarm set-points that have been violated. If a set-point has been exceeded for a designated period of response time, the Messenger 560 system recognizes this as the existence of an alarm condition.

It will send the message to up to eight designated telephone numbers anywhere on or off site and at any time. If the calls are unanswered, the Messenger 560 system will wait a pre-set length of time and perform the complete dial-out sequence again.

The alarm dial-out sequence will continue – even if the alarm condition has cleared – until the alarm has been externally acknowledged.

To fully configure the alarm dialer, use the **INP S** command to set the alarm set-points and the **PHO O** command to program the dialing directory (refer to the Alarm Handling and Command Reference sections).

☑ Configuring the Output Controller

The Messenger 560 system can automatically control loads in response to input set-points or alarm conditions.

To configure the output controller, use the **INP S** command to set the control set-points and the **OUT S** command to define the control mode (refer to the Output Control and Command Reference sections).

Operation

Reports

The Messenger 560 generates a variety of concise text reports. Each report is updated just prior to generation and is time-stamped. An auto-report feature, when enabled, produces an input report at the beginning of each communication session without the need to enter a pass code. Reports can be accessed by any security level.

■ **Input Report**

To get a report of the present condition of the eight inputs, including any that may have exceeded an alarm set-point, type INP R at the command prompt.

Analog inputs will provide LO, HI, and OK status; discrete will provide AL and OK indicators.

```
COMMAND>INP R

INPUT STATUS REPORT
----- ------ ------
  #1 mA     OK        4.000
  #2 mA     OK        4.000
  #3 mA     OK        4.000
  #4 mA     OK        4.000
  #5 Swtch  OK    ON
  #6 Swtch  OK    ON
  #7 Swtch  OK    ON
  #8 Swtch  OK    ON

Time:  02/05/00 12:52:21
```

■ **Output Report**

To get a report of the present condition of the four outputs, type OUT R at the command prompt.

```
COMMAND>OUT R

OUTPUT STATUS REPORT
------ ------ ------
  #1 Relay   MANUAL OFF
  #2 Relay   MANUAL OFF
  #3 Relay   MANUAL OFF
  #4 Relay   MANUAL OFF

Time:  02/05/00 12:53:56
```

■ **Alarm Report**

To get a report of all alarms, including those that have not yet been acknowledged, type ALM R at the command prompt.

```
COMMAND>ALM R

ACTIVE ACKNOWLEDGED ALARMS
------ ------------ ------
None

UNACKNOWLEDGED ALARMS
-------------- ------
None

Time:  02/05/00 12:54:56
```

Alarm report. The Messenger 560 system will report all alarms and give you the option to acknowledge any unacknowledged alarms.

■ **Phone Directory Report**

To get a report of the designated dial-out phone names and numbers, type PHO R at the command prompt.

```
COMMAND>PHO R

DIAL-OUT PHONE NUMBERS
-------- ----- -------
  Office
    610-555-1212
  Pager
    610-555-4321
  CellFone
    610-555-9876
  Computer
    D610-555-7384
  Mike
    610-555-3810
  Lou
    610-555-9110
  Phone #7

  Phone #8
```

■ **Security Report**

To get a report of various system counters and timers, type SEC R at the command prompt.

Note: These counters and timers are non-volatile and will be retained even if all power is removed from the Messenger 560 system.

```
COMMAND>SEC R

SECURITY REPORT
-------- ------
  Dial-out Cycles     000007
  Access Denials      000002
  On Line Sessions    000026
  Service Outages     000000
  System Hours        000464
  Setup Commands      000008

Time:  02/05/00 12:54:56
```

Alarm Handling

The Messenger 560 system constantly monitors all inputs to determine if alarm set-points have been violated. If a set-point has been violated for a specified amount of response time, an alarm condition exists.

This alarm condition will continue until the input has returned to normal and has been externally acknowledged.

When an alarm occurs and the response time has expired, the Messenger 560 system will begin its dial-out sequence. The Messenger 560 system can deliver an alarm in voice or data mode.

The Messenger 560 system will dial each number in succession. If the alarm is not acknowledged, the Messenger 560 system will wait a specified alarm dial-out interval and then start another dial-out sequence with the same alarm message.

Alarms can be acknowledged in either data or voice mode.

There are two classes of alarms -

Active acknowledged alarms: The input continues to violate an alarm set-point but an operator has acknowledged the condition. The Messenger 560 system continues to recognize the alarm condition but will not attempt to make an outgoing phone call.

Unacknowledged alarms: Any alarms which have not been acknowledged. An unacknowledged alarm initiates an alarm dial-out sequence.

■ **Responding to an Alarm Message**

An alarm can be acknowledged by pressing the ALARM CANCEL switch on the front panel of the Messenger 560 system. You can also acknowledge and alarm through the serial port or modem by issuing the ALM R command.

The front panel indicator will remain on continuously when the alarms are acknowledged.

☎ *When an alarm is delivered in voice mode, the Messenger 560 system will repeat the alarm message up to six times:*

"Hello, this is telephone number one two three four five six seven. Alert condition exists."

Recipients of such calls should press and hold any keypad button for one to two seconds. The Messenger 560 system will respond with the following message:

"OK. Enter security code."

When a correct security code has been entered, the Messenger 560 System will acknowledge it, saying, "OK" You can now enter INP R to learn the cause of the input alarm condition and enter ALM# to acknowledge receipt of the alarm message.

☎ *To acknowledge an alarm and prevent the Messenger 560 system from dialing out again until new alarm conditions exist, type ALM#.*

Output Control

The Messenger 560 includes a straightforward output controller that enables you to activate or reset equipment remotely on demand or automatically in response to input set-points or alarm conditions.

Configuring an Output

Each output has several parameters that define how and when they will activate. To check or modify these parameters, type OUT S and select an output.

```
COMMAND>OUT S

SET/CHECK OUTPUT SETTINGS
--------- ------ --------
1 = Out #1    #1 Relay
2 = Out #2    #2 Relay
3 = Out #3    #3 Relay
4 = Out #4    #4 Relay
0 = Previous Menu

Choose a Number>1

Out #1
PRESENT SETTINGS
------- --------
1 = Label              #1 Relay
2 = On Time per Minute  60 Sec
3 = Control Mode        1
4 = Pulse Width         4 Sec
5 = Power-up State     Off
6 = Alarm Mask          FF
0 = Previous Menu

Choose a Number>
```

■ **Label**

A label is a short descriptive name that you assign to each output. By typing =HIDE=, you are able to remove an output from all reports (although it will continue to operate). To bring the input "out of hiding," simply enter a new label for that output.

■ **On Time per Minute**

This parameter is used to 'throttle' an output (rather than have it constantly on or off). If an output has been turned on, and this parameter is set for 40, then the output will cycle on for 40 seconds and off for 20 seconds (ad infinitum). If the parameter is set for 60, the output remains on constantly. The minimum value is one. The default value is 60 seconds. This feature is useful when controlling heaters and chemical feed pumps.

■ **Control Mode**

The output controller has several modes of operation that can be grouped into three categories: Manual, Automatic and Alarm. In manual mode, an output is controlled by commands issued by the user. In automatic mode, an output is controlled by "on" and "off" set-points on a designated input channel. In alarm mode, an output is controlled by the alarm status of the Messenger 560. You can mix or match control mode settings among the four output channels.

```
Out #1
AVAILABLE CHOICES
--------- -------
1 = Manual Control
2 = Auto - Day & Night
3 = Auto - Night
4 = Auto - Day
5 = Momentary
6 = Close - Present ALM
7 = Open - Present ALM
8 = Close - Unacked ALM
0 = Previous Menu

Choose a Number>
```

Manual Control

Manual control permits an operator to remotely control the on/off state of the four output relays.

Automatic - Day and Night

The output will automatically turn ON or OFF as determined by the Output OFF and Output ON control set-points on its corresponding input. Use the INP S command to set or change the control set-points.

Automatic - Night

Identical to "Automatic – Day and Night", except that control only occurs during nighttime hours. The output is off during daytime hours. Use the INP S command to set or change the control set-points and the DAY S to set or change "Day Start Time" and "Day Stop Time".

Automatic - Day

Identical to "Automatic – Day and Night", except that control only occurs during daytime hours. The output is off during nighttime hours. Use the INP S command to set or change the control set-points and the DAY S to set or change "Day Start Time" and "Day Stop Time".

Momentary

When an output defined as "Momentary" is toggled "on", it will stay "on" for a defined period of time them return to the "off" state.

<u>**Close - Present Alarms**</u>

The output will go on (close) when an alarm condition presently exists on any of the inputs designated by the alarm mask. A present alarm is considered to be active when an input alarm set point is exceeded for longer than the input's response time.

<u>**Open on Present Alarms**</u>

The output will go off (open) when an alarm condition presently exists on any of the inputs designated by the alarm mask. A present alarm is considered to be active when an input alarm set point is exceeded for longer than the input's response time.

<u>**Close on Unacknowledged Alarms**</u>

The output will go on (close) when an alarm condition exists on any of the inputs designated by the alarm mask, and stay on even if the alarm condition goes away. It will turn off (open) when the alarm condition is acknowledged.

■ **Pulse Width**

When the momentary output control mode is selected, this parameter specifies the width of the momentary output pulse.

■ **Power-up State**

By default, all outputs are off after a power-up reset. By changing the Power-up State setting to On, you can have an output turn on immediately after a reset.

■ **Alarm Mask**

When using one of the alarm modes to control an output, you must enter an alarm mask for that output. The alarm mask indicates which input's alarm conditions should be used to control the output. The alarm mask is a two character hexadecimal number representing an eight bit binary mask. The least significant bit of the mask correlates to input #1, the most significant bit of the mask correlates to input #8. If a bit in the mask is set to 0, alarms on the correlating input will **not** control the output. Conversely, if a bit is set to 1, an alarm on the correlating input will control the output.

As an example, if you want output #1 to be controlled by alarms on input channels 1 through 4, but ignore alarms on channels 5 through 8, you would use **0F** (equivalent to binary 00001111) as the alarm mask.

Call the Technical Support Hotline if you are unfamiliar with hexadecimal notation.

Controlling an Output

If an output is configured as manual or momentary, it can be interactively controlled in either voice or data mode.

In data mode, use the OUT O command and select the channel you want to control then use the spacebar to manually toggle the output "on" or "off".

☎ *In voice mode, the on/off state of the output is controlled by the operator with the On1# and On0# commands. Entering On1# turns output "n" ON and On0# turns output "n" OFF, where "n" is the desired output number (1-4).*

EXAMPLE: To turn output three OFF, press "0", "3", "0", "#" on the phone keypad. To turn output three ON, press "0", "3", "1", "#" on the phone keypad.

Output   Output

| MNO 6 | DEF 3 | OPER 0 | # | MNO 6 | DEF 3 | 1 | # |

        #3   Off   #3   On
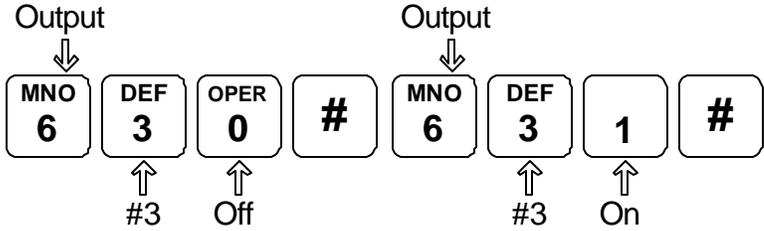
Data Logging/Trending

It is often desirable to track conditions (such as tank level or ambient air temperature) over extended periods of time. The Messenger 560 system provides this ability by recording and maintaining a history of input and output conditions - information that provides valuable insight into the operation of a process, equipment, or facility. This information can be readily accessed through the RS-232 port or via telephone.

Configuring the Data Logger

Whenever a system or log event occurs, the Messenger 560 system will write to memory a time-stamped record of parameters. To check or modify the data logging control parameters, type LOG S.

```
COMMAND>LOG S

DATA RECORDER FUNCTIONS
---- -------- ---------
1 = Set/Check log time
2 = Periodic log ON/OFF
3 = Alarm log ON/OFF
4 = Clear log
5 = High resolution log
0 = Previous Menu

Choose a Number>
```

■ **Set/Check Log Time**

When the data logger is configured for periodic logging, this parameter sets the data-logging interval. Valid intervals range from 1 second to 120 minutes.

■ **Periodic Log ON/OFF**

When enabled, the Messenger 560 system will automatically log all input and output conditions at regular intervals of time.

■ **Alarm Log ON/OFF**

When enabled, the Messenger 560 system will record all input and output conditions whenever an alarm event occurs.

■ **Clear**

This action permanently erases the contents of the data logger's memory. Note: you normally do not have to clear memory - when it is full, it will automatically clear the oldest information in its memory. You can use this clear function after you download the contents of the data logger's memory if you want to eliminate the possibility of downloading redundant information in the future.

■ **High Resolution Log**

When the high-resolution log is enabled then two bytes will be stored for each input selected for logging. When the high-resolution log is disabled, only one byte per selected input is logged.

Data Extraction and Analysis

Data from the Messenger 560 system can be downloaded in a readable format or in a file format compatible with most spreadsheet and data analysis programs. Select the desired format with the **LOG O** command.

```
COMMAND>LOG O

TRANSMISSION PROTOCOL
------------ --------
1 = ASCII
2 = Compressed ASCII
3 = Compressed XMODEM
0 = Previous Menu


Choose a Number>
```

■ **ASCII Format**

A readable text format with all data in comma-delimited fields as follows:

REC,MM/DD/YY hh:mm:ss, Reserved, XIN, A8, A7, A6, A5, A4, A3, A2, A1, O8, O7, O6, O5 ,O4, O3, O2, O1

REC	Record type.
MM/DD/YY	Month / Date / Year
hh:mm:ss.s	Hour: Minute: Second
Reserved	Reserved (Old Ack ID field.)
XIN	Extended Inputs (a decimal representation)
A8-A1	Analog input 8 through 1. Each input value is in engineering units. Un-logged inputs are represented by comma-separated null fields.
O8-O1	Digital outputs 8 through 1.

Record Type is a three-character field that describes the nature of the log entry:

ACK	Acknowledged alarm
ALM	An alarm condition occurred
HKR	(Hacker) Too many bad passwords entered
LOG	A time-initiated recording
NRM	An alarm condition returned to normal
OFF	The end of an on-line session
ON	The beginning of an on-line session

POW   A power failure alarm has occurred
RST   Hardware reset

■ **Compressed ASCII**

A geek-readable text format in which all commas and other punctuation are striped out all, and data is presented in hexadecimal notation. Downloads much faster than uncompressed ASCII.

■ **Compressed XMODEM**

The most reliable way to transfer large amounts of data from the Messenger 560 system to a personal computer is with the XMODEM file transfer protocol. Many communications programs (such as Hyperterminal) support the XMODEM protocol.

If a data error occurs during a file transfer (due to line noise, for example), XMODEM will detect the error and attempt to correct it.

Once you initiate an XMODEM data transfer, you have 30 seconds to tell your communications program to start the XMODEM transfer. Downloading a compressed log file is also possible. The data compression scheme used in the Messenger 560 system strips out all commas and other punctuation, and converts the data from ASCII decimal to binary. The result is a data file, which is at least one-fourth its original size and transfers in one-fourth the time of the original data file. To decompress the data to its original comma-delimited form, use the DOS decompression utility "D-COMP," which is included on the companion disk. The program will request the name of the input file and output file. When the conversion is complete, you will be able to view the data with any text editor or load the data into a spreadsheet program such as Lotus 1-2-3 or Excel.

Command Reference

To Messenger 560 remote monitoring system contains many features and functions that can save you both time and money. An understanding of the commands described in this section will help you maximize the return on your remote monitoring investment.

The commands in this reference are listed in alphabetical order.

ALM (Alarm Commands)

These commands configure the Messenger 560 system to continually monitors all inputs for alarm conditions. If a set-point has been exceeded for a designated period of response time, the Messenger 560 system recognizes this as the existence of an alarm condition.

■ **Help with the ALM command**

Type ALM at the command prompt and the Messenger 560 system will return a list of valid alarm commands and related instructions.

```
COMMAND>ALM

ALARM FUNCTIONS
===== =========
ALM R Alarm Report
ALM S Set/Check Alarm Settings
```

■ **Alarm Reports**

Type ALM R at the command prompt and the Messenger 560 system will generate an alarm status report.

```
COMMAND>ALM R

ACTIVE ACKNOWLEDGED ALARMS
====== ============ ======
None

UNACKNOWLEDGED ALARMS
============= ======
None
```

■ **Alarm Set-up**

Type ALM S at the command prompt and the Messenger 560 system will display a sub-menu of alarm related parameters that you can alter.

```
COMMAND>ALM S

SET/CHECK ALARM SETTINGS
--------- ----- --------
1 = Set/Check Siren
2 = Dialout Interval
3 = Set/Check Redial
0 = Previous Menu

Choose a Number>
```

Local Alarm Siren

When enabled, the Messenger 560 system's internal beeper will sound whenever an unacknowledged alarm exists. When disabled, the beeper will never sound.

Dial-out Interval

This parameter specifies the amount of time the Messenger 560 system will wait after attempting to dial every phone number before it will attempt to dial again.

BYE (End Session)

Type BYE at the command prompt and the Messenger 560 system will terminate the current session.

```
COMMAND>BYE
```

COM (Communications Gateway)

The Messenger 560 system provides a data path between its phone line modem and its local RS-232 port, allowing you to talk "through" the Messenger 560 system to an external computer or system.

■ **Help with the COM command**

Type COM at the command prompt and the Messenger 560 system will return a list of valid communications commands and related instructions.

```
COMMAND>COM

LOCAL SERIAL PORT FUNCTIONS
----- ------ ---- ---------
COM R  Connect Modem to RS232 Port
COM O  Set/Check Local RS232 Options
COM S  Gateway Mode
```

■ **Open Communications Gateway**

Type COM R at the command prompt and the Messenger 560 system will open a communications path between the modem and its serial port. This path can be used to establish communications with a secondary Messenger 560 system or almost any other device that has an RS-232 port.

When using the communications gateway, make sure that the RS-232 cable connecting the Messenger 560 system and secondary device supports full hardware (RTS/CTS) handshaking. If the secondary device does not support hardware handshaking, you must make sure that neither device transmits more data than the receiver can handle.

For example: If you have a Messenger 560 system operating its modem at 33.6 kbps and its RS-232 at 115 kbps you must make sure that the device attached to the RS-232 port does not transmit data at a sustained rate of 115kbps. Because the Messenger 560 system would be receiving data 3.5 times faster than it can send it, the receive buffer will fill up quickly. The Messenger 560 can buffer up to 256 incoming and outgoing bytes but any data received after a buffer has filled up will be lost.

*Note: If you attach a device that continuously generates data to the Messenger 560 RS-232 port, you must enable the smart gateway option. (See COM S).

```
COMMAND>COM R

Connecting modem to RS232 port.
Two seconds of silence followed by Ctrl-D will
close gateway.
```

■ **Communications Gateway Set-up**

Type COM S at the command prompt and the Messenger 560 system will display a sub-menu of related parameters that you can alter.

```
COMMAND>COM O

1 = Baud Rate
2 = Gateway Echo On/Off
0 = Previous Menu

Choose a Number>1

SET/CHECK BAUD RATE
--------- ---- ----
Present Value:  4800

1 =   300 baud
2 =  1200 baud
3 =  2400 baud
4 =  4800 baud
0 = Previous Menu

Choose a Number>
```

CNT (Pulse Counter)

The Messenger 560 system allows pulse counting on all eight analog inputs. It uses two commands in data mode, CNT R, to display all eight counters, and CNT O, to clear individual counters.

The maximum transition rate is 100 state transitions/second (50 Hz signal = 50 counts/second) with no two transitions occurring within less than 10ms of each other. The signal can be a square, saw-tooth, or sine wave, with a transition being a change from above three volts and below two volts, and vice versa. Total counts are displayed as decimals.

■ **Help with the CNT command**

Type CNT at the command prompt and the Messenger 560 system will return a list of valid counter commands and related instructions.

```
COMMAND>CNT

PULSE COUNT FUNCTIONS
----- ----- ---------
CNT R  Pulse Count Report
CNT O  Clear Counters
```

■ **Counter Report**

Type CNT R at the command prompt to view the count totals for all of the inputs.

```
COMMAND>CNT R

PULSE COUNT REPORT
----- ----- ------


NAME       COUNT        RPM
----       -----        ---
#1 mA      00000016     00000
#2 mA      00000015     00000
#3 mA      00000016     00000
#4 mA      00000016     00000
#5 Swtch   00000016     00000
#6 Swtch   00000016     00000
#7 Swtch   00000017     00000
#8 Swtch   00000008     00000
```

■ **Clear Counters**

Type CNT O at the command prompt to reset any or all of the counts.

```
COMMAND>CNT O

PULSE COUNTER OPERATIONS
----- ------- ----------
Enter the counter number you wish
to clear or 9 for all couters.

Choose a Number>
```

HLP

■ **Help**

Type HLP at the command prompt and the Messenger 560 system will return instructions for entering commands.

```
COMMAND>HLP

COMMAND FORMAT
======= ======
3 letter command followed by operand.
Example: INP R  (INPut Report)

SPECIAL KEYS
======= ====
^Z or ESC interrupts report.
```

INI S

```
COMMAND>INI S

INITIALIZATION MENU
-------------- ----
1 = Set Model Name
2 = Reset Counters
3 = Lock Out
4 = Enhanced OUT O Menu
0 = Previous Menu

Choose a Number>
```

INP (Input Commands)

Input commands permit you to check the condition of any monitored input and configure the inputs for a variety of applications. Custom or non-standard sensors can also be accommodated by means of "Look-Up" tables.

Each input has separate alarm and control set points. The control set points can be used to automatically control output devices (see OUT S).

■ **Help with the INP command**

Type INP at the command prompt and the Messenger 560 system will return a list of valid input commands and related instructions.

```
COMMAND>INP

INPUT FUNCTIONS
----- ---------
INP R  Input Status Report
INP O  Input Filtering Options
INP S  Set/Check Input Settings
```

■ **Input Status Report**

To get a real-time report of the present condition of the eight inputs, including any that may have exceeded an alarm set point, type INP R at the command prompt.

Analog inputs will provide LO, HI, and OK status; discrete will provide AL and OK indicators.

```
COMMAND>INP R

INPUT STATUS REPORT
----- ------ ------
  #1 mA     OK        4.000
  #2 mA     OK        4.000
  #3 mA     OK        4.000
  #4 mA     OK        4.000
  #5 Swtch  OK    ON
  #6 Swtch  OK    ON
  #7 Swtch  OK    ON
  #8 Swtch  OK    ON

Time:  02/05/00 15:22:39
```

■ **Input Operation Parameters**

Type INP O at the command prompt to get a sub-menu parameters (applied globally to all inputs) that affect the sensitivity and responsiveness of the monitored inputs.

Input Damping

Input damping causes the Messenger 560 to react slowly to a rapidly changing input. For example, if temperature were being monitored and the temperature probe was moved from an ice bath to a hot water bath, a damped input would show a gradual change in temperature every 10 to 20 seconds, rather than an instantaneous change. This option will eliminate many false alarm situations.

```
COMMAND>INP O

INPUT FILTERING OPTIONS
----- --------- -------
Input filtering is disabled
Change present state ?
Type Y or N
```

■ **Input Setup Parameters**

Type INP S at the command prompt to control the configuration parameters for each input. You will get a list of all configurable inputs. Select the input you wish to configure and you will get a sub-menu containing parameters for that input.

```
COMMAND>INP S

SET/CHECK INPUT SETTINGS
--------- ----- --------
1 = Input #1  <Label>
2 = Input #2  <Label>
3 = Input #3  <Label>
4 = Input #4  <Label>
5 = Input #5  <Label>
6 = Input #6  <Label>
7 = Input #7  <Label>
8 = Input #8  <Label>
0 = Previous Menu

Choose a Number>1

Input #1
PRESENT SETTINGS
------- --------
1 = Label               <Label>
2 = Response Time         0 MIN
3 = Input Type            1
4 = Lo ALARM Setpoint     0
5 = Hi ALARM Setpoint     1
6 = Output OFF Setpoint   0
7 = Output ON Setpoint  255
8 = Calibration           0
0 = Previous Menu

Choose a Number>
```

Hiding Inputs

By typing =HIDE=, you are able to remove this particular item from all reports. To bring the input "out of hiding," simply enter a new label for that input.

```
Input #1
PRESENT SETTINGS
------- --------
1 = Label                <Label>
2 = Response Time         0 MIN
3 = Input Type            1
4 = Lo ALARM Setpoint     0
5 = Hi ALARM Setpoint     1
6 = Output OFF Setpoint   0
7 = Output ON Setpoint   255
8 = Calibration           0
0 = Previous Menu

Choose a Number>1
ENTER AN 8 CHARACTER LABEL NAME,
TYPE "=HIDE=" TO REMOVE THIS ITEM
FROM ALL REPORTS, OR PRESS ENTER
FOR A LIST OF SPECIAL LABELS.

>Outside Air
```

Sensor Type

```
Input #1
PRESENT SETTINGS
------- --------
1 = Label                <Label>
2 = Response Time           0 MIN
3 = Input Type              1
4 = Lo ALARM Setpoint       0
5 = Hi ALARM Setpoint       1
6 = Output OFF Setpoint     0
7 = Output ON Setpoint    255
8 = Calibration             0
0 = Previous Menu

Choose a Number>3
Input #1
AVAILABLE CHOICES
--------- -------
1 = Temperature (F)
2 = Reserved
3 = Normally Closed
4 = Normally Open
5 = Rom table A
6 = Pulse Counter
7 = Linear
8 = EEprom table A
9 = EEprom table B
0 = Previous Menu

Choose a Number> 6
```

Alarm Set-Points

Each of the input channels can be given alarm set points.
Inputs configured with a temperature, pulse rate, custom, linear, or 4 to 20 mA sensor type can be given high and low alarm set points.

If the input value falls below the low alarm set point or above the high alarm set point for a defined period of time, the Messenger 560 system will recognize an alarm condition. In the case of a dry contact, if the input state equals the configured alarm state then an alarm condition is triggered.

To enter a low alarm or high alarm limit, type INP S. Each of the input items should be given a low set point, below which the Messenger 560 system will be activated and send alarm messages, and a high set point, conversely above which the system will be activated.

When adding data at the "Enter New Value" prompt, please note that the range depends on the input type as well as the bottom and top of scale definitions.

To disable the low alarm, set it equal to the bottom of scale parameter. To disable the high alarm, set it equal to the top of scale parameter.

Response Time

Each of the input channels can be given a response time. This time determines how long an alarm condition must exist before it is recognized as an alarm. Type INP S and choose the input you want to modify from the

menu. A second menu will be given listing all parameters associated with that input. Choose Response Time and enter the desired response time. The response time can range from 1 second to 120 minutes. The response time only applies to alarm set points.

Output ON / OFF Control Set-Points

Each of the input channels can be programmed with output control set points. The output control set points only affect outputs that have a control mode of Automatic, Automatic Day, and Automatic Night. If the input value goes above the output ON set point, the output will be turned ON and remain ON until it falls below the output OFF set point. The response time does not apply to Output On and Output Off set points.

Calibration

Each of the input channels can be calibrated by adding (or subtracting) a calibration constant to the raw (unscaled) input value. To enter a new calibration constant, type INP S and choose from the menu the input you want to calibrate. A second menu will be given, listing all parameters associated with that input. Choose "Calibration".

The Messenger 560 system will display the measured value of the input and ask you to enter the actual value. When you do, a calibration offset will be calculated and stored in the Messenger 560 system's memory.

LOG (Event and Data Recorder)

It is often desirable to track conditions (such as tank level or ambient air temperature) over extended periods of time. The Messenger 560 system provides this ability by recording and maintaining a history of input and output conditions, information that provides valuable insight into the operation of a process, equipment, or facility. This information can be readily accessed through the RS-232 port or via telephone.

Refer to the Data Logger section of this manual for additional information.

■ Help with the LOG command

Type LOG at the command prompt and the Messenger 560 system will return a list of valid data logging and trending commands and related instructions.

```
COMMAND>LOG

DATA RECORDER FUNCTIONS
---- -------- ---------
LOG R  24 hour Graph (input #1)
LOG O  Download Data File
LOG S  Set/Check Data Recording Settings

COMMAND>
```

OUT (Output Commands)

The Messenger 560 system has four outputs that can be configured for manual or automatic operation.

■ **Help with the OUT command**

Type OUT at the command prompt and the Messenger 560 system will return a list of valid output commands and related instructions.

Refer to the Output Controller section of this manual for additional information.

```
OUTPUT FUNCTIONS
------ ---------
OUT R  Output Status Report
OUT O  Turn Outputs ON or OFF
OUT S  Set/Check Output Settings


COMMAND>
```

PHO (Telephone Dialing Directory)

The PHO commands configure the Messenger 560 system to deliver alarm messages to up to eight people, pagers, computers or facsimile machines.

Refer to the Alarm Handling section of this manual for additional information.

■ **Help with the PHO command**

Type PHO at the command prompt and the Messenger 560 system will return a list of valid phone directory commands and related instructions.

```
COMMAND>PHO

PHONE FUNCTIONS
===== =========
PHO R Phone Number Report
PHO S Set/Check Phone Settings
PHO O Edit Phone Directory
```

■ **Phone Parameters**

This enables you to specify how many rings the Messenger 560 system will wait before it answers an incoming phone call. You can also specify touch-tone or pulse dialing methods.

```
COMMAND>PHO S

SET/CHECK PHONE SETTINGS
--------- ----- --------
1 = Rings to Answer
2 = Carrier Wait Time
3 = Dialing Method
0 = Previous Menu

Choose a Number>
```

POW (AC Power Monitor)

■ **Help with the POW Command**

Type POW at the command prompt and the Messenger 560 system will return a list of valid power monitoring commands and related instructions.

```
COMMAND>POW

SYSTEM POWER FUNCTIONS
------ ----- ---------
POW R  Power Status Report
POW S  Set/Check Power Settings
```

■ **Power Status Report**

This enables you to report the current condition of the AC line power that is supplying operating voltage to the Messenger 560.

```
COMMAND>POW R

AC POWER REPORT
== ===== ======
AC Power is On
```

■ **Power Failure Alarm Parameters**

Change alarm parameters associated with the AC line power.

```
COMMAND>POW S

SET/CHECK POWER SETTINGS
--------- ----- --------
1 = Set AC Fail alarm
2 = Alarm response time
0 = Previous Menu


Choose a Number>
```

Power Alarm

When enabled, the Messenger 560 system will begin an alarm sequence when the power has been off for the specified alarm delay time.

Power Alarm Delay

The power mu st be off continuously for this amount of time before a power alarm is recognized. A time period of 5 to 15 minutes is recommended in most cases to prevent alarms during momentary outages. Enter a much smaller time if you are monitoring power sensitive devices but set it much higher if the location is prone to long power outages and the equipment you are monitoring would not be affected.

RTU (Real-Time Update)

■ **RTU**

Type RTU at the command prompt and the Messenger 560 system will return a continuously updated input/output status report.

SEC (Security & Identification)

The SEC commands allow you to configure your Messenger 560 system with passwords, identification fields and geo-codes, and give you access to important system information.

■ **Help with the SEC command**

Type SEC at the command prompt and the Messenger 560 system will return a list of valid security commands and related instructions.

```
COMMAND>SEC

SECURITY FUNCTIONS
======== =========
SEC R System Counters Report
SEC S Set/Check Security Settings
```

■ **Security Report**

The Messenger 560 system has several internal event counters and timers that are useful as an indication of proper system operation. The information can be viewed by typing SEC R at the command prompt.

```
COMMAND>SEC R

SECURITY REPORT
-------- ------
  Dial-out Cycles      000000
  Access Denials       000000
  On Line Sessions     000002
  Service Outages      000004
  System Hours         000016
  Setup Commands       000009


Time:  02/05/00 15:27:23
```

■ **Add/Edit Security Codes and Identification**

Your Messenger 560 system has a multi-level password system as well as several key identification fields that are used to safeguard the Messenger 560 system's data and authenticate the location of the site originating the data.

Several of these fields are user programmable and can be changed by typing SEC S at the command prompt.

```
COMMAND>SEC S

SET/CHECK SECURITY CODES & ID
--------- -------- ----- - --
1 = Security Code #1
2 = Security Code #2
3 = Security Code #3
4 = Code #
5 = Phone #
6 = Site Name
7 = Automatic Report
0 = Previous Menu
```

Security Codes

Your Messenger 560 system has three levels of security, each permitting access to the system but with varying degrees of privilege. These security codes are also used when accessing the Messenger 560 system from a touch-tone telephone.

Level Three security permits a user to access the report ("R") commands.

Level Two security permits a user to access and change certain operational ("O") commands as well as report ("R") commands.

Level One security permits a user to access and change the set-up commands ("S") as well as the operational ("O") and reporting ("R") commands.

To set or change security codes, you must have a level one Security Code. At the command prompt, type SEC S and choose menu selections 1, 2, or 3.

You will be prompted to enter a new security code. The security code is eight digits long and all eight must be entered. Only the digits 0-9 are accepted.

Entering your code number

You can program an eight-character alphanumeric code to provide your Messenger 560 system a unique identity. That code, which will appear in the log-on message, typically is an account number, site code, or serial number.

At the command prompt, type SEC S, choose menu selection number 4, and type your eight-character code.

Entering the unit phone number

You can program a 15 character alphanumeric code to provide your Messenger 560 system with additional identity. The unit phone number will be part of the Messenger 560 system's voice mode alarm dial message.

Entering your location name

Similarly, to complete your unique system signature, you can program your Messenger 560 system with a location name which, like your code number, will appear in the log-on message. Typically, the location name is the address where the system is located.

XON (Extended On)

- **XON**

Type XON at the command prompt and the Messenger 560 system will give you an option to disable the activity timer.

```
COMMAND>XON
EXTENDED ON SETTING
======== == =======
Extended on setting Disabled
Change Present State? [y/n]> Yes
Warning: System will stay on-line until a BYE command
  is issued
or carrier detect is lost.
```

Accessories

Below is a list of some of the most popular accessories for theMessenger 560. For information concerning these and other accessories, contact technical support.

> *Weather-proof enclosure*
>
> *Temperature sensor (30F to 100F)*
>
> *Temperature sensor (-40F to +40F)*
>
> *Flow sensor*
>
> *Pressure sensor*
>
> *Humidity sensor*