Model 1550 SentriMax
Product Manual

025-9305H

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Compliance Statements

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

The Ringer Equivalence Number (REN) for this terminal equipment is 0.1. The REN assigned to each terminal equipment provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices does not exceed 5.0.

Information on Disposal of Old Electrical and Electronic Equipment and Batteries (applicable for EU countries that have adopted separate waste collection systems)



Products and batteries with the symbol (crossed-out wheeled bin) cannot be disposed as household waste. Old electrical and electronic equipment and batteries should be recycled at a facility capable of handling these items and their waste byproducts.

Contact your local authority for details in locating a recycle facility nearest to you.



Pb

Proper recycling and waste disposal will help conserve resources whilst preventing detrimental effects on our health and the environment.

Notice: The sign “Pb” below the symbol for batteries indicates that this battery contains lead.

Safety Summary

Warning! For your safety and the protection of the equipment, observe these precautions when installing or servicing Zetron equipment:

- Follow all warnings and instructions marked on the equipment or included in documentation.
- Only technically qualified service personnel are permitted to install or service the equipment.
- Be aware of and avoid contact with areas subject to high voltage or amperage. Because some components can store dangerous charges even after power is disconnected, always discharge components before touching.
- Never insert objects of any kind through openings in the equipment. Conductive foreign objects could produce a short circuit that could cause fire, electrical shock, or equipment damage.
- Remove rings, watches, and other metallic objects from your body before opening equipment. These could be electrical shock or burn hazards.
- Ensure that a proper electrostatic discharge device is used, to prevent damage to electronic components.
- Do not attempt internal service of equipment unless another person, capable of rendering aid and resuscitation, is present.
- Do not work near rotating fans unless absolutely necessary. Exercise caution to prevent fans from taking in foreign objects, including hair, clothing, and loose objects.
- Use care when moving equipment, especially rack-mounted modules, which could become unstable. Certain items may be heavy. Use proper care when lifting.

Warning! Shipping the lead acid battery and/or battery charger back to the factory inside the NEMA enclosure will cause damage to the enclosure, battery, and/or charger. Zetron will charge the sender for any damage incurred as a result.

Release History

Date	Rev	Description
30 May 2006	G	Manual revised to support the new, Windows-based programming tool SMCU No new features added to Model 1550 operations Deleted Theory of Operation chapter Deleted Parts Lists and Drawings chapter
10 Sep 2008	H	Updated the manual style, formatting, and layout to match the current template. Revised the explanation of interval timing for the All's Well Alarm to make it more clear how the unit behaves depending on whether or not the Real Time Clock option is installed. See *Interval Time* on page 98.

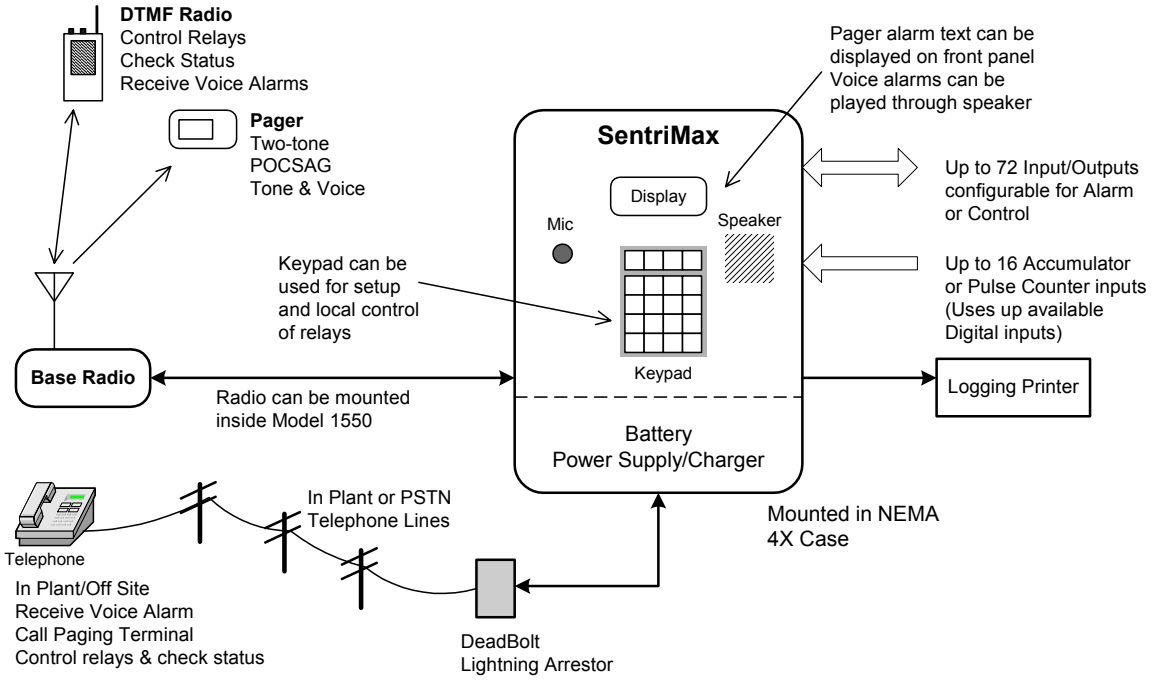
Contents

Introduction

SentriMax is a powerful, full-featured, wireless, industrial voice alarm system. Users can monitor and control processes, sites, or operations via phone or radio. SentriMax features automatic alarming through phone, speaker, or radio with natural recorded voice stored in solid state memory. Modular inputs and outputs, industrial lightweight NEMA 4X enclosure, built in keypad and display, and battery backed operation make SentriMax a versatile remote alarm processor.



The following diagram shows the common configuration of an alarm system using the Model 1550.



Features

- Keypad and LCD display for status, control, and setup
- Integrated microphone and speaker
- Front panel status indicators
- Panic button
- Integrated battery and charger
- 16 digital inputs/output points
- Modular expansion up to 64 digital I/Os
- 8 analog inputs
- Pulse counting on 16 inputs
- Run-time accumulation on 16 inputs
- Remote control outputs via phone and radio
- Listen to remote site via phone and radio
- Up to 4 minutes of user recordable voice storage
- Built-in default voice messages and voice prompts
- Voice alarms via radio or phone

- Optional two-tone sequential and POCSAG display paging
- Optional TAP paging for dial access paging
- Optional scheduling of calls based on time of day, day of week, holidays
- Optional time/date stamped event logging to a printer

Applications

The Model 1550 is suitable for use in many different situations. Some typical Model 1550 situations follow:

pump stations	remote oil fields	greenhouses
refrigerated storage	sewage lift stations	tank monitoring
level control	pressure monitoring	temperature monitoring
community warning	leak detection	pH monitoring
fire warning	engine monitoring	RF site monitoring
security	flow monitoring	electrical substations
autodialers	boilers	fish hatcheries
HVAC systems	hydro stations	agricultural monitoring
pipeline compressors	telephone switch monitoring	water control
SCADA	telemetry	trunked radio
site remediation	cell phone sites	food processing
well monitoring	environmental compliance	micro wave towers

Terms and Definitions

The following terms and definitions are frequently used in this manual.

Term	Description
Acknowledge	A command given by a user to signal to the SentriMax that an alarm message has been received. The command may or may not stop the alarm reporting.
Alarm	Any input signal condition for which the user wishes to be notified, such as closure to ground, an open circuit or analog signal level. This condition starts an alarm cycle.
Alarm Cycle	One complete pass through a call list that is associated with one alarm. An alarm cycle may include sending an alert message to the front panel display and speaker, making telephone call alerts, and sending a radio alert.
Alarm Delay Time	The amount of time that an input signal must be in the alarm condition before being recognized as a "real" alarm condition.
Alert	Transmission that may include text messages, special tones, and voice messages.
Call	A specification of how the SentriMax should send an alert.
Call List	A list of calls SentriMax will make for a particular alarm.
Call List Repeat Interval	The amount of time that the SentriMax will delay after ending one alarm cycle and before starting another alarm cycle for one alarm.
Call List Repeats	The number of times a complete alarm cycle will be repeated, if it is not acknowledged, before SentriMax quits calling for that alarm.
DTMF	Dual Tone Multi-Frequency. Common signaling method where two tones are simultaneously sent to represent the values 0-9, *, #, A, B, C, and D. Used in both telephone (where it is commonly called Touch Tone) and radio.
Hysteresis	For the purposes of the Model 1550, hysteresis is defined as that amount by which an analog input signal must move away from the set point value and back into the normal operating range before an alarm condition is considered "cleared".
NEMA	National Electrical Manufacturer Association - NEMA Standard 250 defines the degree of protection against corrosion, windblown dust, and rain provided by an enclosure. This standard is used to specify the case used for the Model 1550.
Status	Indication of the inputs and outputs of the SentriMax.
SMCU	The Windows-based SentriMax Configuration Utility used for configuring the SentriMax from a PC. SMCU supports the configuration of Model 1550 units with firmware version 3.0 or later.
Voice Message	A predefined or user-definable spoken phrase normally used to describe the status of an input or alarm.

Conventions

This section describes some of the text formatting conventions used in this manual.

Menu Paths

This manual gives the menu paths for all commands the user can enter from SentriMax's front panel menus. The format is:

Main Menu | Level 1 Menu | Level 2 Menu

For example, to specify whether SentriMax uses pulse or tone dialing, the front panel menu path is:

Setup | Phone Setup | Dialing Method

This means you must first bring up the setup menu (by pressing the **Setup** menu key), select **Phone Setup** to bring up the telephone settings menu, then select **Dialing Method**.

DTMF Commands

The following discussion of DTMF command listing conventions uses as an example the specification of the string of digits that is to be sent to a display pager when a digital input goes into the alarm condition. This command is shown in this manual as:

228*ii[<pager text>]*#

The portion of the command that must always be entered exactly as shown is printed in normal (non-italic) text. In the example, the 228 and # must always be entered exactly as shown for this command.

Italics are used to indicate parts of the command that may vary each time the command is given. In the example, both the *ii* (which specifies the digital input number) and *[<pager text>]* (the text that will be sent to the pager) are variable and are shown in italics.

If a portion of a DTMF command is optional, it is enclosed in square brackets. The *<pager text>* in the example command can be left out of the command (blanking out the pager text for the designated input) so it is enclosed in square brackets.

Another common use of square brackets is to show where a value may be entered using a variable number of digits. For example, *n[nnn]* in a command specification indicates that a number may be entered using from one to four digits.

Portions of some configuration commands (from both the front panel and from telephone or radio) use special key sequences to enter characters not supported directly by the keypad. Angle brackets are used to indicate these portions of the command, e.g., *<pager text>* in the example. *Appendix A: DTMF Reference* and *Appendix B: Front Panel Keypad and Display* describe these special key sequences and where they are used.

Specifications

General

Monitoring/Control Capacity	16 discrete input/output points, expandable to 64 8 analog inputs 0 to 5VDC or 4 to 20mA
Voice Capacity	1 minute of canned messages standard 1 minute of user voice storage standard up to 4 minutes of optional user voice storage with a maximum of 99 user recordable alarm messages
Communication Interfaces	Single PSTN telephone interface standard Optional telephone interface (for inbound calls only) is available Radio interface standard
Programming Interfaces	Front panel keypad and display RS-232 port with supplied SMCU programming software DTMF compatible radio or PSTN phone
Enclosure	NEMA 4X fiberglass/polyester

Communications

Radio Interface	PTT, COR, flat TXAUD, flat RXAUD, and ground input levels from 20mV to 3Vpp input impedance > 30kΩ at 1kHz output level 3Vpp maximum with 10kΩ load output impedance < 1kΩ at 1kHz COR adjustable from 0.1 to 4.5VDC PTT output relay to ground sink < 300mA max, normally open or closed position DTMF signaling capable DTMF output signal: 100msec on/100msec off
Telephone Interface	2 wire (Tip/Ring) RJ11 connector FCC registration number: EYBUSA-21802-AL-E ringer equivalent number: 0.4B load number: 10 automatic line seizure maximum voice power output to PSTN: -10 dBm (averaged over 3 seconds) maximum DTMF power output to PSTN: -1dBm DTMF output signal: 100msec on/100msec off
RS-232 Interface	TX, RX, and ground (Zetron or PC compatible) Adjustable baud rate 8 bit with one stop bit and no parity no hardware or software flow control

Electrical Limits

Maximum Input	$45V_{DC}$ max input into any input
Discrete input levels	< 0.8V low, > 2V high
Discrete output	Open collector type 100mA typical sink current 45VDC max collector voltage
Analog input levels	0 to 5V or 4 to 20mA 20mV or 80μA resolution
Battery[1]	12V, 7amp-hour, lead-acid gel cell
Charger[1]	500mA float charge, 2 amp max fast charge, short circuit protected, battery over-discharge protection
AC power	115 VAC, @ 0.7 amps max
DC power	10.5-16VDC, @ 0.9 amps max

[1] Battery and charger have a 1-year warranty

Physical

Size	15.5" x 13.5" x 6.5"
Weight	≤ 22 lb.
Operating Temperature	With internal gel-cell battery and charger: 0º to 40º C (32º to 104ºF) Without battery and charger: 0º to 50º C (32º to 122ºF)

Options

- Expansion modules with 16 digital input/output points (limit of three)
- Real-time clock/printer logging, clock option also supports time-based control of when and how alarms are issued
- 1 minute of user programmable voice storage (additional storage may be purchase in blocks of 1, 2, or 3 minutes, with a total limit of 4 minutes)
- Second PSTN line for incoming calls, obtaining input status, and other local uses
- Radio cable for Motorola RNET radio
- Radio cable for Motorola Radius radios
- Radio paging option: 2-tone, POCSAG
- Phone paging option: TAP/IXO
- Extended temperature range (100% tested)

Installation

This section gives a step-by-step procedure for installing the SentriMax hardware.

Installation of the hardware requires disassembly of the unit so that holes for cables may be drilled into the enclosure. It is also easier to install the AC power cable and radio with the unit dismantled. After re-assembly, the SentriMax may be mounted to the wall and connections made to the inputs and outputs.

Installation of the SentriMax Configuration Utility is covered in *SentriMax Configuration Utility* on page 77.

Hardware

The SentriMax comes standard with: NEMA enclosure, 7amp-hour battery, radio mounting brackets, battery mounting bracket, generic radio cable, telephone cable, SentriMax Configuration Utility (SMCU), two types of terminal lugs for the power connections, and this manual. These items are shipped in separate containers. Remove the components from their containers. Note that an AC power cord for the power supply is *not* included.

Inside the NEMA enclosure is the front panel circuit board with keypad and display (all mounted on the front panel sheet metal) and the charger board, power supply, Expansion I/O board, and Analog input board (all mounted on the base panel). The I/O cards are connected to the main board via 10-pin flat cable. A DC power cable connects the charger board to the main board and has a set of terminals for connecting to the battery (see Figure 1, Figure 2, and Figure 3). Note that the red lead of the power cable should be connected to positive DC power, and the black lead should be connected to power supply ground or negative DC power. Refer to *Appendix C: Connectors, Test Points, and Jumpers* on page 179 for the pin-outs of all connectors on the SentriMax.

Before proceeding with the installation, plan where the enclosure will best fit. Decide how the unit will be mounted to the wall. Decide how the I/O cabling, the antenna, the phone cords and the AC power cord will reach the SentriMax. Decide where the antenna should

be mounted (on the enclosure, on the wall, or outside). Decide on the size and number of holes that will need to be made through the enclosure. Determine if the enclosure needs to maintain its water resistance and, if so, choose couplings and cable grips that will maintain a water tight connection (many couplings such as made by Thomas & Betts are available).

It is recommended that the mechanical and electrical components be assembled outside of the enclosure. Since the electronics are "static" sensitive, it is recommended that a static-safe area be used. *Always follow good static prevention practices when working on the main electronics or when installing options.*

Figure 1: Model 1550 Standard Installation

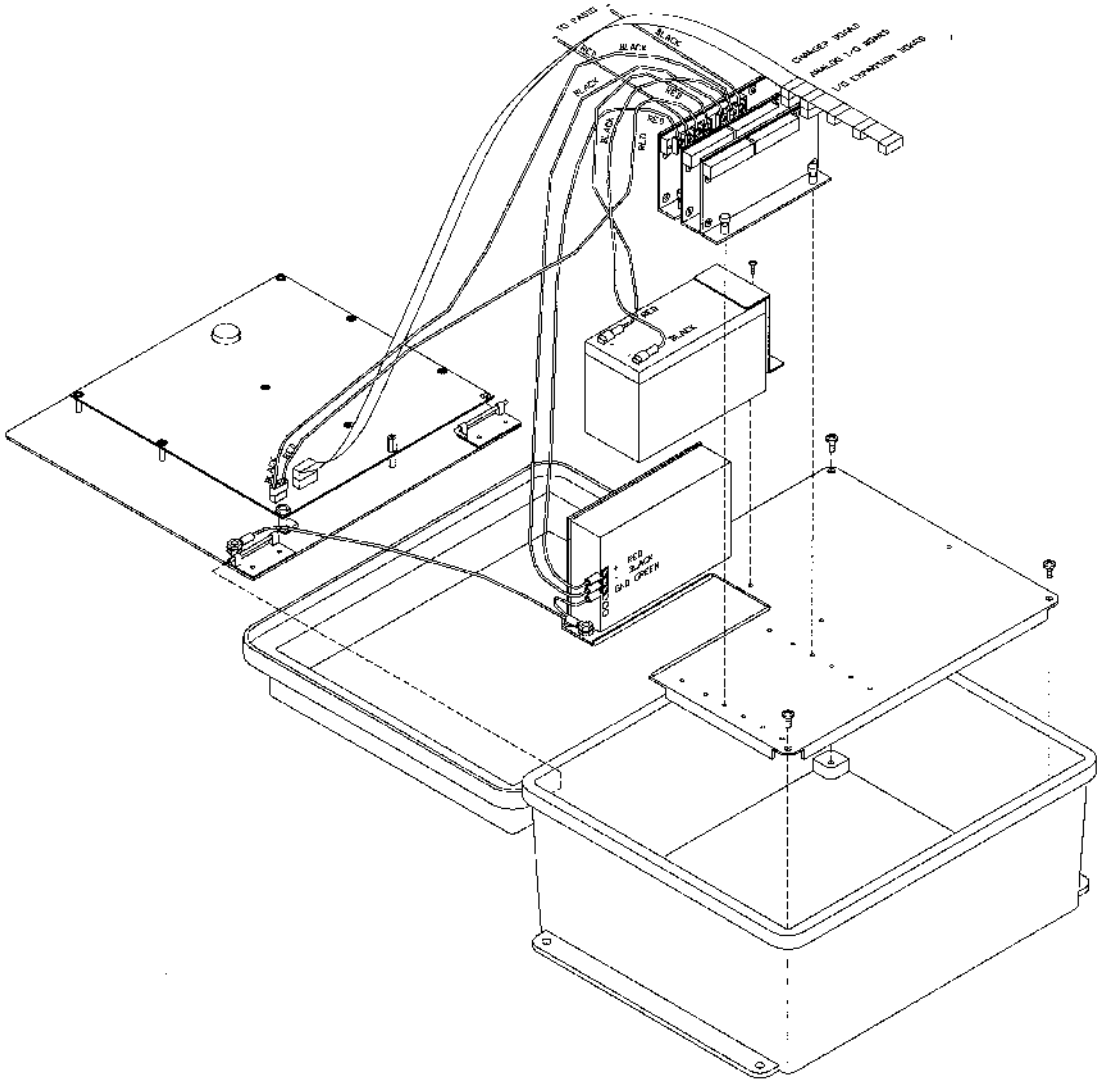


Figure 2: Model 1550 Radio and Battery Installation

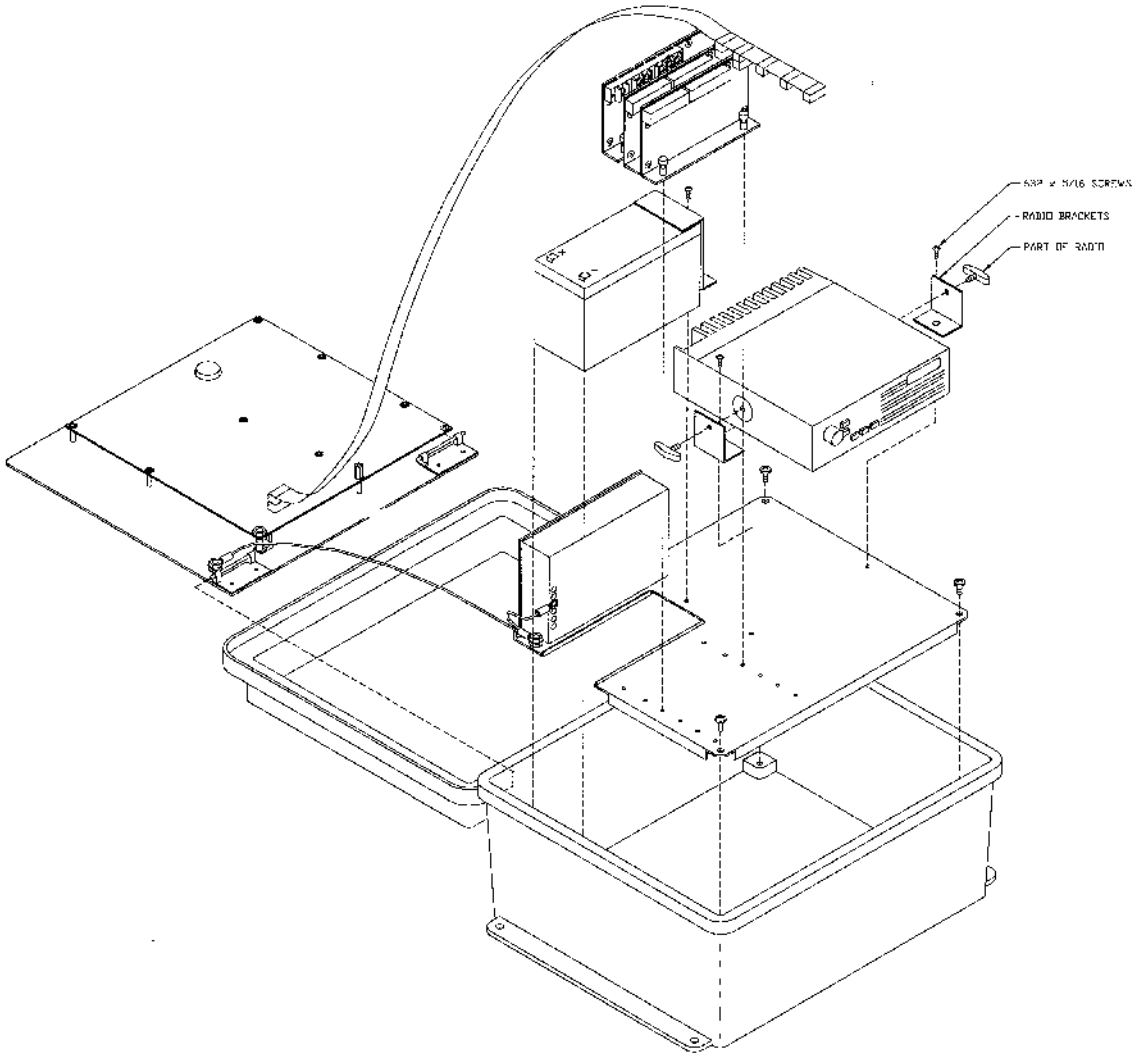
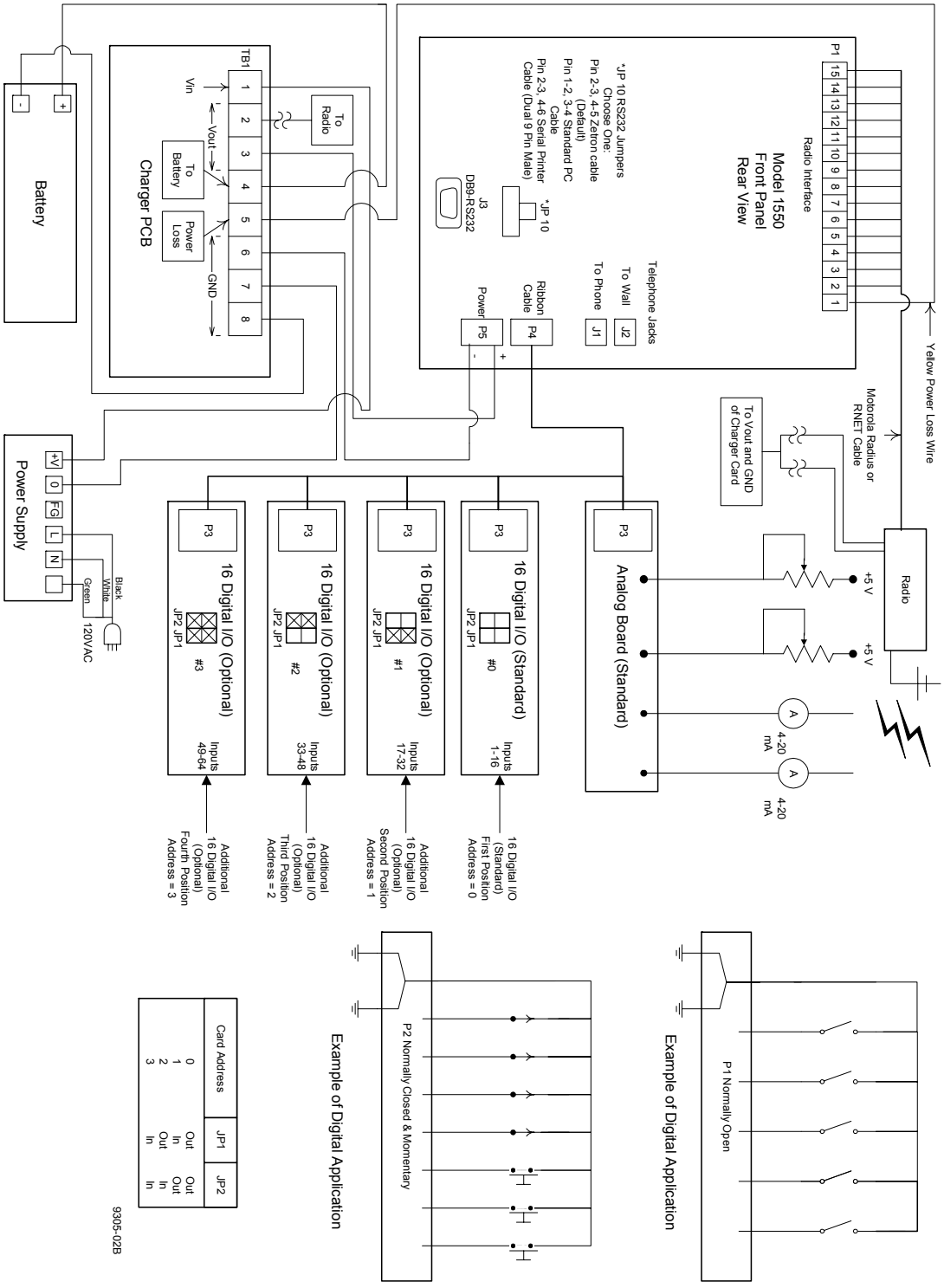


Figure 3: Model 1550 System Block Diagram



Installation Preparation

Tools required for installation include: device for cutting holes through the NEMA enclosure for cables, drill bit and drill for radio mounting (if needed), medium size flat head screw driver, and medium size Phillips head screw driver.

♦ To prepare for installing the Model 1550

1. Attach the System Ground/Earth. The base panel of the SentriMax should be securely attached to earth ground. In addition, each device connected to the SentriMax should also be attached to earth ground somewhere in the system.
2. Build the Radio Cables. Using the supplied generic radio cable, add the proper connector for control of the radio. SentriMax pins available for the radio connection include: flat audio in, flat audio out, carrier operated relay in, PTT out, and ground. If a special radio cable was purchased, verify that the cable connections match the radio and the SentriMax connectors. Two terminal lugs are included for connecting the radio DC power cable to the charger board.
3. Build the AC power Cable. Using the three small terminal lugs supplied, crimp one on each wire of a three-wire AC power cord. Put the cable aside for later installation.
4. Build the I/O Cable. The I/O cables should be made from shielded twisted pair cable. One end of each of the twisted pair should be configured as the ground lead and soldered to the other ground leads going to the same connector (pin 9 and 10 of every I/O connector). In addition, the cable shield should be soldered to the grounds.
5. Start disassembling the Model 1550 by disconnecting the DC power cable, red and black cable pair, running from the charger board to the front panel circuit board.
6. Disconnect the front panel sheet metal chassis cable running to the base panel.
7. Remove the front panel sheet metal and front panel board assembly and place aside for later.
8. Unscrew the four screws holding the base panel to the enclosure and remove the base panel from the NEMA enclosure.
9. Drill holes, as needed, through the NEMA enclosure for the antenna or antenna cable, the power cord, the I/O cables and phone cable. See *Appendix E: Drilling Template* on page 197 for the installation drilling template.
10. Remove battery mounting bracket from the base panel and put aside.

Telephone

There are two telephone jacks on the main board (702-9592): J1 and J2. J1 is used to connect directly to a telephone (NOT to the wall jack). J2 is for connecting the unit to the wall jack for making telephone alert calls.

During idle operation of the unit, J1 will be available for use by local personnel to "borrow" the SentriMax phone line connected through J2. However, be aware that as soon as SentriMax needs to make an alert call via the telephone, it will seize the telephone line

immediately and begin its alert call sequence. Calls in progress by local personnel will be terminated. The line will be released only after SentriMax is finished.

Radio

The radio should be the first device mounted on the panel. The maximum dimensions for the radio - including cable strain relief - are 7" W x 3" H x 11" L. Mounting brackets are provided for a Motorola Radius series type radio. It is recommended that all radios be mounted so that the controls are accessible and that the antennae and power cables be routed along the base plate edge toward the hinge of the enclosure.

♦ To mount the radio

1. Determine if holes need to be drilled for mounting the radio to the base panel and drill if necessary. Leave enough room around the radio to attach the antenna, control leads, and power leads later.
2. Attach and secure the radio to the base panel. If possible, make sure the radio is off so that when the battery is attached, the radio will not draw power.
3. Attach the antenna or antenna cable to the radio.

AC Power

When adding the AC power, keep safety in mind. Do not leave extra exposed bare wire where it can be a safety threat.

♦ Connecting to AC power source

1. Run the three-wire AC power cord through a hole through the enclosure and screw the AC power leads to the power supply. Insulate any exposed wire. Note that the line, the neutral, and the frame ground are all marked on the supply.
2. Make sure the base panel chassis cable is securely attached to the power supply frame ground terminal.
3. Mount the base panel in the enclosure with the four screws.
4. Insert the battery into the battery hole, but do not attach the DC power cable to the battery yet.
5. Screw the battery mounting bracket securely to the base panel.
6. Wire the radio power to the charger board terminal block: “+” to pin 4, and “-” to pin 6.

Mounting

The SentriMax mounts best to a flat wall surface. Due to its weight (22 lb.), the mounting bolts should be screwed into a firm wall support.

♦ To mount the unit

1. Using four mounting bolts, mount the SentriMax to a wall.
2. Place the front panel back in its location on the enclosure.
3. Reattach the chassis cable to the front panel sheet metal.
4. Reconnect the power connector to the front panel board.
5. Connect the generic radio cable between the front panel circuit board and the radio.
6. Connect the supplied telephone cable to the front panel board, J2; this is the cable that should be plugged into the telephone wall connector; route this cable through one of the chassis holes.
7. Connect a telephone and cable, if used, to the front panel board, J1; route this cable through one of the chassis holes.

DC Power

The unit is now ready to be powered.

Note If you do not plan to use the unit for a period of time, and you prefer not to leave the unit attached to the AC wall socket, leave the battery unattached from the DC power cable to prevent battery drain.

♦ To connect DC power

1. Install the battery as shown in Figure 2. The terminals should be at the bottom of the enclosure. Replace the battery mounting bracket.
2. Attach the battery terminals to the DC power cable - red wire to the "+" terminal and black wire to the "-" terminal.
3. Attach the AC power cord to the AC wall socket.
4. The front panel display should immediately give a message.
5. If you will program the hardware from a PC, attach the RS-232 cable to the front panel, J3, 9-pin connector.

Note The RS-232 jumpers on the front panel board are configured for a Zetron cable and may need to be moved to support an IBM-compatible cable.

6. Attach the yellow AC Fail cable from the charger board connector TB1 pin 5 to the radio interface connector P1 pin 1 on the main front panel board (this is the radio interface connector).

The input voltage for the charger board is expected to be about 16 ± 0.1Vdc. The output voltage is controlled by U1. It is factory set for 13.8 ±0.05Vdc at 23° C (73° F). The output voltage may vary slightly depending on room temperature. Note that the charger board may appear not to work if it is not connected to the battery. The battery must be attached

for the charger board to operate. See *Charger Board* on page 188 for the Charger Board Connector pin-outs.

The standard supplied battery is a 7 amp-hour, lead-acid, gel cell. The battery should be fully charged before using it. A complete charge takes 8 hours. A fully charged battery can provide 350mA (5% of the battery capacity) continuously for 20 hours. As the current drain goes up, the amp-hour capacity is reduced in a non-linear fashion. As an example, for a continuous draw of 700mA (10% battery capacity), battery life is only about 9 hours. At 7.5 amps, battery life is about 20 minutes. The end of the battery life is considered the point where the battery voltage drops below 10.5 V.

Note The charger does not output power unless a battery is connected to its terminals. In addition, if the battery is discharged below 10.5 V, the charger may not output power. In this case, the main front panel board fuse must be momentarily removed to restart the charger. It is important to keep the battery charged above 10.5 V.

Two practical examples of battery life should be useful:

- A 2-to-5 watt telemetry radio draws between 900-1500mA during transmissions. Assume that the transmissions last about 6 seconds (including one second for keyup/down time) and transmissions are sent out every hour. For a 24 hour period, transmitter current draw would be: (24 x 6 seconds/3600 seconds/hour) x 1.5A = 0.06 amp-hour discharge per day. This is typically a small part of the continuous current draw. The radios have a standby/receiver current of only about 50mA. The SentriMax draws about 350mA typical. The 400mA total amounts to about 6% of the capacity of the battery per hour. Looking at a discharge curve for the battery indicates that for this current drain, at 25º C (77º F), the expected usable battery life is between 15 and 18 hours.
- For a 25-watt radio, typical standby current could be 350mA. In addition, the current draw during transmissions can be 7.5 amps. Total transmissions (assuming 6 seconds per hour for 24 hours) would require: (144/3600)hr x 7.5amp = 0.30 amp-hour discharge per day. Again, the SentriMax draws about 350mA continuously. The total continuous current would be 700mA per hour. This is equivalent to a current drain of 10% of the battery capacity per hour. The battery would be expected to last about 8 hours. Note that the high current drain of the battery during transmissions would actually have a higher impact on the battery than calculated. As the battery capacity was drained, its ability to maintain 12V output during a heavy discharge into the transmitter would diminish. At some point, the battery output would drop below 10.5 volts when a transmission was initiated. The lower voltage would cause the SentriMax to eventually reset.

The preceding examples assumed that the temperature was about 25º C (77º F). Once the battery temperature drops below 20º C (68º F), the total battery capacity starts to diminish. The rate at which this happens is greater for high current loads. For low drain applications (300-700mA) every 10º C (18º F) drop in temperature, the battery capacity drops about 10%. If the temperature falls to -20º C (-4º F), the battery capacity is reduced to about 60%. For a high drain application (7.5 amps) the battery capacity at that temperature is reduced to only 20% of its original value.

A few final notes about lead-acid batteries; if the battery is deep discharged too many times, the battery capacity will be reduced. Batteries should not be stored more than nine months without recharging them. Temperatures above 50º C (122º F) reduce battery life. Note that the unit should not be made air tight since the battery may leak small amounts of hydrogen gas if overcharged.

The battery charger for the SentriMax outputs 13.7 Vdc during idle/standby operation and can supply up to 2 amps for charging a depleted battery. About 350mA is required to operate the SentriMax board. The radio is assumed to draw between 100mA to 400mA in standby mode. When the radio transmits, it may draw 6 Amps or more. The battery will supply the additional needed current. The charger is protected against shorts. The charger will typically charge a 50% depleted 7amp-hour battery in about 8 hours. Note that if the battery is depleted below 10V, the charger may not be able to recharge the battery.

I/O Connections

The external I/O cables can be attached next.

♦ To attach the I/O cables

1. Insert the I/O cable through the enclosure holes and attach to the I/O connectors.
2. Power up the SentriMax.
3. Check operation by shorting a discrete input to ground and noting that an alarm message should appear on the front panel display.

Expansion I/O Board(s)

The basic SentriMax configuration includes one expansion I/O card with 16 digital I/O points. By default, each pin is configured to operate as an input. To make an I/O point an output, the user must modify the software settings.

The user can buy up to three additional cards for a total of 64 I/O points. Each card must be given a unique address using jumpers JP1 and JP2. The address is factory set to 0 (both jumpers removed). JP 1 is the least significant address bit, JP2 the most significant. If additional cards are installed in the factory, they will be numbered 1, 2 and 3.

The maximum input voltage on any signal pin is 45Vdc.

See *Expansion Digital I/O Board* on page 185 for the Expansion I/O Board Connector pin-outs and jumper settings.

Analog Input Board

Each SentriMax is sent with one Analog input card. The address is factory set to 4.

The analog inputs can be configured for either 0 to 5Vdc operation or 0 to 20mA operation. To configure the analog inputs for 0 to 5Vdc operation, nothing needs to be

done. To configure them for 0 to 20mA operation, the “20mA” jumpers must be installed and the software configuration must be modified.

See *Analog Input Board* on page 187 for the Analog Input Board Connector pin-outs and jumper settings.

Options

Voice Memory

The SentriMax comes standard with 1 minute of canned voice prompts and messages. If the user wishes to record additional messages, the optional voice memory provides that capability. Each option consists of a voice component, a coupling capacitor, and a socket. Each voice component provides 1 minute of recording/playback capability. A maximum of four options can be placed in the SentriMax.

If this option was installed by Zetron, this installation description can be skipped. The optional voice components must be placed sequentially on the front panel board in locations: U2, U3, U4, and U5. Note that these parts are subject to static damage. The installation should occur in a static protected area and the installer should be strapped safely to ground. Make sure the components are oriented correctly during the installation.

Second Telephone Line Input

The optional phone input line requires a dedicated PSTN connection. This option consists of an add-on PSTN board, header connector, mounting hardware, and an additional telephone cable. Unlike the main phone interface, the optional phone interface cannot call out and it cannot share the phone line. This option allows the user to call in and obtain status or issue acknowledgments. Its primary purpose is to allow the main phone line to be used for calling out with alarm messages while accepting other commands on the option phone line.

If this option was installed by Zetron, this installation description can be skipped. This option must be mounted on the front panel board. For proper mounting, the 6-pin modular connector on the optional board should be placed near the front panel board’s 6-pin modular connector. There is a standoff on the front panel board. This should be used as one of the standoffs for the optional board. The option comes with three additional standoffs. Note that it is critical that the standoffs be used and screwed to the optional phone card. Failure to use the supplied standoffs and screws may allow the option to be damaged by transient voltages on the phone line.

Telephone Modem

This option provides the user with a TAP/IXO compatible interface. The interface is used to automatically call a paging terminal and provide phone numbers and text messages. The baud rate for the option is selectable. See *Phone Settings* on page 42 for operating parameter descriptions.

This option requires a number of components to be added to the front panel circuit board. Please contact the factory for installation of this option.

Real Time Clock

The real time clock option allows the user to route time stamped alarms to a printer and setup call scheduling.

If this option was installed by Zetron, this installation description can be skipped. This option must mounted on the front panel board. The option comes with a socket, the real time clock component, and a firmware PROM. Install the socket into location U24, then install the real time clock component into the socket. Replace U32 with the new PROM. Use safe static sensitive procedures while working on the front panel circuit board and during component installation.

Directions for setting the time and date can be found in *System Settings* on page 28.

Setup Mode

This section gives a complete description of each of SentriMax's configurable settings including menu paths for the front panel, DTMF command sequences, default values, valid ranges, and required options.

SentriMax is a sophisticated device with a large number of configurable settings. Even though SentriMax does check for the correct number of digits in each DTMF command, and checks the entry values for out of range errors, it cannot prevent you from pressing the wrong keys. Because there is no way to verify that you have actually entered the proper data, relying too heavily on DTMF programming can be risky.

Having said that, SentriMax does allow you access to a majority of its settings via either the SentriMax Configuration Utility, the front panel, or a DTMF-capable telephone or radio. The only exceptions would be entering the text strings required to name users and inputs, and enter alpha strings for display pagers. Those types of entries may only be accomplished using the SentriMax Configuration Utility.

Caution! Even though SentriMax can be programmed remotely from a telephone or radio using DTMF commands, we recommend that this feature be used only when absolutely necessary. Use the SentriMax Configuration Utility or the front panel menus whenever possible, as these both provide visual feedback and make programming errors much less likely.

Miscellaneous Commands

Exit Setup Mode

Front panel:	Press ESC
DTMF command:	000# or press "*" key for two seconds

This command causes the SentriMax to exit setup mode and do a software reset. After reset it resumes operating in running mode with the newly modified settings in effect. *Always* use the **Exit** command when you finish programming.

Reset Factory Defaults

Front panel:	Setup | Reset Defaults
DTMF command:	999#

This command is used to return all configurable settings to their factory default values. All run-time meters are also cleared by this command.

System Settings

System Name

Front panel:	N/A
DTMF command:	N/A

The system name is displayed on the top line of the LCD display when the SentriMax front panel menus are not active. This setting can be modified only with the Model 1550's PC based configuration program, SMCU.

System Version

Front panel:	Setup | System Setup | System Version
DTMF command:	N/A

The current system firmware number and version are displayed on the bottom line of the LCD display when this item is selected from the front panel menu. This is only for system version inquiries and cannot be modified.

Set Date

Front panel:	Setup | System Setup | Set Date
DTMF command:	100*mmddyy*# *mm* = month (01 to 12) *dd* = day (01 to 31) *yy* = year (00 to 99)

This command is used to initialize the date in SentriMax's internal clock/calendar. The date is entered in month, day, year order.

Set Time

Front panel:	Setup | System Setup | Set Time
DTMF command:	101*hhmm*# *hh* = hours (00 to 23) *mm* = minutes (00 to 59)

Sets the time on the SentriMax's internal clock/calendar. SentriMax uses military format - 00:00 for midnight, 12:00 for noon and 23:59 for one minute before midnight.

Note This command requires that the Real Time Clock option be installed.

Printer Logging

Front panel:	Setup | System Setup | Printer Log
DTMF command:	102*x*# *x* = 0 to disable, 1 to enable
Default:	Disabled

With the real time clock option, SentriMax has the ability to log time and date stamped records of system events to its RS232 serial port. The output is normally sent to a printer for a hardcopy report, but could also be captured by a computer.

Note This command requires that the Real Time Clock option be installed.

Real Time Clock Option on page 191 gives a complete description of the events that are recorded and how they are formatted in the printed report.

Clear Holiday Calendar

Front panel:	Setup | System Setup | Clear Holidays
DTMF command:	103#

The real time clock option allows SentriMax to call different lists of people depending on the time of day, day of week, and whether or not the date is a holiday (see *Call List Settings* on page 71). The M1550 lets you specify up to twenty holidays for the year. This command is used to remove all previously defined holidays.

Modify Holiday

Front panel:	Setup | System Setup | Modify Holiday
DTMF command:	104*hhmmddyy*# *hh* = holiday number (01 to 20) *mm* = month (01 to 12) *dd* = day of month (01 to 31) *yy* = year (00 to 99)
Default:	All Holidays are cleared

This command is used to enter a date into SentriMax's holiday calendar. A holiday can be cleared by entering 0's for the month, day, and year.

As each holiday passes, it is automatically cleared from the holiday calendar.

Note This command requires that the Real Time Clock option be installed.

Modify User

Front panel:	Setup | System Setup | Modify User
DTMF command:	105*uu[ai[iii]]*# *uu* = user number (01 to 20) *a* = optional access level (1 to 4) *i[iii]* = optional 1 to 4 digit password
Default:	passwords disabled

This command is used to specify passwords and access levels for up to twenty different users.

Warning! If you want to be able to change SentriMax's setup from either the front panel or from a DTMF device, you must either leave all passwords blank, or make sure that at least one user has System access. Otherwise you will not be able to enter into setup mode from the front panel, telephone, or radio.

By default, all passwords are blank, and anyone can access all features of the M1550. Once any passwords are configured, SentriMax will not let you give any commands until after a valid password is entered.

Each user password can contain from one to four digits, and is assigned one of four access levels. The access levels specify which features of the SentriMax the user can control. The four access levels are:

1. Inquire: the user can determine the status of inputs and alarms.
2. Acknowledge: the user can acknowledge alarms.
3. Control: the user can control outputs.
4. System: the user has full access to SentriMax including setup mode.

Each level includes the features of the previous level, so that a user with Control access can perform all functions allowed by Inquire and Acknowledge access in addition to being able to control outputs.

A user can be removed from the system by leaving the password blank (using DTMF, just enter 105*uu*#).

When using the SentriMax's PC configuration utility, you can also specify a 10-character name for each user.

System ID Message

Front panel:	Setup | System Setup | System ID Msg
DTMF command:	106*[mm]*# *mm* = optional voice message number (00 to 99)
Default:	pre-recorded message "This is the Zetron SentriMax."

This command is used to assign a user defined voice message to identify the SentriMax. This message is played at the beginning of every alarm transmission that includes voice playback, and whenever a user enters the command mode from telephone or radio.

Valid range for System ID Message is 00 to 99, where 00 selects the default (pre-recorded) voice message.

Mailbox Length

Front panel:	Setup | System Setup | Mailbox Length
DTMF command:	107*l[ll]*# *l[ll]* = length in seconds (0 to 240)
Default:	0 seconds

The mailbox length is the amount of user definable voice storage that will be reserved for SentriMax's voice mailbox. Voice storage set aside for the mailbox is not available for other user defined voice messages.

The voice mailbox feature is disabled if the mailbox length is set to 0.

Panel Menu Time-out Period

Front panel:	Setup | System Setup | Menu Time Out
DTMF command:	108*n[nn]*# *n[nn]* = minutes before time out (1 to 255)
Default:	3 minutes

This setting controls the amount of time that the SentriMax waits before automatically logging off a front panel operator.

RS232 Baud Rate

Front panel:	Setup | System Setup | RS232 Baud Rate
DTMF command:	N/A
Default:	19200

This sets the baud rate of the RS232 serial port on the unit which is often used for printer (or computer) logging. User selectable baud rates include 1200, 2400, 4800, 9600, and 19200.



Note The same baud rate is used for programming that is used for logging events to the printer (and the other way round). If you change the serial port baud rate in order to support programming, be sure to return it to the correct baud rate before reconnecting it to the printer.

Assign All Call Lists

Front panel:	Setup | System Setup | All Call Lists
DTMF command:	109*[aa[bb[cc]]]*# *aa, bb, cc* = optional call list numbers (01 to 10)
Default:	N/A

This command is an easy way to assign the call lists used by all alarms.

All's Well Enable

Front panel:	Setup | System Setup | All's Well | Enable
DTMF command:	120*x*# *x* = 0 to disable, 1 to enable
Default:	Disabled

This command enables or disables All's Well alarms.

The All's Well alarm is triggered periodically depending on the interval and start time settings described in the two following commands.

All's Well Interval

Front panel:	Setup | System Setup | All's Well | Interval
DTMF command:	121*hhhmm*# *hhh* = hours (000 to 168) *mm* = minutes (00 to 59)
Default:	4 hours, 0 minutes

The interval at which All's Well alarms are triggered can be set anywhere in the range from 0 hours 5 minutes to 168 hours 0 minutes.

All's Well Start Time

Front panel:	Setup | System Setup | All's Well | Start Time
DTMF command:	122*hhhmm*# *hhh* = hours (000 to 167) *mm* = minutes (00 to 59)
Default:	0 hours, 0 minutes (12:00 midnight Saturday)

This command is used to set a reference time for the All's Well alarm event. The range is from 00:00 (Saturday midnight) to 167:59 (1 minute before midnight Saturday).

This setting, along with the All's Well interval, allows you to schedule All's Well calls at specific times of the day. For example, if you want the All's Well report to be sent out at 7:00 AM, 3:00 PM and 11:00 PM, set the start time to 7:00 and the interval to 8 hours.

All's Well Call List(s)

Front panel:	Setup | System Setup | All's Well | Call List(s)
DTMF command:	123*[aa[bb[cc]]]*# *aa, bb, cc* = optional call list numbers (01 - 10)
Default:	no call list(s) specified

This setting specifies which list(s) of calls should be made when reporting All's Well alarms. If the real time clock option is installed, up to 3 call lists can be specified to allow different people to be notified depending on the time of day and day of the week.

All's Well No Alarm Message

Front panel:	Setup | System Setup | All's Well | No Alarm Msg
DTMF command:	124*[mm]*# *mm* = optional voice message number (00 - 99)
Default:	pre-recorded message "There are no active alarms."

Use this command to specify a user defined voice message to be played on voice calls for the All's Well alarm when there are no other active alarms. If no voice message number is given, the default message will be played.

The valid range for Alarm Message voice messages is 00 to 99, where 00 selects the default (pre-recorded) voice message.

All's Well Alarm Active Message

Front panel:	Setup | System Setup | All's Well | Alarm Message
DTMF command:	125*[mm]*# *mm* = optional voice message number (01 - 99)
Default:	pre-recorded message "There are <N> active alarms."

This is the voice message that will be played on All's Well calls when there are one or more active alarms. If no voice message number is given, the default message will be played.

All's Well Paging Text

Front panel:	Setup | System Setup | All's Well | Paging Text
DTMF command:	126*[<pager text>]*# *<pager text>* = up to 40 characters
Default:	blank

This command specifies the text string that will be sent if there are POCSAG or TAP paging calls in the call list used by the All's Well alarm.

All's Well DTMF String

Front panel:	Setup | System Setup | All's Well | DTMF String
DTMF command:	127*[<DTMF string>]*# *<DTMF string>* = up to 16 DTMF characters
Default:	blank

This string of DTMF characters is used if there are overdial telephone calls or DTMF radio calls in the All's Well call list.

Panic Key Enable

Front panel:	Setup | System Setup | Panic Key | Enable
DTMF command:	130*x*# *x* = 0 to disable, 1 to enable
Default:	Enabled

Enables or disables panic key alarms. This alarm is triggered by pressing the panic key on the SentriMax front panel.

Panic Key Call List(s)

Front panel:	Setup | System Setup | Panic Key | Call List(s)
DTMF command:	131*[aa[bb[cc]]]*# *aa, bb, cc* = optional call list numbers (01 - 10)
Default:	no call list(s) specified

Specifies which list(s) of calls should be used for reporting panic key alarms.

Panic Key Normal Message

Front panel:	Setup | System Setup | Panic Key | Normal Message
DTMF command:	132*[mm]*# *mm* = optional voice message number (01 - 99)
Default:	pre-recorded message “Panic key normal.”

Specifies the message that will be played when a user inquires about the status of the panic key alarm and the alarm is not active. If no voice message number is given, the default message will be played.

Panic Key Alarm Message

Front panel:	Setup | System Setup | Panic Key | Alarm Message
DTMF command:	133*[mm]*# *mm* = optional voice message number (00 - 99)
Default:	pre-recorded message “Panic key alarm.”

Use this command to specify a user defined voice message to be played on voice calls for the panic key alarm, and for status inquiry when the alarm is active.

Panic Key Paging Text

Front panel:	Setup | System Setup | Panic Key | Paging Text
DTMF command:	134*[<pager text>]*# <*pager text*> = up to 40 characters
Default:	blank

This command specifies the string of numbers or text that will be sent during POCSAG or TAP paging calls for the panic key alarm.

Panic Key DTMF String

Front panel:	Setup | System Setup | Panic Key | DTMF String
DTMF command:	135*[<DTMF string>]*# <*DTMF string*> = up to 16 DTMF characters
Default:	blank

This command sets the string of DTMF characters that is used in overdial telephone calls and radio DTMF calls for the panic key alarm.

Power Loss Enable

Front panel:	Setup | System Setup | Power Loss | Enable
DTMF command:	140*x*# *x* = 0 to disable, 1 to enable
Default:	disabled

Enables or disables AC power loss alarms. This alarm is triggered if the AC power is lost for longer than 1 minute.

Power Loss Self Clear

Front panel:	Setup | System Setup | Power Loss | Self Clearing
DTMF command:	141*x*# *x* = 0 to disable, 1 to enable
Default:	disabled

If enabled, this setting will cause alerting for the power loss alarm to be stopped automatically (after at least one call is made) when the AC power is restored.

Power Loss Call List(s)

Front panel:	Setup | System Setup | Power Loss | Call List(s)
DTMF command:	142*[aa[bb[cc]]]*# *aa, bb, cc* = optional call list numbers (01 - 10)
Default:	no call list(s) specified

This command specifies which call list(s) will be used to report AC power loss alarms.

Power Loss Normal Message

Front panel:	Setup | System Setup | Power Loss | Normal Message
DTMF command:	143*[mm]*# *mm* = optional voice message number (00 - 99)
Default:	pre-recorded message “Power normal.”

This setting tells the SentriMax which voice message to play when a user inquires about the status of the power loss alarm and AC power is present. The default message will be played if no voice message number is specified.

Power Loss Alarm Message

Front panel:	Setup | System Setup | Power Loss | Alarm Message
DTMF command:	144*[mm]*# *mm* = optional voice message number (01 - 99)
Default:	pre-recorded message “Power loss.”

This is the voice message that will be played for power loss alarm voice calls and for status inquiries if the power loss alarm is active. The default message is played if no user defined message number is given.

Power Loss Paging Text

Front panel:	Setup | System Setup | Power Loss | Paging Text
DTMF command:	145[<pager text>]# <pager text> = up to 40 characters
Default:	blank

The SentriMax uses the string specified here when sending an alert to a POCSAG pager or TAP paging terminal for the power loss alarm.

Power Loss DTMF String

Front panel:	Setup | System Setup | Power Loss | DTMF String
DTMF command:	146*[<DTMF string>]*# *<DTMF string>* = up to 16 DTMF characters
Default:	blank

During overdial and radio DTMF calls for the AC power loss alarm, this string of DTMF digits is used.

Low Battery Enable

Front panel:	Setup | System Setup | Low Battery | Enable
DTMF command:	150*x*# *x* = 0 to disable, 1 to enable
Default:	disabled

Enables or disables low battery alarms. The low battery alarm is triggered if the battery drops below 11.5 VDC for longer than 1 minute.

Low Battery Self Clear

Front panel:	Setup | System Setup | Low Battery | Self Clearing
DTMF command:	151*x*# *x* = 0 to disable, 1 to enable
Default:	disabled

This settings determines whether or not alerting for the low battery alarm will be automatically terminated (after at least one call is made) when the battery level returns to normal.

Low Battery Call List(s)

Front panel:	Setup | System Setup | Low Battery | Call List(s)
DTMF command:	152*[aa[bb[cc]]]*# *aa, bb, cc* = optional call list numbers (01 - 10)
Default:	no call list(s) specified

Specifies which list(s) of calls should be used for reporting low battery key alarms.

Low Battery Normal Message

Front panel:	Setup | System Setup | Low Battery | Normal Message
DTMF command:	153*[mm]*# *mm* = optional voice message number (01 - 99)
Default:	pre-recorded message “Battery normal.”

Specifies the message that will be played when a user inquires about the status of the low battery alarm and the alarm is not active. If no voice message number is given, the default message will be played.

Low Battery Alarm Message

Front panel:	Setup | System Setup | Low Battery | Alarm Message
DTMF command:	154*[mm]*# *mm* = optional voice message number (01 - 99)
Default:	pre-recorded message “Battery low.”

Use this command to specify a user defined voice message to be played on voice calls for the low battery alarm, and for status inquiry when the alarm is active.

Low Battery Paging Text

Front panel:	Setup | System Setup | Low Battery | Paging Text
DTMF command:	155*[<pager text>]*# *<pager text>* = up to 40 characters
Default:	blank

This command specifies the string of numbers or text that will be sent during POCSAG or TAP paging calls for the low battery alarm.

Low Battery DTMF String

Front panel:	Setup | System Setup | Low Battery | DTMF String
DTMF command:	156*[<DTMF string>]*# *<DTMF string>* = up to 16 DTMF characters
Default:	blank

This command sets the string of DTMF characters that is used in overdial telephone calls and radio DTMF calls for the low battery alarm.

High Temperature Enable

Front panel:	Setup | System Setup | High Temp. | Enable
DTMF command:	160*x*# *x* = 0 to disable, 1 to enable
Default:	disabled

Enables or disables the high temperature alarm. SentriMax triggers this alarm when the temperature inside its enclosure rises above 45ºC (113ºF) and stays there for longer than one minute. Temperatures above 50ºC (122ºF) can cause damage to the gel-cell battery used for backup power.

High Temperature Self Clear

Front panel:	Setup | System Setup | High Temp. | Self Clearing
DTMF command:	161*x*# *x* = 0 to disable, 1 to enable
Default:	disabled

If enabled, this setting will cause alerting for the high temperature alarm to be stopped automatically (after at least one call is made) when the temperature drops below 45ºC (113º F).

High Temperature Call List(s)

Front panel:	Setup | System Setup | High Temp. | Call List(s)
DTMF command:	162*[aa[bb[cc]]]*# *aa, bb, cc* = optional call list numbers (01 - 10)
Default:	no call list(s) specified

This command specifies which call list(s) will be used to report high temperature alarms.

High Temperature Normal Message

Front panel:	Setup | System Setup | High Temp. | Normal Message
DTMF command:	163*[mm]*# *mm* = optional voice message number (01 - 99)
Default:	pre-recorded message "Temperature normal."

This setting tells the SentriMax which voice message to play when a user inquires about the status of the high temperature alarm and the alarm is not active. The default message will be played if no voice message number is specified.

High Temperature Alarm Message

Front panel:	Setup | System Setup | High Temp. | Alarm Message
DTMF command:	164*[mm]*# *mm* = optional voice message number (01 - 99)
Default:	pre-recorded message "Temperature too high."

This is the voice message that will be played for high temperature alarm voice calls and for status inquiries if the alarm is active. The default message is played if no user defined message number is given.

High Temperature Paging Text

Front panel:	Setup | System Setup | High Temp. | Paging Text
DTMF command:	165*[<pager text>]*# *<pager text>* = up to 40 characters
Default:	blank

The SentriMax uses the string specified here when sending an alert to a POCSAG pager for the high temperature alarm.

High Temperature DTMF String

Front panel:	Setup | System Setup | High Temp. | DTMF String
DTMF command:	166*[<DTMF string>]#* *<DTMF string>* = up to 16 DTMF characters
Default:	blank

During overdial and radio DTMF calls for the high temperature alarm, this string of DTMF digits is used.

Phone Settings

Dialing Method

Front panel:	Setup | Phone Setup | Dialing Method
DTMF command:	170*x*# *x* = 0 for tone dialing, 1 for pulse dialing
Default:	tone dialing

Specifies whether SentriMax will use tone or pulse dialing when dialing telephone numbers.

Dialtone Detection

Front panel:	Setup | Phone Setup | Dialtone Detect
DTMF command:	171*x*# *x* = 0 to disable, 1 to enable
Default:	disabled

When dialtone detection is enabled, SentriMax will dial a phone number only if it detects a dialtone after going off hook. If SentriMax fails to detect dialtone, it gives up and moves to the next call in the call list.

Note The TAP Paging option must be installed in order for this feature to be available.

If dialtone detection is disabled, the Model 1550 dials the number even in the absence of dialtone.

Answer Detection

Front panel:	Setup | Phone Setup | Answer Detect
DTMF command:	172*x*# *x* = 0 to disable, 1 to enable
Default:	disabled

This setting determines whether or not SentriMax will detect when an outgoing phone call has been answered by the called party. In order for this feature to be available, the TAP Paging option must be installed.

SentriMax's method of detecting answer is to monitor the ringing tones sent back from the phone company. When the ringing tones stop the M1550 assumes the phone has been answered and begins sending the alert messages. If the ringing does not stop within 60 seconds, the M1550 gives up and moves on to the next call.

Caution! For answer detection to operate properly, the phone system must generate standard progress tones. In particular, it must provide audible ringing after the phone number is dialed. In addition, at least one full ring must occur before the called party answers the phone. Answer detection should be disabled if these conditions cannot be met.

If answer detection is enabled, it has several effects on the operation of the SentriMax:

- the call will be terminated if a busy or re-order tone is detected
- for voice calls, SentriMax makes sure the siren tone and voice messages are played after the call is answered
- for overdial calls, the overdialed digits are not sent until after answer is detected
- for TAP paging calls, SentriMax does not start the modem handshaking sequence until after answer is detected

Dial Pause Time

Front panel:	Setup | Phone Setup | Dial Pause
DTMF command:	173*n[n]*# *n[n]* = pause time in seconds (1 to 20)
Default:	2 seconds

The dial pause time determines how long SentriMax waits for each pause embedded in a phone number. This setting also applies to pauses embedded in DTMF overdial strings sent to telephone or radio. This variable is represented by a "P" that can be entered into any phone number DTMF string that requires a pause.

Incoming Rings Before Answer

Front panel:	Setup | Phone Setup | Incoming Rings
DTMF command:	174*n[n]*# *n[n]* = number of rings before answer (1 to 20)
Default:	answer after 3 rings

This setting determines the number of rings SentriMax must detect before it answers an incoming phone call. This setting applies to both the primary and secondary telephone lines.

Select TAP Terminal

Required Options:	TAP paging
Front panel:	Setup | Phone Setup | TAP Paging | TAP Terminal | Select Terminal
DTMF command:	N/A
Default:	N/A

This menu item is used to select one of the three TAP paging terminals for editing by the remaining TAP paging commands.

From the front panel menus, you must specify a TAP terminal number using this command before using any of the other TAP paging settings commands. From a DTMF device, the paging terminal number is included in each command.

TAP Phone Number

Required Options:	TAP paging
Front panel:	Setup | Phone Setup | TAP Paging | Phone Number
DTMF command:	175*t*[<*DTMF string*>]# *t* = paging terminal (1 to 3) <*DTMF string*> = up to 30 DTMF characters
Default:	blank

This setting is the phone number of the paging terminal used to make TAP paging calls.

It is also possible to directly connect SentriMax and the paging terminal through their RS-232 serial ports. In this case, the TAP Phone Number should be left blank.

TAP Password

Required Options:	TAP paging
Front panel:	Setup | Phone Setup | TAP paging | Password
DTMF command:	176*t[pppppp]*# *t* = paging terminal (1 to 3) *pppppp* = 0 to 6 character password
Default:	blank

This is the password sent to the TAP paging terminal during a paging phone call. Not all paging terminals require a password, so you may need to leave this setting blank.

From the SentriMax front panel, or from phone or radio, only numeric characters can be entered. If alphabetic characters are required in the password, it must be entered from the SentriMax PC setup utility.

TAP Parity

Required Options:	TAP paging
Front panel:	Setup | Phone Setup | TAP Paging | Parity
DTMF command:	177*tx*# *t* = paging terminal (1 to 3) *x* = parity designator (0 to 2)
Default:	2 (even parity)

This command selects the data communications format used when making TAP paging calls. The three formats are:

0 - no parity, 8 data bits, 1 stop bit
1 - odd parity, 7 data bits, 1 stop bit
2 - even parity, 7 data bits, 1 stop bit

TAP Baud Rate

Required Options:	TAP paging
Front panel:	Setup | Phone Setup | TAP Paging | Baud Rate
DTMF command:	178*tx*# *t* = paging terminal (1 to 3) *x* = Baud rate designator (0 to 4)
Default:	3 (4800 baud)

This command sets the baud rate used for communications with the TAP paging terminal. When there is a direct serial connection between the SentriMax and the TAP paging terminal, the choices are:

0 - 300 baud
1 - 1200 baud
2 - 2400 baud
3 - 4800 baud
4 - 9600 baud

Caution! For a modem connection to a TAP paging terminal (the phone number is non-blank), SentriMax uses 1200 baud if 1200 baud is selected and 300 baud if any other baud rate is selected.

For a direct serial connection to the paging terminal, SentriMax always uses the selected baud rate.

Telephone Voice Prompts

Front panel:	Setup | Phone Setup | Voice Prompts
DTMF command:	179*x*# *x* = 0 to disable, 1 to enable
Default:	enabled

This setting is used to enable or disable command mode voice prompts when the user accesses the SentriMax from a telephone. Tone prompts will still be played in response to commands when voice prompts are disabled.

Radio Settings

Radio ID

Front panel:	Setup | Radio Setup | Radio ID
DTMF command:	190*[iiii]*# *iiii* = 0 to 4 digit DTMF string (# and * not allowed)
Default:	blank

The radio ID allows DTMF commands from radio to be directed to a specific SentriMax unit when more than one unit share the same radio frequency. It is a string of one to four DTMF digits that must be entered as the first part of the radio log on procedure.

If there is only one SentriMax on the radio channel, the radio ID can be left blank. If more than one SentriMax uses the same radio channel, however, each must have a unique radio ID.

The radio ID can not contain "#" or "*", but the digits "A", "B", "C", and "D" are allowed.

Radio Type

Front panel:	Setup | Radio Setup | Radio Type
DTMF command:	191*x*# *x* = 0 for conventional, 1 for trunked radio
Default:	conventional

This command tells the SentriMax whether it should use the key up sequence for trunking or conventional (non-trunking) radio.

The key up sequence for conventional radio is:

1. Wait until the COR (channel busy) signal stays off for the channel busy delay time.
2. Assert PTT.
3. Wait for the key up delay time.
4. Transmit audio.

For trunking radios, the key up sequence is:

1. Assert PTT (PTT is used as a channel request signal).
2. Wait for the COR (channel busy) signal to go off and stay off for the channel busy delay time (meaning that a channel has become available). If the channel does not become available within 10 seconds, turn off PTT, wait 15 seconds, and start over with step 1.
3. Wait for the key up delay time.
4. Transmit audio.

When SentriMax is trying to make an alert call, it gives up and moves to the next call if the channel is busy for longer than 60 seconds.

Key Up Delay

Front panel:	Setup | Radio Setup | Key Up Delay
DTMF command:	192*n[nn]*# *n[nn]* = key up delay in tenths of a second (0 to 255)
Default:	0.5 seconds

For a conventional (non-trunking) radio, the key up delay is the amount of time the SentriMax waits between asserting the PTT (push-to-talk) relay and beginning to transmit audio signals. For a trunking radio, it is the delay between the time the channel becomes available and when the SentriMax starts to transmit its audio.

From the front panel or the PC configuration program, the value is entered using a decimal point to specify tenths of a second. The range is 0.0 to 25.5 seconds. With the DTMF command, enter the required delay multiplied by 10.

Channel Busy (COR) Level

Front panel:	Setup | Radio Setup | Busy Level - COR
DTMF command:	193*x*# *x* = 0 if low indicates busy, 1 if high indicates busy
Default:	low indicates busy

This setting tells SentriMax whether the radio applies a low or a high voltage to the COR input of the radio connector when the radio channel is busy.

COR is an acronym for Carrier Operated Relay. When the COR signal is active (carrier has been detected), the channel is busy and the SentriMax will not key up the radio.

The term COR applies only to conventional (non-trunking) radios, but the SentriMax uses the same signal line for trunking systems, where there is usually some indicator that the channel has become available.

Channel Busy Delay

Front panel:	Setup | Radio Setup | Busy Delay
DTMF command:	194*n[nn]*# *n[nn]* = delay in tenths of a second (0 to 255)
Default:	1.0 seconds

The channel busy delay specifies the amount of time that the channel busy indicator (COR signal) must remain inactive before the SentriMax considers the radio channel to be available.

The range is 0.0 to 25.5 seconds and this value can be entered directly with a decimal point from the front panel keypad or the PC configuration program. From DTMF, you must enter the required delay time multiplied by 10.

Two Tone Timing

Required options:	Radio paging
Front panel:	Setup | Radio Setup | Two Tone Timing
DTMF command:	195*x*# *x* = timing designator (0 to 7)
Default:	6 (Motorola/GE tone & voice)

This command is used to specify which timing format the SentriMax will use for two-tone paging. Table 1 shows the timings (in seconds) for the different formats.

If both the A and B tones for a page are set to the same tone, then only a single long tone will be produced, using the group tone timing.

Table 1: Two-Tone Timing

Pager Type	Format #	A Tone	Gap	B Tone	Group Tone
NEC D	0	0.4	0	0.4	3.0
NEC M	1	0.4	0	0.8	4.0
Mot tone only	2	0.4	0	0.8	8.0
NEC L	3	0.5	0	0.5	3.0
NEC C	4	1.0	0	1.0	4.0
NEC B	5	1.0	0	3.0	6.0
Mot/GE tone & voice	6	1.0	0	3.0	8.0
NEC A	7	1.0	.25	3.0	6.0

POCSAG Format

Required options:	Radio paging
Front panel:	Setup | Radio Setup | POCSAG Format
DTMF command:	196*x*# *x* = format designator (0 to 5)
Default:	4 (1200 Baud alphanumeric)

The POCSAG format command specifies which of the following formats SentriMax is to use for POCSAG paging.

0 - 512 Baud numeric
1 - 1200 Baud numeric
2 - 2400 Baud numeric
3 - 512 Baud alphanumeric
4 - 1200 Baud alphanumeric
5 - 2400 Baud alphanumeric

POCSAG Polarity

Required options:	Radio paging
Front panel:	Setup | Radio Setup | POCSAG Inverted
DTMF command:	197*x*# *x* = 0 for normal, 1 for inverted
Default:	normal

This command is used to change the polarity of the DIG_DATA line on the SentriMax's radio interface. This is the signal sent to the radio for POCSAG paging. The proper setting depends on both the radio and pagers. The best way to determine the correct setting is to try both ways and see which one works.

Radio Voice Prompts

Front panel:	Setup | Radio Setup | Voice Prompts
DTMF command:	198*x*# *x* = 0 to disable, 1 to enable
Default:	enabled

This setting determines whether or not voice prompts will be used to guide the user through entry of command mode commands from the radio. If disabled, only tone prompts will be played in response to command entry.

Voice Message Commands

Free Voice Memory

Front panel:	Setup | Voice Setup | Free Voice Mem.
DTMF command:	N/A
Default:	N/A

This command is used to display (in seconds) the amount of unused voice storage space remaining in the SentriMax. This function is not available when programming SentriMax via DTMF radio or telephone.

Select Voice Message

Front panel:	Setup | Voice Setup | Select Msg #
DTMF command:	N/A
Default:	N/A

Before trying to record, play or change the length of a user definable voice message, you must first specify, with this command, which message you want to modify. There are 99 user definable voice messages numbered 1 through 99.

This command is not necessary for programming via DTMF radio or telephone.

Voice Message Length

Front panel:	Setup | Voice Setup | Message Length
DTMF command:	210*mml[ll]*# *mm* = voice message number (01 to 99) *l[ll]* = message length in seconds (0 to 240 max)
Default:	0 seconds for all messages

This command is used to set the length of one of the user defined voice messages. From the front panel, you must select a message with the Specify Message command before setting the length - from a DTMF device, the message number is specified as part of this command.

The maximum length for any message is the total amount of voice storage space installed in the SentriMax less that used by the voice mailbox and by other user definable voice messages. Message lengths are specified in 1 second increments.

If you change the length of a previously recorded message, the entire message content is lost and will have to be recorded again. However, other messages will not be affected.

Record

Front panel:	Setup | Voice Setup | Record
DTMF command:	211*mm*# *mm* = voice message number (01 to 99)
Default:	N/A

This command is used to record one of the user definable voice messages. From the front panel, you must select a message with the Specify Message command - from a DTMF device, the message number is given as part of this command.

Recording automatically stops when the allocated voice storage is filled.

Play

Front panel:	Setup | Voice Setup | Play
DTMF command:	212*mm*# *mm* = voice message number (01 to 99)
Default:	N/A

This command is used to play back of the user definable voice messages. If the command is given from a DTMF radio or from the telephone, the message number is embedded in the command. From the front panel, you must first select the message with the Specify Message command.

Playback will automatically cease at the end of the message.

Digital I/O Settings

Select Digital I/O

Front panel:	Setup | Digital I/O | Select I/O
DTMF command:	N/A
Default:	N/A

When configuring SentriMax from its front panel, this command is used to select which digital I/O pin will be affected by the other digital I/O commands described in this section.

SentriMax comes standard with 16, and can be expanded up to 64, digital I/O points.

Activate Digital I/O

Front panel:	Setup | Digital I/O | Activate I/O
DTMF command:	220*iix*# *ii* = I/O number (01 to 64) *x* = 0 to disable, 1 to enable
Default:	enabled

This setting determines whether or not the SentriMax will allow status display or output control for a particular digital I/O point. The front panel menus display only the digital I/O points that are activated. DTMF commands return either an error tone or a voice prompt if an inactive I/O point is specified.

Disabling this setting does not disable alarm events on the input.

I/O Mode

Front panel:	Setup | Digital I/O | I/O Mode
DTMF command:	221*iix*# *ii* = I/O number (01 to 64) *x* = mode designator (0 to 2)
Default:	0 (normally open input)

Each digital I/O point can operate in one of three modes:

0 - Normally Open (a low input level triggers the alarm)
1 - Normally Closed (a high input level triggers the alarm)
2 - Output (the I/O point is used as an output)

The low input level is 0.8V and the high level 2.0V. Voltages between these values are indeterminate.

When used as an output, the I/O point is driven through an open collector device that has a pull-up resistor to the SentriMax's DC power supply. When the output is turned on, the voltage drops to about 0.6VDC. When off, it rises to the pull up voltage (> 10 VDC).

When a digital I/O point is changed to output mode, the Output Momentary Time (same as Alarm Delay) is not automatically set to 0 and should usually be changed as well.

Alarm Delay/Output Momentary Time

Front panel:	Setup | Digital I/O | Alarm Delay
DTMF command:	222*iin[nnnn]*# *ii* = I/O number (01 to 64) *n[nnnn]* = delay time in tenths of a second (0 to 60000)
Default:	1.0 second

This command sets the alarm delay time if the selected digital I/O is used as an input, and the momentary on time if the I/O is used as an output.

An input alarm will be triggered only if the input remains in the alarm condition for this amount of time.

If the I/O point is used as an output, and this setting is greater than 0, the output will turn on when commanded to do so, stay on for the specified amount of time, then automatically turn off. If this setting is 0, the output will stay on until turned off by user command.

Alarm Enable

Front panel:	Setup | Digital I/O | Enable Alarm
DTMF command:	223*iix*# *ii* = I/O number (01 to 64) *x* = 0 to disable, 1 to enable
Default:	enabled

This command enables or disables triggering of alarms for the selected input.

Self Clear

Front panel:	Setup | Digital I/O | Self Clearing
DTMF command:	224*iix*# *ii* = I/O number (01 to 64) *x* = 0 to disable, 1 to enable
Default:	disabled

This setting determines whether alerting should stop automatically for the selected digital input alarm when the alarm condition goes away. Even when self-clearing is enabled, the alarm will not be cleared until after at least one alert transmission.

Call List(s)

Front panel:	Setup | Digital I/O | Call List(s)
DTMF command:	225*ii[aa[bb[cc]]]*# *ii* = I/O number (01 to 64) *aa, bb, cc* = optional call list numbers (01 to 10)
Default:	no call lists specified

Determines which list(s) of calls are to be used for the specified digital input alarm.

Normal Message

Front panel:	Setup | Digital I/O | Normal/Off Msg
DTMF command:	226*ii[mm]*# *ii* = I/O number (01 to 64) *mm* = optional voice message number (01 to 99)
Default:	"Digital input N normal" or "Digital output N off"

Specifies which user defined voice message will be played back during status inquiries for the selected I/O point. This message is played when the I/O is configured as an input and it is not in the alarm condition, and when the I/O is configured as an output and it is turned off.

The pre-recorded default message will be used if no message number is given.

Alarm Message

Front panel:	Setup | Digital I/O | Alarm/On Msg
DTMF command:	227*ii[mm]*# *ii* = I/O number (01 to 64) *mm* = optional voice message number (00 to 99)
Default:	"Digital input N alarm" or "Digital output N on"

Specifies a user defined voice message for alarm reporting and status inquiry for the selected I/O point. This message applies when the I/O is used as an input and it is in the alarm condition, or when it is used as an output and is turned on.

If no message number is given, the built in default message will be used.

The valid range for Alarm Message voice messages is 00 to 99, where 00 selects the default (pre-recorded) voice message.

Paging Text

Front panel:	Setup | Digital I/O | Paging Text
DTMF command:	228*ii[<pager text>]*# *ii* = I/O number (01 to 64) <*pager text*> = up to 40 characters
Default:	blank

The SentriMax uses the string specified here when sending an alert to a POCSAG pager or TAP paging terminal for a digital input alarm.

DTMF String

Front panel:	Setup | Digital I/O | DTMF String
DTMF command:	229*ii[<DTMF string>]*# *ii* = I/O number (01 to 64) <*DTMF string*> = up to 16 DTMF characters
Default:	blank

This command is used to enter the string of DTMF digits that is played out during a telephone overdial or radio DTMF alert call for the selected digital input.

I/O Name, Input Normal/Output Off Text, Input Alarm/Output On Text

Front panel:	N/A
DTMF command:	N/A
Default:	“Digital I/0 #n”, “Normal”, and “Alarm”

These three items are used to assign names to the digital I/O, and its normal (output off) and alarm (output on) states. They are used to display the input status and alarm status on SentriMax’s front panel display, and when logging data to the printer (real time clock option required).

These settings can be modified only with the SentriMax Configuration Utility (SMCU). The maximum length of each is 15 characters.

Counter Settings

Select Counter

Front panel:	Setup | Input Counters | Select Counter
DTMF command:	N/A
Default:	N/A

Specifies which counter the rest of the counter setup commands will apply to. This command is not required when programming SentriMax with DTMF via telephone or radio.

Each of the 16 counters counts alarm event on its corresponding digital input. That is, counter 3 keeps track of the number of alarm events detected on digital input number 3.

The count is increased each time the input transitions from the normal to the alarm condition, even if the alarm for the digital input is disabled.

Activate Counter

Front panel:	Setup | Input Counters | Activate Ctr
DTMF command:	260*iix*# *ii* = counter number (01 to 16) *x* = 0 to disable, 1 to enable
Default:	disabled

This setting determines whether or not status inquiry and counter clear commands will be allowed from the front panel menus or from a DTMF device for a particular input counter. Counter alarms and automatic clearing can occur even if the counter is declared not inactive.

The primary purpose of this setting is to keep unused counters from being listed on the front panel menus.

Alarm Count

Front panel:	Setup | Input Counters | Alarm Count
DTMF command:	261*iin[nnnn]*# *ii* = counter number (01 to 16) *n[nnnn]* = alarm count (0 to 65535)
Default:	0

An alarm will be triggered when the input counter value reaches the alarm count (provided the alarm count is > 0). If the Reset Count is less than the Alarm Count, the input will never alarm.

Reset Count

Front panel:	Setup | Input Counters | Reset Count
DTMF command:	262*iin[nnnn]*# *ii* = counter number (01 to 16) *n[nnnn]* = reset count (0 to 65535)
Default:	0

This setting determines the count at which the input counter will be automatically reset to 0. Specifying a reset count of 0 disables automatic counter reset.

Alarm Enable

Front panel:	Setup | Input Counters | Enable Alarm
DTMF command:	263*iix*# *ii* = counter number (01 to 16) *x* = 0 to disable, 1 to enable
Default:	disabled

This commands enables or disables alarms for the specified input counter. A counter alarm is triggered when the counter value reaches the alarm count.

Self Clearing

Front panel:	Setup | Input Counters | Self Clearing
DTMF command:	264iix# ii = counter number (01 to 16) x = 0 to disable, 1 to enable
Default:	disabled

If self clearing is enabled, alerting for the input counter alarm will stop (after at least one alert transmission) if the counter is reset either automatically or by user command.

Call List(s)

Front panel:	Setup | Input Counters | Call List(s)
DTMF command:	265*ii[aa[bb[cc]]]*# *ii* = counter number (01 to 16) *aa, bb, cc* = optional call list numbers (01 to 10)
Default:	no call list(s) specified

Specifies the list(s) of calls to be made for the counter alarm.

Normal Message

Front panel:	Setup | Input Counters | Normal Message
DTMF command:	266*ii[mm]*# *ii* = counter number (01 to 16) *mm* = optional voice message number (01 to 99)
Default:	"Counter N normal"

This setting tells the SentriMax which voice message to play when a user inquires about the status of the input counter alarm and the alarm is not active (not when inquiring about the status of the counter itself).

The default message will be played if no voice message number is specified.

Alarm Message

Front panel:	Setup | Input Counters | Alarm Message
DTMF command:	267*ii[mm]*# *ii* = counter number (01 to 16) *mm* = optional voice message number (01 to 99)
Default:	"Counter N alarm"

SentriMax plays the voice message specified here in response to the input counter alarm inquiry command when the counter alarm is active. The default message will be played if no voice message number is specified.

Paging Text

Required options:	Radio paging or TAP paging
Front panel:	Setup | Input Counters | Paging Text
DTMF command:	268*ii[<pager text>]#* *ii* = counter number (01 to 16) <*pager text*> = up to 40 characters
Default:	blank

This command specifies the text that will be sent out when making a POCSAG or TAP paging call for the counter alarm.

DTMF String

Front panel:	Setup | Input Counters | DTMF String
DTMF command:	269*ii[<DTMF string>]#* *ii* = counter number (01 to 16) <*DTMF string*> = up to 16 DTMF characters
Default:	

This setting is the DTMF string SentriMax uses for overdial telephone and radio DTMF calls for the input counter alarm.

Counter Name

Front panel:	N/A
DTMF command:	N/A
Default:	“Counter #n”

This is the name of the input counter displayed in the front panel menus and when logging events to the printer (real-time clock option required). It can be modified only with the SentriMax Configuration Utility (SMCU).

Run Time Meter Settings

Select Meter

Front panel:	Setup | Run Time Meters | Select Meter
DTMF command:	N/A
Default:	N/A

Specifies the run time meter to which the rest of the meter setup commands will apply. This command is not required when programming SentriMax with DTMF via telephone or radio.

The run time meters keep track of the total amount of time its corresponding digital input is in the alarm condition. There are sixteen run time meters, one for each of the first sixteen digital inputs.

The run time meters can accumulate up to 999 hours and 59 minutes.

Activate Run Time Meter

Front panel:	Setup | Run Time Meters | Activate Mtr
DTMF command:	280*iix*# *ii* = meter number (01 to 16) *x* = 0 to disable, 1 to enable
Default:	disabled

This setting determines whether or not status inquiry and meter clear commands will be allowed from the front panel menus or from a DTMF device. Run time meter alarms and automatic clearing can occur even if the run time meter is declared inactive.

The primary purpose of this setting is to keep unused run time meters from being listed on the front panel menus.

Alarm Time

Front panel:	Setup | Run Time Meters | Alarm Time
DTMF command:	281*iihhhmm*# *ii* = meter number (01 to 16) *hhh* = hours (000 to 999) *mm* = minutes (00 to 59)
Default:	0 hours 0 minutes

An alarm will be triggered when the accumulated run time reaches the alarm time specified with this command (provided the alarm time is > 0). If the Reset Time is less than the Alarm Time the input will never alarm.

Please note that accumulated run time is accurate to the nearest minute.

Reset Time

Front panel:	Setup | Run Time Meters | Reset Time
DTMF command:	282*iihhhmm*# *ii* = meter number (01 to 16) *hhh* = hours (000 to 999) *mm* = minutes (00 to 59)
Default:	0 hours 0 minutes

The run time meter will automatically be reset to 0 hours and 0 minutes when the reset time is reached. Specifying a reset time of 0 hours and 0 minutes disables automatic reset of the meter.

Alarm Enable

Front panel:	Setup | Run Time Meters | Enable Alarm
DTMF command:	283*iix*# *ii* = meter number (01 to 16) *x* = 0 to disable, 1 to enable
Default:	disabled

This commands enables or disables alarms for the specified run time meter. The run time meter alarm is triggered when the meter value reaches the specified alarm time.

Self Clearing

Front panel:	Setup | Run Time Meters | Self Clearing
DTMF command:	284*iix*# *ii* = meter number (01 to 16) *x* = 0 to disable, 1 to enable
Default:	disabled

If self clearing is enabled, alerting for the run time meter will stop (after at least one alert transmission) if the meter is reset either automatically or by user command.

Call List(s)

Front panel:	Setup | Run Time Meters | Call List(s)
DTMF command:	285*ii[aa[bb[cc]]]*# *ii* = meter number (01 to 16) *aa, bb, cc* = optional call list numbers (01 to 10)
Default:	no call list(s) specified

Specifies the list(s) of calls to be made for the run time meter alarm.

Normal Message

Front panel:	Setup | Run Time Meters | Normal Message
DTMF command:	286*ii[mm]*# *ii* = meter number (01 to 16) *mm* = optional voice message number (01 to 99)
Default:	"Run time meter N normal"

This setting tells the SentriMax which voice message to play when a user inquires about the status of the run time meter alarm and the alarm is not active (not when inquiring about the status of the meter itself).

The default message will be played if no voice message number is specified.

Alarm Message

Front panel:	Setup | Run Time Meters | Alarm Message
DTMF command:	287*ii[mm]*# *ii* = meter number (01 to 16) *mm* = optional voice message number (00 to 99)
Default:	"Run time meter N alarm"

SentriMax plays the voice message specified here in response to the run time meter alarm inquiry command when the meter alarm is active. The default message will be played if no voice message number is specified.

Paging Text

Front panel:	Setup | Run Time Meters | Paging Text
DTMF command:	288*ii[<pager text>]#* *ii* = meter number (01 to 16) <*pager text*> = up to 40 characters
Default:	blank

This command specifies the text that will be sent out when making a POCSAG or TAP paging call for the run time meter alarm.

DTMF String

Front panel:	Setup | Run Time Meters | DTMF String
DTMF command:	289*ii[<DTMF string>]#* *ii* = meter number (01 to 16) <*DTMF string*> = up to 16 DTMF characters
Default:	blank

This setting is the DTMF string SentriMax uses for overdial telephone and radio DTMF calls for the run time meter alarm.

Run Time Meter Name

Front panel:	N/A
DTMF command:	N/A
Default:	“Meter #n”

This is the name of the run time meter displayed in the front panel menus and when logging events to the printer (real-time clock option required). It can be modified only with the SentriMax Configuration Utility (SMCU).

Analog Input Settings

Select Input

Front panel:	Setup | Analog Inputs | Select Input
DTMF command:	N/A
Default:	N/A

This command is used to specify the analog input to which the remaining analog input settings commands will apply.

From the front panel menus, you must specify an input number using this command before you can use any of the other analog input settings commands. From a DTMF device, the input number is specified as part of each command.

Activate Input

Front panel:	Setup | Analog Inputs | Activate Input
DTMF command:	240*iix*# *ii* = analog input number (01 to 08) *x* = 0 to disable, 1 to enable
Default:	enabled

Disabling this setting will prevent viewing of the status of the specified analog input from SentriMax's front panel menus, and will disable the status inquiry from a DTMF radio or telephone.

Disabling this setting does not disable alarm events on the input.

Jumper Mode

Front panel:	Setup | Analog Inputs | Jumper Mode
DTMF command:	241*iix*# *ii* = analog input number (01 to 08) *x* = 0 for 0 to 5V (jumper out), 1 for 4 to 20mA (jumper in)
Default:	0 to 5V (jumper out)

Each analog input can be configured with a jumper on the circuit board to sense either 0 to 5 Volt (jumper not installed) or 4 to 20 milliampere (jumper installed) signals. This setting tells the SentriMax software whether the jumper is installed or out.

Measurement Range Low

Front panel:	Setup | Analog Inputs | Measured Range
DTMF command:	242*ii*<*analog value*># *ii* = analog input number (01 to 08) <*analog value*> = low end of measured range (-1000000.0 to 1000000.0, 3 decimal places max)
Default:	0.0

The low end of the measurement range is the real world value that corresponds to a 0 Volt or 4mA (depending on the jumper mode setting) level on the analog input.

Measurement Range High

Front panel:	Setup | Analog Inputs | Measured Range
DTMF command:	243*ii*<*analog value*># *ii* = analog input number (01 to 08) <*analog value*> = high end of measured range (-1000000.0 to 1000000.0, 3 decimal places max)
Default:	5.0

The high end of the measurement range is the real world value that corresponds to a 5 Volt or 20mA level (depending on the jumper mode setting) on the analog input.



Note The value entered for the high end of the range must be greater than the value entered for the low end of the measurement range.

Alarm Set-point

Front panel:	Setup | Analog Inputs | Setpoint
DTMF command:	244*ii*<*analog value*># *ii* = analog input number (01 to 08) <*analog value*> = alarm set point (must be within measurement range, 3 decimal places maximum)
Default:	2.0

The alarm set point determines the value, within the limits specified by the measurement range, at which the analog input alarm will be triggered.



Note The Setpoint entered must fall between the Range Low limit entered and the Range High limit.

Hysteresis

Front panel:	Setup | Analog Inputs | Hysteresis
DTMF command:	245*ii*<*analog value*># *ii* = analog input number (01 to 08) <*analog value*> = hysteresis (must be within the measurement range, 3 decimal places maximum)
Default:	1.3

When an analog input alarm is detected, the hysteresis setting determines how far away from the alarm set point the level must move back into the normal operating range before the input is considered to be in the non-alarm condition.

The Hysteresis value specified must fall within the measurement range defined by the using the Setpoint and either the Low Value or the High Value. The calculation is determined by whether the alarm state is configured to occur when the incoming signal moves above or below the Setpoint.

If the input is set to alarm when the signal moves above the Setpoint: Hysteresis ≤ Setpoint - Low Value

If the input is set to alarm when the signal moves below the Setpoint: Hysteresis ≤ High Value - Setpoint

The measurement range, Setpoint, and Alarm Level should be set before giving this command to allow SentriMax to check the hysteresis for out of range values.

Note For additional information about analog inputs, please see *Analog Inputs* on page 147. Be sure to review Figure 13: on page 149, as well as Figure 14: on page 149.

Alarm Level

Front panel:	Setup | Analog Inputs | Alarm Level
DTMF command:	246*iix*# *ii* = analog input number (01 to 08) *x* = 0 for alarm below set point, 1 for alarm above set point
Default:	trigger alarm above set point

This setting tells the M1550 if the input is in the alarm condition when measurement is above, or when it is below the alarm set point.

Alarm Delay

Front panel:	Setup | Analog Inputs | Alarm Delay
DTMF command:	247*iin[nnnn]*# *ii* = analog input number (01 to 08) *n[nnnn]* = alarm delay in seconds (1 to 6000)
Default:	1 second

This command sets the alarm delay time for an analog input. The input must cross the alarm set point into the alarm range and remain there for this amount of time before the alarm is triggered.

Alarm Enable

Front panel:	Setup | Analog Inputs | Enable Alarm
DTMF command:	248*iix*# *ii* = analog input number (01 to 08) *x* = 0 to disable, 1 to enable
Default:	enabled

This setting enables or disables the alarm on the specified analog input.

An analog input alarm is triggered when the level at the input crosses the alarm set point in the direction specified by the alarm level setting, and stays there for the alarm delay period. The input stays in the alarm condition until the level moves away from the set point in the opposite direction by the amount specified by the hysteresis setting.

Self Clearing

Front panel:	Setup | Analog Inputs | Self Clearing
DTMF command:	249*iix*# *ii* = analog input number (01 to 08) *x* = 0 to disable, 1 to enable
Default:	disabled

If self clearing is enabled, reporting of alarms for the analog input will automatically stop (after at least one alert transmission) when the input leaves the alarm condition.

Call List(s)

Front panel:	Setup | Analog Inputs | < ? >
DTMF command:	250*ii[aa[bb[cc]]]*# *ii* = analog input number (01 to 08) *aa, bb, cc* = optional call list numbers (01 to 10)
Default:	no call lists specified

This command is used to select which call list(s) will be used to report alarms on the specified analog input.

Normal Message

Front panel:	Setup | Analog Inputs | Normal Message
DTMF command:	251*ii[mm]*# *ii* = analog input number (01 to 08) *mm* = optional voice message number (01 to 99)
Default:	"Analog input N normal"

Specifies the number of the voice message that will be played back when inquiring from telephone or radio the status of the analog input alarm and the alarm is not active. The default message will be played if no user defined voice message is given.

Alarm Message

Front panel:	Setup | Analog Inputs | Alarm Message
DTMF command:	252*ii[mm]*# *ii* = analog input number (01 to 08) *mm* = optional voice message number (01 to 99)
Default:	"Analog input N alarm"

Specifies the number of the voice message that will be played during alerting or in response to an alarm status inquiry command when the input is in the alarm condition. If no user defined voice message is specified, the default message will be played.

Paging Text

Require options:	Radio paging or TAP paging
Front panel:	Setup | Analog Inputs | Paging Text
DTMF command:	253*ii[<pager text>]#* *ii* = analog input number (01 to 08) *<pager text>* = up to 40 characters
Default:	blank

The SentriMax uses the string specified here when sending an alert to a POCSAG pager or TAP paging terminal for an alarm on this analog input. The use of a PC and the SentriMax Configuration Utility is required in order to enter a text message for the pager.

DTMF String

Front panel:	Setup | Analog Inputs | DTMF String
DTMF command:	254*ii[<DTMF string>]#* *ii* = analog input number (01 to 08) *<DTMF string>* = up to 16 DTMF characters
Default:	blank

This command is used to enter the string of DTMF digits that is played out during a telephone overdial or radio DTMF alert call for an alarm on the selected analog input.

Input Name, Units Name

Front panel:	N/A
DTMF command:	N/A
Default:	"Message #n" for input name unit's name is blank

The input and units names are used when displaying the status of the analog input on the SentriMax front panel. These settings can be modified only with the Model 1550's PC based configuration program.

The units setting determines the units of measurement (feet, degrees, GPH, and similar entries) for the analog input.

Call List Settings

Select Call List

Front panel:	Setup | Call List Setup | Select List #
DTMF command:	N/A
Default:	N/A

Once you have worked your way down the menu to the Select List prompt, the unit will default to offering Call List #1 and prompting you to indicate whether or not to enter that list or another list. To accept list #1, press the down arrow key on the front panel keypad. To be offered a chance to select a different call list, press the Enter key and then enter the call list number at the prompt.

Acknowledgement Mode

Front panel:	Setup | Call List Setup | Ack. Mode
DTMF command:	300*llx*# *ll* = call list number (01 to 10) *x* = acknowledgment mode designator (0 to 3)
Default:	2 (stop on 1st acknowledgment)

This setting determines how SentriMax handles call list repeats when a user acknowledges an alarm with a DTMF command from telephone or radio. There are four different modes:

0 - Ignore acknowledgments.
SentriMax continues to make the calls from the call list in order regardless of whether or not anyone acknowledges the alarm. The specified number of call list repeats will always be sent.

1 - Stop calling if everyone has acknowledged.
When a telephone call (not a radio, speaker, or paging call) has been acknowledged, SentriMax drops that call from the list but continues to make all other calls. Once all calls have been dropped, SentriMax stops making calls.

2 - Stop calling as soon as the first acknowledgment is received.
If SentriMax gets an alarm acknowledgment from anyone, it stops making calls.

3 - Pause after the first acknowledgment is received.
As soon as an alarm acknowledgment is received, SentriMax quits making calls for this alarm until the list repeat interval expires or the alarm condition goes away. At the end of the list repeat interval, if the alarm is still active and the specified number of call list repeats has not been reached, SentriMax resumes calling with the first call in the call list.

It is only during an outgoing telephone call that SentriMax associates an acknowledgment from a user with a particular call in the call list. Therefore only telephone calls, and not radio or paging calls, can be dropped from the call list one at a time. When a user

acknowledges an alarm by calling into SentriMax from a telephone or radio, every call in the call list associated with that alarm is acknowledged.

These acknowledgment modes do not apply when the acknowledgment is received through SentriMax's front panel keypad. In this case, the alarm is always cleared and calling is stopped. SentriMax assumes that since the user is at the site, he or she has fixed the problem that caused the alarm and does not want alerting to continue.

Call List Repeats

Front panel:	Setup | Call List Setup | List Repeats
DTMF command:	301*lln[n]*# *ll* = call list number (01 to 10) *n[n]* = # of repeats (0 to 15)
Default:	0 repeats (call list is played once)

This setting determines the maximum number of times SentriMax will pass through the call list.

If all repeats of the call list have been completed and the alarm has not been acknowledged, SentriMax automatically clears the alarm. If the alarm condition then goes away and returns, calling will be restarted.

List Repeat Interval

Front panel:	Setup | Call List Setup | Repeat Interval
DTMF command:	302*lln[nn]*# *ll* = call list number (01 to 10) *n[nn]* = interval in minutes (0 to 255)
Default:	15 minutes

The repeat interval is the amount of time SentriMax waits after making the last call in a call list and before starting the next pass through the list.

Interval Between Calls

Front panel:	Setup | Call List Setup | Call Interval
DTMF command:	303*lln[nnn]*# *ll* = call list number (01 to 10) *n[nnn]* = interval in seconds (0 to 3600)
Default:	120 seconds

This setting determines the amount of time (in seconds) SentriMax waits between the end of one call and the start of the next call in the call list.

Enabled Days

Required options:	Real time clock
Front panel:	Setup | Call List Setup | Enabled Days
DTMF command:	304*ll[01234567]*# *ll* = call list number (01 to 10) *[01234567]* = day of week specifiers
Default:	1234567 (All days except holidays)

This command is used to enable the call list on holidays and/or specific days of the week. The digits 1 through 7 respectively represent the days of the week Sunday through Saturday. Enter a 0 if you want the call list enabled on holidays (see *Modify Holiday* on page 30).

This setting together with the call list enable and disable times allow alerting of different lists of people depending on the time of day and day of the week, and also whether or not the day is a holiday. With the real time clock option, each alarm can be assigned up to 3 different call lists. When an alarm occurs, SentriMax looks at the current time and date and selects the first of the three call lists that is enabled at the time.

Enable Time

Required options:	Real time clock
Front panel:	Setup | Call List Setup | Enable Time
DTMF command:	305*llhhmm*# *ll* = call list number (01 to 10) *hh* = hours (00 to 23) *mm* = minutes (00 to 59)
Default:	0 hours, 0 minutes (12:00 midnight)

The enable time and disable time together determine the time period during the day when the call list is enabled. If the enable time is the same as the disable time (the default setting), the call list is enabled all day. The time is entered in 24-hour military format.

See *Enabled Days*, the previous programming option, for more discussion of call list processing.

Disable Time

Required options:	Real time clock
Front panel:	Setup | Call List Setup | Disable Time
DTMF command:	306*llhhmm*# *ll* = call list number (01 to 10) *hh* = hours (00 to 23) *mm* = minutes (00 to 59)
Default:	0 hours, 0 minutes (12:00 midnight)

This option sets the time of day at which a call list becomes disabled. See the preceding programming option, *Enable Time*, for more information on how these two options work together.

Modify Call

Required options:	Paging options required for paging calls
Front panel:	Setup | Call List Setup | Modify Call
DTMF command:	310*llcct...*# *ll* = call list number (01 to 10) *cc* = position of call in list (01 to 15) *t* = call type designator (0 to disable, or call type 1 to 8) ... = call specification (depends on call type)
Default:	no calls specified

This command is used to modify or delete one of the calls in a call list. To delete a call, select no call (0) for the call type. Other than no call, there are eight types of call:

1 - Phone call
SentriMax dials the phone number given in the call specifier and plays the alarm voice message. A siren tone preceding the voice playback is optional.

2 - Radio call
SentriMax plays the alarm voice message over the radio. The siren tone is optional.

3 - Speaker call
SentriMax plays the alarm voice message through the front panel speaker.

4 - Overdial telephone call
SentriMax dials the phone number given in the call specifier, then overdials the string of DTMF digits specified for the particular alarm. The siren and alarm voice messages may be played at this point if desired.

5 - Radio DTMF
SentriMax sends the string of DTMF digits for the particular alarm over the radio. A siren tone and the alarm voice message may optionally follow.

6 - Two-tone page
SentriMax sends two tone sequential paging tones over the radio. Siren and voice are optional.

7 - POCSAG page
SentriMax sends the paging text associated with the alarm over the radio to a POCSAG display pager.

8 - TAP page
SentriMax connects with a paging terminal (either through a dial up modem connection or directly through the serial port) and sends the paging text associated with the alarm.

When modifying a call from the front panel, you are first asked to select the type of call, then are guided through entry of each additional parameter in the call specification.

When programming SentriMax with a DTMF device, the command to modify a call always begins by specifying the call list and call number with the digits 310*llcc*. The call type designator is next followed by the call specifier as defined below for each of the call types.

Phone Call

...1*svv[<DTMF string>]#*

s = 0 to disable, 1 to enable siren tone

vv = number of times to play voice message (00 to 15)

[<DTMF string>] = up to 30 digit phone number

The SentriMax supports fourth column digits.

Radio Call

...2*svv#*

s = 0 to disable, 1 to enable siren tone

vv = number of times to play voice message (00 to 15)

Speaker Call

...3*svv#*

s = 0 to disable, 1 to enable siren tone

vv = number of times to play voice message (00 to 15)

Overdial Call

...4*svv[<DTMF string>]#*

s = 0 to disable, 1 to enable siren tone

vv = number of times to play voice message (00 to 15)

[<DTMF string>] = up to 30 digit phone number

The overdial digits come from the DTMF String setting for the particular alarm.

Radio DTMF Call

...5*svv*#

s = 0 to disable, 1 to enable siren tone

vv = number of times to play voice message (00 to 15)

The DTMF digits sent to the radio come from the DTMF String setting for the particular alarm.

Two Tone Page Call

...6*svvaaaaabbbbb*#

s = 0 to disable, 1 to enable siren tone

vv = number of times to play voice message (00 to 15)

aaaaa = A tone frequency x 10 (2500 to 35000)

bbbbb = B tone frequency x 10 (2500 to 35000)

The tone frequencies are entered as 10 times the actual frequency desired. SentriMax can output tones from 250.0 Hz to 3500.0 Hz. For more information on two-tone timing, please see *Two Tone Timing* on page 49.

POCSAG Page Call

...7*ppppppppb*#

ppppppp = pager address (0000009 to 2097151)

b = pager beep code (1 to 4)

The data to be displayed on the pager comes from the Paging Text setting for the particular alarm.

TAP Page Call

...8*t*<*pager ID*>#

t = paging terminal (1 to 3)

<*pager ID*> = 1 to 15 digit pager ID

The data to be displayed on the pager comes from the Paging Text setting for the particular alarm.

SentriMax Configuration Utility

Overview

This section of the manual provides a thorough explanation of how to install the SentriMax Configuration Utility (SMCU) and use it to configure the Model 1550 SentriMax.

System Requirements

The SentriMax Configuration Utility requires the following system resources on your PC (as a minimum) in order to run the application.

- Pentium or equivalent processor, 300 MHz or faster
- The operating system must support the .NET framework (version 1.1), this would mean an OS such as Windows 2000 SP4 or Windows XP Professional SP2
- 128 MB of RAM
- 3 MB of free hard drive space for program installation, plus an additional 100 Kb (approximately) for each additional configuration file saved
- A free COM port capable of sustaining a constant data transfer rate of 9,600 baud or better (USB-to-serial port convertors are also supported)
- CD-ROM drive (if installed from CD-ROM, the installation package is available from Technical Support as a download)
- Color monitor and video card capable of displaying 256 color graphics

Installation

♦ **Installing SentriMax Configuration Utility**

1. Place the SMCU distribution CD in the CD-ROM drive of the PC.
2. Open the **Start** menu and select the **Run** option.

3. In the Run dialog, click the **Browse** button and select the CD-ROM drive.
4. On the CD-ROM drive, locate the **SentriMax.msi** file and select it, then click the **Open** button in the Browse dialog.
5. In the Run dialog, click the **Run** button.
6. Once the installer starts, follow the instructions in the installer dialogs.
7. When the installation is completed, remove the CD-ROM from the PC.

Using SMCU

Start Up

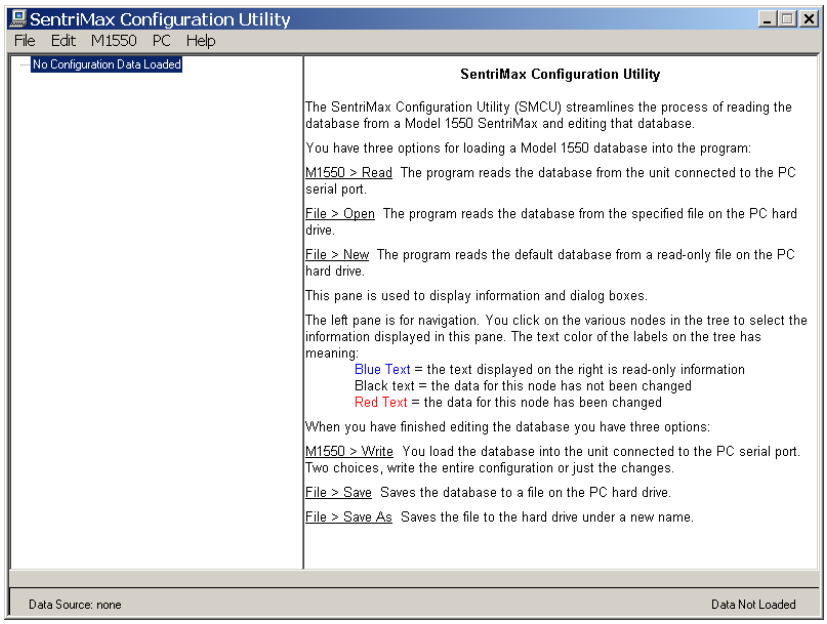
The SentriMax Configuration Utility can be started in one of two ways.

- Double-click on the desktop icon for the program
- Click on the Start button in the Task bar to open the Program menu, locate the SMCU program, and select it

When the SMCU window first appears, it will look like Figure 4. The pane on the left would normally hold a navigation tree for the various screens in the data file. It is empty until you load the unit data file from a 1550 unit, load a data file saved on the PC hard drive, or use the **New** option on the **File** menu to create a new data file. The right pane displays the opening screen with a set of generic instructions. Once a data file has been loaded, the right pane will display the dialog box that matches whichever portion of the data file that is currently selected in the left pane.

- To load the configuration from a Model 1550, select the **Read Configuration** option from the **M1550** menu. The PC COM port must already be connected to the unit from which you want to load data.
- To load a previously saved configuration file from the PC hard drive, open the **File** menu and use the **Open** command. This allows you to select a configuration file off the hard drive in the standard Windows fashion.
- To open a new configuration file, open the **File** menu and select the **New** command. This will open a new database file with all the hardware options present and every parameter set to default values. The first time you save this file you will need to give it a new name.

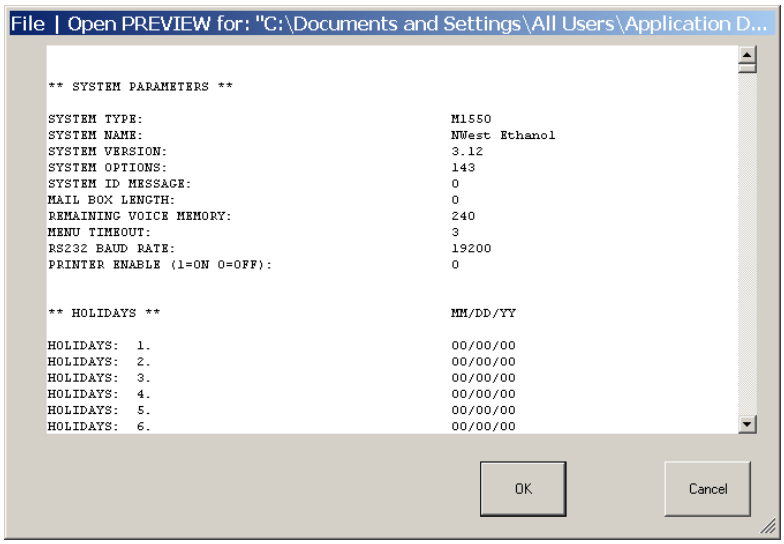
Figure 4: SentriMax Configuration Utility with No Database Loaded



When a database file has been loaded directly from a Model 1550 or is created using the **New** command on the **File** menu, then SMCU will open directly to the Hardware dialog. Please see *Hardware Dialog* on page 93.

Whenever a unit data file is loaded from the PC hard drive using the **Open** command on the **File** menu, SMCU will display a window similar to Figure 5. This window opens displaying the header information from the configuration file to allow you to confirm that you have loaded the configuration data that you intended to load. You may use the scroll bar to move down through the rest of the file if you wish. However, as a practical matter, if the **SYSTEM NAME** shown near the top of the opening window is the correct one, then go ahead and click the **OK** button.

Figure 5: File | Open Preview Window

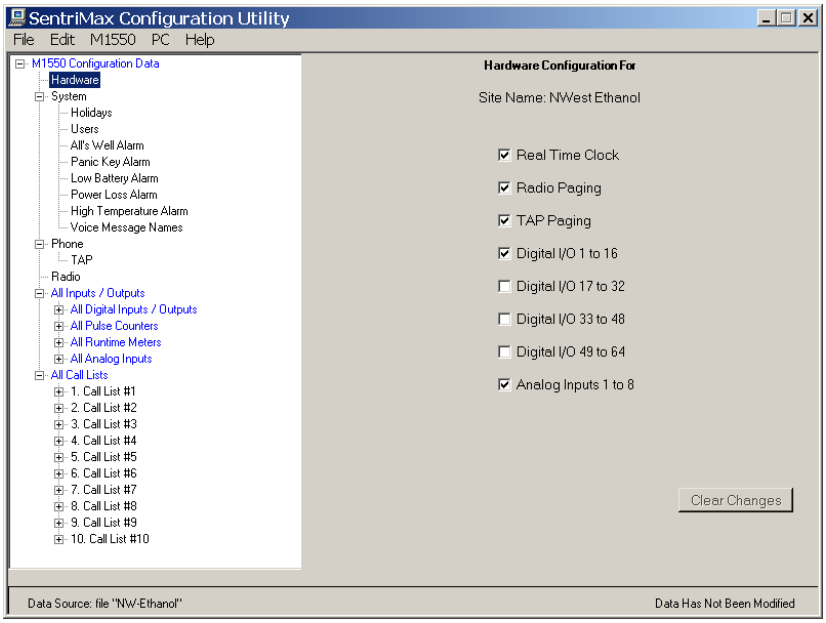


If this is the configuration you intended to load, click the **OK** button. If it is not, click on the **Cancel** button and SMCU will simply return to displaying whatever data it had loaded prior to your starting the load/open process.

The SMCU Window

Aside from the title bar and menu bar across the top, the SentriMax Configuration Utility window is divided into three panes or panels (see Figure 6).

Figure 6: SMCU with Hardware Configuration Dialog Open

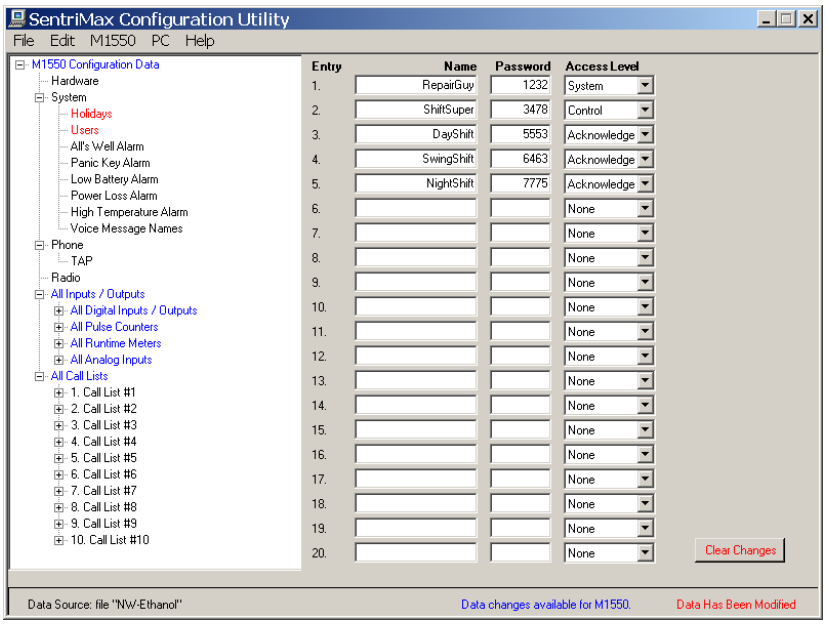


The left panel displays a tree view of the various dialogs used to edit the unit data file. The various top-level nodes on this tree can be expanded to show sub-levels or closed up to shorten the tree. Selecting an item from the tree opens the corresponding dialog box in the right panel of the window. This provides a quick means to navigate through the database, while always making it clear just where you are in the database.

If an item is listed on the tree in **black** text, this indicates that selecting it will open a dialog box. If the item is labeled in blue text, this indicates that the right panel it opens will contain only descriptive information about dialogs that can be opened from that node on the tree. If an item that is normally listed in **black** text is, instead, listed in red, this indicates that the dialog it opens has settings within it that have been altered since the unit data was loaded or last saved.

The third panel appears as a display box across the bottom of the SMCU window. On the left side is a status message that identifies the source of the unit data file that is currently loaded. On the right side is a message that indicates whether any of the settings in the currently loaded unit data file have been altered since the file was loaded. This is a global status message and will remain there even when you move to another dialog box. If the settings have been altered, in addition to the message changing to indicate this, the message text will change from **black** to red (see Figure 7).

Figure 7: User Password Setup Screen after changes are made



Another label that will change to red when settings are altered is the **Clear Changes** button in the dialog box. This will change back to black text if you click on **Clear Changes** to restore the settings in the dialog to their original condition when the current unit data file was first loaded. If you click on another part of the tree, the previous dialog name in the tree will stay red to indicate that the data in that dialog is different now than when it was when this unit data file was first loaded.

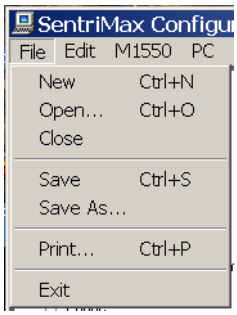
If you perform a **Save** or **Save As** to record the changes to the hard drive, the **Clear Changes** button in the dialog will return to **black** text to indicate that the settings in that dialog once again match the saved file.

The **Clear Changes** button allows you back out of changes you have made a single dialog box at a time. If you decide that the whole data file has become mis-configured beyond the point of trying to fix it, simply close the file without doing a **Save**.

If you are starting out on a fairly massive set of changes to a unit data file, you should consider doing a **File | Save As** to a new (slightly different) file name every so often. This practice is recommended in order to leave yourself several points to start over from if you end up going down a path that does not work out.

SMCU Menus

File Menu



New

The **New** option loads a read-only configuration file with default settings into the SMCU program. The new data set will have all standard hardware enabled. You will need to give this configuration a name and do a **Save As** to create a configuration file for a new unit. This feature is provided to facilitate creating configuration files for new units. Instead of having to wait until the unit is physically available to work on it, those persons tasked with installing new units can create configuration files for units not yet received by modifying and saving configuration files based on the **New** file.

Open

The **Open** option is for loading configuration files that have been previously saved to the PC hard drive.

Close

The **Close** option allows you to close the currently loaded unit data file. This option is available any time a unit data file has been loaded into SMCU; either from the hard drive or from a Model 1550. If changes have been made in any of the dialogs, SMCU will prompt you to save them. If you decline, the file will be closed and the changes lost. If you choose to save the changes, the **Close** operation is aborted and you can then perform a normal **Save** or **Save As** operation.

Save

The **Save** command saves the currently loaded configuration data to the PC hard drive using its current file name. If the currently loaded data came from a Model 1550 or was created using the **New** command, then the **Save** command is not available and you will need to perform a **Save As** in order to save the information to the hard drive.

Save As

The **Save As** command is used to save the currently loaded configuration data under a new file name. You will be prompted to specify a new file name in the typical Windows fashion.

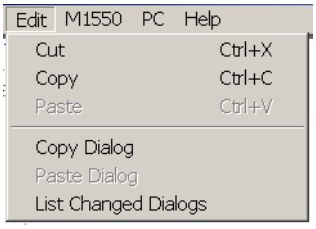
Print

The **Print** command will allow you to print out hard copy of the currently loaded configuration data. The standard Windows Print dialog opens for you to set up the print job.

Exit

This is a standard Windows **Exit** command. If there are unsaved changes in the currently loaded configuration data file, you will be prompted to save the changes before SMCU shuts down.

Edit Menu



Cut, Copy, and Paste

These three editing commands are provided to facilitate your using the Windows Clipboard to copy information between other sources and the unit data file, or from field to field within the data file. They work in the same way here that they do in most other

Windows applications. In this instance they apply to the information contained in the data filed that is currently selected. If there is no field currently selected in the dialog box that is active, then these three menu options are grayed out and unavailable.

These same three functions are also available by placing the cursor over a field and clicking the right button or by using the standard hot-key sequences (Crtl+X, Crtl+C, and Crtl+V).

Copy Dialog

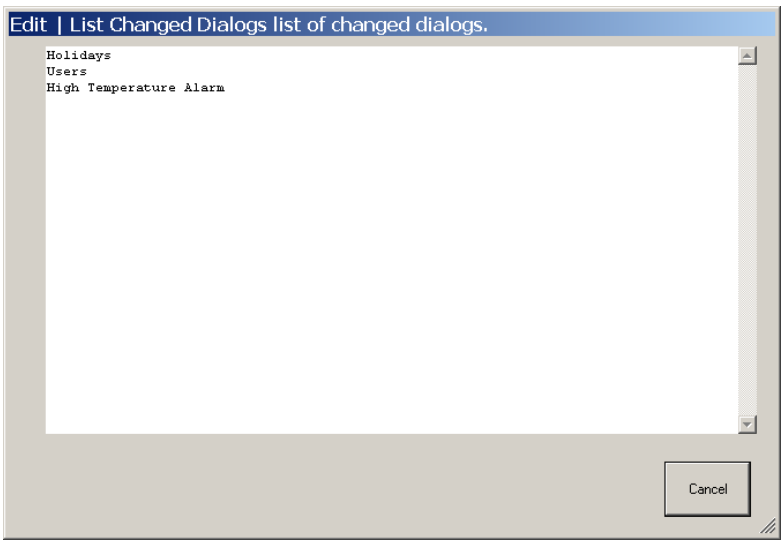
The **Copy Dialog** function is used to copy all of the parameter settings in one of the data dialog boxes on the right side of the SMCU window with a single action. When settings are copied using this function, the data can only be copied into another dialog of exactly same type.

Paste Dialog

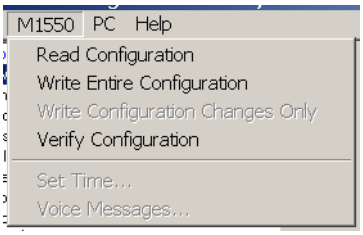
The **Paste Dialog** function is used to paste all of the parameter settings copied using the **Copy Dialog** function into a new dialog box with a single action. This function works only when the destination dialog box is the same type as the dialog from which the settings were originally copied.

List Changed Dialogs

The **List Changed Dialogs** function is used to generate a quick listing of all the dialogs that have been altered since the unit data file was loaded (or since it was last saved). This function is not available when the file is first loaded and will become unavailable again any time the file is saved to the hard drive.



M1550 Menu



Read Configuration

The **Read Configuration** function is used to load configuration data into SMCU from an Model 1550. This is no prompting to select a particular Model 1550 or specify a COM port. When you select this function the program will attempt to read the configuration data off of whatever device is currently connected to the COM port specified with the **COMM Port** function. See *Com Port* on page 92.

Write Entire Configuration

The **Write Entire Configuration** function is used to load the current configuration data file from the PC into whichever Model 1550 is connected to the COM port. This process will take several minutes. It is recommended that you save the unit data file to the hard drive to capture any changes you made prior to writing the data file to the Model 1550.

Write Configuration Changes Only

The **Write Configuration Changes Only** function is similar to the **Write Entire Configuration** function; however, it is intended to save time by only updating those parameters that are now different from the configuration data that was loaded from the Model 1550 originally.

While the SentriMax Configuration Utility will not prompt you to do so, it is a GOOD PRACTICE to save the altered configuration data file to a new file on the hard drive after using this command. This is to maintain a complete record of how the unit was configured at any given time.

Verify Configuration

The **Verify Configuration** function compares the settings in the currently loaded data file to the settings in the Model 1550 connected to the COM port. If they are an exact match, SMCU will confirm this. If they are not an exact match the SMCU will indicate this fact and open a window similar to the preview window in Figure 5: on page 80 to list the differences.

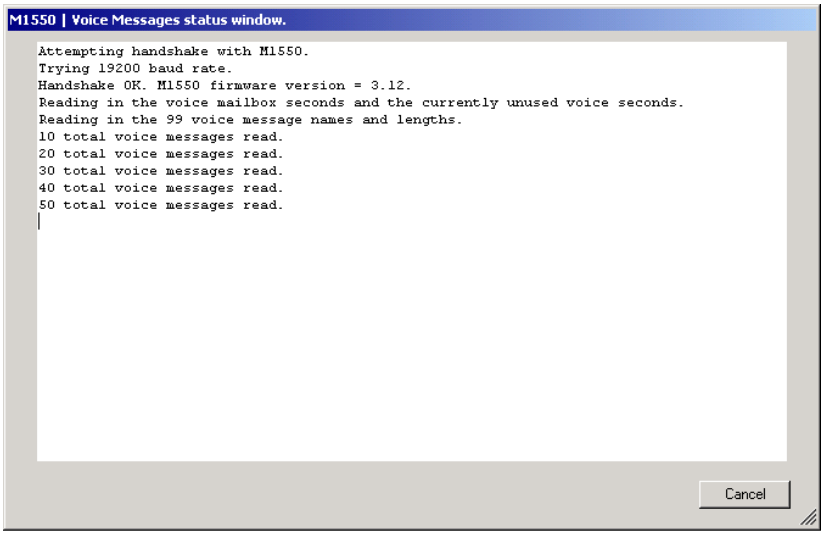
This function is only available when a Model 1550 is connected to the serial port of the PC and the unit data file currently loaded has not been modified since it was loaded. This operation, like other operations that involved reading from or writing to the Model 1550, will take several minutes to complete.

Set Time

The **Set Time** function is used to adjust the current time setting in a Model 1550 that is connected to the PC. This is the same operation that can be performed from the front panel of the unit.

Voice Messages

The **Voice Messages** function is used to record voice messages in the Model 1550 connected to the serial port of the PC. When you first click on the Voice Messages command, SMCU opens the following dialog to keep you informed of its progress as it loads the current message settings from the Model 1550.

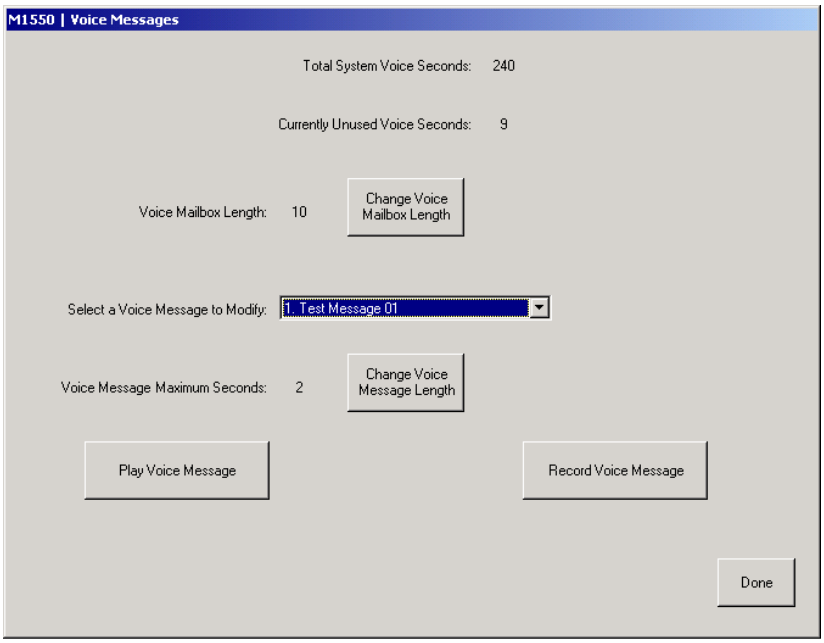


Once SMCU has obtained the data it requires from the Model 1550, it opens the main Voice Messages dialog box.

Note The Voice Messages function can be used only when the PC is connected to a Model 1550. In addition, no database file can be loaded while using this function. Use the File | Close command before using the M1550 | Voice Messages command.

Regardless of whether the recording operation is controlled from the front panel of the Model 1550 or from a PC using SMCU, the microphone on the front of the Model 1550 must be used as the audio input.

Figure 8: The Main Voice Messages Dialog



The dialog displays the following information and controls:

Total System Voice Seconds

This value is the total amount of voice storage time (for user voice messages and voice mailbox use) installed in the Model 1550. It should not change unless the memory is upgraded. (This value is not related in any way to the memory space taken up by default messages and voice prompts that come with every Model 1550 unit. Those recordings have their own resources elsewhere in the unit.)

Currently Unused Voice Seconds

This value is the remaining amount of voice storage time not currently used by either user voice messages or the voice mailbox.

Voice Mailbox Length

This value is the amount of voice storage time that is currently reserved for use by the Voice Mailbox feature. Storage time reserved by the Voice Mailbox is not available for storing user messages. The valid range for the parameter is from 0 to 240 seconds (or however much is installed). If the Voice Mailbox Length is set to 0, the mailbox is disabled. The default setting is disabled (0).

Change Voice Mailbox Length

Clicking this button initiates the process for changing the value recorded for Voice Mailbox Length.

Select a Voice Message to Modify

This field is used to select a voice message to modify (change its length or record a new message). A message must be selected before any changes can be made to it. The message names are displayed here from the drop-down list; however, message names can be set only from the Voice Message Names dialog.

Voice Message Maximum Seconds

If a message has already been recorded under the message number selected, the length of that message is displayed here in seconds. If no message exists, this will equal the **Currently Unused Voice Seconds**. If a new message is to be recorded under the same message number/name, this parameter sets the length of that message. The possible range for this parameter is from 0 to the value shown in **Currently Unused Voice Seconds**. If the recording is shorter than the time specified here, the remaining time will be retained as silence at the end of the message.

Change Voice Message Length

Clicking this button initiates the process for changing the value recorded for the length of the currently selected voice message.

Play Voice Message

This control plays the specified message (#1 to #99) through the speaker on the front panel of the Model 1550. In the SMCU Voice Messages dialog box, the remaining seconds of message time count down as the message is played. If the currently recorded message is shorter than the total time reserved for the message, the Model 1550 will skip to the end as soon as the recorded sound material ends.

Record Voice Message

Once a voice message number has been selected, this control allows the user to record a voice message through the microphone on the front panel of the Model 1550. In the SMCU Voice Messages dialog box, the remaining seconds available count down as the message is recorded.

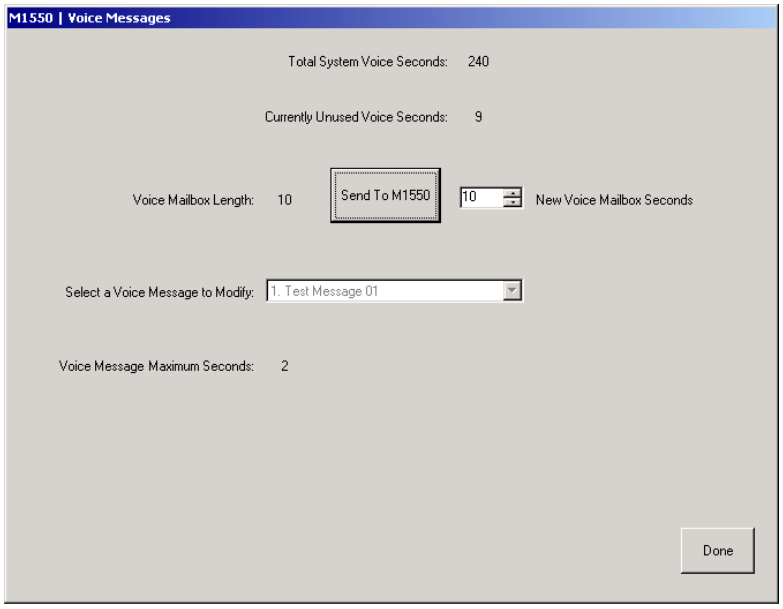
The Voice Messages dialog is closed by clicking on the **Done** button in the lower right corner.

All of the following voice message procedures assume you are starting from a point of already having the Model 1550 connected to the PC and Voice Messages dialog open.

♦ Changing the Voice Mailbox Length

1. Click on the **Change Voice Mailbox Length** button in the Voice Messages dialog.
2. In the new field that appears to the right of the button, use the up/down arrows to select **New Voice Mailbox Seconds** (see Figure 9). Notice that, as the value for the **Voice Mailbox Length** changes, the value for **Unused Voice Seconds** will also change in the opposite direction.
3. When the new **Voice Mailbox Length** has been selected, click on the **Send To M1550** button to record the new setting in the Model 1550.

Figure 9: Changing the Length of the Voice Mailbox



♦ Changing the Length of a Voice Message

1. Use the down arrow in the **Select Voice Message to Modify** field to open the list of message names. Select the message you wish to modify from that list (see Figure 10).
2. Click on the **Change Voice Message Length** button.
3. In the new field that appears to the right of the button, use the up/down arrows to select **New Voice Message Seconds** (see Figure 11). Notice that, as the value for the **Voice Message Maximum Seconds** changes, the value for **Unused Voice Seconds** will also change in the opposite direction.
4. When the new **Voice Message Maximum Seconds** has been selected, click on the **Send To M1550** button to record the new setting in the Model 1550.

Figure 10: Selecting a Voice Message to Modify

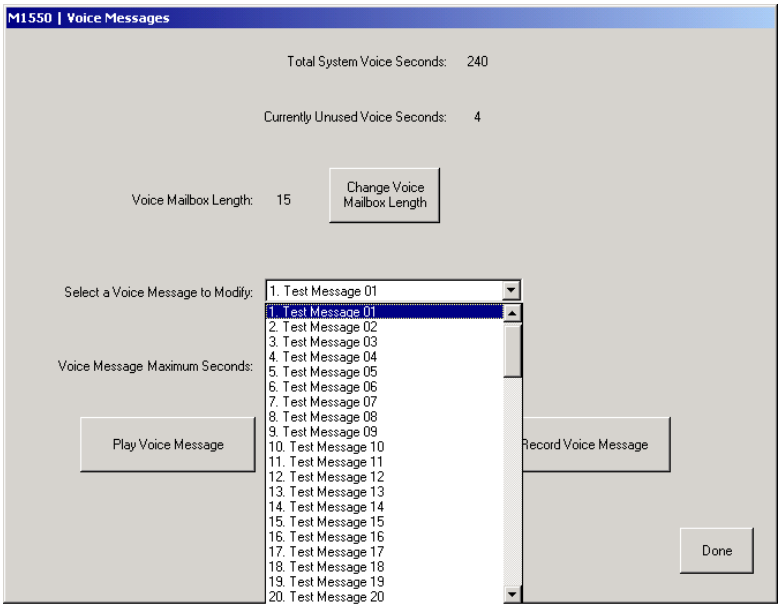
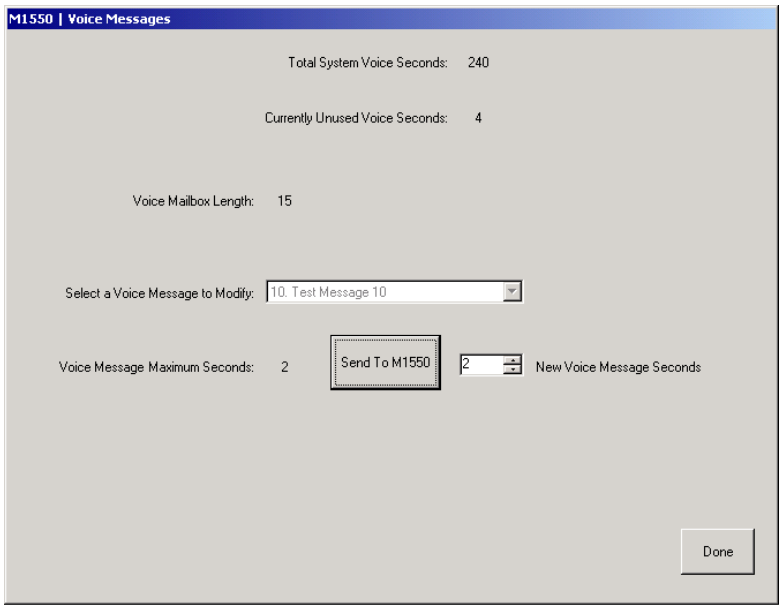


Figure 11: Changing the Length of a Voice Message

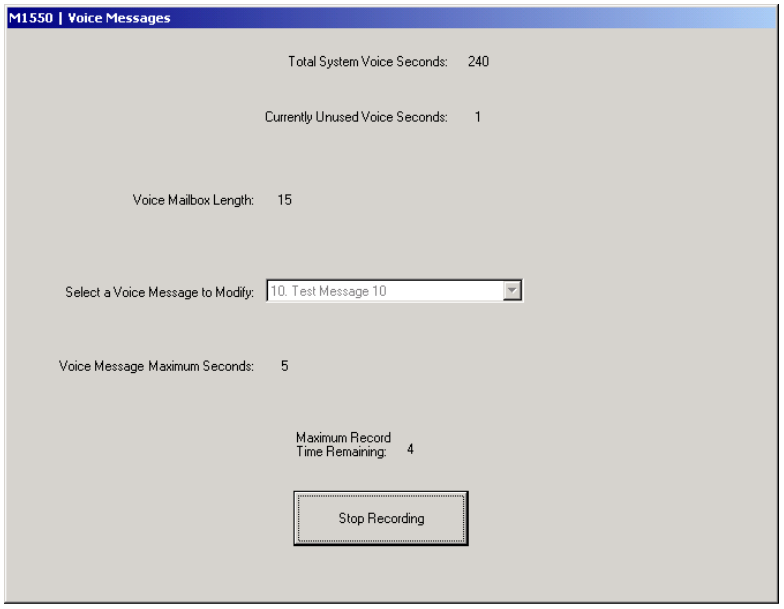


♦ Playing an Existing Message

1. Use the down arrow in the **Select Voice Message to Modify** field to open the list of message names. Select the message you wish to play from that list (see Figure 10).
2. When you are ready, click the Play Voice Message button (see Figure 8).
3. The voice message plays from the speaker on the front panel of the Model 1550. The playback stops as soon as the recorded audio is finished, regardless of the total time specified for the message selected.

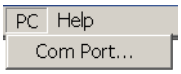
♦ Recording a New Message

1. Use the down arrow in the **Select Voice Message to Modify** field to open the list of message names. Select the message you wish to modify from that list (see Figure 10).
2. If necessary, adjust the length of that voice message.
3. When you are ready, click on the **Record Voice Message** button and start recording you message. Speak into the microphone on the front panel of the Model 1550.



4. When you are finished recording, click on the **Stop Recording** button to close this dialog and return to the Voice Messages dialog. If you reach the time limit before you stop recording. the Model 1550 will stop recording automatically and return to the Voice Messages dialog on its own.
5. Click the **Play Voice Message** button to review the message you just recorded.
6. Click the **Done** button to close the Voice Messages dialog.

PC Menu



The PC menu has only a single function at this time.

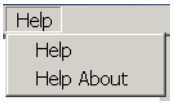
Com Port

This function is used to select which one of the PC COM ports is used to communicate with the Model 1550 unit that is being read or updated by the SentriMax Configuration Utility. The valid range for this field (as far as SMCU ins concerned) is from Com 1 to Com 255. The number entered must be one of the serial ports available on the PC running SMCU.

The baud rate of the Model 1550 is set from the System dialog. It is recommended that you use 19,200 baud. The Model 1550 will always communicate using 8 data bits, 1 stop bit, and no parity bits.

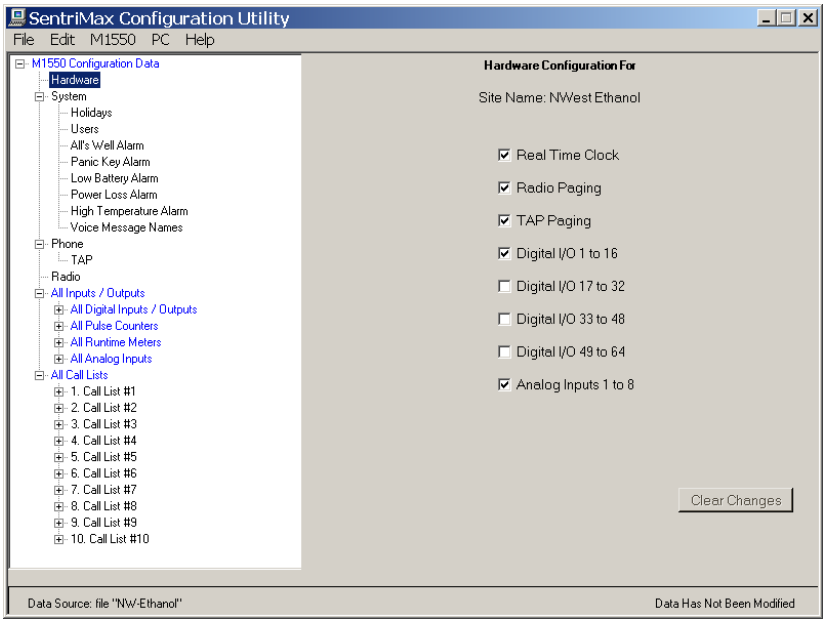
The SMCU program auto-bauds from 19,200 on down through the standard baud rates whenever it attempts to connect to a Model 1550.

Help



The Help menu has only the two standard functions; common to all Help menus. The **Help** function opens the Help window for the SentriMax Configuration Utility. The **Help About** function opens the usual text box with copyright and revision information for the application.

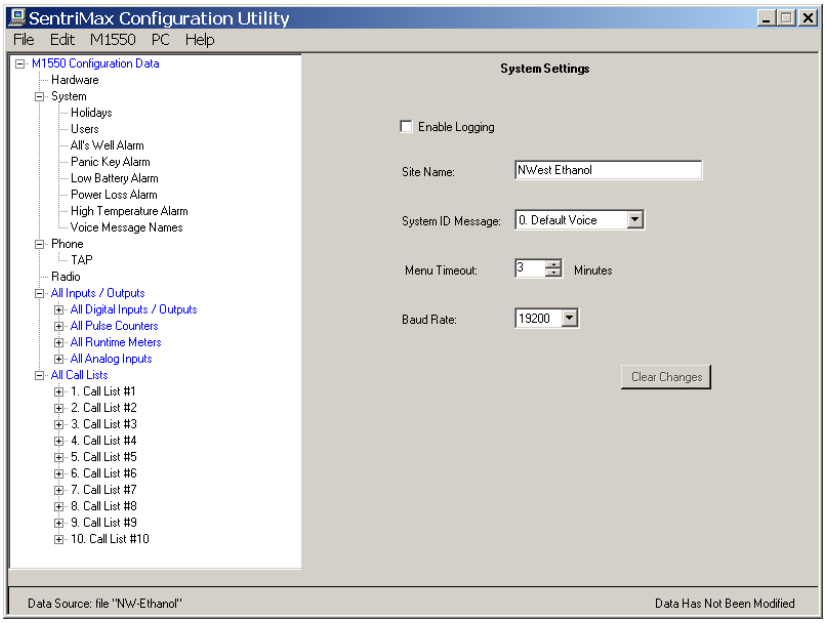
Hardware Dialog



This dialog is used to specify which of the available hardware options are actually installed in the Model 1550 to which this data file will eventually be loaded. This dialog can always be modified because the data file being prepared for any real unit may be based on the default file (which has everything) or another unit (which has similar but not exactly the same options).

The SentriMax Configuration Utility makes various portions of the data file available or unavailable for configuration based on the settings it finds in this dialog. Therefore, it is important that the hardware options checked in this dialog match the options actually installed in the Model 1550 for which the configuration data file is intended.

System Settings



The Systems Settings dialog contains parameters that effect the overall system. It is also the node on the tree that allows access to eight other lower-level dialogs: Holidays, Users, All's Well Alarm, Panic Key Alarm, Low Battery Alarm, Power Loss Alarm, High Temperature Alarm, and Voice Message Names.

The following parameters are available in this dialog:

Enable Logging

Enables or disables logging to printer. With the Real Time Clock option, the SentriMax has the ability to log time and date stamp records of system events to a printer attached to the RS232 serial port.

Site Name

Changes the name displayed on the top line of the front panel LCD display when in Run Mode. The default entry is "SentriMax vX.XX", where "X.XX" is the version number of the firmware.

System ID Message

This is used to assign a user defined voice message to identify the SentriMax. This message is played at the beginning of every alarm transmission that includes voice playback. This message is also played whenever a user enters the Command Mode from a

telephone or radio. If no voice message number is given, the default message will be played. The default message is message #0.

Menu Timeout

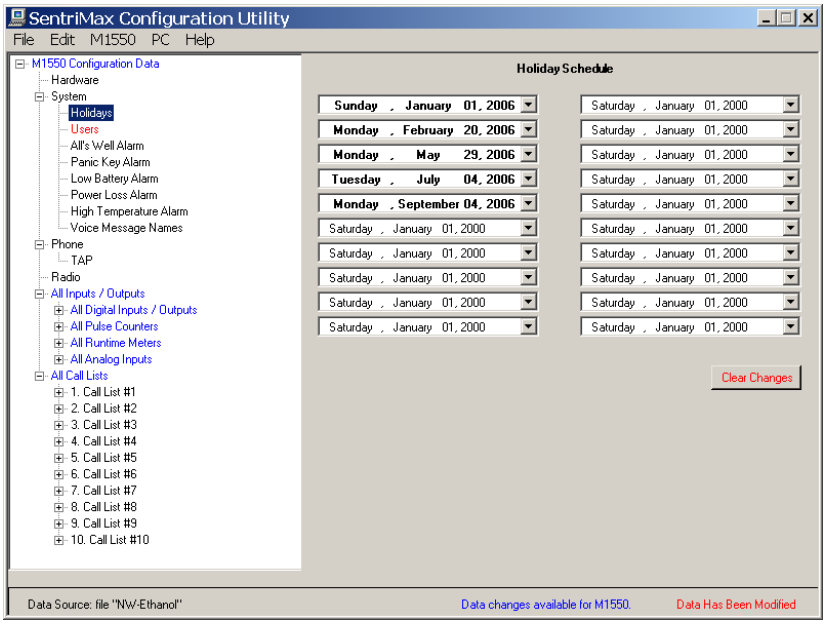
This parameter sets how long the SentriMax waits before it automatically logs off and returns to Run Mode when an operator leaves the unit idle while still in the setup or configuration modes. This time limit applies to programming sessions being conducted from the front panel, from a PC connected to the serial port, or by means of a phone call.

The default setting is 3 minutes. the valid range is 1 to 255 minutes.

Baud Rate

Baud Rate sets the speed the SentriMax communicates at through its serial port when accessed by SMCU or when printing to a serial printer. Available baud rates include: 1200, 2400, 4800, 9600, and 19200.

Holidays



If the Real Time Clock option is installed, call lists can be configured to be active on different days of the week, and at different times of the day. One option for days of the week is holidays. If a day is in the Holidays List and the Holiday Box is not selected in a call list's settings, the SentriMax would not call the list on that day (from midnight to midnight) if an alarm occurred.

Most alarms can have up to three call lists assigned to them. These are not called sequentially. Depending on time of day, day of week, and the holiday schedule, different call lists can be called. One call list could be for weekdays, one for weeknights, and

another for weekends and holidays. These lists are checked in the order of A, B, and C. As soon as an active list is found, the search ends and the calls on that list are executed.

To setup a holiday, click on the down arrow at the right end of an unused field. This will open the calendar dialog used to set dates.



When the calendar first opens, it defaults to January 1, 2000. This date in the past is used to indicate that there is “no holiday”. You can bring it up to the current date (whatever the PC real time clock is set to) quickly by simply clicking on the today’s day line in the bottom of the calendar.

Note The calendar will allow you to set dates between 1 January 2000 and 31 December 2089.



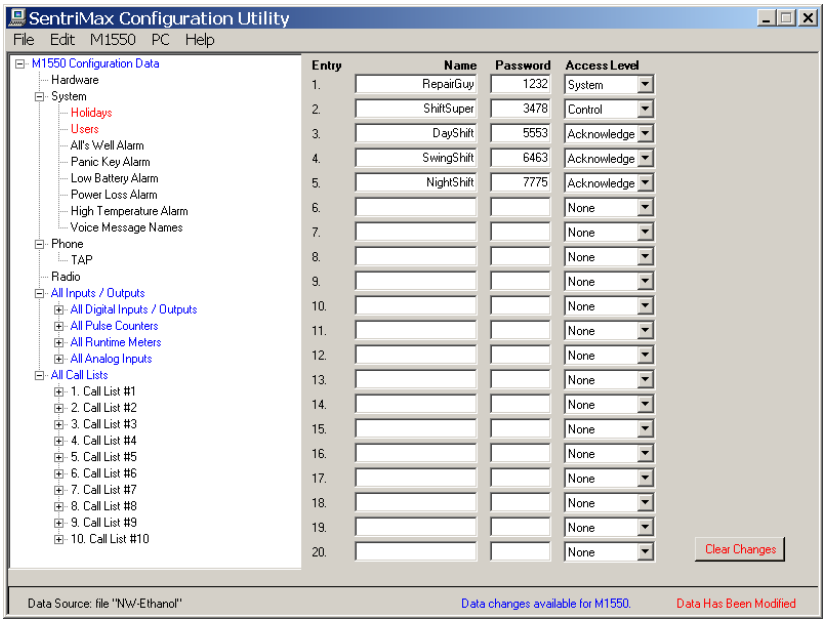
You can manually adjust the by clicking on the year in the calendar header and using the little up/down arrows that appear at its right end to select a new year. The month is selected by clicking on the left/right arrows at either side of the calendar header until the desired month is displayed. Once you have the correct month and year selected, simply click on the correct date to finish the process.



The current date is circled in red if it happens to fall within the month displayed.

It is not necessary to enter the holidays in order in the Holiday Schedule dialog box. As each holiday passes, it is automatically cleared from the Holiday calendar.

Users



The User Password Setup dialog specifies passwords and access levels for up to twenty different users. By default, all passwords are blank, allowing anyone to access all the features of the M1550 from the front panel keypad. Once any passwords are set, SentriMax will not allow any commands to be entered from the front panel (or the telephone or radio) until after a valid password is entered. SMCU will not save a user **Name** without a **Password** if the **Access** level for that user has been set to something other than **None**. The same applies to trying to save a user **Name** and **Password** without assigning an **Access** level higher than **None**.

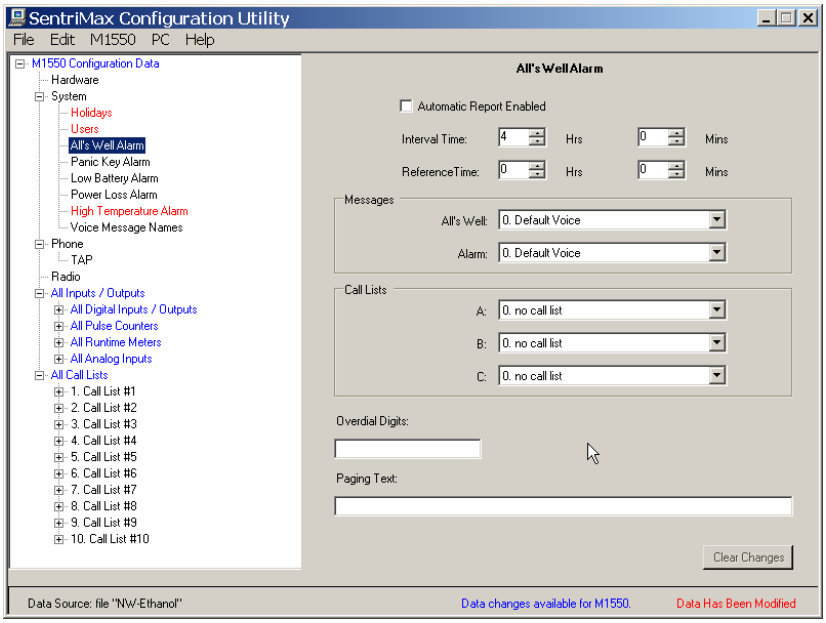
⚠ **Caution!** When setting up users, if only low access levels are set there is the possibility of getting locked out of front panel (or telephone) access to the SentriMax.

The SentriMax Configuration Utility can always be used to change settings and user access levels, even if access to the front panel menus (or by telephone) is restricted.

Each user is assigned a password that can contain from one to four digits. Each user is also assigned one of five possible access levels. The access levels specify which features of the SentriMax the user can control. The five access levels are:

1. **None** - the user is denied access by means of the front panel or the telephone
2. **Inquire** - the user may view the status of inputs and alarms
3. **Acknowledge** - the user may view the status of inputs and alarms, in addition the user may acknowledge alarms
4. **Control** - the user may control outputs
5. **System** - the user has full access to the Model 1550, including the Setup mode.

All's Well Alarm



This dialog is used to configure the All's Well Alarm. The All's Well alarm provides periodic verification that the SentriMax, and its communication paths, are in working order. In addition, the All's Well alarm gives an indication of whether or not there are any active alarms. This feature is made more robust with the addition of the Real Time Clock option; All's Well alarms can then be set to occur on a strict schedule.

Automatic Report Enabled

This check box enables or disables the sending of All's Well alarms. The All's Well alarm is triggered periodically depending on the Interval and Reference time settings. The default for this setting is disabled.

Interval Time

This parameter sets the interval at which All's Well alarms are triggered. The range is from 5 minutes to 168 hours (equals 1 week).

How the Interval Time works depends on whether or not the Real Time Clock option is installed.

- If the Real Time Clock option *is not* installed, the interval timing begins when the unit switches from Setup mode to Run mode.
- If the Real Time Clock option *is* installed, the interval timing begins either at the Reference Time or an integral number of intervals prior to the Reference Time, whichever occurs first.

The default setting is for 4 hours 0 minutes. The valid range is from 0 hours 5 minutes to 168 hours 0 minutes.

Reference Time

This parameter sets the time for the All's Well alarms to start. The start time that equals 12:00 AM on Sunday morning is 0 hours 0 minutes. The All's Well Alarm can be set anywhere between 0 hours 0 minutes (12:00 AM Sunday morning) to 167 hours 59 minutes (11:59 PM Saturday night).

Note For this function to be available, the unit must have the Real Time Clock option installed.

Using the **Reference Time** and the **Interval** together allows the scheduling of All's Well calls at specific times of the day. For example, if the **Reference Time** is set to 7 hours 0 minutes (7:00 AM Sunday) and the **Interval Time** is set for 8 hours 0 minutes, the All's Well report will be sent out at 7:00 AM, 3:00 PM, and 11:00 PM, every day.

The default setting is 0 hours 0 minutes.

Message/All's Well

This field specifies the user defined voice message to be played on voice alerts for the All's Well alarm. It will also be played for status inquiries when there are no active alarms. If no voice message number is given, the default message will be played.

The default setting is message #0, "There are no active alarms."

Message/Alarm

This field specifies the user defined voice message played on voice alerts for the All's Well alarm as well as for status inquiries when there are one or more active alarms. If no voice number is given, the default message will be played.

The default setting is message #0, "There are *n* active alarms." The variable "*n*" will be replaced by the number of alarms present.

Call Lists

These three fields specify which call lists should be used when reporting All's Well alarms. If the Real Time Clock option is installed, up to three call lists can be specified to allow different people to be notified depending on the time of day and day of the week. If the Real Time Clock option is not installed, only one call list can be specified.

The default is for: **A** = 0, **B** = 0, **C** = 0 (0 = no call list assigned)

Overdial Digits

This parameter specifies the DTMF string that will be sent if there are Overdial telephone or Radio DTMF calls in the All's Well Call List.

The default setting for this parameter is blank. The limit is a string of up to 16 DTMF characters.

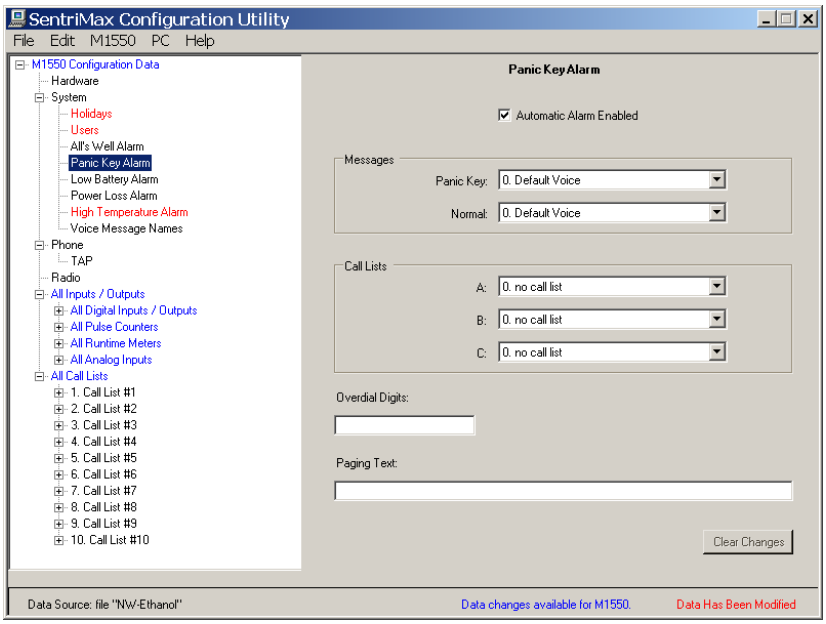
Paging Text

This parameter specifies the text string that will be sent if there are POCSAG or TAP paging calls in the Call List used by the All's Well alarm.

The default setting for this parameter is blank. The limit is an alphanumeric string of up to 40 characters.

> **Note** For this function to be available, the unit must have either the Radio or TAP Paging option installed.

Panic Key Alarm



The Panic Key provides a quick way to trigger an alarm.

Automatic Alarm Enabled

This check box enables or disables the Panic Key alarm. The Panic Key alarm is triggered by pressing the Panic Key on the SentriMax front panel.

The default setting is enabled.

Messages/Panic Key

This field is used to select the user defined voice message played during voice calls for the Panic Key alarm as well as for status inquiries when the alarm is active. If no voice number is given, the SentriMax plays the default message.

Messages/Normal

This field is used to select the user defined voice message played during status inquiries about the Panic Key alarm when the alarm is not active. If no voice number is given, the SentriMax plays the default message.

Call Lists

These fields are used to select which call lists should be used for reporting Panic Key alarms. If the Real Time Clock option is installed, up to 3 call lists can be specified to allow different people to be notified depending on the time of day and day of the week. If the Real Time Clock option is not installed, only one call list can be specified.

The default is for: **A** = 0, **B** = 0, **C** = 0 (0 = no call list assigned)

Overdial Digits

This field is used to enter the DTMF string that will be sent if there are Overdial telephone or DTMF radio calls in the Panic Key alarm Call List.

The default setting is to be blank. The limit is up to 16 digits.

Paging Text

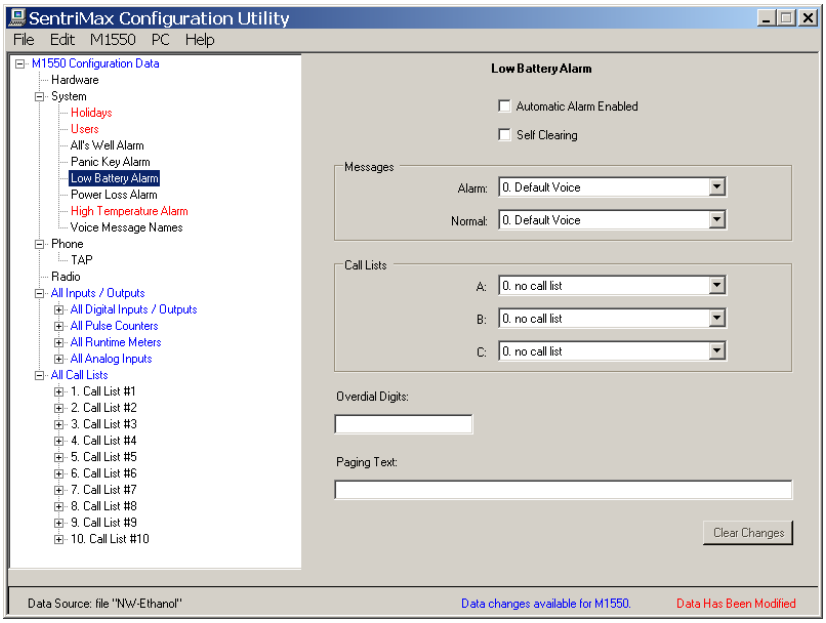
This field is used to enter the text string that will be sent if there are POCSAG or TAP paging calls in the Call List used by the Panic Key alarm.

The default setting is to be blank. The limit is up to 40 characters.



Note This function requires that the Radio or TAP Paging option be installed.

Low Battery Alarm



In the event of AC power loss, the SentriMax will operate for some time with its internal battery. The SentriMax continuously monitors the battery, and can trigger an alarm event when the voltage level drops below 11.5 VDC for at least one minute. If battery voltage drops below 10 VDC, the SentriMax turns itself off until the battery recharges. When battery voltage returns above 10.5 VDC, the SentriMax turns itself back on.

Automatic Alarm Enabled

This check box enables or disables the Low Battery alarm. The Low Battery alarm is triggered when the battery voltage drops below 11.5 VDC for longer than one minute. The default setting is disabled.

Self Clearing

This check box determines whether or not alerting for the Low Battery alarm will be automatically terminated when the battery level returns to normal. The SentriMax will call at least the first number on the call list before clearing the alarm. If self-clearing is enabled, the Low Battery alarm does not need to be acknowledged. The default setting is disabled.

Messages/Alarm

This field is used to select the user defined voice message played during voice alerts for the Low Battery alarm as well as for status inquiries when the alarm is active. If no voice number is given, the SentriMax plays the default message.

Messages/Normal

This field is used to select the user-defined message played during status inquiries about the Low Battery alarm when the alarm is not active. If no voice message number is given, the SentriMax plays the default message.

Call Lists

These fields are used to select which lists of calls should be used for reporting Low Battery alarms. If the Real Time Clock option is installed, up to 3 calls lists can be specified to allow different people to be notified depending on the time of day and day of the week. If the Real Time Clock option is not installed, only one call list can be specified.

The default is for: **A** = 0, **B** = 0, **C** = 0 (0 = no call list assigned)

Overdial Digits

This field is used to enter the DTMF string that will be sent if there are Overdial telephone or DTMF radio calls in the Low Battery alarm Call List.

The default setting is to be blank. The limit is up to 16 digits.

Paging Text

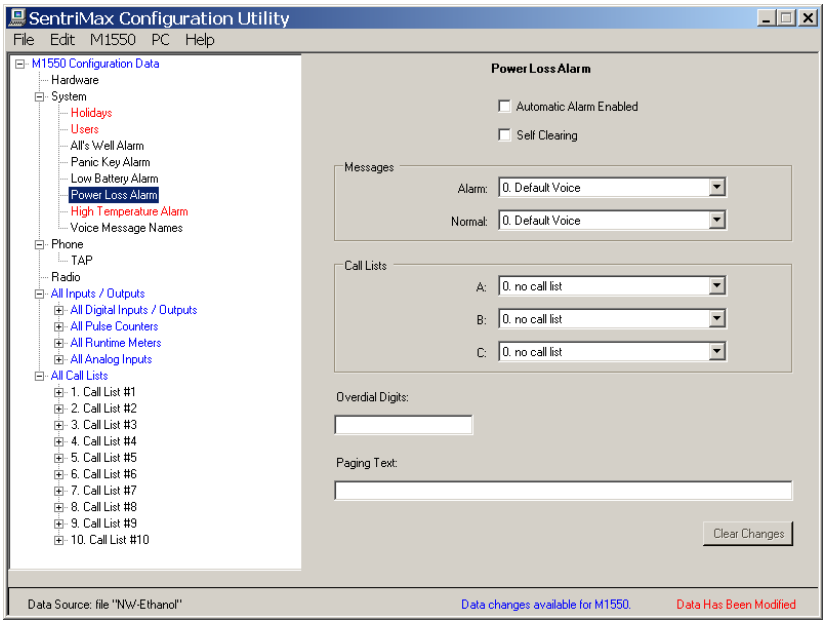
This field is used to enter the text string that will be sent if there are POCSAG or TAP paging calls in the Call List used by the Low Battery alarm.

The default setting is to be blank. The limit is up to 40 characters.



Note This function requires that the Radio or TAP Paging option be installed.

Power Loss Alarm



In the event of AC Power Loss, the SentriMax uses a built-in battery backup until AC Power is returned.

Automatic Alarm Enable

This check box enables or disables the AC Power Loss alarm. The AC Power Loss alarm is triggered if AC power is lost for longer than one minute.

The default setting is disabled.

Self Clearing

This check box determines whether or not alerting for the Power Loss alarm will be automatically terminated when AC power returns. The SentriMax will call at least the first number on the call list before clearing the alarm. If self-clearing is enabled, the Power Loss alarm does not need to be acknowledged.

The default setting is disabled.

Messages/Alarm

This field is used to select the user defined voice message played during voice alerts for the Power Loss alarm as well as for status inquiries when the alarm is active. If no voice number is given, the SentriMax plays the default message.

Messages/Normal

This field is used to select the user defined message played during status inquires about the Power Loss alarm when the alarm is not active. If no voice message number is given, the SentriMax will play the default message.

Call Lists

These fields are used to select which call lists should be used for reporting Power Loss alarms. If the Real Time Clock option is installed, up to 3 calls lists can be specified to allow different people to be notified depending on the time of day and day of the week. If the Real Time Clock option is not installed, only one call list can be specified.

The default is for: **A** = 0, **B** = 0, **C** = 0 (0 = no call list assigned)

Overdial Digits

This field is used to enter the DTMF string that will be sent if there are Overdial telephone or DTMF radio calls in the Power Loss alarm Call List.

The default setting is to be blank. The limit is up to 16 digits.

Paging Text

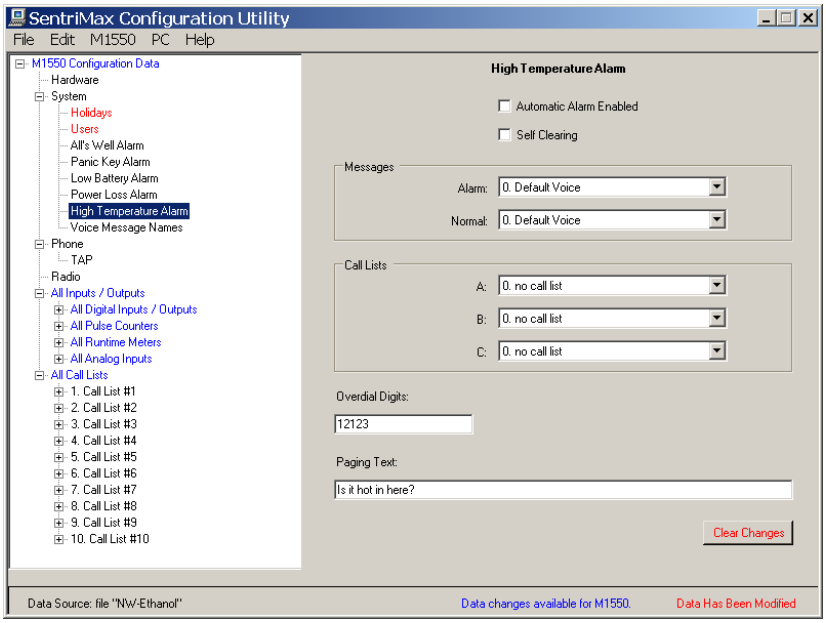
This field is used to enter the text string that will be sent if there are POCSAG or TAP paging calls in the Call List used by the Power Loss alarm.

The default setting is to be blank. The limit is up to 40 characters.



Note This function requires that the Radio or TAP Paging option be installed.

High Temperature Alarm



The rechargeable gel-cell batteries used in the SentriMax are rated up to 40°C (104°F) and can be damaged if operated above 50°C (122°F). The SentriMax continuously monitors the temperature within its enclosure and can send out an alarm if it exceeds 45°C (113°F) for longer than one minute.

Automatic Alarm Enabled

This check box enables or disables the High Temperature alarm. The High Temperature alarm is triggered if the temperature inside SentriMax's enclosure rises above 45°C (113°F) and stays there for longer than one minute. Temperatures above 50°C (122°F) can cause damage to the gel-cell battery used for backup power.

The default setting is disabled.

Self Clearing

This check box determines whether or not alerting for the High Temperature alarm will be automatically terminated when the temperature drops below 45°C (113°F). The SentriMax will call at least the first number on the call list before clearing the alarm. If self-clearing is enabled, the High Temperature alarm does not need to be acknowledged.

The default setting is disabled.

Messages/Alarm

This field is used to select the user defined voice message played during voice alerts for the High Temperature alarm as well as for status inquiries when the alarm is active. If no voice number is given, the SentriMax plays the default message.

Messages/Normal

This field is used to select the user defined voice message played during status inquiries about the High Temperature alarm when the alarm is not active. If no voice message number is given, the SentriMax plays the default message.

Call Lists

These fields are used to select which call lists should be used for reporting High Temperature alarms. If the Real Time Clock option is installed, up to 3 calls lists can be specified to allow different people to be notified depending on the time of day and day of the week. If the Real Time Clock option is not installed, only one call list can be specified.

The default is for: **A** = 0, **B** = 0, **C** = 0 (0 = no call list assigned)

Overdial Digits

This field is used to enter the DTMF string that will be sent if there are overdial telephone calls or DTMF radio calls in the High Temperature alarm Call List.

The default setting is to be blank. The limit is up to 16 digits.

Paging Text

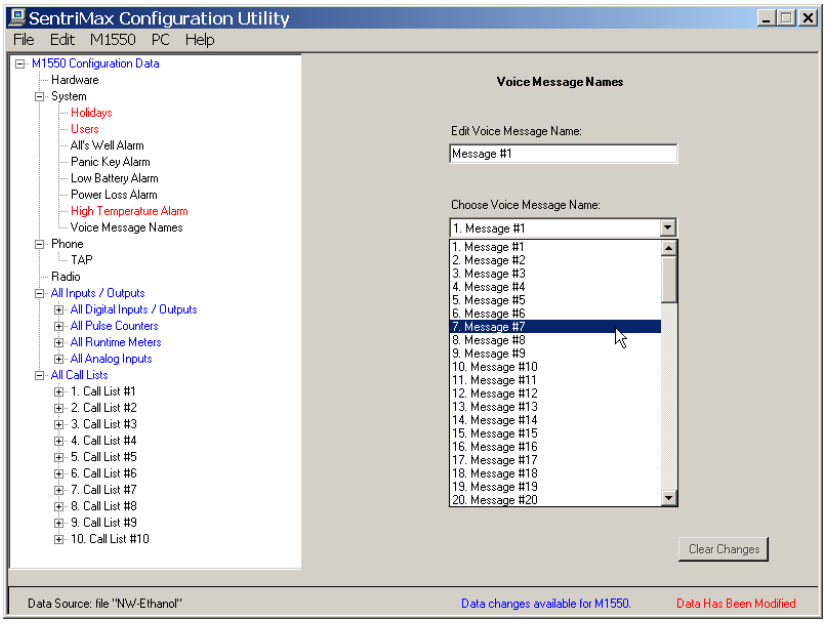
This field is used to enter the text string that will be sent if there are POCSAG or TAP paging calls in the Call List used by the High Temperature alarm.

The default setting is to be blank. The limit is up to 40 characters.



Note This function requires that the Radio or TAP Paging option be installed.

Voice Message Names



The purpose of this dialog is simply to allow the system operator to assign text label to the voice messages stored in the SentriMax unit. The labels are then displayed in the LCD window on the front of the unit when the need to identify a message arises. They are also used in printed log reports generated by the Model 1550.

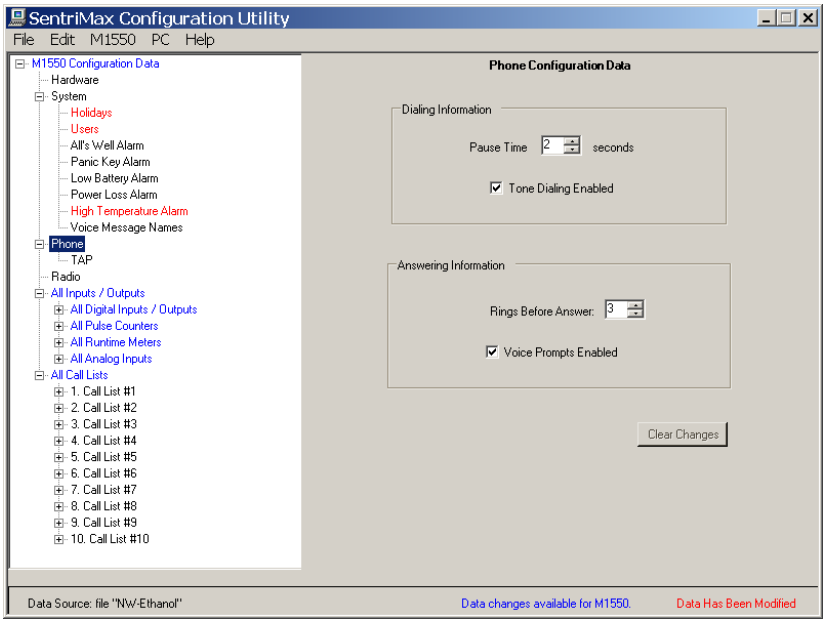
The default label for each message is “Message #*n*”; where “*n*” is the number (1 to 99) of that particular message.

♦ Assigning a Name to a Voice Message

1. Click on the down arrow of the **Choose Voice Message Name** box to open the scrolling list of voice message names.
2. Select the desired voice message label from the list.
3. Click in the **Edit Voice Message Name** box and type in the new label.

Message names may be from 1 to 16 characters in length. All the standard ASCII characters may be used with the exception of the backslash (\).

Phone Configuration Data



The Phone Configuration Data dialog sets how the SentriMax uses the phone.

Note The are also two items in the TAP Configuration Data dialog that effect telephone usage; however, they are only available if the TAP option is installed. The two items are **Dialtone Detect Enabled** and **Answer Detect Enabled**. For more information on these two parameters, see *TAP Configuration Data* on page 110.

Pause Time

The pause time determines how long the SentriMax waits for each pause in a phone number. This setting also applies to pauses in DTMF overdial strings sent to telephone or over radio. This variable, represented by a “P”, can be entered into any phone number DTMF string that requires a pause.

The default setting is 2 seconds. The range for this parameter is from 1 to 20 seconds.

Tone Dialing Enabled

This check box specifies whether the SentriMax uses tone or pulse dialing when dialing telephone numbers. The default setting is for tone dialing.

Rings Before Answer

This parameter determines the number of rings SentriMax must detect before it answers an incoming phone call. This setting applies to both the primary and secondary telephone lines.

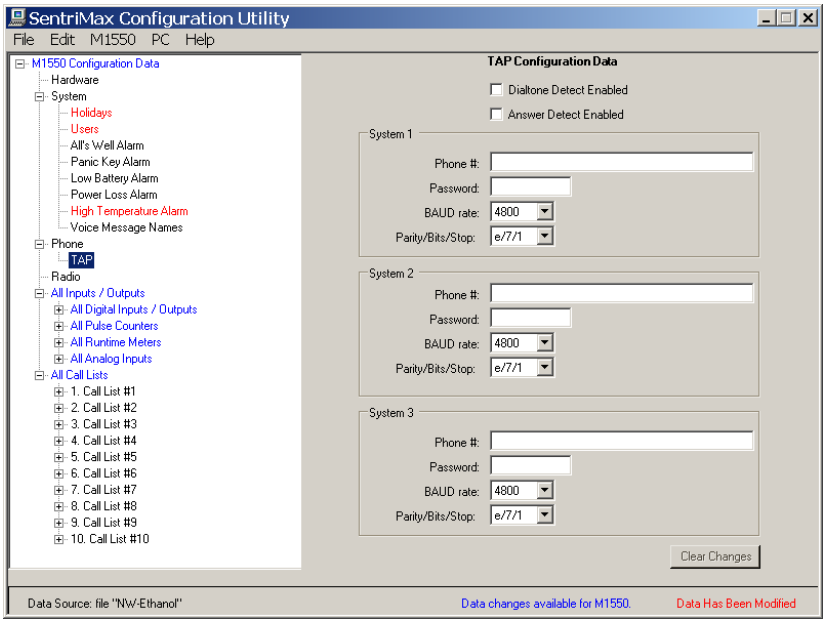
The default setting is for 3 rings. The range for this parameter is from 1 to 20 rings.

Voice Prompts Enabled

This check box determines whether or not voice prompts will be used to guide the user through entry of Command Mode commands from the phone. If disabled, only tone prompts will be played in response to command entry.

The default setting is for the voice prompts to be enabled.

TAP Configuration Data



The TAP Paging dialog box configures the SentriMax communication parameters for Telocator Alphanumeric Protocol (TAP) terminals. This would include Zetron products such as the Model 2200 and Model 2700; as well as most public and private paging systems.

Dialtone Detect Enabled

When dialtone detection is enabled, the SentriMax must detect a dialtone before dialing. If the SentriMax fails to detect a dialtone, it proceeds to the next call in the call list.

If dialtone detection is disabled, the Model 1550 dials the number without checking for dialtone first.

The default setting is disabled.

Note This function requires that the TAP Paging option be installed. It is for this reason that the dialtone detection enable appears in this dialog even though it effects all telephone calls originated by the Model 1550.

Answer Detect Enabled

Determines whether or not the SentriMax will detect if an outgoing phone call has been answered by the calling party.

The SentriMax's method of detecting an answer is to monitor the ringing tones sent back from the phone company. When the ringing tones stop, the Model 1550 assumes the phone has been answered, and begins sending the alert messages. If the ringing does not stop within 60 seconds, the Model 1550 proceeds to the next call.

Note For proper operation, the phone system must generate standard progress tones. In particular, it must give audible ringing after the phone number is dialed. In addition, at least one full ring must occur before the called party answers the phone. Answer detection should be disabled if these conditions cannot be met.

If answer detection is enabled, it has several effects on the operation of the SentriMax:

- The call will be terminated if a busy or re-order tone is detected.
- For voice calls, ensures the siren tone and voice messages, if enabled, are played after someone answers the call.
- For overdial calls, the overdial digits are sent after an answer is detected.
- For TAP paging calls, the SentriMax starts waiting for the modem handshaking sequence after an answer is detected.

Note This function requires that the TAP Paging option be installed. It is for this reason that the answer detection enable appears in this dialog even though it effects all telephone calls originated by the Model 1550.

System x/Phone

These fields are used to input phone numbers of TAP paging terminals for paging calls. Up to three TAP paging terminals may be configured.

It is also possible to directly connect the SentriMax with the paging terminal through RS232 serial ports. In this configuration, the System Phone number should be left blank.

The default condition for these fields is blank. The limit is up to 30 digits.

Note This function requires that the TAP Paging option be installed.

System x/Password

Passwords sent to the respective TAP paging terminals during paging phone calls. If the paging terminal does not require a password, leave this setting blank.

The default condition for these fields is blank. The limit is up to 6 characters.

Note This function requires that the TAP Paging option be installed.

System x/BAUD rate

For modem connections to TAP paging terminals (a telephone number has been entered), the SentriMax will only allow you to choose between 1200 baud and 300 baud.

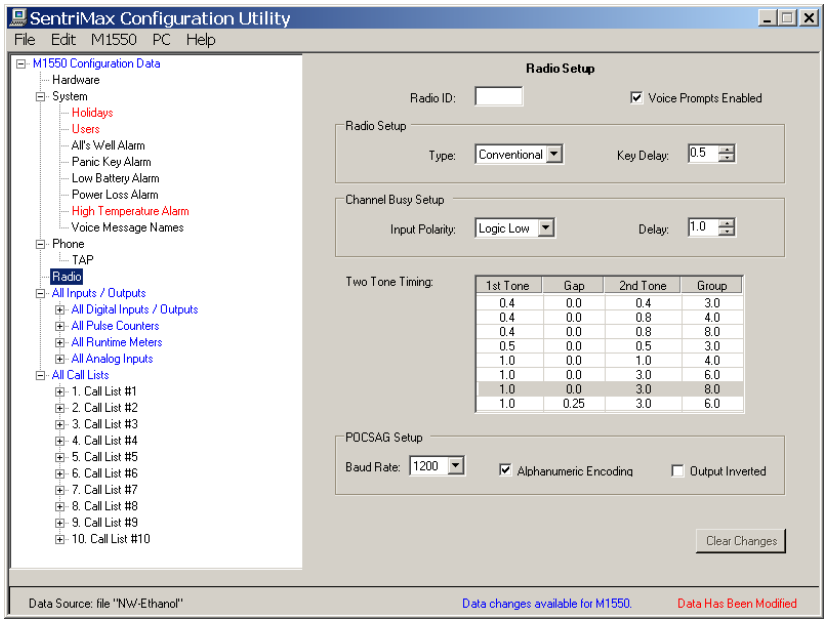
For a non-modem serial connection between the SentriMax and the paging terminal (the telephone number field is blank), the SentriMax allows a wider selection of baud rates. The available settings are: 300, 1200, 2400, 4800, and 9600 baud.

System x/Parity/Bits/Stop

This field sets the communication format used by the respective TAP paging terminal. The correct parity type, data bits, and stop bit can be selected.

The default setting (**e**ven/**7** data bits/**1** stop bit) is what the TAP protocol specifies.

Radio Setup



The Radio Setup dialog configures how the SentriMax will use the radio when sending voice messages or radio pages.

Radio ID

Using this parameter allows DTMF commands from the radio to be directed to a specific SentriMax unit whenever more than one unit share the same radio frequency. The Radio ID is a string of one to four DTMF digits that must be entered as the first part of the radio log on procedure.

If there is only one SentriMax on the radio channel, the radio ID can be left blank. If more than one SentriMax uses the same radio channel, however, each must have a unique radio ID.

The radio ID cannot contain "#" or "*". Fourth column digits (A, B, C, and D) are allowed.

The default setting is to be blank. The field may hold up to 4 digits.

Voice Prompts Enabled

This setting determines whether or not voice prompts will be used to guide the user through entry of Command Mode commands. If disabled, only tone prompts will be played in response to command entry, over the radio. The default setting is enabled.

Radio Setup/Type

This setting tells the SentriMax whether it should use the key up sequence for trunking or for conventional radio. The default setting is for conventional radio.

The key up sequence for *conventional* radios is:

1. Wait until the COR (Channel Busy) signal stays off for the Channel Busy Delay duration. COR is an acronym for Carrier Operated Relay. When the COR signal is active (carrier has been detected), the channel is busy and the SentriMax will not key up the radio.
2. Activate PTT.
3. Wait for the key up delay time.
4. Transmit audio.

For *trunking* radios, the key up sequence is:

1. Activate PTT.
2. Wait for the COR (Channel Busy) signal to deactivate for the channel busy delay time (meaning that a channel has become available). If the channel does not become available within 15 seconds, turn off PTT, wait 5 seconds, and start over with Step 1.
3. Wait for the key up delay time.
4. Transmit audio.

When the SentriMax is trying to make an alert call and the channel is busy for longer than 60 seconds, it proceeds to the next call.

Radio Setup/Key Delay

For a conventional radio, the key up delay is the amount of time the SentriMax waits between activating the PTT (push-to-talk) relay and transmitting audio signals. For a trunking radio, it is the delay between the time the channel becomes available and when the SentriMax starts to transmit its audio.

The default setting is for 0.5 seconds delay. The valid range for this setting is from 0 to 25.5 seconds.

Channel Busy Setup/Input Polarity

This setting tells the SentriMax whether the radio applies a low or a high voltage to the COR input of the radio connector when the radio channel is busy.

The default setting is an active low signal for COR.

Channel Busy Setup/Delay

This setting specifies the amount of time that the Channel Busy (COR signal) must remain inactive before the SentriMax considers the radio to be available.

The default setting is 1 second. The valid range for this setting 0 to 25.5 seconds.

Two Tone Timing

This dialog box shows the timings (in seconds) for the different Two tone formats. If both the A and B tones for a page are set to the same tone, then only a single long tone will be produced, using the group tone timing.

The default timing is 1.0 second **A**-tone, 0.0 second gap, 3.0 second **B**-tone, and 8.0 second group call.

Note For the timing parameter to be available, the Radio Paging Option must be installed.

POCSAG Setup/Baud Rate

This parameter determines the baud rate used when making POCSAG pages. The choices are 512, 1200, and 2400 baud. The default setting is 1200 baud.

Note For this parameter to be available, the Radio Paging Option must be installed.

POCSAG Setup/Alphanumeric Encoding

This parameter determines whether or not the SentriMax will restrict POCSAG paging to numeric messages only, or will also support alphanumeric messages. The default setting is for alphanumeric paging.

Note For this parameter to be available, the Radio Paging Option must be installed.

POCSAG Setup/Output Inverted

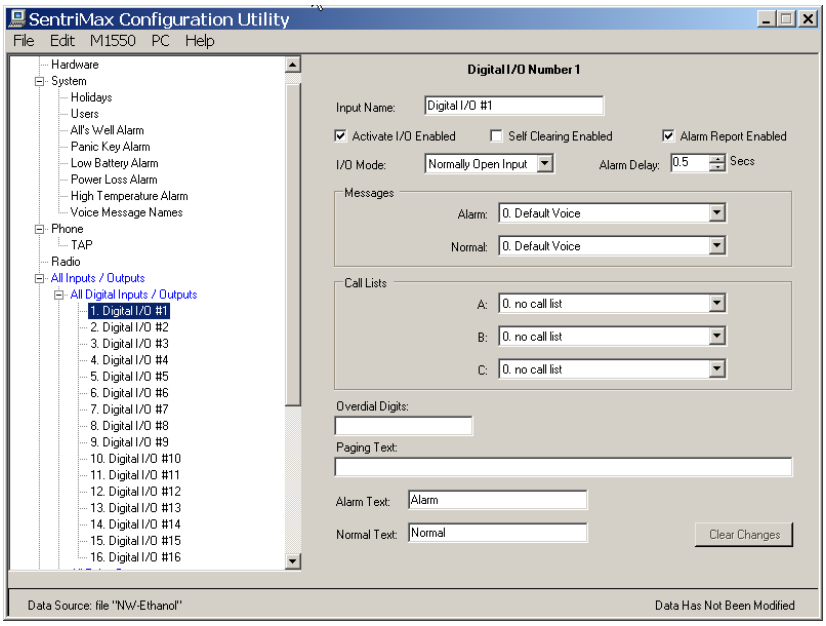
This parameter determines whether the data stream sent to the transmitter is sent in inverted or non-inverted form. The default setting is for no inversion.

Note For this parameter to be available, the Radio Paging Option must be installed.

Inputs and Outputs

There are four different types of inputs and one type of output available for the SentriMax. The digital I/O points can be configured as Digital Inputs or Outputs, and the first 16 Digital Inputs can be used to trigger Pulse Counters or Runtime Clocks. The Analog Inputs can measure either a Voltage Range or a Current Range.

Digital Inputs/Outputs



Select the number of the input/output to modify.

Input Name

This is a descriptive name of the Digital I/O point displayed on the front panel LCD screen and when logging events onto the printer (Real Time Clock option required for printer logging). In addition, the descriptive name is also used on the tree view used in the left pane of SMCU to navigate the dialog boxes used to edit the database. The limit for this parameter is 15 characters.

Activate I/O Enabled

This check box determines whether or not the SentriMax will allow status display or output control for a particular Digital I/O point. The front panel menus display only the Digital I/O points that are activated. DTMF commands return an error tone or voice prompt if a disabled I/O point is specified. The primary purpose for this setting is to keep unused Digital Inputs/Outputs from being listed on the front panel menus. Disabling this setting does not disable alarm events on the I/O point.

The default setting is enabled.

Self Cleaning Enabled

This check box determines whether or not alerting for a Digital Input alarm is automatically terminated when the alarm condition clears. The SentriMax will call at least the first number on the call list before clearing the alarm. If self-clearing is enabled, a Digital Input alarm does not need to be acknowledged.

The default setting is disabled.

Alarm Report Enabled

This check box enables or disables Call List reporting for alarms on the selected Digital Input.

The default setting is enabled.

I/O Mode

This field determines the mode of the Digital I/O point. There are three modes:

1. **Normally Open** - low input (contact closed to ground) level triggers the alarm
2. **Normally Closed** - high input (contact to ground opened) level triggers the alarm
3. **Output** - I/O point is used as an output

The low input level is 0.8V and the high level is 2.0V. Voltages between these values are indeterminate.

When used as an output, the I/O point is driven through an open collector device that has a pull-up resistor to the SentriMax's DC power supply. When the output is turned on, the voltage drops to about 0.6V. When off, it rises to the pull up voltage (>10V).

When a digital I/O point is changed to output mode, the **Output Momentary Time** (same value as **Alarm Delay**) should usually be changed as well due to the fact that the factory default would set a momentary output time of 1.0 second.

The default setting is **Normally Open**.

Alarm Delay

This field sets the Alarm Delay time when the selected Digital I/O point is used as an input, and the Output Momentary Time time when the Digital I/O point is used as an output.

An input alarm will be triggered only if the input remains in the alarm condition for this amount of time.

If the I/O point is used as an output, and this setting is greater than 0, the output will turn on when commanded to do so, stay on for the specified amount of time, then automatically turn off. If this setting is 0, the output will stay on until turned off by a user command.

The default setting is 1.0 second. The valid range is from 0 to 6000.0 seconds.

Messages/Alarm

This field specifies the user defined voice message played during voice alert reporting as well as for status inquiries for the selected I/O point. This message applies when the I/O point is used as an input and it is in the alarm condition, or when I/O point is used as an output and is turned on. If no voice number is given, the SentriMax plays the default message.

Messages/Normal

This field specifies the user defined voice message played during status inquiries for the selected I/O point. This message applies when the I/O point is used as an input and it is not in the alarm condition, or when the I/O point is configured as an output and is turned off. If no voice number is given, the SentriMax plays the default message.

Call Lists

These fields specify which call lists should be used when reporting Digital Input alarms. If the Real Time Clock option is installed, up to 3 call lists can be specified to allow different people to be notified depending on the time of day and day of the week. If the Real Time Clock option is not installed, only one call list can be specified.

The default settings are: **A** = 0, **B** = 0, **C** = 0 (0 = no call list assigned)

Overdial Digits

This parameter specifies the DTMF string if there are Overdial telephone or DTMF radio calls in the alarm Call List for this Digital Input.

The default setting blank. The limit is up to 16 digits.

Paging Text

This parameter specifies the text string that will be sent if there are POCSAG or TAP paging calls in the Call List used by a Digital Input alarm.

The default is blank. The limit is for up to 40 characters.



Note In order for this parameter to be available, either the Radio Paging option or the TAP Paging option must be installed.

Alarm Text

This parameter sets a descriptive name for an input's alarm state or for an output's on state. This is displayed on the Front Panel LCD screen when the user examines the I/O point's condition, and during alarm reporting.

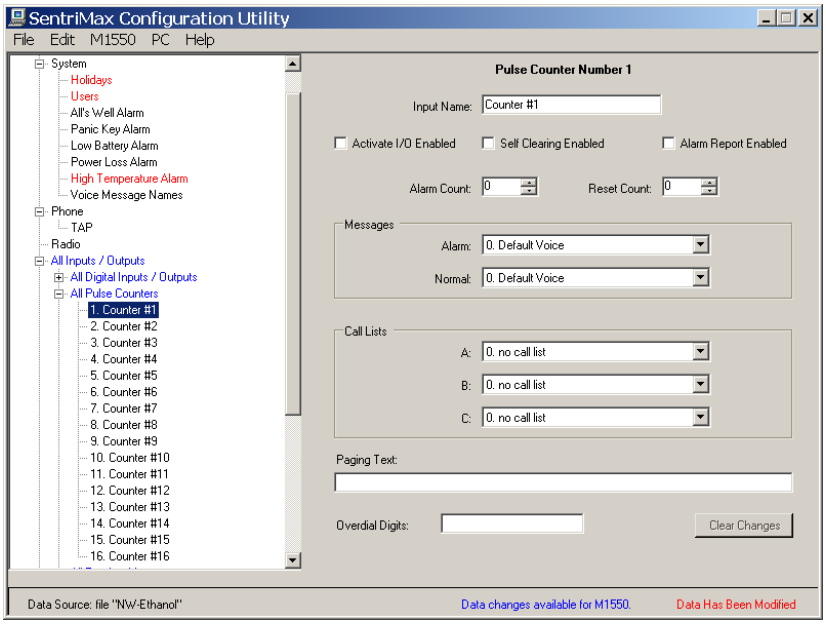
The default setting is "Alarm". The limit is for up to 15 characters.

Normal Text

This parameter sets a descriptive name for an input's normal state or for an output's off state. This is displayed on the Front Panel LCD screen when the user examines the I/O point's condition.

The default setting is "Normal". The limit is for up to 15 characters.

Pulse Counters



Select the digital input that is to be a Pulse Counter. Only the first 16 Digital Inputs can be used as Pulse Counters.

Input Name

This field holds the descriptive name of the Pulse Counter input to be displayed on the Front Panel LCD and when logging events onto the printer (Real Time Clock option required for printer logging).

The valid range for this parameter is up to 15 characters.

Activate I/O Enabled

This check box determines whether or not the SentriMax will allow status display or counter clear commands for a particular Pulse Counter. The front panel menus display only the Pulse Counters that are activated. DTMF commands return an error tone or voice prompt if a disabled Pulse Counter is specified. The primary purpose for this setting is to keep unused Pulse Counters from being listed on the front panel menus. Disabling this setting does not disable alarm events on the input.

The default setting is disabled.

Self Cleaning Enabled

This check box determines whether or not alerting for an input Pulse Counter alarm will be automatically terminated when the counter resets. The SentriMax will call at least the first number on the call list before clearing the alarm. If self-clearing is enabled, an Input Counter alarm does not need to be acknowledged.

The default setting is disabled.

Alarm Report Enabled

This check box enables or disables Call List reporting for alarms on the selected Pulse Counter. A Counter Alarm is triggered when the counter value reaches the Alarm Count.

The default setting is disabled.

Alarm Count

An alarm will be triggered when the input Counter value reaches the Alarm Count. Setting the Alarm Count to 0 disables the alarm.

The default setting is 0. The range for this parameter is 0 to 65535.

Reset Count

The Reset Count determines the count at which the input counter will be automatically reset to 0. Specifying a reset count of 0 disables the automatic reset of the counter.

The default setting is 0. The range for this parameter is 0 to 65535.

Messages/Alarm

This parameter specifies the user defined voice message played during voice alert reporting for the Pulse Counter as well as for status inquiries when the alarm is active. If no voice number is given, the SentriMax plays the default message.

Messages/Normal

This parameter specifies the user defined voice message played during status inquiries for a Pulse Counter alarm when the alarm is not active. If no voice message number is given, the SentriMax plays the default message.

Call Lists

These fields specify which call lists should be used when reporting Counter alarms. If the Real Time Clock option is installed, up to 3 calls lists can be specified to allow different people to be notified depending on the time of day and day of the week. If the Real Time Clock option is not installed, only one call list can be specified.

The default settings are: **A** = 0, **B** = 0, **C** = 0 (0 = no call list assigned)

Paging Text

This field specifies the text string that will be sent if there are POCSAG or TAP paging calls in the Call List used by the Pulse Count alarm.

The default condition is for this field to be blank. The limit is for a message up to 40 characters in length.



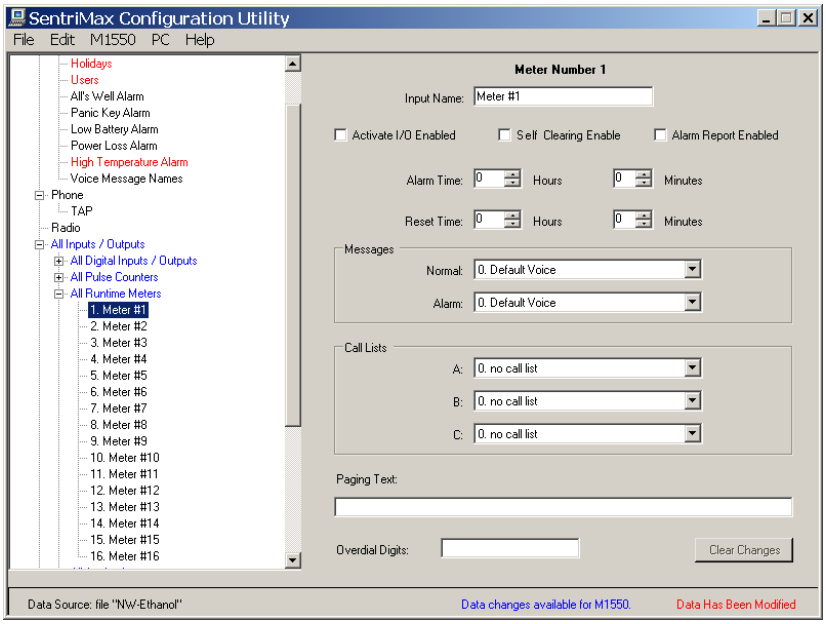
Note This function requires that the Radio or TAP Paging option be installed.

Overdial Digits

This field specifies the DTMF string that will be sent if there are Overdial telephone or DTMF radio calls in the Pulse Counter's alarm Call List.

The default setting is blank. The limit is for up to 16 digits.

RunTime Meters



Select the digital input that is to be a Runtime Meter. Runtime Meters count the millisecond timer to get their times. They do not use the Real Time Clock. Only the first 16 digital inputs can be used as Runtime Meters.

Input Name

This field holds the descriptive name of the Runtime Meter input to be displayed on the Front Panel LCD and when logging events onto the printer (Real Time Clock option required for printer logging).

The limit for this field is up to 15 characters.

Activate I/O Enabled

This check box determines whether or not the SentriMax will allow status display or meter clear commands for a particular Runtime Meter. The front panel menus display only the Runtime Meters that are activated. DTMF commands return an error tone or voice prompt if a disabled Runtime Meter is specified. The primary purpose for this setting is to keep unused Runtime Meters from being listed on the front panel menus. Disabling this setting does not disable alarm events on the input.

The default setting is disabled.

Self Cleaning Enabled

This check box determines whether or not alerting for a Runtime Meter alarm will be automatically terminated when the Reset Time expires. The SentriMax will call at least the

first number on the call list before clearing the alarm. If self-clearing is enabled, a Runtime Meter alarm does not need to be acknowledged.

The default setting is disabled.

Alarm Report Enabled

This check box enables or disables Call List reporting for alarms on the selected Runtime Meter. The Runtime Meter alarm is triggered when the meter value reaches the specified Alarm Time.

The default setting is disabled.

Alarm Time

An alarm will be triggered when the accumulated time reaches the Alarm Time (provided the Alarm Time is greater than 0).

The default settings are 0 hours and 0 minutes. The valid ranges are 0 to 999 hours and 0 to 59 minutes.

Reset Time

The Reset Time determines the time at which the Runtime Meter will be automatically reset to 0 hours and 0 minutes. Specifying a reset time of 0 hours and 0 minutes disables the automatic reset of the Runtime Meter.

The default settings are 0 hours and 0 minutes. The valid ranges are 0 to 999 hours and 0 to 59 minutes.

Messages/Normal

This field specifies the user defined voice message played during status inquiries for a Runtime Meter alarm when the alarm is not active. If no voice message number is given, the SentriMax plays the default message.

Messages/Alarm

This field specifies the user defined voice message played during voice alert reporting for the Runtime Meter as well as for status inquiries when the alarm is active. If no voice number is given, the SentriMax plays the default message.

Call Lists

These fields specify which call lists should be used when reporting Runtime Meter alarms. If the Real Time Clock option is installed, up to 3 call lists can be specified to allow different people to be notified depending on the time of day and day of the week. If the Real Time Clock option is not installed, only one call list can be specified.

The default settings are: **A** = 0, **B** = 0, **C** = 0 (0 = no call list assigned)

Paging Text

This field specifies the text string that will be sent if there are POCSAG or TAP paging calls in the Call List used by the Runtime Meter alarm.

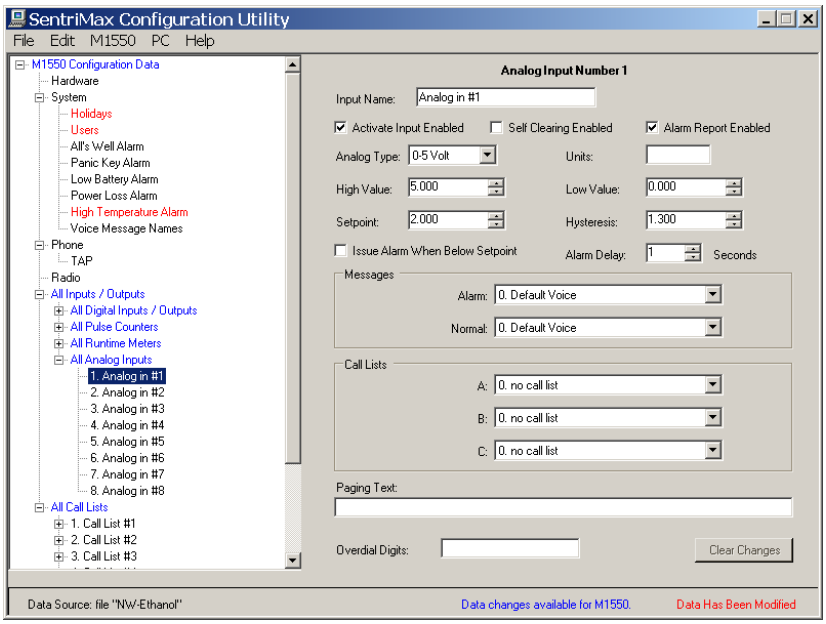
The default condition is blank. The range is for up to 40 characters.

Overdial Digits

This field specifies the DTMF string that will be sent if there are Overdial telephone or radio DTMF calls in the Runtime Meter's alarm Call List.

The default condition is blank. The range is for up to 16 digits.

Analog Inputs



Select the number of the input to modify. There are 8 Analog Inputs. For more information on how the Analog Inputs work, see *Analog Inputs* on page 147.

Input Name

This field holds a descriptive name of the Analog input to be displayed on the Front Panel LCD and when logging events onto the printer (Real Time Clock option required for printer logging). In addition, this becomes the name displayed in the tree view used to navigate the dialog boxes.

The limit is for up to 15 characters.

Activate I/O Enabled

This check box determines whether or not the SentriMax will allow status display for a particular Analog Input. The front panel menus display only the Analog Inputs that are activated. DTMF commands return an error tone or voice prompt if a disabled input is specified. The primary purpose for this setting is to keep unused Analog Inputs from being listed on the front panel menus. Disabling this setting does not does not disable alarm events on the input.

The default setting is enabled.

Self Cleaning Enabled

This check box determines whether or not alerting for an Analog Input alarm will be automatically terminated when the alarm condition clears. The SentriMax will call at least the first number on the call list before clearing the alarm. If self-clearing is enabled, an Analog Input alarm does not need to be acknowledged.

The default setting is disabled.

Alarm Report Enabled

This check box enables or disables Call List reporting for alarms on the selected Analog Input.

The default setting is enabled.

Analog Type

This parameter sets whether the Analog Input references a 0 to 5 V scale or a 4 to 20 milliampere scale. 0V or 4mA would be equal to the Low Value and 5V or 20mA would be equal to the High Value. See *Analog Inputs* on page 147 for more information on how the Analog Inputs work.

The default setting is to the 0 to 5 Volt scale.

Units

This field provides names for the units of measurement (feet, degrees, GPH, CFM, and similar terms) for the Analog Input displayed on the Front Panel LCD screen during a check from the Command Menu.

The default condition is blank. The limit is for up to 5 characters.

High Value

The entry in this field determines the high end of the measurement range in real world values that correspond to a 5V or 20mA (depending on the **Analog Type** setting) on the Analog Input. Low and High Values should be set before setting **Setpoint**.

The default setting is 5. The valid range for this entry is from -1,000,000.000 to 1,000,000.000 (3 decimal places maximum).

Note The value entered for the high end of the range must be greater than the value entered for the low end of the measurement range.

Low Value

The entry in this field determines the low end of the measurement range in real world values that correspond to a 0V or 4mA (depending on the **Analog Type** setting) on the Analog Input. Low and High Values should be set before setting **Setpoint**.

The default setting is 0. The valid range for this entry is from -1,000,000.000 to 1,000,000.000 (3 decimal places maximum).

Note The value entered for the low end of the range must be smaller than the value entered for the high end of the measurement range.

Setpoint

The entry in this field determines the value, within the limits specified by the measurement range, at which the Analog Input alarm will be triggered. **Low Value** and **High Value** parameters should be set before setting the **Setpoint**.

The default entry is 2. The **Setpoint** value must fall within the measurement range defined by the **Low Value** and **High Value** entered.

Hysteresis

The entry in this field determines how far away from the alarm **Setpoint** value the input level must change (moving back towards the normal operating range) before the input is considered to be clear again. It uses the units specified for the input under the **Units** parameter.

The **Hysteresis** value specified must fall within the measurement range defined by the using the **Setpoint** and either the **Low Value** or the **High Value**. The calculation is determined by whether the alarm state is configured to occur when the incoming signal moves above or below the **Setpoint**.

If the input is set to alarm when the signal moves *above* the Setpoint: Hysteresis ≤ Setpoint - Low Value

If the input is set to alarm when the signal moves *below* the Setpoint: Hysteresis ≤ High Value - Setpoint

Note For additional information about analog inputs, please see *Analog Inputs* on page 147. Be sure to review Figure 13: on page 149, as well as Figure 14.

Issue Alarm When Below Setpoint

This check box determines which side of the **Setpoint** (high side or low side) is considered to be the alarm condition.

The default setting is the alarm condition is above the **Setpoint**.

Alarm Delay

This field sets the delay time for an analog input. The input must cross the **Setpoint** and remain there for this amount of time before the alarm is triggered.

The default setting is 1 second. The valid range is from 1 to 6000 seconds.

Messages/Alarm

This field specifies the user defined voice message played during voice alert reporting for the Analog Input as well as for status inquiries when the alarm is active. If no voice number is given, the SentriMax plays the default message.

Messages/Normal

This field specifies the user defined voice message played during status inquiries for an Analog Input alarm when the alarm is not active. If no voice message number is given, the SentriMax plays the default message.

Call Lists

These fields specify which call lists should be used when reporting Analog Input alarms. If the Real Time Clock option is installed, up to 3 calls lists can be specified to allow different people to be notified depending on the time of day and day of the week. If the Real Time Clock option is not installed, only one call list can be specified.

The default settings are: **A** = 0, **B** = 0, **C** = 0 (0 = no call list assigned)

Paging Text

This field specifies the text string that will be sent if there are POCSAG or TAP paging calls in the Call List used by the Analog Input alarm.

The default setting is blank. The limit is from 0 up to 40 characters.

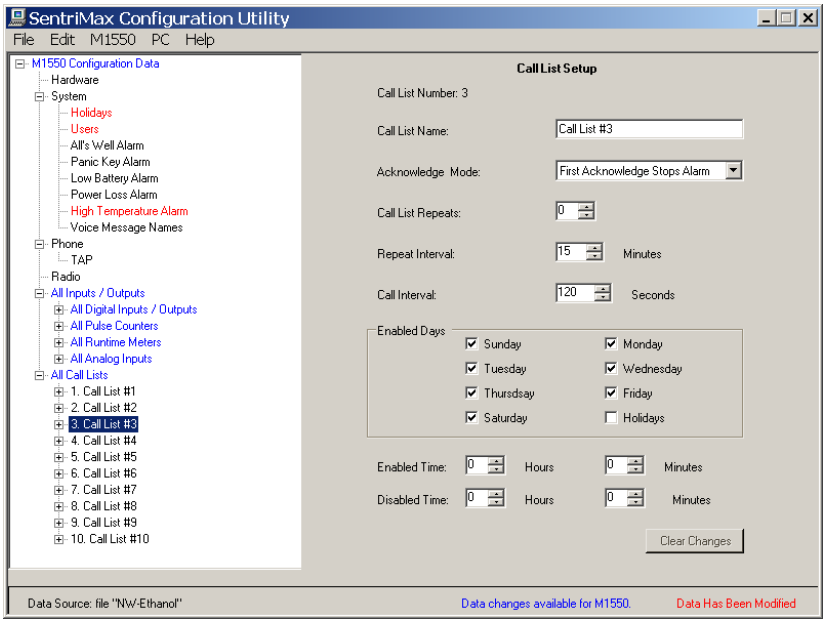
Overdial Digits

This field specifies the DTMF string that will be sent if there are Overdial telephone or Radio DTMF calls in the Analog Input's alarm Call List.

The default setting is blank. The limit is from 0 up to 40 characters.

Call Lists

Expanding the **All Call Lists** item on the tree displays the list of available **Call Lists**. Selecting one of these items opens its Call List Setup dialog. Select a **Call List** to modify its settings.



Call List Number

This field displays the number of the call list associated with the dialog that is open. This is for informational purposes only and cannot be altered.

Call List Name

This field gives the call list a descriptive name for use in SMCU tree view and on the Front Panel LCD display. The valid range for this field is up to 15 characters.

Acknowledge Mode

This parameter determines how the SentriMax handles Call List Repeats when a user acknowledges an alarm with a DTMF command from telephone or radio. There are four different modes:

- **No Acknowledge** - The SentriMax continues to process the Call List sequentially, regardless of whether or not anyone acknowledges the alarm. The specified number of **Call List Repeats** is always sent.
- **All Must Acknowledge** - When a telephone call (not a radio, speaker or paging call) has been acknowledged, the SentriMax drops that call from the list but continues to processing all other calls. After all calls have been dropped, the SentriMax stops making calls.
- **First Acknowledge Stops Alarm** - If the SentriMax receives one alarm acknowledgment, it stops making calls.
- **First Acknowledge Pauses Alarm** - When one alarm acknowledgment is received, the SentriMax quits calling for this alarm until the list **Repeat Interval** expires or the alarm condition goes away. At the end of the list **Repeat Interval**, if the alarm is still active and the specified number of **Call List Repeats** has not been reached, the SentriMax resumes calling, starting with the first call in the call list.

It is only during an outgoing telephone call that the SentriMax associates an acknowledgment from a user with a particular call in the call list. Therefore only telephone calls, not radio or paging calls, can be dropped from the call list one at a time. When a user acknowledges an alarm by calling into the SentriMax from a telephone or radio, every call in the call list associated with that alarm is acknowledged.

Acknowledgment modes do not apply when the acknowledgment is received through the SentriMax's front panel keypad. In this case, the alarm always clears and calling stops. The SentriMax assumes that since a user is at the site, the problem is fixed and alerting should stop.

Most alarm sources can be set as self-clearing. When an alarm is designated as self-clearing, it automatically clears when the alarm condition goes away. The SentriMax stops sending alert transmissions (after at least one alert). The Panic Button is the only alarm that cannot be configured as self-clearing since it would clear upon releasing the button.

The default setting is to First Acknowledge Stops Alarm.

Call List Repeats

This parameter determines the maximum number of times the SentriMax will pass through the call list.

If all repeats of the call list have been completed and the alarm has not been acknowledged, then the SentriMax automatically clears the alarm. If the alarm condition clears and returns, calling starts again.

The default setting is 0, that is, the SentriMax passes through the list once and stops. The range for this setting is from 0 to 15.

Repeat Interval

This parameter sets the amount of time the SentriMax waits after finishing a call list before it starts the next pass through the list.

The default setting is 15 minutes. The range is from 0 to 255 minutes.

Call Interval

This parameter determines the amount of time (in seconds) the SentriMax waits after the end of one call before it starts the next call in the list. This gives someone who was paged time to call in and acknowledge the alarm.

The default setting is 120 seconds. The range is from 0 to 3600 seconds.

Enabled Days

These check boxes enable the call list to be used on holidays and/or specific days of the week.

This setting, together with the call list **Enable Time** and **Disable Time**, allow alerting of different call lists depending on the time of the day, day of the week, and holidays. With the Real Time Clock option, each alarm can be assigned up to 3 different call lists. When an alarm occurs, the SentriMax looks at the current time and date and selects the first of the three call lists that is enabled at that time. Without the Real Time Clock option, only one list can be called regardless of time or day.

The default setting is for all days of the week except holidays.



Note For the features **Enabled Days**, **Enabled Time**, and **Disabled Time** to be available the Real Time Clock option must be installed.

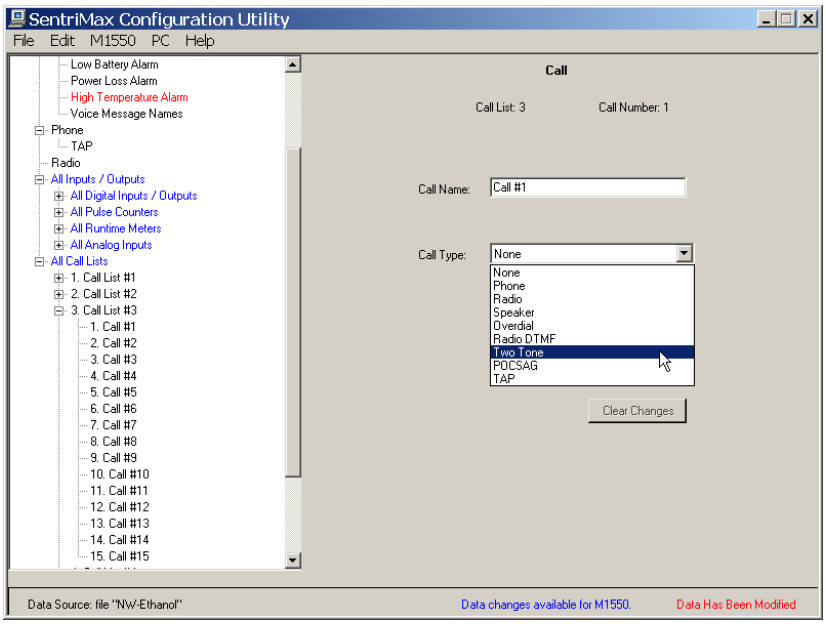
Enabled Time/Disabled Time

Enable Time and **Disable Time** together determine the time period during the day when the call list is enabled. If the **Enable Time** is the same as the **Disable Time** (the default setting), the call list is enabled all day. The time is entered in 24-hour format.

The valid ranges for these fields are: 0 to 23 hours, 0 to 59 minutes

Call Dialog

Once you have opened/expanded a particular call list, selecting any individual call within the list will open the Call dialog box for that call.



Call Name

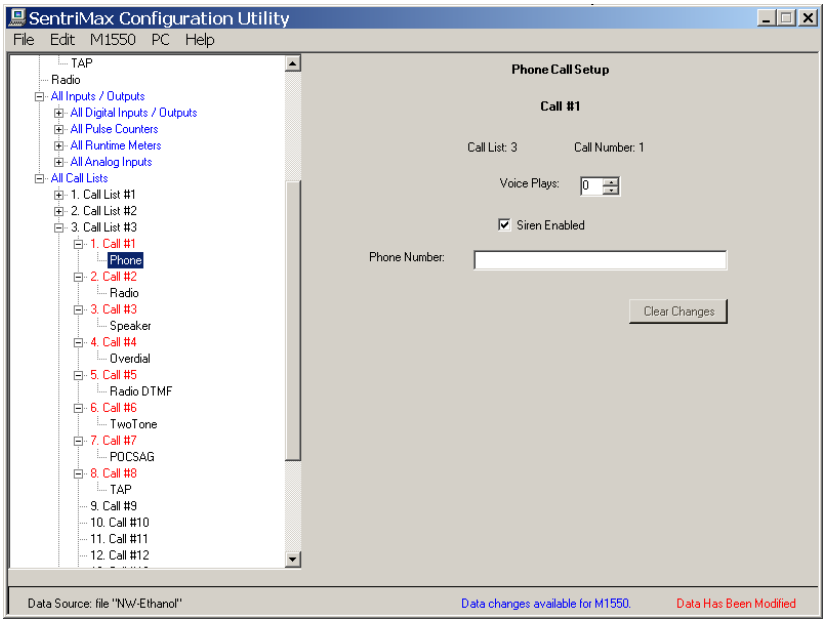
This field gives a descriptive name to the call entry displayed on the Front Panel LCD screen or in SMCU. The range is up to 15 characters.

Call Type

This field sets the Call Type for this particular slot in the Call List. When set to **None**, there is no call associated with this slot. The default condition for this field is **None**. If you choose one of the available equipment types for the call, then another dialog is added to the tree under this call. It is from this “call type” dialog that you enter the necessary details for the Model 1550 to complete the call using the equipment type specified.

The available **Call Types** are Phone, Radio Speaker, Overdial, Radio DTMF, Two Tone, POCSAG, and TAP.

Call Type - Phone



Voice Plays

This field sets the number of times to play the voice message for the specified alarm.

Siren Enabled

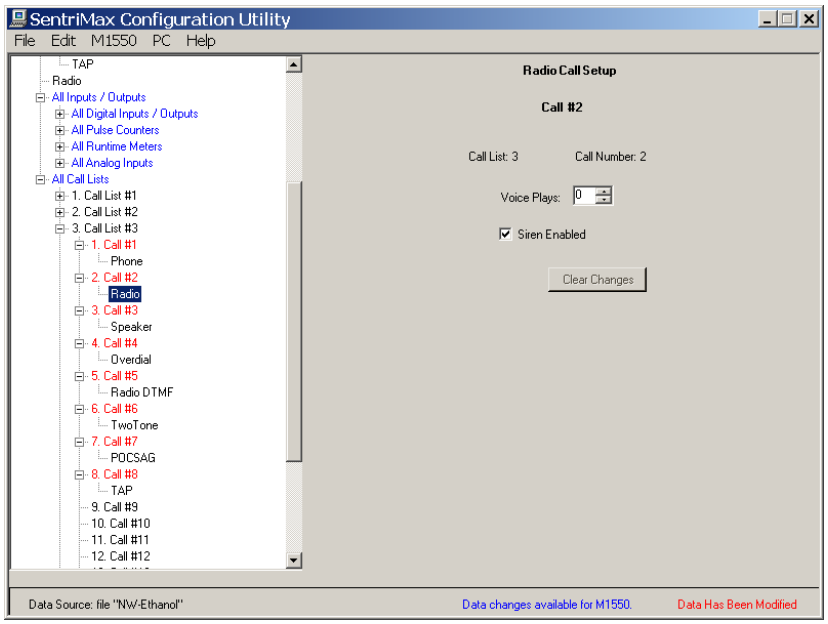
This check box determines whether or not the alarm siren is played before the voice message.

Phone Number

This field holds the telephone number to be dialed for the call. Valid entries include all DTMF digits and the letter “P” (for pause). The maximum length is 30 digits.

For additional information on telephone configuration, see *Phone Configuration Data* on page 109.

Call Type - Radio



Voice Plays

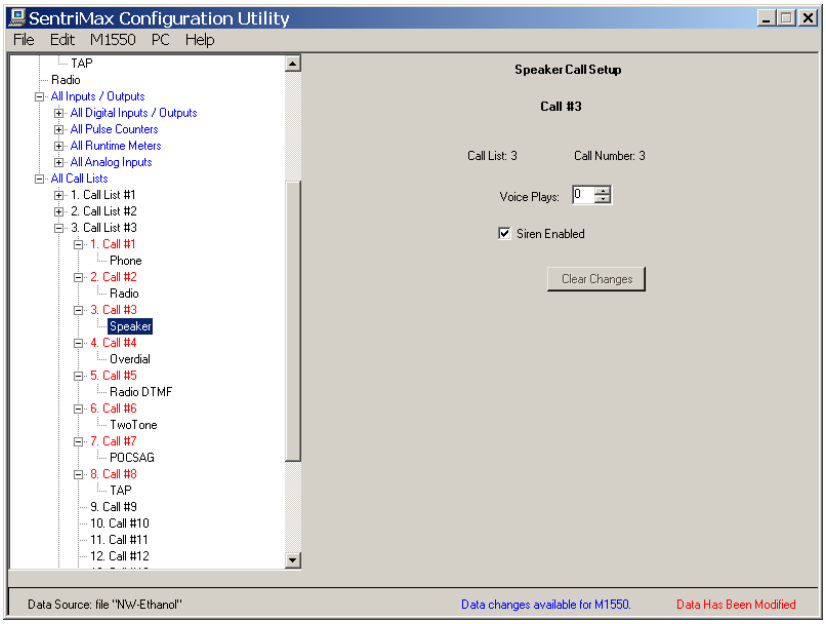
This field sets the number of times to play the voice message for the specified alarm.

Siren Enabled

This check box determines whether or not the alarm siren is played before the voice message.

Additional parameters for configuring radio operation are found in *Radio Setup* on page 113.

Call Type - Speaker



Voice Plays

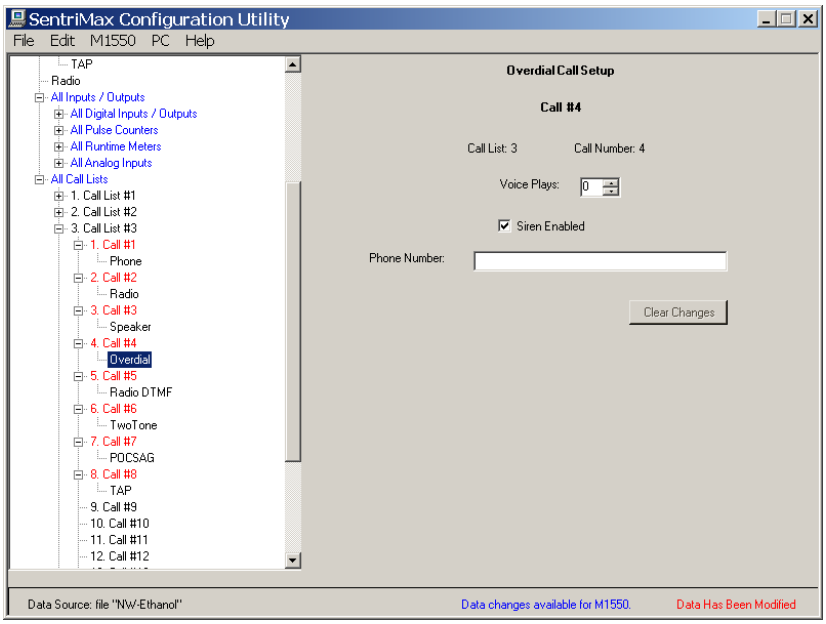
This field sets the number of times to play the voice message for the specified alarm.

Siren Enabled

This check box determines whether or not the alarm siren is played before the voice message.

Call Type - Overdial

The major difference between the call type **Overdial** and the call type **Phone** is that in an **Overdial** call, the Model 1550 will send the DTMF string programmed for the alarm under the **Overdial Digits** parameter in addition to any voice message.



Voice Plays

This field sets the number of times to play the voice message for the specified alarm.

Siren Enabled

This check box determines whether or not the alarm siren is played before the voice message.

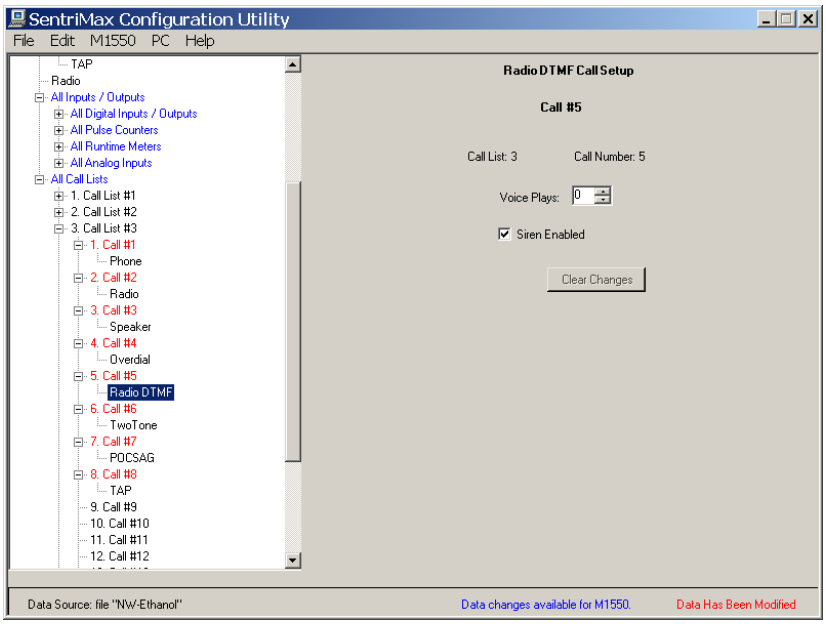
Phone Number

This field holds the telephone number to be dialed for the call. Valid entries include all DTMF digits and the letter “P” (for pause). The maximum length is 30 digits.

For additional information on telephone configuration, see *Phone Configuration Data* on page 109.

Call Type - Radio DTMF

The major difference between the call type **Radio DTMF** and the call type **Radio** is that in a **Radio DTMF** call, the Model 1550 will send the DTMF string programmed for the alarm under the **Overdial Digits** parameter in addition to any voice message.



Voice Plays

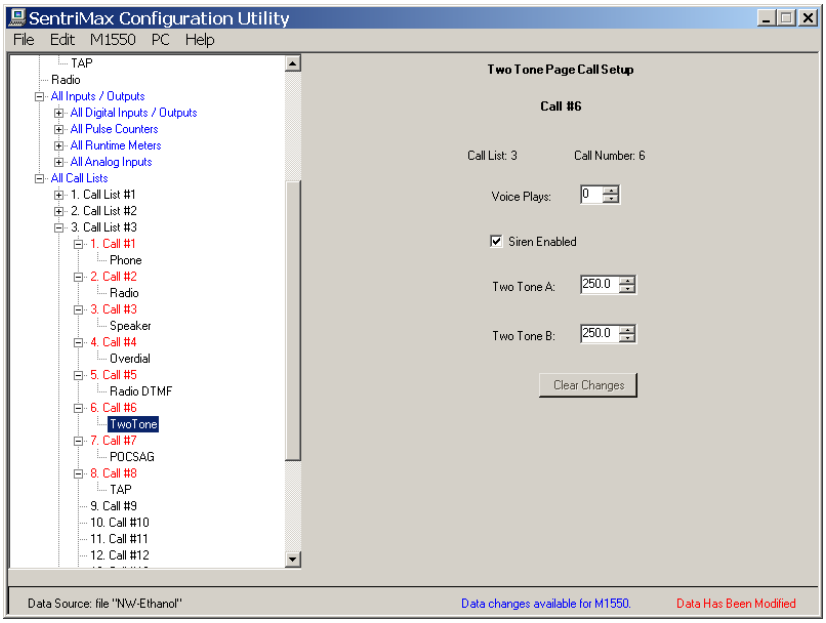
This field sets the number of times to play the voice message for the specified alarm.

Siren Enabled

This check box determines whether or not the alarm siren is played before the voice message.

Additional parameters for configuring radio operation are found in *Radio Setup* on page 113.

Call Type - Two Tone



Voice Plays

This field sets the number of times to play the voice message for the specified alarm.

Siren Enabled

This check box determines whether or not the alarm siren is played before the voice message.

Two Tone A

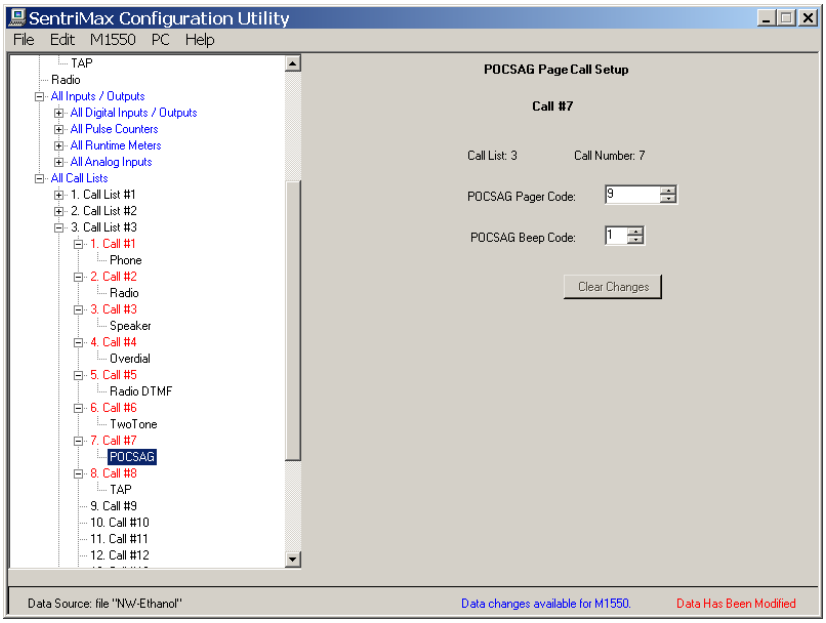
This field sets the frequency of the **A** paging tone sent out over the radio for this call. The valid range for this field is from 250.0 Hz to 3500.0 Hz.

Two Tone B

This field sets the frequency of the **B** paging tone sent out over the radio for this call. The valid range for this field is from 250.0 Hz to 3500.0 Hz.

Note If the **A** tone and the **B** tone are set to the same frequency, the Model 1550 will automatically send the page out using the Group Call timing. For more information on how the two-tone paging timing is set, please see *Radio Setup* on page 113.

Call Type - POCSAG



When a POCSAG page is sent, the actual paging text used is entered in the dialog box for the specific alarm that is sending the POCSAG page.

POCSAG Pager Code

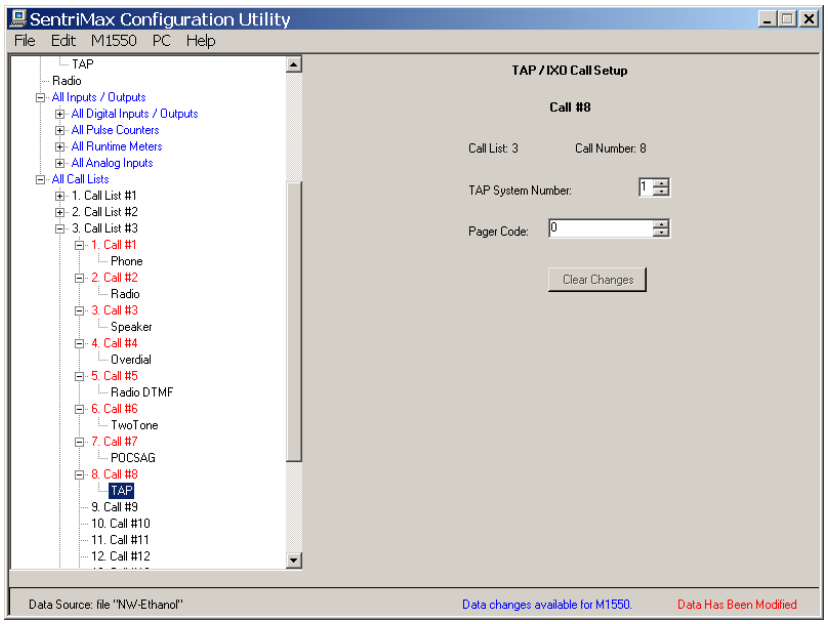
This field holds the paging code to be signalled for this call. The range is from 0000009 to 2097151.

POCSAG Beep Code

This field specifies the POCSAG beep code to send along with the page for this call. The range is from 1 to 4.

Additional parameters for configuring POCSAG paging are found in *Radio Setup* on page 113.

Call Type - TAP



When a display page is sent by means of TAP, the actual paging text used is entered in the dialog for the specific alarm that is sending the page.

TAP System Number

This field specifies the TAP System Number to be signalled for this call. Valid entries for this field are the digits 1, 2, or 3. These digits refer to TAP system entries set up in the TAP Configuration Data dialog.

Pager Code

This field specifies the pager code to be sent by this call. The range is from 1 to 15 digits.

Additional information concerning the setup and sending of pages by means of the TAP protocol can be found under *TAP Configuration Data* on page 110 and *TAP Paging Option* on page 189.

Operation

This section introduces the three operating modes of the SentriMax. This section also includes a tutorial that provides brief examples of how to configure and use SentriMax from the front panel. For information on configuring the SentriMax from a PC using the SentriMax Configuration Utility, please see *SentriMax Configuration Utility* on page 77.

Modes of Operation

The SentriMax is always in one of three modes: run mode, command mode, or setup mode. These three modes have the following characteristics.

Mode	Characteristics
Run	• waiting for user to log on • alarm events recognized • alert transmission enabled
Command	• user logged on • command mode commands accessible • alarm events recognized • alert transmission suspended • logging off returns to run mode
Setup	• user logged on • setup mode commands accessible • alarm events ignored • alert transmission suspended • logging off causes a system reset and return to run mode

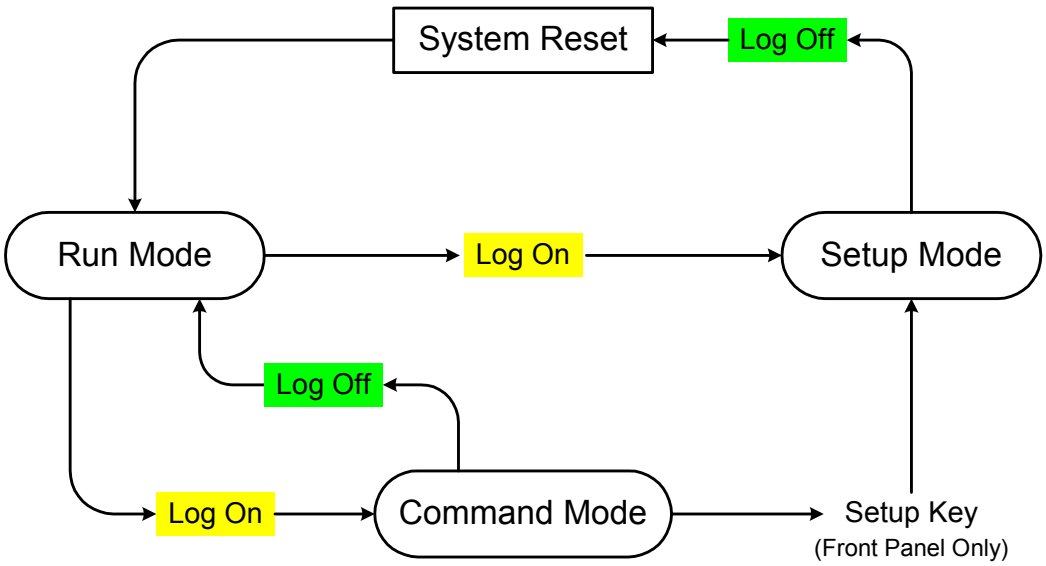
SentriMax is normally in run mode where it continuously looks for alarm conditions and sends alerts if necessary. SentriMax stays in this mode until put into command or setup mode by a command from the user.

In command mode, the user can perform a variety of operations such as polling the status of inputs, acknowledging alarms, and turning outputs on or off. In other words, in command mode the SentriMax performs all the day-to-day operations that require some kind of human interaction. These operations do not interfere with the detection of alarm events, but they do temporarily prevent SentriMax from transmitting alert messages. SentriMax returns to run mode when you exit from the command mode.

Setup mode allows you to modify the Model 1550's configuration. You may be modifying settings that affect the way the SentriMax detects alarms and transmits alerts, so these processes are suspended until you leave setup mode. When you leave setup mode, SentriMax always does a software reset to allow any changes you have made to take effect. After the software reset, it will again be "running".

Figure 12 illustrates the transition from mode to mode.

Figure 12: SentriMax Mode Transitions



Front Panel Tutorial

This subsection will guide you step-by-step through some of the basic setup and operation of SentriMax through the front panel. It assumes you have a standard SentriMax with at least 60 seconds of user definable voice storage.

Before beginning the front panel tutorial, you should connect a wire between pins 1 and 2 of connector P1 on the first digital I/O card. This is done to support the tutorial examples, which use output 2 to cause an alarm condition on input 1.

Configuring a Digital Input

Press the **SETUP MENU** key to put SentriMax into setup mode (if you have previously programmed in some passwords, SentriMax will ask you to enter the password at this point). The backlight on the LCD display should come on and the "running" LED indicator will go out.

The display should now show **Setup Menu** and **System Setup**. On right side of the lower line of the display is an arrow indicating that the other menu selections can be reached by pressing the down arrow key. First we want to change some settings for the digital inputs and outputs. Press the down arrow until the bottom line of the display shows **Digital I/O**, then press **ENTER** to select this menu option.

We are going to use digital I/O #1 as alarm input. Most of the default settings will suffice, but we do want to change a couple of items.

Press the down arrow until the lower line of the display shows **Call List(s)**, then press **ENTER**. SentriMax is now asking you to specify which list of calls (SentriMax supports 10 different lists of 15 calls) you want to use to report alarms on this input. We will use call list number 1, so press the "1" key followed by **ENTER**. (If you have the real time clock option, SentriMax will ask for two more call lists. For now just press **ENTER** when it asks for lists B and C). We will edit the call list a little later.

Next we want to tell SentriMax which voice message to play when an alarm is detected on this input. Press the down arrow until the display shows **Alarm/On Msg**, then press **ENTER**. We will use voice message number 5 for this alarm, so press "**5**" followed by **ENTER**. We will record the voice message later.

Configuring a Digital Output

Now we want to configure digital I/O #2 as a control output. Press the up arrow key until you reach the **Select I/O** option, then press **ENTER**. Now press "**2**" and **ENTER** again. The top line of the display should show that digital I/O # 2 is selected.

Now press the down arrow again until **I/O Mode** shows in the display. Press **ENTER**. SentriMax now wants you to select from a list of different modes for digital I/O #2. Press

either the up or down arrows until **Output** appears on the bottom line of the display, then press **ENTER** to configure the I/O point as an output.

Move down the menu to **Alarm Delay**, then press **ENTER**. Press "**0**" and **ENTER** again. This will prevent the output from automatically turning off after the delay time.

Press **ESCAPE** to back out of the **Digital I/O** menu and return to the **Setup Mode** menu.

Recording a Voice Message

Now we will record the alarm message for digital I/O #1. Press the up arrow until you reach the **Voice Setup** selection, then press **ENTER**. Press the down arrow until the display shows **Select Msg #** and again press **ENTER**. We want to select message number 5, so press "**5**" and **ENTER**. The display should now show our selection.

Move down the menu to **Message Length**. Press **ENTER**, "**1**" then "**0**", and **ENTER** again to set the length of message number 5 to 10 seconds.

To record the message, move down the menu to **Record**. When you are ready to start recording, press **ENTER**, wait for front panel to display recording prompt, then begin speaking. Say something like "SentriMax has detected an alarm condition on input number 1". You can press **ENTER** again as soon as you finish speaking, or wait for SentriMax to automatically stop recording when the 10 seconds has elapsed.

To play back the voice message, press the down arrow and select **Play** from the menu. SentriMax will play the message over the built in speaker.

Now press **ESC** to return to the **Setup Mode** menu.

Configuring a Call List

The last thing we need to configure is the call list we are using to report alarms. Move down the menu until you reach **Call List Setup** and press **ENTER**.

First move down to the **Repeat Interval** selection, and press **ENTER**. Set the interval between repeats of the call list to 1 minute by pressing "**1**" and **ENTER** again.

Now press either the up or down arrow key until SentriMax shows the **Modify Call** option. This selection is used to actually enter a call into the call list. Press **ENTER**.

The first thing SentriMax asks for is the position in the list (there are 15 calls per list) you want to change. Press "**1**" and **ENTER** to begin to modify the first call in the list.

SentriMax now needs to know the type of call you want to make. Press the down arrow several times to view the different call types SentriMax can make. We want to make SentriMax play the alarm message over the speaker; so press the down arrow until **Speaker Call** appears. Press **ENTER** again.

An optional siren tone can be played preceding the voice message that describes the alarm. Press the up or down arrow to either enable or disable the siren tone, then press **ENTER**. SentriMax now asks you how many times it should play the alarm voice message before terminating the call. Press "**2**" and **ENTER** to make SentriMax play the voice message twice.

Setting Off an Alarm

We are now ready to exit from setup mode. Press **ESCAPE** once to exit from the **Call List Setup** menu and again to exit from the **Setup Menu**. Press **ENTER** when the SentriMax asks you for confirmation. SentriMax always re-initializes itself when you exit from setup mode. In a few seconds, the display and LED indicators should look just as they did when you first powered up SentriMax.

Remember that we have wired digital I/O #2, which we configured as a control output, to digital I/O #1, which we configured as an alarm input. We should now be able to trigger the input alarm by turning the output on.

Press the **CMD MENU** key to put SentriMax into the command mode. Note that the **Running** LED stays on this time. This means SentriMax is still looking for alarm conditions, something it does not do when in setup mode.

Move down the command mode menu to the **Set Output** option and press **ENTER**. Press **ENTER** again to select output #2. SentriMax shows you that the output is currently off. Press either the up or down arrow to select **On**, then press **ENTER** to change the output level.

Output #2 is now driving input #1 into the alarm state. The **Alarm** LED should come on. Press **ENTER**, select **Off** and press **ENTER** again to turn the output off.

Notice that even though an alarm has been detected, SentriMax does not yet play the alarm message. When in command mode, SentriMax will detect alarm conditions, but will not send out alerts. You need to exit from command mode before alert transmission will begin.

Press **ESCAPE** twice to exit from command mode. You should shortly see the **Alerting** LED indicator come on and hear the voice message from the speaker.

When SentriMax finishes playing the alarm message, the **Alerting** LED goes out. Because SentriMax has finished making all of the calls we told it to make, it automatically clears the alarm condition and the **Alarm** LED goes out as well.

This is the end of the tutorial. SentriMax has many more features than were demonstrated here, but you should now have the basic skills you need to configure and control SentriMax through its front panel keypad and display.

Alarm Detection and Alerting

This section begins with a description of the different types of inputs provided by SentriMax and how they are used to detect alarm conditions. It then discusses how SentriMax's user recordable voice storage is used to create custom voice messages for alarm and input status. It wraps up with a discussion of how SentriMax sends out alerts when an alarm is detected. These events occur while the SentriMax is in run mode.

Inputs and Alarms

The primary purpose of SentriMax is to monitor real world conditions and send alerts when they indicate some kind of trouble. This subsection discusses the different types of inputs provided by SentriMax and how they can be used to trigger alarm events. An alarm event is any condition that can cause the SentriMax to automatically send out alert messages.

There are also several built-in sources of alarm events that are covered in this subsection: the Panic Button, Low Battery, High Temperature, and Power Loss. The All's Well feature, which sends out alarms on a periodic basis, is described here as well.

Digital I/O

The SentriMax comes standard with 16 digital input/output points and can be expanded up to a total of 64 digital I/Os. A digital I/O point is used to sense conditions or control devices that have only two states: High or Low, Open or Closed, Off or On.

Each digital I/O point can be configured as either an input or an output. When configured as inputs, all digital I/Os can trigger alarms when their levels change. In addition, the first 16 (I/O numbers 1 to 16) are capable of counting events and tracking run times.

Input Level Sensing

The most common way to use a digital input is to have changes in the input level trigger alarm events. The SentriMax considers input levels above 2 Volts to be high (or open circuit) and below 0.8 Volts to be low (or closed circuit).

Each digital input can respond to level changes in one of two basic ways:

1. Normally open - an alarm event occurs when the input changes from high to low
2. Normally closed - a low to high transition of the input triggers the alarm event

Sometimes you do not want alert messages sent out unless an input stays in the alarm condition for a specific amount of time, or you might have a noisy input signal that bounces around when changing from one state to the other. To accommodate these situations, the SentriMax provides a programmable alarm delay time for each input. The input must stay in the alarm condition for the delay time before an alarm event is recorded.

Event Counting

Each of the first 16 digital I/Os has a counter that keeps track of the number of alarm events detected on that input. For example, if the input is set up as normally open, a transition from high to low (provided it meets the alarm delay requirement) causes the counter to increase by one, but a transition from low to high does not.

A counter input could be used with a water meter that outputs a pulse for every 10000 gallons of water that flows through a pipeline. Counting the number of pulses from the meter allows you to keep track of the total flow through the pipeline.

If desired, counters can be set up to cause an alarm when a specific count is reached. Each counter can count up to 65535 events. The counter is usually cleared in one of two ways: automatically when the given count is reached, or manually by giving the SentriMax a counter clear command. The counter is also automatically cleared whenever the SentriMax micro controller is reset, for example when power is removed or when the SentriMax leaves the setup mode.

Run Time Metering

The third use of a digital input is as a run time meter, which keeps track of the total time the input is in an alarm condition. The first sixteen digital I/O points on the SentriMax can perform run time metering. The Model 1550's run time meters can accumulate up to 999 hours and 59 minutes. The SentriMax can trigger an alarm event and/or clear the meter when the run time reaches a specific value.

For example, a pump needs to be serviced every 200 hours of use. You can use one of the I/O points on the SentriMax to alert you when the pump run time reaches 200 hours and the pump requires service.

Run time meter values are remembered even if power to the SentriMax is removed. However, the values are automatically cleared if you enter the factory default command from the front panel or from a DTMF device.

Analog Inputs

SentriMax also comes standard with eight analog inputs. These inputs are meant to support the use of transducers that measure things like temperature, flow rate, or fluid level in a tank. Instead of having two discrete levels, the signals from these transducers will vary over a range of values.

Measurement Range

An analog input is normally used with a transducer that measures some real-world value and outputs either a voltage or a current that varies depending on the measured value. SentriMax directly supports transducers with 0 to 5 Volt or 4 to 20 mA outputs (transducers with a broader output range can usually be adapted by adding one or two external resistors).

When you configure an analog input, you tell the SentriMax the actual range of values your transducer can measure. For example, a water level sensor might output 0 Volts when the water tank level is at 5 feet, and 5 Volts when the level is at 80 feet, so you enter the measurement range of 5 to 80 feet into SentriMax.

Note The change in value of the signal received from an analog sensor must match the change in value of the real-world value the sensor is measuring. If the voltage or current is increasing, then the level, pressure, or temperature must be increasing too. If the sensor's output signal normally moves in the opposite direction from the parameter it measures, then that signal must be inverted before it is connected to an analog input on the Model 1550.

Once the limits of the measurement range are set, further interaction with the SentriMax (specifying alarm set point, analog input level inquiry, and similar items) is done using values in the measurement range (instead of a values in the range 0 to 5 Volts). For this reason, the transducer type and measurement range should be the first two items configured when setting up an analog input.

Note Transducer type refers to the signal provided by the transducer. A jumper on the analog circuit board is used to indicate whether the transducer for a given input will provide a 0 to 5 VDC signal or a 0 to 20 mA signal.

Analog Input Alarms

Each analog input has a set point (a value somewhere within the measurement range), which specifies the level at which the input goes into an alarm condition.

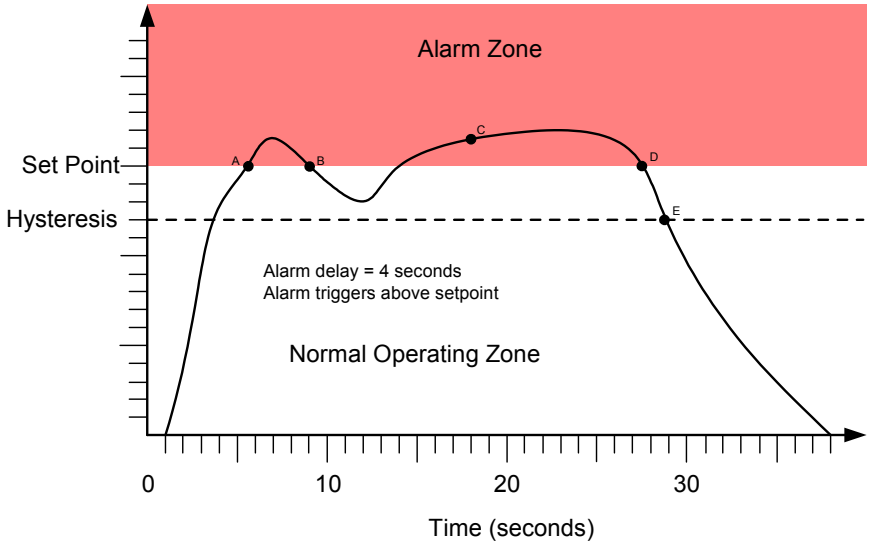
The input can be set to trigger an alarm event in one of two ways:

- when the input level rises above the set point
- when it drops below the set point

Two other settings also affect detection of analog input alarms. A configurable alarm delay period will keep the analog input from triggering an alarm event unless the input remains in the alarm condition for a specific period of time. The hysteresis setting controls how far away from the set point the input level must move (back into the normal range) before the alarm condition is cleared.

Figure 13 illustrates how these factors combine to determine when an analog input enters into and leaves the alarm condition.

Figure 13: Analog Input Alarm Detection (Alarm above Set Point)

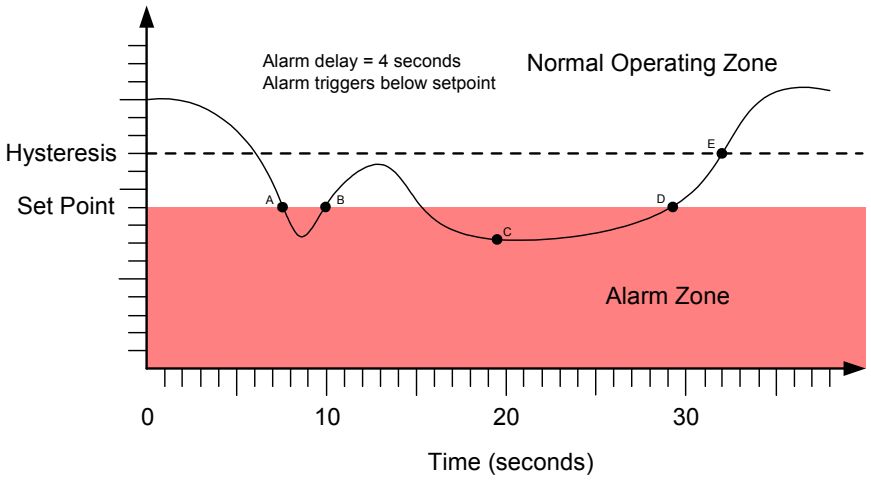


At point **A**, the analog value has crossed the set point but drops below it again at point **B**. Since the level did not stay above the set point for the delay time (4 seconds), the alarm was not triggered.

At point **C**, the analog value has again risen above the set point, but this time it stays there for the delay time so the alarm is activated. At point **D**, the input level goes below the set point, but the alarm is not cleared until the level drops by the hysteresis amount at point **E**.

Figure 14 shows the same five points on a time line drawn for an input that is set to alarm when the level drops below the set point.

Figure 14: Analog Input Alarm Detection (Alarm below Set Point)



Other Alarm Sources

Panic Button

The front panel of the SentriMax has a panic button that triggers an alarm event when pressed. The panic button is a quick way to manually trigger an alarm without having to enter passwords or move through the menu system of the Model 1550.

AC Power Loss

The SentriMax has a built in battery backup that allows it to continue to operate even in the event of the loss of AC power. Even so, you may wish to be warned when AC power is out, therefore SentriMax will optionally trigger this alarm if AC power is out for 60 seconds or longer.

Low Battery

In the event of AC power loss, the SentriMax will operate for some time off its internal battery (the actual amount of time depends on the initial charge on the battery, the current drawn by any radio installed in the box, and the number of alarm transmissions made). SentriMax continuously monitors the battery and can trigger an alarm event when the level drops below 11.5 VDC ±0.25V for at least one minute.

High Temperature

Rechargeable gel-cell batteries such as those used in the SentriMax are rated only up to 40ºC (104ºF) and can be damaged if operated above 50ºC (122ºF). The M1550 continuously monitors the temperature within its enclosure and can send out an alarm if it exceeds 45ºC (113ºF) for longer than one minute.

All's Well

The all's well feature is used to provide periodic verification that the SentriMax and the communications paths are in working order and to give an indication of whether or not there are any active alarms. When enabled, all's well will cause SentriMax to call a list of people at a specific time interval which can be from 5 minutes up to 24 hours. Though not required, the real time clock option is suggested to keep all's well transmissions on a strict schedule.

Alarm Activation and Clearing

Once an alarm becomes active, it stays active, and SentriMax continues to send alerts, until the alarm is cleared. The alarm can be cleared either automatically or by user command.

Automatic clearing can occur in one of two ways. The first is when SentriMax has completed all the alert calls it has been told to make for the alarm. At this point the alarm is cleared but will be re-activated if the alarm condition goes away and later returns.

For most alarm sources, you are also able to specify whether or not the alarm is to be self-clearing. When an alarm is designated as self-clearing, it is automatically cleared when the alarm condition goes away. SentriMax stops sending out alert transmissions (although not until it has sent at least one alert) and waits for the alarm condition to return before sending out any more alerts. SentriMax must make at least one call before it will allow the alarm condition to self-clear. An alarm will not self-clear if there are no call lists selected, or if the call lists selected are empty.

The only alarm that can not be configured as self-clearing is the panic button alarm (since it would clear as soon as you released the button).

For more information about clearing an alarm by means of user commands, please see *Alarm Commands* on page 157.

Voice Storage

The SentriMax has two types of voice storage: pre-recorded and user recordable. The SentriMax makes use of its pre-recorded storage for voice prompts and playback of counter values, run-time meter values, and analog input levels.

Pre-recorded voice storage is also used to provide default messages for system identification, input status and alarm conditions. However, these default messages can be overridden with custom messages recorded by the system users in their own voices. This is the primary subject of the rest of this chapter.

Finally, the SentriMax provides a voice mailbox. This feature provides a means of recording “on the fly” a voice message targeted at other users of the system.

User Definable Voice Massages

The standard model SentriMax comes with one minute of user definable voice storage space. Optional voice storage time can be ordered to expand the total user definable voice storage out to four minutes. This storage forms a pool that can be divided between 99 different messages in any way. In other words, each of the user definable messages can be of a different length.

These messages are referred to by number, from 1 to 99. By default, the lengths of all 99 user definable messages are set to 0. To modify a user definable message, you must change its length to something other than 0 before recording.



Note The default voice prompts contained in the Model 1550 have their own dedicated memory space. They have no impact on how much time is available for user definable voice messages.

Assignment of User Defined Messages

Though SentriMax provides default voice messages for the system identification, alarm conditions and input status, you will usually want to override the defaults with your own custom messages.

The setup section of the manual describes in detail how and where to assign user defined voice messages. Here we will just say that assigning a message number from 1 to 99 will cause the SentriMax to play the user-defined message instead of the default. To switch back to the default message, do not enter anything when the SentriMax asks you for a message number.

System Identification message

You will almost certainly want to assign a custom message for the system identification. The system identification message is played at the beginning of every voice alert transmission and whenever a user "logs on" to the system in order to enter commands.

The system identification message is normally used to describe the physical location of the SentriMax. For example, if you receive a phone call and hear the words "Totem Lake Water Station" followed by "pump failure" you know the failure occurred at Totem Lake and not in Woodinville.

Alarm Status and I/O Status Messages

Using a telephone or radio with DTMF keypad, you can ask SentriMax to play a voice message indicating the status of an alarm or the status of an input.

Each alarm source (input and output point, event counter, run-time meter and misc. alarms) has two voice messages assigned to it: the alarm message and the normal, or non-alarm, message. These can be either the built in default messages, or user defined messages that you assign. This subsection describes how these messages are used to report input and alarm status.

When SentriMax sends out an alert that requires voice playback, it plays the alarm message. When you inquire about the status of an alarm, SentriMax will play either the alarm or normal message depending on whether or not the alarm is active.

For digital I/Os, these two messages are also used to report the current I/O status when you ask for it or when you remotely change the level of an I/O point configured as an output. For outputs, the normal message is used when the output is off and the alarm message is used when the output is on.

When you inquire about the status of a digital input, you may receive a different message than if you inquired about the status of the input's alarm. This is because when an input is not configured as self clearing, the alarm will remain active even though the input level may have left the alarm condition.

When you inquire about the status of an analog input, input counter or run time meter, SentriMax always plays back the current value instead of playing back an alarm or normal message.

Because it is usually not necessary or even desirable to have unique messages for each input, the SentriMax lets you assign the same message number to as many inputs as you wish. For example, SentriMax may be used in an alarm system in a building that has a number of possible entry points in each of several zones. If someone breaks in, you want only to be notified of the zone, so each input in a zone is assigned the same alarm message.

Alerting

This subsection describes how SentriMax knows how to send out alerts when an alarm becomes active.

Call Lists

Call lists tell SentriMax whom to alert when an alarm becomes active. There are 10 call lists available, each of which can contain up to 15 calls.

Each call in the list can be any one of a number of different types of calls (the programming guide contains a complete reference). SentriMax can send voice messages and/or strings of DTMF tones to either telephone or radio. With the paging option, it can send two-tone or POCSAG pages over the radio, or can send a text page through a dial access paging terminal.

In configuring the SentriMax, you specify which call list to use for each alarm source. The standard SentriMax provides one call list per alarm source. With the real time clock option up to three call lists, enabled for different days of the week or time spans, can be assigned to each alarm.

Call List Processing

When an alarm becomes active, SentriMax begins to process the call list assigned to the alarm. There are several settings you can modify for each call list. For example, you can specify the delay time between calls, the number of times to pass through the call list, and the action SentriMax should take when an alarm is acknowledged. The setup section describes these settings in detail.

SentriMax processes the call lists for all active alarms simultaneously. In other words, it can make calls from the call list associated with alarm Y in between the calls being made for alarm X. If the call lists for alarms X and Y are both ready for their next call at the same time, SentriMax uses the following priority assignments to decide which call to send next.

Panic Button	highest priority
Digital Inputs	
Analog Inputs	
Counter Alarms	

Run Time Meter Alarms
Power Loss
Low Battery
High Temperature lowest priority

Alarm Acknowledgment

As mentioned previously, SentriMax continues to make calls from the call list until the associated alarm becomes inactive by user alarm acknowledgment, by self-clearing, or when the all calls have been made. One of the configurable items associated with each call list is the acknowledgment mode.

An acknowledgment is a confirmation given to the SentriMax by a user that an alert transmission has been received and understood. You can specify for each call list one of several methods of handling acknowledgments:

Ignore acknowledgments	SentriMax ignores acknowledgment commands and processes the call list strictly according to the call list settings.
Everyone must acknowledge	Telephone calls are dropped from the list if the called party acknowledges the alarm. SentriMax stops calling immediately when all calls have been dropped.
Stop after the first acknowledgment	Processing of the call list is stopped as soon as the first acknowledgment is received from any called party.
Pause after first acknowledgment	When an acknowledgment is received, SentriMax delays for a specified period of time, then resumes call list processing from the top of the list if the alarm is still active.

Alarm acknowledgments behave somewhat differently depending on whether they come from telephone, radio, or from the SentriMax front panel. Complete details are given in *Call List Settings* on page 71.

LED Indicators

SentriMax has four LED indicators on its front panel.

Alarm	This bright red LED blinks when there are active alarms.
Alerting	This yellow LED is lit when the Model 1550 is in the process of sending an alert.
Power	This green LED is lit when power is applied to the Model 1550.
Running	This green LED is lit when the Model 1550 is in the process of monitoring its inputs for alarm conditions.

Run Mode

Generally speaking, before a user can give a command to a SentriMax in Run Mode, he must first log on to the system. This section describes passwords, access levels, and logging on to the Model 1550 while it is in run mode. The instances where a command can be given without first logging on are described at the end of this section. For a description of how the Model 1550 monitors inputs for alarm conditions and sends alerts (also while in Run Mode), see *Alarm Detection and Alerting* on page 146.

Passwords and Access Levels

SentriMax optionally uses passwords to prevent unauthorized persons from interacting with it. If passwords are enabled, a valid code must be entered before a user can perform any of the command mode or setup mode commands.

> ⚠ **Caution!** If you want to be able to change SentriMax's setup from either the front panel or from a DTMF device, you must either leave all passwords blank or make sure that at least one user has System access. Otherwise, you will not be able to enter into setup mode from the front panel, telephone, or radio (there are no such restrictions on the PC-based SentriMax Configuration Utility).

Each password can contain from 1 to 4 numeric digits. SentriMax has room to store up to 20 different passwords.

Associated with each password is an access level. Access levels provide additional security by disabling some of the command mode commands or preventing access to the setup mode for a particular user.

SentriMax supports four different access levels. Each succeeding level allows access to all the features of the previous level.

Inquire	Lets you inquire the status of alarms and inputs.
Acknowledge	Adds the ability to acknowledge alarms.
Control	Lets you turn outputs on and off and clear input event counters and run-time meters.
System	Allows complete access to the SentriMax including setup mode.

The main effect of access levels is to control which commands are available to the user when in command mode. The details are given in *Command Mode* on page 157.

The password and access level feature can be disabled by setting all of the passwords to a blank string. This is the state in which SentriMax is shipped from the factory. When passwords are disabled, anyone who has access to SentriMax's front panel, phone number

or radio channel can perform any command, including entering setup mode. Therefore, the passwords should be disabled only in cases where security is not an important issue.

Logging On

From the Front Panel

A user can log on from the front panel keypad at any time by pressing either the **CMD MENU** or **SETUP MENU** keys. If passwords are required, the user must next enter his 1 to 4 digit password. He will be allowed access to setup mode only if he has been assigned the system access level. If passwords are disabled, he will be allowed immediately into either command mode or setup mode.

From a Telephone or Radio

From telephone, the user can log on either when SentriMax calls him with an alert, or when he calls into SentriMax by entering the following commands on his telephone keypad:

1*[password]*# to enter command mode
or
2*[password]*# to enter setup mode

If no passwords have been enabled, he simply enters 1# or 2#.

If the radio ID is enabled, the user must enter it first when logging on from radio:

*[radio ID]*1*[password]*# to enter command mode
or
*[radio ID]*2*[password]*# to enter setup mode

SentriMax plays a sequence of ascending tones, and in command mode an optional voice prompt to indicate a successful log on. The error tone (a low buzz) is played if the password and/or radio ID are invalid.

If the radio ID is blank and passwords are not enabled, only two digits (1# or 2#) are required to log on. If there is other DTMF activity on the radio channel, there is a chance that SentriMax could unknowingly be put into command or setup mode. It is recommended that you always have passwords, the radio ID or both enabled when using SentriMax with a radio.

Short Cut Keys for Ending Phone Calls

Specific commands for acknowledging alarms are described in detail in the next section, Command Mode.

However, there are also a couple of short cut operations that can be performed (via telephone only) to acknowledge alarms without entering Command Mode.

When SentriMax calls with an alarm report, you can acknowledge the alarm by pressing the pound (#) key while the voice message is still playing. SentriMax plays its OK tone (3 beeps) then hangs up.

You can also tell SentriMax to terminate the call without acknowledging the alarm by pressing the star (*) key and holding for two seconds. SentriMax plays a single beep then hangs up. This short cut key also works when you call into SentriMax and want to end the call.

Command Mode

The command mode lets you interact with the SentriMax at any time from either the front panel keypad or remotely with a telephone or radio. Once in command mode, you can acknowledge alarms, play the status of alarms, inputs, counters and run time meters, and control SentriMax's outputs.

Note The Command mode is not available when accessing the Model 1550 using the SentriMax Configuration Utility. SMCU can only access the unit in Setup mode.

SentriMax is put into the command mode using the log on procedure described in *Logging On* on page 156. When SentriMax is in command mode, it will continue to detect alarm conditions, but will not send out alerts until it returns to run mode. To return to run mode from the front panel, press the **ESC** key or select **Exit** from the menu. From telephone or radio, enter the "**00#**" command, or hold down the "*****" key for two seconds at the command prompt.

Even though the SentriMax automatically returns to run mode after the Menu Time-out Time expires, it is a good idea to develop the habit of explicitly exiting from command mode. This is particularly true when programming the unit from a radio, where unexpected DTMF activity on the radio channel can cause unexpected effects.

The rest of this section covers the available command mode commands, how they are entered from the front panel and from remote DTMF devices, and what access level is required to access each.

Alarm Commands

The commands in this subsection are used to inquire the status of, acknowledge, and (from telephone or radio only) activate alarms.

From telephone or radio, many of the alarm commands require specification of the alarm number. Table 2 shows the alarm numbers that are used for the different inputs and other alarm sources on the SentriMax.

Table 2: Alarm Sources and Numbers

Alarm Source	Alarm Number
Panic Button	0
Digital Input #1 to 64	1 to 64
Analog Input #1 to 8	65 to 72
Counter #1 to 16	73 to 88
Run Time Meter #1 to 16	89 to 104
Power Loss	105
Low Battery	106
High Temperature	107
All's Well	108

Next Alarm

Front panel:	Command | View/Ack. Alarm
DTMF command:	10#
Access Level:	Inquire

This command is used to play (over telephone or radio) or view (on the front panel display) the next alarm in the list of active alarms. When SentriMax reaches the end of the list, it wraps around to the first item on the following **Next Alarm** command.

Alarms are listed in order according to the alarm number. SentriMax precedes the alarm status message with the alarm number.

From the front panel, the user selects **View/Ack. Alarm** from the command menu. The user can then scroll up and down through the active alarms with the two arrow keys.

Previous Alarm

Front panel:	Command | View/Ack. Alarm
DTMF command:	11#
Access Level:	Inquire

This works the same as the **Next Alarm** command, but moves the opposite direction in the list of active alarms.

Play a Specific Alarm

Front panel:	N/A
DTMF command:	12*n[nn]*# *n[nn]* = alarm number (1 to 109)
Access Level:	Inquire

This command is used to play back the status of a particular alarm over telephone or radio. The message played depends on whether or not the alarm is active.

Note that an alarm that is not self-clearing will remain active even though the alarm condition is no longer present, and it will stay active until acknowledged or until all alerts have been sent. Therefore the alarm status may not indicate the current status of an input. The I/O commands described later are used to obtain input status conditions.

Acknowledge Alarm

Front panel:	Command | View/Ack. Alarm
DTMF command:	13*n[nn]*# *n[nn]* = alarm number (1 to 109)
Access Level:	Acknowledge

This command acknowledges an alarm.

From radio or telephone, the user must specify the alarm by number. If voice prompts are enabled, SentriMax asks for confirmation before acknowledging the alarm, and verifies with a voice message the receipt of the acknowledgment.

From the front panel, after selecting an alarm as described under the **Next Alarm** command above, the user can acknowledge it by pressing the **ENTER** key.

If the acknowledgment comes from the front panel, the alarm condition is always cleared and alerting for the alarm will be canceled. The effect of an acknowledgment from radio or telephone depends on the acknowledgment mode assigned to the call list for the alarm (see *Call List Settings* on page 71).

Acknowledge All Alarms

Front panel:	ACK ALARM key
DTMF command:	14#
Access Level:	Acknowledge

This command acknowledges all active alarms at once. If voice prompts are enabled from telephone or radio, SentriMax asks for confirmation before accepting the acknowledgments.

Activate Alarm

Front panel:	N/A
DTMF command:	20*n[nn]*# *n[nn]* = alarm number (1 to 109)
Access Level:	Control

The Activate Alarm command is used to remotely activate any alarm from telephone or radio. This command forces an alarm into the active condition even though the alarm source (e.g. a digital input) is not in the alarm state. If voice prompts are enabled, SentriMax asks for confirmation before activating the alarm.

Once activated, the alarm stays active until cleared by user acknowledgment or by the completion of all alerting calls for the alarm.

The only alarm that can be activated from the front panel is the panic button alarm.

I/O Commands

This group of commands is used to obtain the current status of SentriMax's inputs and outputs, and to change the level of the outputs.

Digital Status

Front panel:	Command | Dgtl In Status or Command | Output Status
DTMF command:	30*n[n]*# *n[n]* = digital I/O number (1 to 64)
Access Level:	Inquire

This command is used to play back or view the current status of one of the digital I/O points.

From the front panel, there are two menu selections in the command menu, one for inputs and one for outputs. The arrow keys are used to scroll from one I/O point to the next in either direction.

The DTMF command is the same for both inputs and outputs.

Analog Input Status

Front panel:	Command | Anlg In Status
DTMF command:	31*n[n]*# *n[n]* = analog input number (1 to 8)
Access Level:	Inquire

From the front panel, this command will display the current status of an analog input. The user may scroll through the inputs with the up and down arrow keys. The display is continuously updated so that changes in the input level can be see as soon as they occur.

When this command is given from telephone or radio, SentriMax will speak out the current input level.

In either case, the input level is scaled to real world units (see *Analog Input Settings* on page 65) before being displayed or spoken.

Counter Status

Front panel:	Command | Counter Status
DTMF command:	32*n[n]*# *n[n]* = counter number (1 to 16)
Access Level:	Inquire

This command is used to view or hear the current value of the input counters.

Run Time Meter Status

Front panel:	Command | Run Time Status
DTMF command:	33*n[n]*# *n[n]* = run time meter (1 to 16)
Access Level:	Inquire

The current value of the run time meters can be obtained with this command. SentriMax gives the run time as the total number of hours and minutes accumulated.

Turn Output Off

Front panel:	Command | Set Output
DTMF command:	40*n[n]*# *n[n]* = output number (1 to 64)
Access Level:	Control

This command and the Turn Output On command are used to change the level of SentriMax's digital outputs. Turning an output "On" is defined as pulling the digital output contact down to ground or 0.0 VDC. Conversely, turning an output "Off" is defined as pulling up the digital output level to 10.5 VDC.

From the front panel, the user selects Set Output from the command menu. SentriMax allows him to scroll through the list of outputs. Pressing ENTER selects the output currently shown in the display and gives the user a change to select the new output level. After selecting the new output level, pressing ENTER causes the change.

From telephone or radio, the 40 command is used to turn an output off and the 41 command to turn it on. SentriMax asks for confirmation of the change if voice prompts are enabled.

Turn Output On

Front panel:	Command | Set Output
DTMF command:	41*n[n]*# *n[n]* = output number (1 to 64)
Access Level:	Control

See the Turn Output Off command above.

Clear Counter

Front panel:	Command | Clear Counter
DTMF command:	50*n[n]*# *n[n]* = counter number (1 to 16)
Access Level:	Control

This command is used to clear a counter back to a count of 0. From telephone or radio, confirmation is required if voice prompts are enabled.

Clear Run Time Meter

Front panel:	Command | Clear Run Time
DTMF command:	51*n[n]*# *n[n]* = run time meter number (1 to 16)
Access Level:	Control

A run time meter can be cleared back to 0 hours and 0 minutes with this command. Confirmation is required from a DTMF device if voice prompts are enabled.

Mailbox Commands

The mailbox is used to store temporary messages that can be retrieved by other users of the SentriMax when they log on.

See *System Settings* on page 28 for the commands required to set the total amount of time allowed for mailbox messages.

Play Mailbox Messages

Front panel:	Command | Play Mailbox
DTMF command:	60#
Access Level:	Inquire

This command causes SentriMax to play back the current contents of the mailbox.

Record Mailbox Message

Front panel:	Command | Record Mailbox
DTMF command:	61#
Access Level:	Acknowledge

Allows the user to append a new voice message onto the current contents of the voice mailbox. If there are less than 3 seconds of unused space left in the mailbox, SentriMax will give an error message indicating that the mailbox is already full.

Clear Mailbox Message

Front panel:	Command | Clear Mailbox
DTMF command:	62#
Access Level:	Acknowledge

Erases all messages in the voice mailbox. Confirmation is required if the command is given from telephone or radio.

Miscellaneous Commands

Remote Listen

Front panel:	N/A
DTMF command:	70#
Access Level:	Inquire

This command allows a remote user to listen to the audio coming in to the SentriMax's built in microphone. SentriMax passes the microphone audio for 15 seconds or until a key is pressed on the telephone or radio keypad.

Exit Command Mode

Front panel:	Press ESC
DTMF command:	00# or hold down "*" key for 2 seconds
Access Level:	Inquire

This command is used to exit from command mode and return to run mode. From the front panel, simply press ESC until the command menu disappears.

From telephone or radio, either enter the 00# command or hold down the "*" key for two seconds. SentriMax will play a sequence of descending tones and (optionally) a voice prompt to indicate the return to run mode.

Troubleshooting

This chapter covers some of the more common installation and operation problems for the SentriMax.

If you need assistance, call Zetron at (425) 820-6363. Please have the serial number of the unit and/or the Zetron order number. If the call is made from the installation site by the installer or technician, the problem can usually be solved over the phone.

Power

Always check that power is correctly applied to the SentriMax. When AC power is applied, a green LED should light on the front panel. If not, check that at least one LED lights on the charger circuit board. If no light is seen there, look at the power supply. A red or green LED should be lit on the power supply. If no LED is lit, AC power is not reaching the unit. Check the power cord and connections.

If the front panel LED is not lit but the charger board LED is lit, check the fuse on the front panel board. If the fuse is bad, replace. If the fuse is good, check the fuse to the battery. If the battery fuse is broken, the charger board will turn off power to the main PCB.

The standard SentriMax is supplied with a 120VAC, 2 amp power supply. An international version is supplied with a 100-240VAC, 2 amp, power supply. An internal fuse of the power supply protects against excessive current draw. The power supply output is set to 16VDC at the factory. The output of the supply connects directly to the battery charger card. The output of the charger card is about 13.7VDC +/-.1V at 22ºC (72º F).

When AC power is removed for an extended period of time, the battery will discharge to 10 VDC through the load (V+ OUT) terminals. When AC power is restored, the Model 1550 will remain OFF until the battery is charged to greater than 12VDC.

Front Panel Operation

Assuming power is OK, on power up, the front panel display on the SentriMax should light the green “Power” and “Running” LEDs. In addition, a message should appear on the LCD. If the display does not operate as indicated, call the factory for assistance.

Assuming the front panel displays the correct information, the user should be able to proceed to request status. However, if a password is required and the wrong password is entered, no operation will take place. Incorrect password entry gives no response. If the password has been lost, call the factory for assistance.

Access Denied

Use the correct user password. There is no factory default code. If the unit has been programmed with an unknown password, connect a PC to its serial port and use the SentriMax Configuration Utility to discover what the password is set to, or to change its setting.

RF Operation

If this is the first time the radio has been connected to the SentriMax, and if the radio interface appears not to work, check that the carrier operated relay, COR, signal from the radio has the correct polarity. The default level, low level (i.e., <0.8 VDC), inhibits transmission and a high level (> 2VDC) permits a transmission. A second area to check is the power supply. Check that during transmission, the radio does not pull the power to the SentriMax front panel circuit board below 10.5VDC. Voltages below 10.5VDC can cause unexpected operation. A third area to check is the input and output signal levels. This checking requires the use of an oscilloscope. Verify that the audio *input* signal to the SentriMax is in the range of 300mV to 3Vpp. If it exceeds 3Vpp, excessive distortion may result. To reduce the audio input gain of the SentriMax, use R19. If it is lower than 300mVpp, remove JP7 to increase receiver voltage gain by 20dB. If the *output* signal from the SentriMax is less than 300mV, the radio may be loading the signal excessively. Check with the radio manufacturer to determine the input signal loading. The user can also adjust R21 to increase the audio output. Check the output signal for distortion after adjusting R21. The audio output is set to 1Vpp at the factory.

If the radio circuit has been operational for some period of time, check the RF signal path for noise. Sources of noise that can affect RF operation include corroded couplings at the antenna, deterioration of the cable or increased RF traffic.

Phone Operation

Operation over the public switched telephone network, PSTN, may occasionally encounter problems, particularly with long telephone lines back to the central office. If the phone circuit appears to be able to access the phone line but the voice or signals are noisy, the SentriMax may require additional components be added to the circuit to impedance match with the public telephone line characteristics. Call the factory for details.

If the SentriMax appears not to be calling out after receiving an alarm, verify that the call list associated with the input has phone numbers programmed into it; otherwise no dialing will occur.

If the SentriMax appears to hang up immediately after dialing, make sure that a message has been assigned to the input and the number of voice repeats has been programmed.

If the SentriMax appears not to answer the phone, check that the circuits have not been damaged by a nearby lightning strike. Check components RV1-3, R101-102 and relays K3-4 for damage. For the option board, check R1-2, RV1-2 and K2. If damage is found, more damage may be hidden. The unit should be returned to the factory for repair and re-testing.

RS-232 Operation

If after installing and executing the SentriMax Configuration Utility (SMCU), the PC display indicates that there is a communication problem, there are a number of items that can be checked. Firstly, verify that the cable is correctly attached - particularly that a good ground connection exists through the cable between the computer and the SentriMax. Secondly, check that the jumper settings, JP10, on the SentriMax front panel board are set correctly. If you are using a Zetron supplied RS-232 cable, the jumpers at JP10 should be set to short pins 2-3 and 4-5. If you are using a purchased PC RS232 cable, attach the jumpers at JP10 to 1-2 and 3-4. The factory default is for a Zetron supplied cable.

The Real Time Clock option is the only item that allows serial printer operation. The JP10 jumpers may need to be set to short pins 2-3 and 4-6 for proper operation with a PC type male-male 9-pin serial cable. When printer logging is enabled, the Model 1550 generates printer messages on power up automatically.

Discrete I/O Pins Not Operating

The I/O pins are connected to a 10-pin connector on the SentriMax Expansion I/O boards, located on the base panel. The power supply, battery, battery charger board and Analog Input board are all behind the Expansion I/O board locations. Discrete I/O pins 1-16 are located on the first board. Discrete I/O pins 17-32 are located on the second board. Discrete I/O pins 33-48 are located on the third board. And discrete I/O pins 49-64 are located on the last board - furthest from the battery. Each pin has either input or output capability but only one direction can be active at a time. Disconnect the connector plug and cable from the pin of interest.

For an input signal pin, take a short piece of wire and short the signal pin of interest on SentriMax to pin 10 of that same connector. With a voltmeter, verify that the signal voltage at the pin varies from 0VDC to above 10VDC when the short is applied and removed. If the signal does not operate as expected, check to make sure the signal pin has not been configured as an output instead of an input. If the signal pin has the right configuration, a buffer may be damaged and need replacing. If the signal does operate as expected, check the display for alerting information. If no alert message appears when the input signal is held high and low for the required debounce period, check that the signal is enabled.

If the signal pin is set for output, verify the output is enabled. If so, manually set the output low/high and verify the signal pin is low/high. If the signal does not follow the programming, the output buffer may be damaged. If the pin does follow the programming, reattach the cable and test again. It could be that the circuit that you are trying to drive requires more source current (~100 micro-amps) or more sink current (100 milliamperes) than the buffer can provide.

Analog Input Pins not Operating

The analog input pins are connected to a 10-pin connector on the SentriMax Analog Input board, located on the base panel. The power supply, battery, and battery charger board are all behind the Analog Input board and the Expansion I/O boards are located in front of it. Each pin can be configured as either 0 to 5V or 0 to 20mA. The factory default is 0 to 5VDC operation. To set the input to 0 to 20mA, the 249W resistors must be jumpered into place on the circuit board. Disconnect the connector plug and cable from the pin of interest.

With a variable power supply, adjust the input signal to the pin to 0VDC, then to 2.5VDC and then to 5VDC. Note that the ground of the power supply (negative [-] terminal) must be attached to pin 10 of the connector. Verify that the signal is correctly reported when status for that pin is requested at the front panel. If the reported level never varies, the circuit may be damaged and require replacement.

Temperature Warning

A temperature alert message is issued by the SentriMax when the internal temperature reaches 45ºC +/- 2ºC. This is an indication that the upper temperature for the battery operation is being reached. Exceeding this temperature can eventually lead to reduced battery life. If the temperature exceeds 50ºC, the battery may be permanently damaged.

Power Warning

When AC power is lost, the power warning alert is sent. This is an indication that the system is running on internal battery. The user can monitor the battery level with remote commands.

Appendix A: DTMF Reference

DTMF Command Quick Reference

To log on from radio enter: <*radio id*>*1*<*password*>#
where: <*radio id*> = optional radio ID code
<*password*> = optional password

To log on from telephone enter: 1<*password*>#
where: <*password*> = optional password

Press "*" to cancel command.

Press "00#" or press "*" for two seconds to exit command mode.

Table 3: DTMF Commands Quick Reference

Command	Function	Access Level	Parameters
00#	Exit Command Mode	Inquire	—
10#	Play Next Alarm	Inquire	—
11#	Play Previous Alarm	Inquire	—
12*n[nn]*#	Play a Specific Alarm	Inquire	*n[nn]* = alarm # (0 to 108)
13*n[nn]*#	Acknowledge an Alarm	Acknowledge	*n[nn]* = alarm # (0 to 108)
14#	Acknowledge All Alarms	Acknowledge	—
20*n[nn]*#	Activate an Alarm	Control	*n[nn]* = alarm # (0 to 108)
30*i[i]*#	Play Digital I/O Status	Inquire	*i[i]* = digital I/O # (1 to 64)
31*i[i]*#	Play Analog Input Status	Inquire	*i[i]* = analog input # (1 to 8)
32*i[i]*#	Play Counter Status	Inquire	*i[i]* = counter # (1 to 16)
33*i[i]*#	Play Run Time Status	Inquire	*i[i]* = run time meter # (1 to 16)
40*i[i]*#	Turn Output Off	Control	*i[i]* = output # (1 to 64)
41*i[i]*#	Turn Output On	Control	*i[i]* = output # (1 to 64)
50*i[i]*#	Clear Counter	Control	*i[i]* = counter # (1 to 16)
51*i[i]*#	Clear Run Time Meter	Control	*i[i]* = run time meter # (1 to 16)
60#	Play Mailbox Messages	Inquire	—
61#	Record Mailbox Message	Acknowledge	—
62#	Clear Mailbox	Acknowledge	—
70#	Remote Listen	Inquire	—

Table 4: Valid Ranges for Programmable Parameters

Alarm Source	Alarm Number
Panic Button	0
Digital Input #1 to 64	1 to 64
Analog Input #1 to 8	65 to 72
Counter #1 to 16	73 to 88
Run Time Meter #1 to 16	89 to 104
Power Loss	105
Low Battery	106
High Temperature	107
All’s Well	108

Special Keys for DTMF Setup

When configuring SentriMax from a remote telephone or radio, SentriMax uses a two key sequence, the "*" key followed by another key, to enter characters not supported directly by the DTMF keypad. Pressing the "*" key twice is equivalent to pressing ESC on the front panel and cancels the current command. The following sub-topics list the key sequences and tell where they are required.

DTMF Strings and Phone Numbers

You can enter the extended DTMF digits A, B, C, and D, embedded pauses, and phone number punctuation characters using the following key sequences:

* + 1 = A	* + 6 = #
* + 2 = B	* + 7 = (
* + 3 = C	* + 8 =)
* + 4 = D	* + 9 = -
* + 5 = *	* + 0 = p (pause)

These key strokes apply when entering phone numbers and alarm DTMF strings and when setting the radio ID (though only 0-9, A, B, C, and D are valid in the radio ID).

Alarm Paging Text

These key strokes apply when entering phone numbers and alarm DTMF strings and when setting the radio ID (though only 0-9, A, B, C, and D are valid in the radio ID).

* + 1 = "U"	* + 4 = "]"
* + 2 = " " (space)	* + 5 = "["
* + 3 = "-"	

Each alarm source has a paging text command where these key sequences can be used. SentriMax does not support alphabetic character entry from the DTMF keypad. The SentriMax Configuration Utility must be used to enter these characters.

Analog Input Values

Analog inputs have several settings (measurement range, set point and hysteresis) that require the entry of numbers that may be negative and/or have up to three decimal places. For entry of these numbers, SentriMax uses the following special key combinations:

* + 1 = "-" (minus)	* + 2 = "." (decimal)

Appendix B: Front Panel Keypad and Display

The Keypad

The keypad of a Model 1550 is broken into two parts. At the top are four special function keys that allow instant access to some of the most important features. The layout of the lower 16 keys is based on a 12 key telephone keypad with a fourth column of keys on the right hand side for menu movement and editing.

The keys have the following functions:

PANIC	triggers an alarm event when pushed
ACK ALARM	used to view and acknowledge alarm conditions
COMMAND MENU	puts the SentriMax into command mode
SETUP MENU	puts the SentriMax into setup mode
ARROWS	scroll through menus. Also clear and backspace during numeric entry
ESCAPE	move back 1 menu level or cancel partial numeric entry
ENTER	select menu item or accept numeric entry

The Display

SentriMax has a 2 line by 16 character LCD display. The top line of the display is used primarily for a description of the type of input that's expected, while the bottom line is used for the actual input.

All interaction with SentriMax through the front panel is based upon two simple operations: selecting from list of options (menu selection) and entering numbers (for example, phone number entry).

Selecting from a List of Items

When selecting from a list of items, a description of the list appears in the top line of the display, and one of the possible selections appears in the bottom line. The two keypad arrow keys are used to scroll through the items in the list. Arrows displayed on the right hand edge of the display indicate that the list can be scrolled up, down, or in either direction.

The ENTER key is pressed to select the currently displayed item. The ESC key backs up one level in the menu tree.

Entering Numbers

There are many times when you will need to enter numbers from the keypad. Passwords, phone numbers, and alarm delay times are a few examples.

When entering numbers, the down arrow functions as a backspace key that deletes the character to the left of the cursor and moves the cursor back one position. The up arrow will clear the current entry. When entering decimal numbers (for example, the set point for an analog input alarm) the "*" and "#" keys are used for the decimal point and sign specification.

Key Sequences for Extended Characters

When entering telephone numbers, strings of DTMF characters or the radio ID in setup mode, you can specify the extended DTMF digits A, B, C, and D, embedded pauses, and phone number punctuation characters using the following key sequences:

* + 1 = A	* + 6 = #
* + 2 = B	* + 7 = (
* + 3 = C	* + 8 =)
* + 4 = D	* + 9 = -
* + 5 = *	* + 0 = p (pause)

Only the digits 0 to 9, A, B, C, and D are valid for the radio ID.

Each alarm source has a string of paging text associated with it for POCSAG or TAP display paging. SentriMax lets you program from the front panel the special characters used by numeric display pagers with the following key sequences.

* + 1 = “U”	* + 4 = “]”
* + 2 = “ ”(space)	* + 5 = “[”
* + 3 = “-”	

SentriMax does not support alphabetic character entry from the front panel. The SentriMax Configuration Utility (SMCU) must be used to enter these characters.

Appendix C: Connectors, Test Points, and Jumpers

Main (Front Panel) Board

P1 - Radio Interface

Pin	Signal
1	Power loss
2	NC
3	Radio ground
4	Radio ground
5	PTT_NC
6	PTT_COM
7	PTT_NO
8	Digmode
9	Dig_data
10	COR
11	Txout
12	Radio ground
13	Tx-req
14	Radio ground
15	Recv_in

P2 - Auxiliary Interface

Pin	Signal
1	analog ground
2	+5A
3	+Vcc
4	-48V
5	NC
6	LS_relay_2
7	analog ground
8	NC
9	Ring/loop_2
10	NC
11	Aux_in
12	Aux_out
13	NC
14	NC
15	NC
16	NC

P3 - Auxiliary Audio

Pin	Signal
1	Aux_in
2	Analog ground
3	Aux_out
4	Analog ground
5	NC

P4 - I^{2}C Interface

Pin	Signal
1	SCL (serial clock)
2	SDA (serial data)
3	+5D
4	+Vcc
5	+5A
6	Analog ground
7	Analog ground
8	Digital ground
9	Reset
10	Digital ground

P5 - Power Input

Pin	Signal
1	+10.5 to 16VDC
2	NC
3	Power return

P7 - Speaker Output

Pin	Signal
1	Speaker wire +
2	Speaker wire -

P8 - Microphone +

P9 - Microphone - (shield)

J1 - Phone Interface

(May be seized by out-going call)

Pin	Signal
1	NC
2	NC
3	Tip
4	Ring
5	NC
6	NC

J2 - PSTN Interface

Pin	Signal
1	NC
2	NC
3	Ring
4	Tip
5	NC
6	NC

J3 - Serial Port

Pin	Signal
1	NC
2	NC (default) Tx or Rx
3	Tx (default) Rx or nc
4	Rx (default) or nc
5	Ground
6	NC
7	NC
8	NC
9	NC

Test Points

Test Point	Signal	Test Point	Signal
TP1	COR adjust	TP21	Dial Tone
TP2	Xmit_aud	TP22	Digital Ground
TP3	Recv_in	TP23	Digital Ground
TP4	Auxiliary audio annenuator	TP24	Tone_B buffered
TP5	Recv_radio_aud	TP25	Tone_B unbuffered
TP6	Transmit_out	TP26	Tone_A buffered
TP7	AGC_in	TP27	Power Ground
TP8	Speaker_out	TP28	+5D
TP9	DTMFA_in	TP29	+Vcc in
TP10	Modem_in	TP30	RXD
TP11	Battery voltage	TP31	TXD
TP12	Buffered_ref	TP32	E Clock (1.26MHz)
TP13	Attenuator Circuit	TP33	Tone_A unbuffered
TP14	ADC_ref	TP34	DTMF_B
TP15	Buffered_telco_in	TP35	Digital Ground
TP16	Buffered_telco_out	TP36	DTMF_A
TP17	Telco_in	TP37	SCL (I^2C clock)
TP18	Buffered_telco_ground	TP38	SDA (I^2C data)
TP19	DTMFA_in	TP39	Reset
TP20	Mic_in	TP40	Voice_In (into voice memory)

Main Board Jumper Settings

Jumper	Functional Description	
JP1	PLY/REC	- **OUT** (This jumper is for factory use only)
JP2	COR	- **OUT** (active low COR, 47 KΩ pull-up to +5 V) - IN (active high COR, adds 1 KΩ pull-down to GND)
JP3	PTT NC/NO	- **A** (NO, adds 47 KΩ pull-up to +5 V) - B (NC, adds 47 KΩ pull-up to +5 V)
JP4	PTTCOM	- A (Connected to pin 7 of P1) - **B** (pulled to ground)
JP5	DIG_DATA	- not installed unless POCSAG option purchased - A (POCSAG signaling at RS-232 levels, ± 10 V) - B (POCSAG signaling at TTL levels, 0 to +5 V)
JP6	-48V/GND	- **OUT** (not used)
JP7	RECV Gain	- **IN** (low gain range) - OUT (high gain range)
JP8	XMIT Gain	- **IN** (low gain range) - OUT (high gain range)
JP9	Manual Reset	- **OUT** (applying a momentary short to these pins resets the Model 1550 microprocessor)
JP10	RS232 Jumpers	- selects cable type, choose one of the following combinations: pin **2-3**,**4-5** = Zetron 9-pin cable to PC (default) pin 1-2,3-4 = PC cable to PC (PC type 9-pin cable) pin 2-3,4-6 = to serial printer (dual 9-pin male cable)
JP12	Test Tone	- **OUT** - IN (unit generates continuous 1 kHz test tone)

Note Jumper positions shown in **bold** indicate the default position coming from the factory.

Expansion Digital I/O Board

P1 - I/O Connector

Pin	Signal
1	I/O 1
2	I/O 2
3	I/O 3
4	I/O 4
5	I/O 5
6	I/O 6
7	I/O 7
8	I/O 8
9	GND
10	GND

P2 - I/O Connector

Pin	Signal
1	I/O 9
2	I/O 10
3	I/O 11
4	I/O 12
5	I/O 13
6	I/O 14
7	I/O 15
8	I/O 16
9	GND
10	GND

Address Jumper Settings

Address	JP1	JP2
0	OUT	OUT
1	IN	OUT
2	OUT	IN
3	IN	IN

Note The default address setting is "0". Jumper JP3 is not installed.

Analog Input Board

P2 - I/O Connector

Pin	Signal
1	Analog In 1
2	Analog In 2
3	Analog In 3
4	Analog In 4
5	Analog In 5
6	Analog In 6
7	Analog In 7
8	Analog In 8
9	GND
10	GND

Default Jumper Settings

Jumper	Function
JP3	AN7 4 to 20mA 249Ω resistor - open
JP4	AN6 4 to 20mA 249Ω resistor - open
JP5	AN5 4 to 20mA 249Ωresistor - open
JP6	AN4 4 to 20mA 249Ω resistor - open
JP7	AN3 4 to 20mA 249Ω resistor - open
JP8	AN2 4 to 20mA 249Ω resistor - open
JP9	AN1 4 to 20mA 249Ω resistor - open
JP10	AN0 4 to 20mA 249Ω resistor - open

Address Jumper Settings

Address	JP18	JP17
0	OUT	OUT
1	IN	OUT
2	OUT	IN
3	IN	IN

Note The default address setting is "0". Jumper JP16 is not installed.

Charger Board

TB1

Pin	Signal
1	PS+ (input power)
2	Vout (output power)
3	Vout (output power)
4	Batt (to battery + terminal)
5	Pwr loss (output signal)
6	GND
7	GND
8	GND

Appendix D: Options

TAP Paging Option

TAP Paging

Telocator Alphanumeric Protocol (TAP) is a standard format for sending text paging information to a paging terminal, either from a computer or from another paging terminal.

The TAP paging option allows SentriMax to communicate with up to three paging terminals. This option includes a modem that allows communications with a TAP paging terminal over the phone lines, but SentriMax can also be directly connected to a paging terminal via the RS232 serial port.

TAP paging terminals support both numeric and alpha display pagers. You can program SentriMax with numeric text messages from the front panel, radio or telephone, but if you need alphabetic characters in your messages, you need to use the SentriMax Configuration Utility.

The alphanumeric messages sent to the pager are configured individually for each alarm source. Each message can be up to 40 characters long. Other TAP paging setup is described in the Phone Settings section of the setup reference.

Progress Tone Detection

The modem that is used for TAP paging also allows SentriMax to detect call progress tones - primarily dial tone and audible ringing. Progress tone detection can be enabled or disabled. For programming from the front panel or using DTMF commands, progress tone operation is configured from *Phone Settings* on page 42. For programming done with SMCU, see *TAP Configuration Data* on page 110.

DTMF Overdial Paging

There are two types of dial access paging the SentriMax can do even without the TAP paging option. These support tone, tone and voice, and numeric display, but not alphanumeric display pagers.

The first type assigns a unique phone number to each pager. To set off the pager, all you do is dial the phone number.

The second type requires you to dial the number of the paging service, and when it answers, overdial the pager number. This can be done in one of two ways. You can embed pauses in the phone number followed by the overdial digits, or you can use the overdial call type which sends a unique string of overdial digits for each different alarm source.

Radio Paging Option

The radio paging option allows SentriMax to activate pagers directly through the radio.

It supports several paging formats, including tone only, tone and voice, numeric, and alphanumeric. Paging calls can be mixed into the call list along with regular voice alerts over phone and radio.

Two-Tone Sequential Paging

SentriMax can directly generate two tone sequential paging tones over the radio channel. It supports all standard two tone timing formats; however, since timing is set at the system level, all pagers in the system must use the same timing. Any tones in the range from 250Hz to 3500Hz can be generated.

Both tone-only and voice pagers are supported. The SentriMax does not waste airtime sending voice to a tone-only pager.

Setup information for timing can be found under *Radio Settings* on page 47 and *Radio Setup* on page 113. Tone selection information can be found under *Call List Settings* on page 71 and *Call Type - Two Tone* on page 137.

POCSAG Paging

SentriMax supports display paging using the POCSAG standard. The pagers can be either numeric or alphanumeric at 512, 1200, or 2400 baud. Since the baud rate is set at the system level, all the POCSAG pagers used by a single Model 1550 will have to use the same baud rate.

Each alarm event can be assigned a message, up to 40 characters long, that is sent out to a pager during alerting. When SentriMax is configured from the front panel, telephone or

radio, these messages must consist of strings of numeric digits. The PC based configuration program must be used to enter messages containing the full range of characters for alphanumeric pagers.

For front panel and DTMF programming, most setup for POCSAG paging is covered under *Radio Settings* on page 47 and *Call List Settings* on page 71. For programming done with SMCU, the POCSAG paging parameters are found under *Radio Setup* on page 113 and *Call Type - POCSAG* on page 138. The string of characters to be sent to the pager is part of the settings for each alarm source.

Radio Connections for POCSAG Paging

For POCSAG paging, you must use a transmitter that has a data input to accept the digital paging signals from SentriMax. The DIG_DATA line (P1 pin 9) of the SentriMax should be connected to the data input of the radio. This signal can be configured via JP5 to provide either TTL (0 to 5V) or RS232 (+/- 10V) levels.

If the transmitter is capable of both digital and analog operation, you must also connect the DIGMODE signal (P1 pin 8) from SentriMax's radio connector to the mode control input of the transmitter. DIGMODE is an active low TTL level signal (0 to 5V). It is low to put the transmitter into digital mode and high to put in analog mode.

Real Time Clock Option

The real time clock option adds two major features to SentriMax: call list scheduling and time stamped event logging.

Call List Scheduling

The real time clock allows SentriMax to select the list of calls to be made based on the time of day, day of week, and whether or not the date is a holiday. When installed, up to three call lists can be associated with each alarm source. When an alarm occurs, SentriMax compares the current time and date with the settings for each of the three call lists. If it finds a call list that is enabled, it uses that list to make the alert calls for the alarm.

The holiday calendar setup is covered in the System Settings section of the setup reference. The sections *Call List Settings* on page 71 and *Call Lists* on page 128 discuss enabling and disabling call lists.

Time Stamped Event Logging

When the real time clock option is installed and event logging is enabled (see the System Settings section of the setup reference), SentriMax will send text descriptions of system events out its RS232 serial port. The port can be connected to a printer for a hard copy record, or collected by a computer for later analysis.

The serial port communicates at whatever baud was set from the front panel or DTMF programming (see *RS232 Baud Rate* on page 32). The rest of the serial parameters are fixed at: no parity, 8 data bits and 1 stop bit. There are jumpers on SentriMax's circuit board to configure the port for different cables.

Note The same baud rate is used for programming that is used for logging events to the printer (and the other way round). If you change the serial port baud rate in order to support programming, be sure to return it to the correct baud rate before reconnecting it to the printer.

The basic format for each line printed by SentriMax is:

```
Data Type.mm/dd/yy.hh:mm:ss..<event name>.........<more info><CR><LF>

Column#...1........10........20........30........40........50......
```

The date and time are the first two items printed at columns 1 and 10 respectively. The event name follows starting at column 20. If there is any additional information it starts in column 41. The line ends with carriage return and line feed characters (ASCII 13 and 10).

Event Reference

This subsection lists the event names and additional information for each of the events logged by SentriMax.

Reset **<reset cause>**

This event is caused whenever the SentriMax is reset. There are six causes of reset that might be shown: Hardware, Software, No cop, Illegal opcode, XIRQ and CME.

A hardware reset occurs whenever SentriMax is powered up. A software reset occurs when SentriMax leaves setup mode and re-initializes itself. Both of these are normal events.

The other reset causes are not normal occurrences. If SentriMax should log a No cop, Illegal opcode, XIRQ or CME reset, please advise Zetron immediately.

Alarm **Alarm #xxx <alarm name>**

This event indicates the detection of an alarm event. The alarm name indicates the source of the alarm.

Alarm self clear **Alarm #xxx <alarm name>**

This event is recorded when an alarm automatically clears in when the alarm condition goes away or when the call list is completed.

Counter self clear **Counter #xx <counter name>**

This event indicates that the counter value has reached the reset count causing the counter to automatically reset itself to 0.

Meter self clear **Meter #xx <meter name>**

This event indicates that the run time meter value has reached the reset time causing it to automatically reset itself to 0 hours and 0 minutes.

Alert call **Alarm #xxx Call List #xx Call #xx**

SentriMax records this event at the beginning of each alert call.

Call list complete **Alarm #xxx Call List #xx**

When SentriMax has finished making calls for an alarm, this event is recorded. This may occur either because the alarm self-cleared, a user acknowledged the alarm, or the SentriMax has completed the specified number of repeats of the call list.

User log on **User #xx <user name> <device>**

This event indicates that a user has logged on to the SentriMax. The device name indicates which device he used to log on from ("Front panel", "Telephone", "Radio", or "2nd phone"). User names must be configured with the PC setup program.

User log off

When a user explicitly logs off from SentriMax, this event is recorded.

Auto log off

This event indicates that a user has logged on to SentriMax but has not given a command for 3 minutes. SentriMax has automatically logged him off.

Mode change **<mode>**

This event indicates a change of SentriMax's operating mode. This is usually preceded by a log on or log off event. The three modes are "Running", "Command mode", and "Setup mode".

Alarm acknowledged **Alarm #xxx <alarm name>**

Indicates that an acknowledgment was received for an alarm.

Output control **Output #xx <output name> <output level>**

This event is logged when a user has entered the command to change the level of one of SentriMax's outputs. SentriMax does not record an event when a momentary output automatically turns off.

Counter cleared **Counter #xx <counter name>**

When a user gives the command to clear a counter, this event is logged.

Meter cleared **Meter #xx <meter name>**

This event is logged when a user gives the command to clear a run time meter.

I/O bus error **Address xx Error x**

This event indicates that SentriMax was unable to communicate with one of the devices on its expansion bus.

Just after a hardware or software reset event, SentriMax attempts to detect the presence of all devices on the expansion bus, so it is normal to see bus errors for I/O cards that are not installed. If errors occur at other times, first check the cable between SentriMax and the expansion cards. If errors continue to occur, contact Zetron.

The address is always printed as two hexadecimal digits. The first digit in the address identifies the device on which the error occurred. The second digit is for Zetron use only.

1 - Expansion I/O card 1 (digital I/O 1-16)

2 - Expansion I/O card 2 (digital I/O 17-32)

3 - Expansion I/O card 3 (digital I/O 33-48)

4 - Expansion I/O card 4 (digital I/O 49-64)

5 - Analog Input card

e - Tone generator (U46)

The error number is one of the following:

1 - Expansion bus busy (new transaction sent before the last one finished)

2 - Time-out error (timed out waiting for transaction to complete)

3 - Ack error (device did not acknowledge transaction)

4 - Bus error (lost bus arbitration or other error)

Power Up Error(s) **x**

This event indicates that SentriMax has detected one or more errors during its self-test power up routine. The number x is the sum of the error numbers for all errors that were detected. The SentriMax checks for the following errors:

1 - ROM checksum error

2 - RAM test failed

4 - Expansion bus error

8 - Error in voice storage table

64 - Configuration checksum error

Second Telephone Option

SentriMax supports an optional second telephone line that allows an operator to call in and take control even if SentriMax is busy with a call on the primary phone line or the radio. The second telephone line is never used by SentriMax to make alert phone calls; it is used only to process user commands.

Of the three remote access devices (radio, primary telephone, and secondary telephone), the secondary telephone has the highest priority and at times can cause other remote users to be automatically logged off. A user at the front panel still has priority over any remote user. If a user is logged on from the front panel, in either command mode or setup mode, he cannot be forced off by any remote user.

Operation of the second telephone varies slightly according to these four situations:

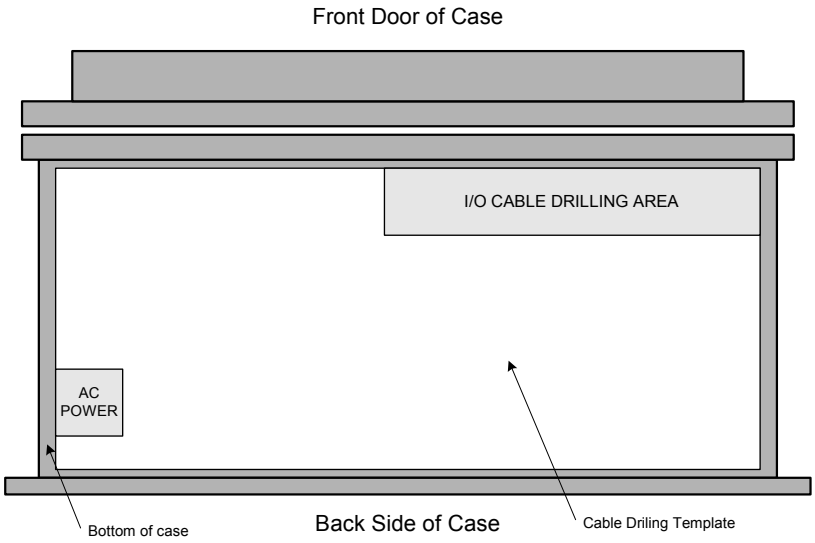
1. If a user calls in on the second phone line when SentriMax is not busy sending out alerts, and no other user is already logged on, SentriMax sends out the OK tone (3 beeps). He may now log on to either command mode or setup mode (provided, of course, he has a valid password and the proper access level).
2. If SentriMax is busy sending alerts when a user calls in on the second phone line, it will play a short siren tone after answering. If the user has “acknowledge” level access (or higher), he may still log on to command mode causing SentriMax to cancel the current call. If he has only inquire access, he can not enter command mode. Of course, system access is still required to enter setup mode.
3. If another user is already logged on in command mode from radio or the primary telephone when a user calls in on the second phone line, SentriMax plays a short busy tone. He may still log on, forcing SentriMax to drop the other user, if he has the system access level.
4. If SentriMax is in setup mode when a user tries to call in from the second phone line, the call will not be answered.

Appendix E: Drilling Template

Using the Drilling Template

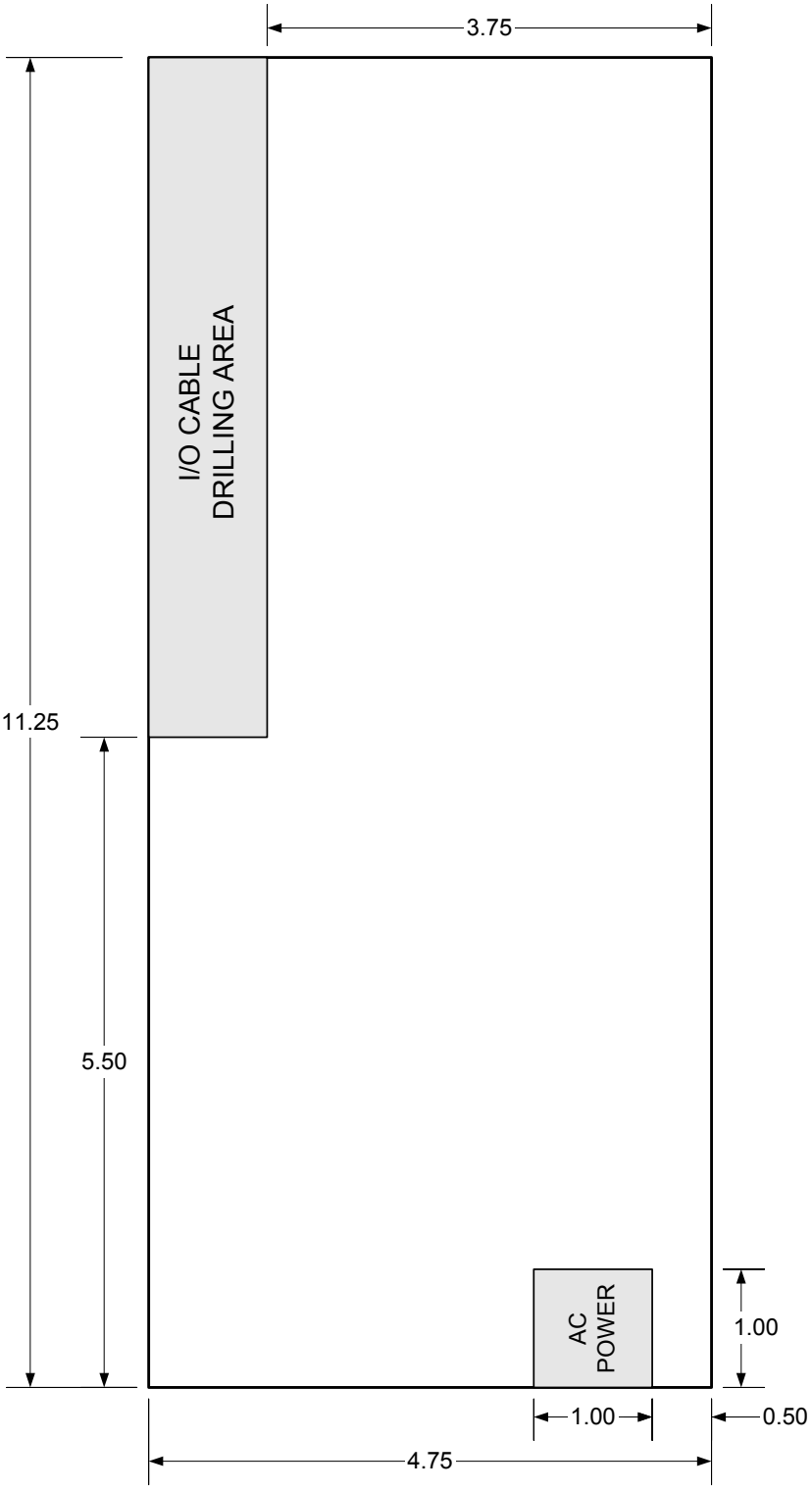
The SentriMax drilling template is provided to assist the installer in making the final feed through holes in the case of the Model 1550 just before it is mounted on site.

Once the template has been created at full size, it is taped to the bottom of the Model 1550 case as shown here.



Copy the diagram on the following page onto 11” x 17” paper with the copier set to enlarge the image to 158%.

Or you can just make your own template at full size. The dimensions shown in the drawing are correct for a full size template.



Note Units are in inches. Diagram is not actual size.

Index

Symbols

.NET required, 77

A

AC power connections, 20
acknowledge, 10
acknowledge mode, call list setup, 129
acknowledgement mode, 71
activate counter, 57
activate digital I/O, 53
activate I/O enabled
    analog input, 125
    pulse counter, 120
    runtime meter, 122
activate run time meter, 61
active I/O enabled, digital I/O, 116
address jumper settings
    analog boards, 187
    digital I/O boards, 186
alarm
    alarm cycle, 10
    alarm delay time, 10
    counter alarm enable, 58
    defined, 10
    delay, 54, 68, 117, 127
    enable, 54, 62, 68, 123
    enabled, 117
    issue alarm below setpoint, 127
    level, 67
alarm activation and clearing, 150
alarm count, 58, 120
alarm detection and alerting, 146
alarm report enabled, 120
alarm sources
    AC power loss, 150
    all's well, 150
    high temperature, 150
    low battery, 150
    panic button, 150
alarm text
    digital input, 119
alarm time, run time meter, 61, 123
alerting
    alarm acknowledgement, 154
    call list processing, 153
    call lists, 153
    LED indicators, 154
all's well
    alarm active message, 34
    call list, 34
    DTMF string, 35
    enable, 33
    interval, 33
    no alarm message, 34
    paging text, 35
    start time, 33
all's well dialog
    alarm message, 99
    all's well message, 99
    automatic report enabled, 98
    call list, 99
    interval time, 98
    overdial digits, 99
    paging text, 100
    reference time, 99
alphanumeric encoding, POCSAC, 115
analog input boards, 23
analog input number x dialog
    activate I/O enabled, 125

alarm delay, 127
alarm report enabled, 125
analog type, 125
call lists, 127
high value, 125
hysteresis, 126
input name, 124
issue alarm below setpoint, 127
low value, 126
messages
alarm, 127
normal, 127
overdial digits, 128
paging text, 127
self clearing enabled, 125
set point, 126
units, 125
analog input settings
activate input, 65
alarm delay, 68
alarm enable, 68
alarm level, 67
alarm message, 69
alarm set point, 66
call list, 69
DTMF string, 70
hysteresis, 67
input name, 70
jumper mode, 65
measurement range high, 66
measurement range low, 66
normal message, 69
paging text, 70
select input, 65
self clearing, 68
units name, 70
analog inputs
alarms, 148
hysteresis explained, 148
measurement range, 147
set point explained, 148
answer detect enabled, 111
answer detection, 43
applications, 9
assign all call lists, 33
assigning a name to a voice message, 108

B

battery
charger, 23
description, 22
life, 23
baud rate
POCSAG paging, 115
RS-232, 32
system settings dialog, 95
TAP, 46

C

cable drilling template, 197
calendar, setting, 96
call dialog
call name, 131
call type, 131
call list
alerting, 153
all's well, 34, 99
analog input, 69
analog inputs, 127
call list repeat interval, 10
call list repeats, 10
configuring from front panel, 144
counter, 59
defined, 10
digital I/O, 55, 118
disable time, 74
enable time, 73
enabled days, 73
high temperature, 41
high temperature alarm, 107
low battery, 39
low battery alarm, 103
panic key, 35
panic key alarm, 101
power loss, 37
power loss alarm, 105
pulse counter, 121
runtime meter, 123
call list settings
acknowledgement mode, 71
call list repeats, 72
disable time, 74
enable time, 73
enabled days, 73

interval between calls, 72
list repeat interval, 72
modify call, 74
select call list, 71
call list setup
disabled time, 130
call list setup dialog, 128
acknowledge mode, 129
call interval, 130
call list name, 128
call list number field, 128
call list repeats, 129
enabled days, 130
enabled time, 130
repeat interval, 130
Call, defined, 10
change voice mailbox length, 87
change voice message length, 88
changing length of a voice message, 89
channel busy
COR level, 48
delay, 49
channel busy setup
delay, 115
input polarity, 114
charging the battery, 23
clear changes, 82
clear holiday calendar, 30
close file, 83
COM port selection, 92
command mode
alarm commands, 157
described, 142, 157
I/O commands, 160
mailbox commands, 162
miscellaneous commands, 163
connector pinouts
analog interface (P2), 187
auxiliary audio (P3), 180
auxiliary interface (P2), 180
charger board (TB1), 188
digital I/O interface (P1), 185
digital I/O interface (P2), 185
I2C interface (P4), 181
phone interface (J1), 182
power input (P5), 181
PSTN interface (J2), 182
radio interface (P1), 179
serial port (J3), 182
speaker output (P7), 181
conventions, text, 11
copy dialog, 84
copy function, 84
counter settings
activate counter, 57
alarm count, 58
alarm enable, 58
alarm message, 59
call list, 59
counter name, 60
DTMF string, 60
normal message, 59
paging text, 60
reset count, 58
select counter, 57
self clearing, 58
Crtl+X, Crtl+C, and Crtl+V, 84
cut function, 84

D

data file directory tree, 81
DC power connection, 21
delay, channel busy, 115
diagrams
M1550 assembly, 16
M1550 system block diagram, 18
radio & battery installation, 17
dial pause time, 43
dialing method, 42
dialogs
all's well alarms, 98
analog input number x, 124
call, 131
call list setup, 128
digital I/O number x, 116
hardware, 81
hardware configuration, 93
high temperature alarm, 106
holidays, 95
list changed dialogs, 84
low battery alarm, 102
open preview window, 80
opening, 79
overdial call setup, 135
panic key alarm, 100
phone call setup, 132

phone configuration data, 109
POCSAG page call setup, 138
power loss alarm, 104
pulse counter number x, 119
radio call setup, 133
radio DTMF call setup, 136
radio setup, 113
runtime meter, 122
speaker call setup, 134
system settings, 94
TAP configuration data, 110
TAP/IXO call setup, 139
two tone page call setup, 137
user name/password, 81, 97
voice message names, 108
voice message selection, 90
voice messages, 87
voice messages status window, 86
dialtone detect enabled, 110
dialtone detection, 42
digital I/O
event counting, 147
input level sensing, 146
run time metering, 147
digital I/O number x dialog
active I/O enabled, 116
alarm delay, 117
alarm report enabled, 117
alarm text, 119
call lists, 118
I/O mode, 117
input name, 116
messages
alarm, 118
normal, 118
normal text, 119
overdial digits, 118
paging text, 118
self clearing enabled, 117
digital I/O settings
activate digital I/O, 53
alarm delay, 54
alarm enable, 54
alarm message, 55
call list, 55
DTMF string, 56
I/O mode, 53
I/O name, 56
input alarm text, 56
input normal text, 56
normal message, 55
output momentary time, 54
output off text, 56
output on text, 56
paging text, 56
select digital I/O, 52
self clear, 54
disable time, call lists, 74
display, front panel, 175
done button, voice messages, 88
drilling template for case, 197
DTMF, 10
DTMF commands
parameter ranges, 172
quick reference, 171
special keys for setup, 173
table of commands, 172
text conventions, 11

E

edit menu
copy, 84
copy dialog, 84
cut, 84
list changed dialogs, 84
paste, 84
paste dialog, 84
enable time, call lists, 73
enabled days
call list setup dialog, 130
call lists, 73
exit setup mode command, 28
exit SMCU, 83
expansion I/O boards
installation, 23

F

features list, 8
file menu
close, 83
exit, 83
new, 82
open, 82
print, 83
save, 83

save as, 83
firmware version, 10
free voice memory, 51
front panel
configuring a call list, 144
configuring digital input, 143
configuring digital output, 143
display, 175
entering numbers, 176
key sequences for special characters, 176
keypad, 175
recording a voice message, 144
selecting from a list of items, 176
setting off alarm, 145
tutorial, 143

H

hardware configuration dialog, 93
Help menu, 92
high temperature
alarm message, 41
call list, 41
DTMF string, 42
enable, 40
normal message, 41
paging text, 41
self clear, 40
high temperature alarm dialog
alarm messages, 107
automatic alarm enable, 106
call lists, 107
normal messages, 107
overdial digits, 107
paging text, 107
self clearing, 106
high value, analog input, 125
holiday calendar
clearing, 30
modify holiday, 30
holidays
calendar, 96
dialog, 95
hysteresis
analog input dialog, 126
defined, 10
explained, 148
front panel/DTMF command, 67

I

I/O connections, 23
I/O mode, digital, 117
I/O text
input alarm, 56
input normal, 56
name, 56
output off, 56
output on, 56
I/O, digital mode select, 53
ID message for system, 31
incoming rings before answer, 44
input name
analog, 70
digital I/O, 116
input polarity, channel busy, 114
inputs and alarms, 146
installation
2nd telephone line, 24
AC power connections, 20
analog input boards, 23
DC power connection, 21
expansion I/O boards, 23
I/O connections, 23
M1550 assembly diagram, 16
M1550 system block diagram, 18
mounting the unit, 20
pre-install decisions, 15
preparation, 19
radio & battery install diagram, 17
radio connections, 20
real time clock option, 25
SMCU, 77
telephone connections, 19
telephone modem, 25
voice memory, 24
interval between calls, 72

J

jumper mode, analog inputs, 65
jumper settings
analog board address, 187
analog board defaults, 187
digital I/O board, 186
main board, 184

K

key delay, radio setup, 114
key up delay, radio, 48
keypad, front panel, 175

L

LED indicators, 154
list changed dialogs, 84
list repeat interval, 72
loading a data file, 78
low battery
  alarm message, 39
  call list, 39
  DTMF string, 40
  enable, 38
  normal message, 39
  paging text, 40
  self clear, 39
low battery alarm dialog
  alarm messages, 102
  automatic alarm enable, 102
  call lists, 103
  normal messages, 103
  overdial digits, 103
  paging text, 103
  self clearing, 102
low value, analog input, 126

M

M1550 menu
  read configuration, 85
  set time, 86
  verify configuration, 85
  voice messages, 86
  write configuration changes only, 85
  write entire configuration, 85
mailbox length, 32
main board
  test points, 183
main board jumper settings, 184
measurement range
  high, 66
  low, 66
menu paths, 11
messages
  alarm, 118, 120, 123, 127
  alarm & I/O status, 152
  assigning user defined, 152
  normal, 118, 121, 123, 127
  system ID, 152
  user defined, 151
meter number x dialog
  activate I/O enabled, 122
  alarm report enabled, 123
  alarm time, 123
  call lists, 123
  input name, 122
  messages
    alarm, 123
    normal, 123
  overdial digits, 124
  paging text, 124
  reset time, 123, 199
  self clearing enabled, 123
misc. commands
  exit setup mode, 28
  reset factory defaults, 28
modes of operation
  command, 142
  command mode, 157
  run, 141
  run mode, 155
  setup, 142
modify call
  overdial call, 75
  phone call, 75
  POCSAG page call, 76
  radio call, 75
  radio DTMF, 76
  speaker call, 75
  TAP page call, 76
  two tone page call, 76
modify call, call lists, 74
modify holiday, 30
modify user, 30
mounting the unit, 20

N

NEMA, 10
NEMA 4X enclosure, 7
New command, 79
new file, 82
normal text
  digital input, 119

O

open file, 82
operating modes, 141
operating system requirements, 77
options
    radio paging, 190
    real time clock, 191
    second telephone option, 195
    TAP paging, 189
output inverted, POCSAC paging, 115
output momentary time, 54
overdial call setup dialog
    phone number, 135
    siren enabled, 135
    voice plays, 135
overdial digits
    all's well, 99
    analog inputs, 128
    digital input, 118
    high temperature alarm, 107
    low battery alarm, 103
    panic key alarm, 101
    power loss alarm, 105
    pulse counter, 121
    runtime meter, 124

P

paging parameters
    POCSAG format, 50
    POCSAG polarity, 50
    two tone timing, 49
paging text
    all's well, 100
    analog input, 127
    digital input, 118
    high temperature, 107
    low battery alarm, 103
    panic key alarm, 101
    power loss alarm, 105
    pulse counter, 121
    runtime meter, 124
panel menu time out, 32
panic key
    alarm message, 36
    call lists, 35
    DTMF string, 36
    enabled, 35
    normal message, 36
    paging text, 36
panic key alarm dialog
    automatic alarm enable, 100
    call lists, 101
    normal messages, 101
    overdial digits, 101
    paging text, 101
    panic key messages, 101
paste dialog, 84
paste function, 84
PC menu, COMM port, 92
phone call setup dialog
    phone number, 132
    siren enabled, 132
    voice plays, 132
phone configuration data dialog
    pause time, 109
    rings before answer, 110
    tone dialing enabled, 109
    voice prompts enabled, 110
phone number
    overdial call setup, 135
phone number, phone call setup, 132
phone settings
    answer detection, 43
    dial pause time, 43
    dialing method, 42
    dialtone detection, 42
    incoming rings before answer, 44
    select TAP terminal, 44
    TAP baud rate, 46
    TAP parity, 45
    TAP password, 45
    TAP phone number, 44
    telephone voice prompts, 46
play selected voice message, 88
play voice messages, 52
playing an existing voice message, 91
POCSAG
    format, 50
    polarity, 50
POCSAG page call setup dialog
    POCSAG beep code, 138
    POCSAG pager code, 138
power loss
    alarm message, 38
    call list, 37

DTMF string, 38
enable, 37
normal message, 37
paging text, 38
self clear, 37
power loss alarm dialog
alarm messages, 104
automatic alarm enable, 104
call lists, 105
normal messages, 105
overdial digits, 105
paging text, 105
self clearing, 104
print file, 83
printer logging, 29
pulse counter number x dialog
activate I/O enabled, 120
alarm count, 120
alarm report enabled, 120
call lists, 121
input name, 119
messages
alarm, 120
normal, 121
overdial digits, 121
paging text, 121
reset count, 120
self clearing enabled, 120

R

radio
installation connections, 20
radio call setup dialog
siren enabled, 133
voice plays, 133
radio DTMF call setup dialog
siren enabled, 136
voice plays, 136
radio ID, 113
radio paging
described, 190
POCSAG, 190
radio connections for POCSAG, 191
two-tone sequential, 190
radio settings
channel busy (COR level, 48
channel busy delay, 49
key up delay, 48
POCSAG format, 50
POCSAG polarity, 50
radio ID, 47
radio type, 47
radio voice prompts, 50
two tone timing, 49
radio setup dialog
channel busy setup
delay, 115
input polarity, 114
POCSAG setup
alphanumeric encoding, 115
baud rate, 115
output inverted, 115
radio ID, 113
radio setup
key delay, 114
type, 114
two tone timing, 115
voice prompts enabled, 113
radio voice prompts, 50
read configuration, 85
real time clock
call list scheduling, 191
event reference, 192
holidays, 95
installation, 25
time stamped event logging, 192
record selected message, 88
record voice messages, 52
recording a new voice message, 91
reset count, 58, 120
reset time, 123
reset time, run time meter, 62, 199
reset to factory defaults, 28
rings before answer, 110
RS-232 baud rate, 32
run mode
described, 141, 155
logging on
front panel, 156
telephone or radio, 156
passwords & access levels, 155
short cut keys, 156
run time settings
activate run time meter, 61
alarm enable, 62
alarm message, 63

alarm time, 61
DTMF string, 64
normal message, 63
paging text, 64
reset time, 62
run time meter name, 64
select meter, 61
self clear, 62

S

save as new file, 83
save file, 83
second telephone line option, 24
select a voice message to modify, 88
select counter, 57
select digital I/O, 52
select voice message, 51
selecting the COM port, 92
self clear
analog input, 68, 125
counter alarm, 58
digital I/O, 54
digital input, 117
high temperature, 40
high temperature alarm, 106
low battery, 39
low battery alarm, 102
power loss, 37
power loss alarm, 104
pulse counter input, 120
run time meter, 62
runtime meter, 123
SentriMax
described, 7
potential applications, 9
system block diagram, 8
set date command, 29
set point explained, 148
set point, analog input, 126
set time command, 29
set time for M1550, 86
setup mode
described, 142
siren enabled
overdial call setup, 135
phone call setup, 132
radio call setup, 133
radio DTMF call setup, 136
speaker call setup, 134
two-tone page call setup, 137
SMCU
all's well alarms, 98
described, 10
edit menu, 84
file menu, 82
hardware dialog, 93
help menu, 92
high temperature alarm, 106
holidays dialog, 95
installation, 77
loading a data file, 78
low battery alarm dialog, 102
M1550 menu, 85
New command, 79
opening dialog, 79
overview, 77
panic key alarm, 100
PC menu, 92
power loss alarm dialog, 104
start up, 78
system requirements, 77
system settings dialog, 94
text color explained, 81
user dialog, 97
SMCU phone configuration data dialog, 109
SMCU voice message names dialog, 108
speaker call setup dialog
siren enabled, 134
voice plays, 134
specifications-communications
radio interface, 12
RS-232, 12
RS-232 interface, 12
telephone, 12
specifications-electrical
battery & charger, 13
electrical limits, 13
power, 13
specifications-general
communications interfaces, 12
monitoring & control, 12
voice capacity, 12
specifications-options, 13
specifications-physical
operating temperature, 13
size & weight, 13

system name, 28, 79
system settings
  all's well alarm active message, 34
  all's well call list, 34
  all's well DTMF string, 35
  all's well enable, 33
  all's well interval, 33
  all's well no alarm message, 34
  all's well paging text, 35
  all's well start time, 33
  assign all call lists, 33
  clear holiday calendar, 30
  high temperature alarm message, 41
  high temperature call list, 41
  high temperature DTMF string, 42
  high temperature enable, 40
  high temperature normal message, 41
  high temperature paging text, 41
  high temperature self clear, 40
  low battery alarm message, 39
  low battery call list, 39
  low battery DTMF string, 40
  low battery enable, 38
  low battery normal message, 39
  low battery paging text, 40
  low battery self clear, 39
  mailbox length, 32
  modify holiday, 30
  modify user, 30
  panel menu time out, 32
  panic key alarm message, 36
  panic key call lists, 35
  panic key DTMF string, 36
  panic key enable, 35
  panic key normal message, 36
  panic key paging text, 36
  power loss alarm message, 38
  power loss call list, 37
  power loss DTMF string, 38
  power loss enable, 37
  power loss normal message, 37
  power loss paging text, 38
  power loss self clear, 37
  printer logging, 29
  set date, 29
  set time, 29
  system ID message, 31
  system name, 28
  system version, 28
system settings dialog
  baud rate, 95
  enable logging, 94
  menu timeout, 95
  site name, 94
  system ID message, 95
system version, 28
system x (TAP)
  baud rate, 112
  parity/bits/stop, 112
  password, 112
  phone #, 111

T

TAP
  baud rate, 46
  parity, 45
  password, 45
  phone number, 44
  select terminal, 44
TAP configuration data dialog
  answer detect enabled, 111
  dialtone detect enabled, 110
  system x
    baud rate, 112
    parity/bits/stop, 112
    password, 112
    phone #, 111
TAP paging
  described, 189
  DTMF overdial paging, 190
  progress tone detection, 189
TAP/IXO call setup dialog
  pager code, 139
  TAP system number, 139
telephone
  installation connections, 19
telephone modem option, 25
telephone voice prompts, 46
terms & definitions, 10
test points, main board, 183
text conventions
  DTMF commands, 11
  menu paths, 11
tone dialing enabled, 109
total system voice seconds, 87

tree, data file directory, 81
troubleshooting
  access denied, 166
  analog input pins not operating, 168
  discrete I/O pins not operating, 168
  front panel operation, 166
  power, 165
  power warning, 169
  RF operation, 166
  RS-232 operation, 167
  telephone operation, 167
  temperature warning, 169
tutorial, front panel operation, 143
two tone timing, 49, 115
two-tone page call setup dialog
  siren enabled, 137
  two tone A, 137
  two tone B, 137
  voice plays, 137
two-tone sequential paging, 190

U

units name, analog inputs, 70, 125
unused voice seconds, 87
user
  modify, 30
  name/password dialog, 81
user dialog
  access levels, 97
  passwords, 97

V

verify configuration, 85
voice mailbox
  changing length, 89
  length, 32, 87
voice memory
  adding more, 24
  total, 87
voice messages
  assigning a name to a message, 108
  change voice mailbox length, 87
  change voice message length, 88
  changing length of a message, 89
  defined, 10
  done button, 88
  free voice memory, 51
  M1550 menu selection, 86
  message length, 88
  play, 52, 88
  playing an existing message, 91
  record, 52, 88
  recording a new message, 91
  select a voice message to modify, 88
  select voice message, 51
  voice message length, 51
voice plays
  overdial call setup, 135
  phone call setup, 132
  radio call setup, 133
  radio DTMF call setup, 136
  speaker call setup, 134
  two-tone page call setup, 137
voice prompts enabled, 113
voice storage
  alarm & I/O status messages, 152
  assignment of user defined voice messages, 152
  system identification messages, 152
  user definable voice messages, 151

W

write configuration changes only, 85
write entire configuration, 85