

Microtel Series 1000 Dialer

Operating Manual

October 2007

For Firmware Version 3.01

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Record of Changes

Revision	Changes
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1 January 1998	<p>Page 4: Updated How Does an Alarm Get Acknowledged</p> <p>Page 7: Added section Can an S1000 Talk to a Computer?</p> <p>Page 19: Added Basic System Information Command Summary</p> <p>Page 21: Added Callback Acknowledge enable/disable command to manual (*008). Also, Voice Interaction Delay moved here (*006)</p> <p>Page 23: Put Time and Date on own page</p> <p>Page 26: Added Point Programming Command Summary</p> <p>Page 28: Added Report Status Flag enable/disable command to manual (*c7). Also added Channel Alarm Configuration option 5. Tells a channel output to remember the channel state even after power gets cycled. (*c8)</p> <p>Page 37: Added System Status Command Summary</p> <p>Page 41: Moved Advanced Topics to before Maintenance Section</p> <p>Page 42: Added telephone escape codes *985 and *986 to list.</p> <p>Page 46: Expounded on a dialer connecting to a computer</p> <p>Page 52: Updated Dialer Specs</p> <p>Page 59-63: Updated Part Numbers</p> <p>Page 69: Updated Command Summary</p>
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INTRODUCTION

Thank you for choosing the Microtel *Series 1000* Dialer to implement your remote alarm monitoring solution. You have chosen a product that is simple to set up and easy to use. The *Series 1000* has been designed and manufactured to operate with minimal operator intervention.

The Microtel *Series 1000* features a single level, interactive command structure--there are no multi-level menu structures to navigate. Commands are sent to the *Series 1000* through your telephone either locally or during a call to or from the dialer, by pressing a sequence of touch-tones on your telephone. Each command entered is acknowledged with a spoken response from the dialer, providing verification that the command was entered correctly and understood by the dialer.

The *Series 1000* features true modularity--I/O channels operate completely independently of each other. Using the commands listed in this manual, each I/O module in your dialer can be configured to operate uniquely to satisfy your application requirements. For each I/O channel, you may record a voice message, choose the format of spoken status reports, program an alarm integration delay, alarm call out operation, and telephone number calling sequence. Analog inputs also have user-selectable low and high alarm setpoints.

About this Manual: This manual is organized with the most crucial information in the front; more advanced topics are saved for last or included in the appendices.

Who Should Read this Manual: Anyone involved with use of the dialer should read the *General Description* and *Operation* chapters of the manual. The *Operation* chapter in particular should be read by any personnel who may be required to respond to alarm calls from the dialer. The additional chapters can be read at a later time, or when necessary by authorized personnel to maintain the dialer or troubleshoot any problems you might encounter. System administrators should read the *Advanced Topics* chapter for information on the use of the dialer's remote software configuration capabilities.

In a Hurry to Setup?: Read the quick start section of the *Installation* chapter.

If you encounter a difficulty that cannot be resolved using the information in the manual, call **MICROTEL** at (225) 303-0436.

Again, thank you for choosing **MICROTEL**.

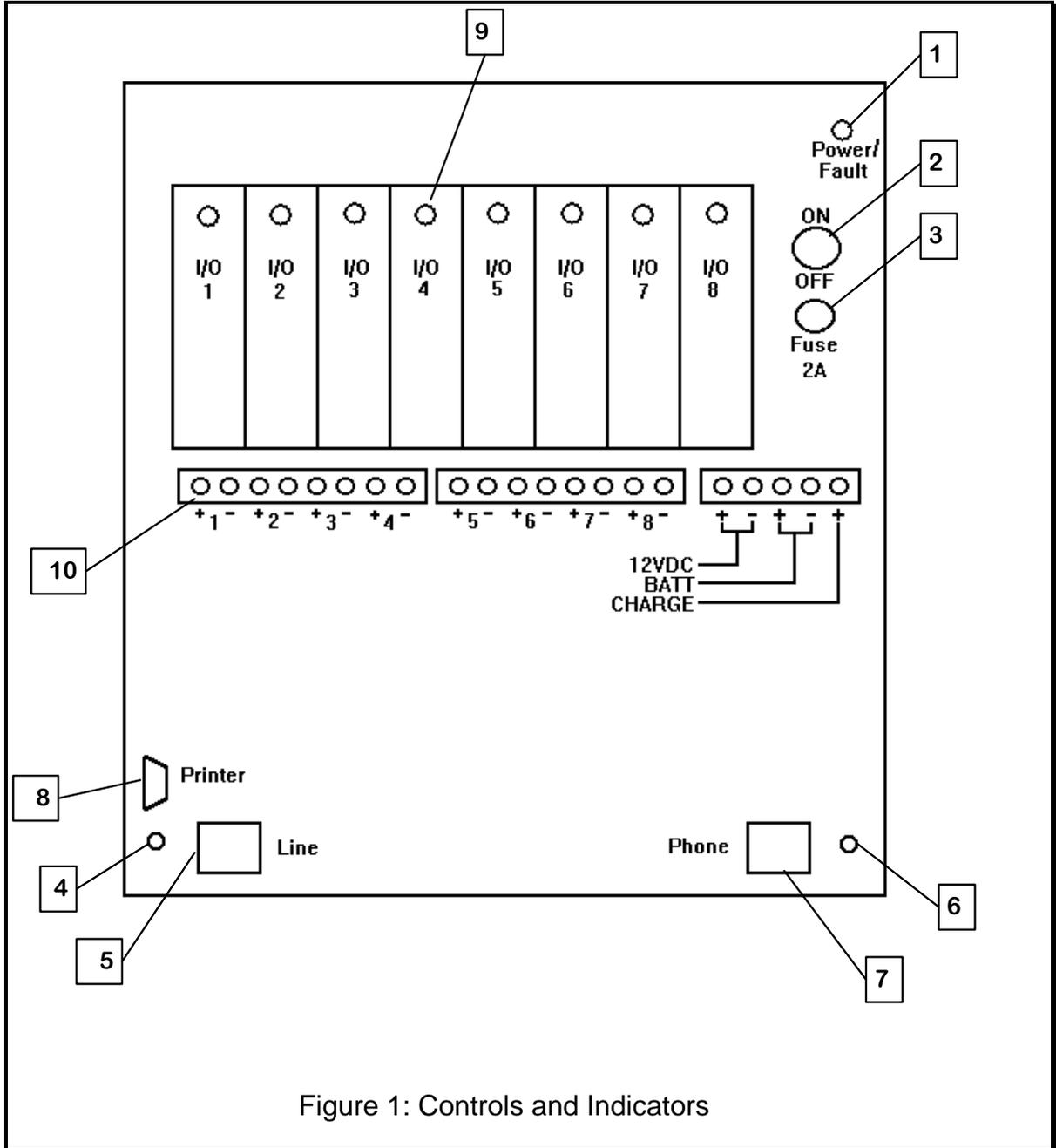


Figure 1: Controls and Indicators

CHAPTER 1 - Description Of The Series 1000 Dialer

The *Series 1000* is a small, rugged, and simple, but powerful, device which easily handles complex dialing notification and alarm monitoring. To accomplish these tasks, the *Series 1000* has an equally simple operator interface. Figure 1 shows the front panel of the dialer and the following paragraphs describe the visible features.

- (1) **POWER/FAULT LED** located in the upper right corner, above the power on/off switch indicates normal run status, Input/Output (I/O) faults, power failure, and dialer internal errors. Use the following guidelines when observing this LED:

Normal Operation:	Flicker 95% ON	5% OFF
Power failure:	Blink 10% ON	90% OFF
I/O fault or internal error:	Blink 50% ON	50% OFF

- (2) **ON/OFF SWITCH** located in the upper right corner, below the Power/Fault LED, turns the dialer on or off.
- (3) **FUSE (2A)** is an easily accessible fuse which protects the dialer's electronics.
- (4) **LINE LED** located adjacent to the LINE connector indicates call progress while the dialer is off-hook and ring detection when on-hook.
- (5) **LINE JACK** is a standard RJ11 phone jack where an outside line is connected to the dialer. (See next chapter for instructions)
- (6) **PHONE LED** located adjacent to the PHONE connector is turned on whenever the dialer senses that a telephone connected to the phone jack is off-hook, or during FAX transmissions.
- (7) **PHONE JACK** is a standard RJ11 phone jack used to connect a local phone to the dialer.
- (8) **PRINTER JACK** is a standard DB -9 connector used to interface serially with a local printer or computer.
- (9) **I/O MODULE LEDs** indicate the status of the individual module. Refer to the appendices for more information on the different I/O modules.
- (10) **TERMINAL BLOCKS** are used to connect the external sensors to the I/O modules.

How Does the Dialer Work? This section provides a simple theory of operation by asking a few questions about typical use of the dialer. The following paragraphs assume the dialer is hooked up and running as described in the *Installation* chapter. The *Operation* chapter provides the details that are missing from the discussion below.

What Happens when an Alarm Occurs? Each Input/Output (I/O) channel of the dialer has its own alarm list, a list of up to nine people, fax machines, or pagers to call in the event of an alarm. When an alarm occurs, the dialer begins to place a series of telephone calls in an attempt to have someone acknowledge the alarm.

The dialer reports the current alarm status when an outgoing call is answered. The dialer will report four conditions to whoever answers the phone:

- 1) Which channels are in alarm.
- 2) Which channels in alarm have been acknowledged.
- 3) Which channels are now normal (a channel that has gone into and out of alarm without being acknowledged).
- 4) The current status of the channels that have their **Report Status Flag Enabled (*c7, **c7n)**

How does an Alarm get Acknowledged? An alarm can be acknowledged in four ways:

- 1) Entering the '*' key on your touch-tone phone during message playback.
- 2) Calling back the dialer immediately after it calls you (callback acknowledge). This feature is necessary if the called party does not have a touch-tone phone. When the dialer is called back, it will report which alarms have been callback acknowledged. This feature can be disabled if desired (*008, **008n)
(See Chapter 3, *Operation*)
- 3) The dialer will automatically acknowledge a successful call to a pager, answering machine, or P.A. system if the telephone number is embedded with an auto acknowledge code. (See chapter 5, *Advanced Configuration*).
- 4) Once in the system, a series of touchtone commands can be done that will acknowledge either all current alarms or just specified individual alarms.

For the first three methods, the dialer will acknowledge all alarms in the system that are programmed to call the same telephone number as the one that was called. This feature assures that acknowledgments only apply to alarms associated with each channel's calling list.

What if I'm not Home? The Call Progress Decoding features of the dialer allow it to determine if the called telephone number is busy or did not answer. In either case, the dialer will wait 10 seconds before going off-hook and placing a call to the next number on the calling list.

When the dialer is off-hook, it has the capability to detect dial tone, busy, ringback, modem, and voice signals. This allows it to detect if a called party answered or not, thus

reducing the time to alert authorized personnel of existing alarm conditions. If a call is not answered, or the called number is busy, the dialer will abort the call and begin calling the next number for that channel in its alarm's calling list. Call progress decoding is also useful for sensing pager terminal tones, or long distance service access prompts before continuing a dialing sequence. It is even possible for one *Series 1000* dialer to call another dialer, gain access to it, and actuate outputs on that dialer. The call progress features of the *Series 1000*, described in the *Advanced Topics* chapter, is also flexible enough to traverse preset menus via touch-tone commands.

Will the Dialer Call Me Back? Each I/O channel has its own independent snooze timer. When an alarm is acknowledged, the snooze timer for that individual channel is started, and alarm calls for that channel are suspended. If a channel is still in alarm after the snooze period ends, then the dialer will begin a new alarm dialing sequence (starting with the first number on the specific channel's calling list).

A channel can also be programmed to make calls when the status returns to normal operation. If a channel's input state returns to normal during a snooze period, then the balance of the snooze delay will be abandoned, and the dialer will begin making call-outs beginning with the first telephone number on the associated call-outs list.

How does the Dialer Know Who to Call? The dialer has a System Telephone Directory composed of up to 9 user-programmed telephone numbers. Each telephone number in the System Telephone Directory can be up to 60 digits long. Special "*" control sequences may be embedded within a user-programmed telephone number. These include tone/pulse selection dialing, pauses, wait for tone, quiet, or voice, auto acknowledgment of an alarm call-out, dial '*' or '#' for interfacing to telephone equipment, turn on or off a dialer output during an alarm call, or specify that the number corresponds to a FAX machine. These special sequences allow a tremendous amount of flexibility on a telephone number by number basis.

How does the Dialer Prioritize its Calls? The dialer maintains an inherent priority of the input modules: the system call-at is highest priority, followed by channel #1, channel #2,...channel #8, and the power fail channel #9. Each telephone number in the System Telephone Directory has its own Disable Timer. If a telephone number's Disable Timer has a non-zero value, then that telephone number will not be called during alarm call out sequences.

When the dialer detects a new alarm condition, it will search the new channel's calling list, beginning with the *first* number on the list, for the first telephone number with a disable timer equal to zero. If the telephone number has the *991 FAX code embedded in it, then the dialer will begin to generate a current alarm status report to FAX. The dialer will then go off-hook and begin to dial the telephone number if the following conditions are true:

- A. The System Disable Timer = 0.
- B. The Call Spacing Timer = 0, and the dialer has been on-hook for at least the network recovery time (10 seconds). (See Chapter 3, Call Spacing Delay)

- C. The local telephone is on-hook (not connected to dialer or outside line).
- D. The telephone number's Disable Timer = 0.
- E. The telephone line is operational (dial tone is detected).

During the dial out sequence, the dialer will implement all special control sequences and/or call progress features embedded within the current telephone number. If the dialer successfully connects with the called number, then it will either report the verbal alarm message, or transmit the current alarm status FAX report as described later.

If the dialer is reporting a verbal alarm message, it will repeat the message the number of times programmed in the system Message Repeats register, or the number of times programmed in the called telephone number using the '*94n' Alternate Message Repeat count escape sequence. While speaking the alarm message, the dialer simultaneously listens for a touch-tone entered by the user at the remote phone. If it receives a valid tone, it will terminate alarm reporting, and examine the tone received. If the user entered a '*' key, then the dialer will accept it as an acknowledgment of the alarm condition. Any other keys received will *not* acknowledge the alarm condition. The dialer will then indicate the acknowledge status and prompt the user to enter a 4-digit access code.

If the user enters the correct code, access will be granted and the user may review or program the dialer's configuration using the touch-tone commands described in this manual. If at any time during remote menu access the user does not enter a command within 30 seconds, the dialer will speak a disconnect warning and hang up.

If an incorrect or no access code is entered during a timed access code entry time (10 seconds), the dialer will disconnect and initialize the system Call Spacing delay timer. If the alarm condition(s) were acknowledged, then the snooze timer(s) associated with the reported alarm condition(s) will be initialized with a value equal to the programmed system Snooze Delay. If alarm conditions were not acknowledged, calls will continue to be placed to the next telephone numbers on the channel's calling list after the system Call Spacing delay has expired.

Can the Dialer print or send me a Hard Copy Report? Yes, in addition to voice reporting of alarms, the *Microtel Series 1000* is capable of locally printing or transmitting a hard copy alarm status report, or a report of all programmed setup data, to a FAX machine.

The *Series 1000* supports a serial printer interface **only**. Therefore, you must have a serial printer, or install a serial interface card in the printer you have. Serial printer interfaces are inexpensive and readily available at your local computer store. The dialer transmits serial printer data at 2400 baud, 8 data bits, 1 stop bit, and no parity. In addition, the printer's serial interface must support DTR (Data Terminal Ready) hardware handshaking. With this method, when the printer buffer level surpasses some high water mark, the printer asserts the DTR signal, telling the dialer to halt transmission. After the printer has emptied most of the data out of its buffer, it will re-assert the DTR

signal, indicating to the dialer that it may resume data transmission. The DTR hardware handshaking protocol is a common method supported by most serial interfaces.

Refer to Chapter 3 and Chapter 5 for more information on sending a FAX report.

How can I Make an Alarm Sound in the Vicinity of the Dialer? Any digital output channel can be configured as a local alarm type. A local alarm will be turned on whenever a new alarm condition exists within the dialer. This output could be connected to a siren or bell to warn the local area of the alarm condition. Refer to Chapter 3 for more information on local alarms.

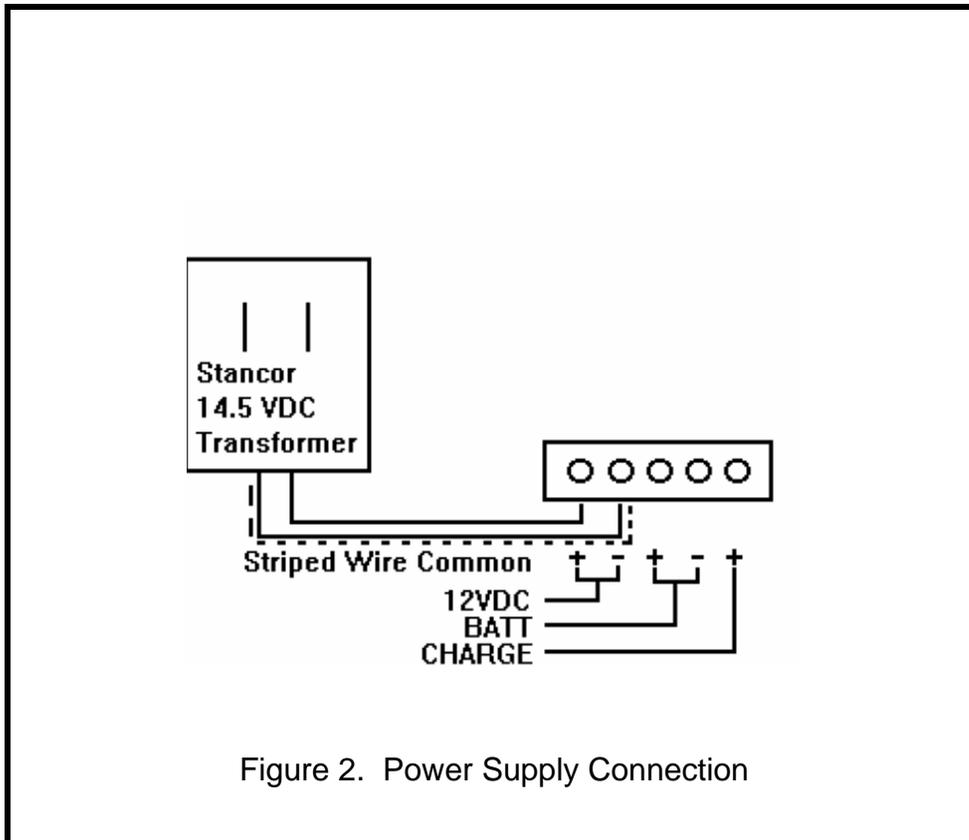
Can an S1000 Dialer Talk to a Computer? Yes. Software is available to configure and monitor your dialer's I/O. Please call factory for additional information.

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CHAPTER 2 - Installation

Installation of the *Series 1000* involves several, simple steps. This chapter outlines the 5 steps necessary to quickly get the dialer up and running. At the end of the chapter is a Quick Start procedure which configures the dialer for simple call-on-alarm operation. Refer to the appendix for outline and mounting diagrams of the dialer.

Step One - Connect the Power Supply Connect the supplied external Stancor transformer to the 12 VDC terminals as shown in Figure 2 below. Plug the transformer into a MicroMax Surge Suppressor (recommended with the purchase of each dialer).



NOTE: Alternatively, you may connect any 12 to 16 Volt DC power (such as a solar panel) to the dialer. Connect the positive side of the voltage source to 12VDC+, and the COMMON lead to 12VDC- of the power supply terminal block of the dialer.

Step Two - Connect a Battery and Enable Charging Circuit of the dialer to insure uninterrupted operation in case of an AC power failure. Refer to Figure 3.

1. Turn power to the dialer OFF.
2. Connect the battery wires to the BATTERY+ and BATTERY- terminals.
3. Turn power to the dialer ON. Test the battery backup circuit by removing the AC power to the dialer (leave POWER switch ON). The dialer should remain ON, and after a few seconds, the POWER/FAULT LED should indicate a power failure (ON 10%, OFF 90% duty cycle). Reapply AC power to prevent a power fault alarm call out at this time.
4. Connect a DC voltmeter across the CHARGE and BATTERY- terminals.
5. Using a small jewelers screwdriver, adjust the potentiometer located beneath the power connector until the voltage is between 13.5 - 13.8 Volts DC.
6. Connect a jumper between BATTERY+ and CHARGE of the power connector. This step enables the charging circuit in the dialer.

NOTE: A power supply voltage greater than **12 VDC** is required to operate the *Series 1000* battery charger.

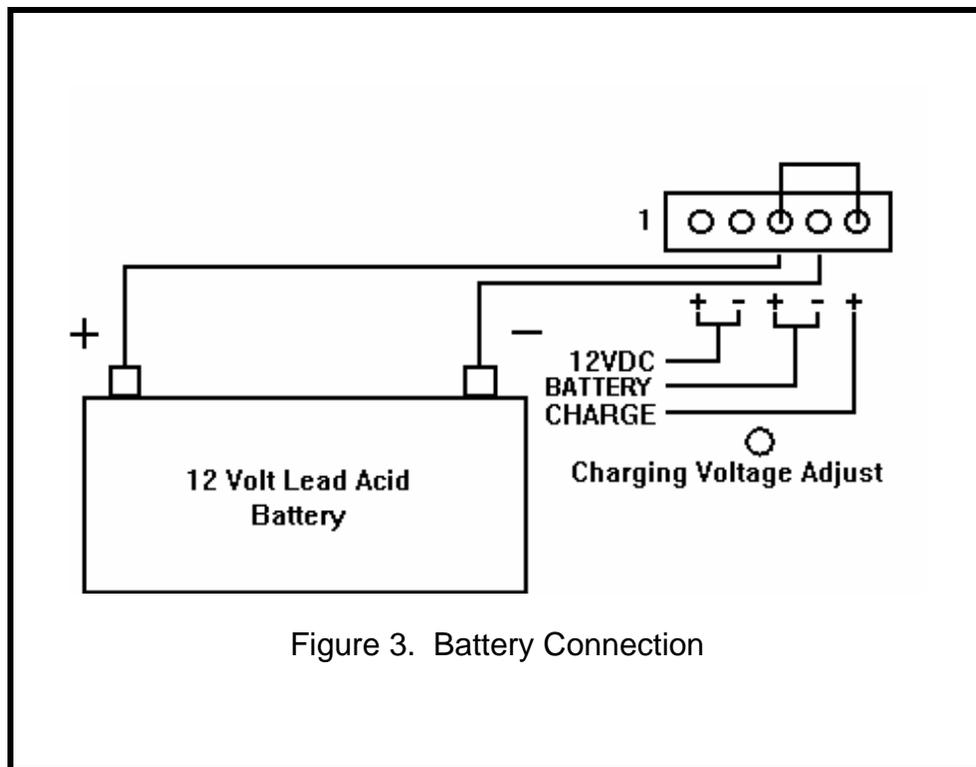


Figure 3. Battery Connection

Step Three - Telephone Connections include the external phone line for call-outs and the optional local telephone connection for local programming and monitoring.

1. Connect the dialer's LINE jack to the EQUIPMENT Phone jack of the MicroMax Surge Suppressor using the cable supplied with your dialer.
2. Connect the Telephone LINE jack on the MicroMax Surge Suppressor to the RJ11 jack of your outside line using the cable supplied with the MicroMax Surge Suppressor.
3. Connect a local telephone (optional) to the dialer's PHONE jack, as shown in Figure 5 below.

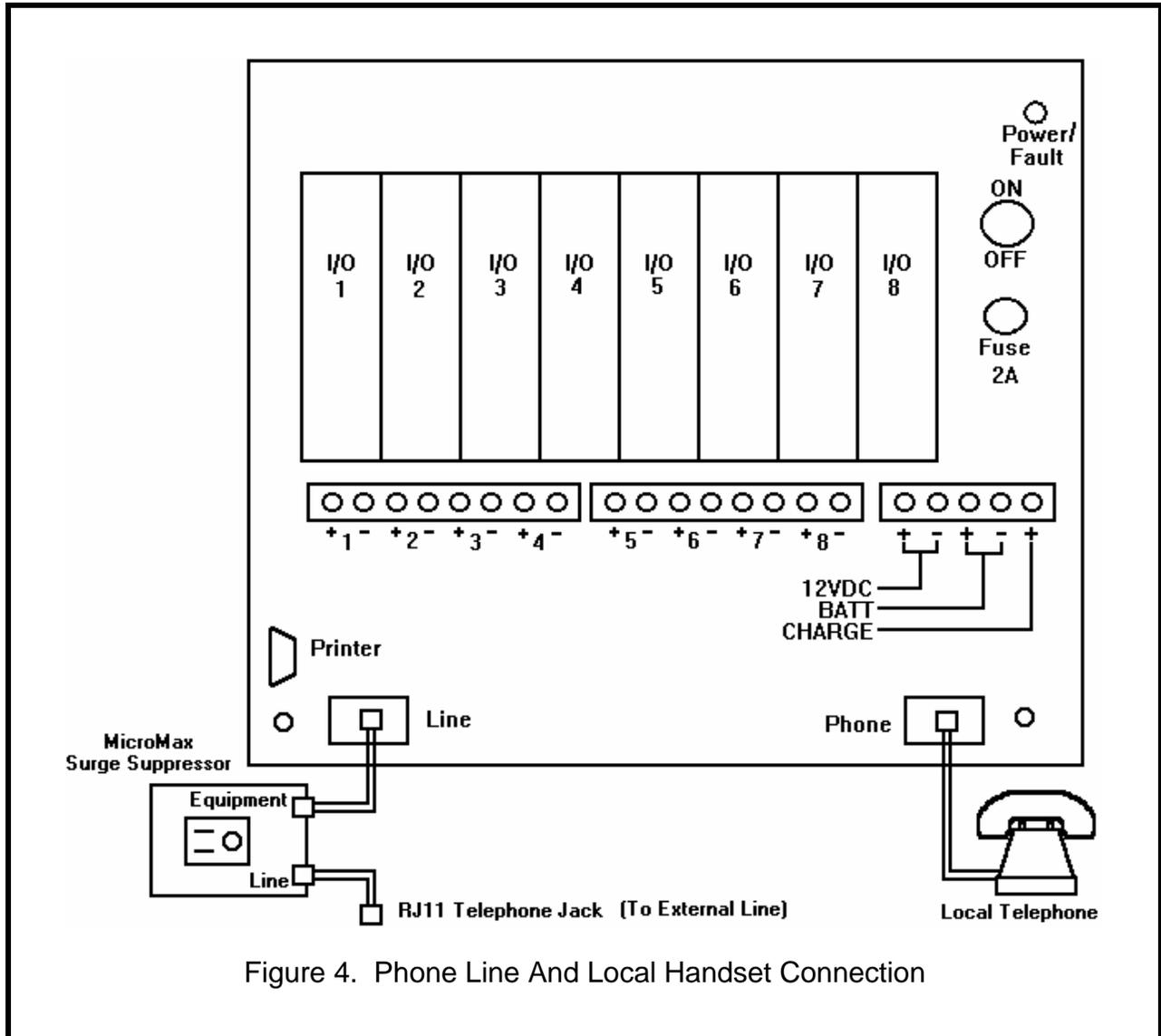


Figure 4. Phone Line And Local Handset Connection

NOTE: Telephone line transients and surges can damage the dialer or disrupt its operation. We recommend use of the MicroMax Surge Suppressor for normal operations.

Step Four - Connect External Input/Output to the Dialer Each I/O module has two (2) corresponding I/O terminals. See Figure 5 below. Use 22 AWG shielded twisted pair wire when wiring external sensors to the I/O terminals. Observe polarity when making connections. Whenever possible, ground the shield at the sensor end only. Sensor control wires should never share conduit with AC power wiring.

NOTE: Keep I/O runs to a maximum length of 150 ft.

Refer to the Appendix for detailed field wiring diagrams, as well as electrical specifications for each type of I/O Module you may install in the *Series 1000*. After physical installation, each I/O module's alarm operation must be configured. This is covered in detail in the next chapter. The Quick Start procedure at the end of this chapter provides info on a simple call-on-alarm configuration.

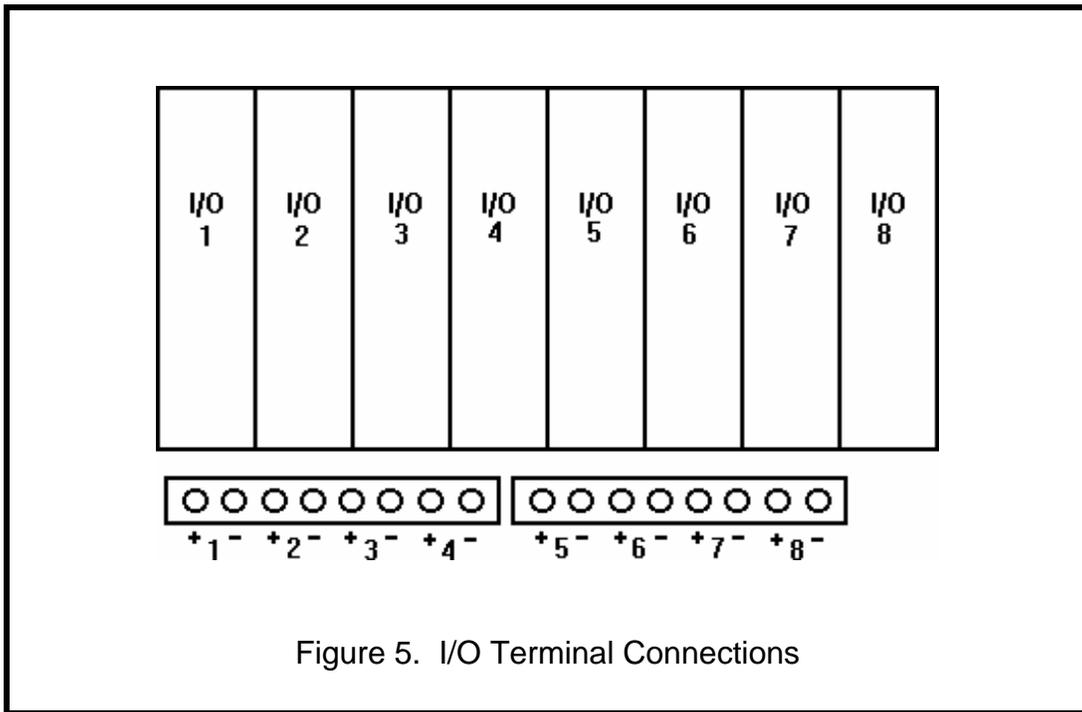


Figure 5. I/O Terminal Connections

Step Five - Installing a Local Printer is a convenient way to print alarm report and enable continuous data logging. Keep in mind, the *Series 1000* supports a serial printer interface as described in Chapter 1, *Description*. Follow the instructions to connect and configure a local printer.

1. Connect a DTE-to-DCE (Straight) RS232C cable with a 9 pin female D-SUB connector on one end to the dialer's PRINTER port.
2. Connect the other end (25 pin female D-SUB) to the serial interface port of your printer.

NOTE: The printer port on the *Series 1000* is used to support advanced features such as a local computer interface (See Chapter 4, *Advanced Topics* for more information). To configure the port for printing only, continue with these instructions.

3. Plug a touch-tone telephone into the dialer's PHONE jack.
4. Pick up the telephone handset and press the '#' key.
5. Listen for the dialer to speak, "System ready".
6. Enter **052 on the telephone's keypad.
7. Listen for dialer's response, "Printing Enabled".
8. Turn the Printer power OFF, then ON again to reset it.

Refer to Chapter 3, *Operations*, for information on how to print reports and enable continuous event logging.

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Quick Start Procedure

This procedure is designed to get the *Series 1000* dialer operating in a typical manner with a minimum of programming. All that is needed is a touch-tone phone with a mute button and a Microtel Series 1000.

1. Plug the touch-tone telephone into the Dialer PHONE jack. Take the telephone off-hook.
2. Turn on the Power Switch and verify the Dialer has power. (Power/Fault light will pulse with a 95% duty cycle indicating no errors). The **Off Hook** light will come ON (red) indicating the unit is ready to accept touch-tone commands from the local telephone. At this point, press the Mute button on the telephone. This will clear up all background noise while still allowing touch-tones to be sent.
3. Press the # key on the telephone. The Dialer will respond "System Ready."

NOTE: Any time you wish to start over, press the # key and listen for "System Ready."

4. Set Time and Date

- Enter the command ****060HHMM**, where the actual 24-hour time is substituted for HHMM. For example, if the time is 1:00 p.m., enter ****0601300**.
- The Dialer will respond, "The time is one three zero zero" for the above example.
- Enter the command ****061MMDDYY** where the actual date is substituted for MMDDYY. For example, if the date is January 2, 1997, enter ****061010297**.

Note that if the year is 2000 or above, simply put the last 2 digits of the year. For example, the year 2003 would be entered as YY = 03.

- The Dialer will respond, "The date is zero one zero two nine seven" for the above example.

5. Enter the Telephone Number of the Dialer.

- Enter the command ****010p****, where p is the telephone number (up to 16 digits) of the Dialer's telephone line. For example, if the Dialer is connected to 504-276-0571, Enter ****010 5042760571 ****.
- The Dialer will respond, "The system telephone number is 5042760571."

6. Enter Telephone Numbers to Call upon Alarm.

- Enter ****01np****, where n = 1,2,3,...9 is the dialer's directory index of telephone numbers and p is the actual telephone number (including optional escape codes of up to 60 digits). Example: Telephone Number 2 in the directory is 555-1212. The command to enter this number is ****012 5551212****.
- The Dialer will respond, "Telephone number two is 5551212."

7. Configure Channel Type

- Enter the command ****c20n**, where **c** is the I/O channel (numbered 1 to 8 from left to right) and **nn** is the I/O type to be programmed

n	Setting	Meaning
0	SPARE	No Type Selected
1	Digital Input Normally Open	Contact closure Normally Open
2	Digital Input Normally Closed	Contact closure Normally Closed
3	Digital Output	Digital Output that is user definable to be Open or Closed
4	Analog Output (00.0 - 99.9%)	Analog Output that is user definable to be at some setting
5	Analog Input (00.0 - 99.9%)	Current Percentage of an input value
6	Local Alarm Output	Digital Output that Closes when there is a local alarm
8	Follow Channel Output	Digital Output that Closes depending on the followed channel's state (see below)

NOTE: This command defaults all the information for a channel. Make sure this is the first command performed on a channel.

8. Review Channel Input/Output Values

- Once a channel's type has been configured (see 7 above), this channel can now report its current status condition. Enter the command ***c0** to review the programmed channels status conditions, where **c** is the channel number 1 to 9. This is an easy way to tell that the dialer is connected properly to the external devices. Example: Enter ***10** to review channel **1**'s current status condition.

9. Assign Telephone Numbers to Individual Channels.

- Enter ****c41t***, where **c** is the I/O channel (numbered 1 to 8 from left to right) and **t** is the index number of the telephone number you wish to dial (**t = 1,2,3,...9**). Example: If you want an alarm on channel 1 to call the telephone numbers 2 and 4 to report the error, enter the command ****14124***. This will set this channel's calling list to be the numbers 2 and 4.

10. Configure the Inputs to Call On Alarm.

NOTE: The pre-configured inputs come from the factory disabled preventing nuisance telephone calls.

- Enter the command, ****c82**, where **c** is the input channel number on the Dialer. Example: Enter ****382** to arm input channel number 3 to call on alarm.
- The Dialer will respond, "Channel three alarm setup is two, call on alarm."

- Repeat procedure for the next alarm and corresponding I/O channel. Channel 9, the internal power fail alarm, can also be configured to call on alarm.

11. Record System and Alarm Voice Messages (Optional)

System ID Voice Message

- Press **001 to record up to a six second system voice message. The dialer will respond "Ready".
- Speak your message clearly into the handset. You may trim the message by pressing any touch tone button.
- Verify your message by pressing *001 to listen.

Individual Alarm Messages

- Press **c1 to record an alarm message for a specific I/O channel. (c = 1 to 9 for the I/O channel of interest). The dialer will respond "Ready".
- Speak your message clearly into the handset. You may trim the message by pressing any touch tone button.
- Verify your message by pressing *c1 to listen.
- Repeat procedure for the next I/O channel and message.

NOTE: The Dialer will use its internal, digitized voice and vocabulary for alarm reporting if you do not record these messages.

12. Test Call Out

Force a test call to one of the telephone numbers you entered after configuring your Dialer. Enter **057n, where n = 1-9, is the directory index of the telephone number. After the dialer responds, the dialer will wait for you to hang up the phone before calling the number you specified.

13. Verify Configuration Data is Saved in the Dialer.

Turn OFF the Dialer's power switch, wait a few seconds, then turn it ON again. The red Power/Fault light should pulse with a 95% duty cycle indicating the new configuration data has been saved in memory.

Many more features are available with the *Series 1000* Dialer. Read the *Operations* and *Advanced Topics* chapters for more information on configuring the dialer for your specific application.

Note for MicroWIN Users: If the Series 1000 Dialer is to be called via a **MicroWIN System**, the dialer will need to put into **Data Answer Mode**. Enter the command

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****0581.** To return to **Voice Answer Mode**, enter the command ****0580** (See **Connecting to the Dialer via Modem** in the **Advanced Operations** section).

CHAPTER 3 - Operation

This chapter, divided into Configuration and Operation sections, will explain how to configure the *Series 1000* dialer to react to I/O events and how an operator can make the dialer respond to remote commands. The Microtel *Series 1000* features a single level, interactive command structure--there are no multi-level menu structures to navigate. Commands are sent to the *Series 1000* through your telephone either locally or during a call to or from the dialer, by pressing a sequence of touch-tones on your telephone. Each command entered is acknowledged with a spoken response from the dialer, providing verification that the command was entered correctly and understood by the dialer.

All programming commands (commands that modify dialer configuration or cause an action to occur) begin with ‘**’ (two stars). All review (report) commands begin with a ‘*’ (single star). After each command is entered, the dialer will respond with a voice message. Most commands require exactly the same number of keys every time, but some commands have a variable data length. The end of variable length data commands is performed with the ‘**’ (two stars).

NOTE: An unwanted command can be terminated at any time by pressing the ‘#’ key. The dialer will respond, “System ready”, indicating it is ready to accept a new command.

Throughout this manual, all commands are highlighted for quick reference as follows:

*nnn	Review item
**nnddd	Configure item

If your telephone line is not yet installed, you can still configure your dialer:

1. With power to the dialer off, connect the telephone to dialer’s PHONE jack.
2. Take the telephone off-hook.
3. Turn ON power to the dialer.
4. The telephone should now be connected to the dialer (indicated by the PHONE LED being ON and the Dialer reporting ‘SYSTEM READY’).
5. You may now enter any of the touch-tone commands to query/configure the dialer.
6. When you are finished, hang-up. The PHONE LED should turn OFF indicating that you hung-up. To have it pick up again, redo this procedure.

Configuration

The configuration commands described in this section modify basic dialer operation and store information about the dialer's operational behavior in nonvolatile memory. You should only have to configure your dialer once -- all changes are saved permanently, even if AC and battery power are removed from your dialer. This section consists of the following subsections:

- Basic System Information - Set/Query various system values
- Time/Date Setting - Set/Query the Dialer's Time and Date
- Automatic Call-outs - Set/Query the Dialer's independent Call At Times
- Telephone Numbers - Set/Query each of the outgoing phone numbers
- Input/Output Modules - Set/Query the I/O Point configurations

The following abbreviations are used in the manual to represent user-selected inputs in the Dialer configuration commands:

Abbreviation	Meaning
c	I/O Channel Number, 1-8 (9 = power-fail), 1 is leftmost
DDHHMM	Days(00-99), hours(00-23), minutes(00-59) - 000000 is disabled
HHMM	Time in 24 hour format (0000-2359)
MMDDYY	Date in month, day, year format
~	Recorded speech
n	1 digit numeric data
nn	2 digit numeric data
nnn	3 digit numeric data
nnnn	4 digit numeric data
t	Variable length Telephone selections (up to 9 selections)
p	Variable length Telephone number (up to 60 digits) with escape codes
aaa	3 Digits corresponding to an Analog value (00.0 - 99.9%)
w	Day of week (1=Sunday ... 7=Saturday, 9=all days)

Basic System Information Overview

The following commands configure and report the current values for the overall system level operations of the *Series 1000*. These settings include:

Section	Current Setting	Change Setting	Meaning
Voice System Name	*001	**001~	User defined Voice System Name for the Dialer
Call Spacing Time	*002	**002MM	Time in minutes the dialer waits after making an answered outgoing call before making another one
Ring Count	*003	**003nn	Waits nn rings before answering an incoming call
Access Code	*004	**004nnnn	Code to get access to the Dialer during a callin or callout
Message Repeat Count	*005	**005nn	Number of times the Dialer will repeat the alarm messages for a callin or callout
Voice Interaction Delay	*006	**006n	Delay time between entering a command and the dialer responding to this command
Callback Acknowledge	*008	**008n	Enabling Callback Acknowledge. n=1 Enables it. n=0 Disables it
Snooze Delay Time Interval	*074	**074 DDHHMM	The delay after which the Dialer will re-arm an acknowledged alarm so that alarm will again generate callouts
System Telephone #	*010	**010p**	The Dialer's telephone number (Required for faxes to comply with FCC Regulations)

A **Glossary of Dialer Terminology** that defines these parameters with respect to the *Series 1000* operation is provided in the Appendix.

Basic System Information

The following commands configure and report the current values for the system level information of the *Series 1000*. A Glossary of Dialer Terminology that defines these parameters with respect to *Series 1000* operation is provided in the Appendix.

- **Voice System Name** The name the dialer will say in introduction before making any report.

*001	Play system name
**001~	Record system name

Once the command to Record the system name has been typed in, the Dialer will respond by saying 'Ready'. When you hear this, speak the message. Once you have finished speaking, you can either wait until it finishes recording or press the '#' key to trim off the end of the message. If the message is trimmed, type '*001' to replay the message.

Example voice responses-

Microtel SERIES 1000 (default in the normal system voice)
 -or-
Jonesburg remote site number 6 (recorded)

- **Call Spacing Delay** This is the number of minutes the dialer will wait after an answered Callout before beginning any other Callouts (01-99 minutes).

*002	Review call spacing
**002MM	Program call spacing

Example- Command: **00260
 Response: *The call delay period is six zero minutes.*

- **Ring Count** The number of rings the dialer will see before answering an incoming call.

*003	Review ring count
**003nn	Program ring count

Example- Command: **00305
 Response: *The ring count is five.*

- **Access Code** This 4 digit access code is required to access configuration commands during a telephone call to and from the dialer.

*004	Gives the status of the access code (Enabled/Disabled)
**004nnnn	Program access code

NOTE: The factory set default code is '1234'. Use a 0000 access code value to disable access code requirement. Access code is not required to configure the dialer through the local PHONE jack.

Example- Command: **0041357
 Response: *The access code is enabled.*

- **Message Repeat Count** The number of times the dialer will repeat the initial system status report for a callout or callin. This value can be overridden for an individual phone number by placing an alternate message repeat count command within the telephone number (*94n escape sequence). The escape code *940 will cause no status message to be spoken (useful when dialing paging terminals).

*005	Review Message repeat count
**005nn	Program Message repeat count

Example- Command: **00503
 Response: *The message repeat count is three.*

- **Voice Interaction Delay** A programmed time delay (in tenths of a second) that sets the time between command entry and the dialer's voice response, and between spoken phrases during status message reports.

*006	Review voice interaction delay
**006n	Program voice interaction delay

Example- Command: **0061
 Response: *The voice delay is one.*

- **Callback Acknowledge Enable Switch** This flag tells the dialer whether to or not to acknowledge the current alarms when it receives a callback.

When an alarm occurs, callouts will be made to a specific set of phone numbers to report the active alarms. It will continue calling until all alarms get acknowledged (or these alarms clear). Once finished with a callout, it will wait an intercall delay period before placing the next call. During this time, a user can place a call to the system that would acknowledge all channels that are currently in alarm that are programmed to call the phone number the dialer had just previously called. This switch allows you to **Enable** or **Disable** this type of acknowledgement

*008	Review Callback Acknowledge Setting
------	-------------------------------------

**0080	Disable Callback Acknowledge
**0081	Enable Callback Acknowledge

Example- Command: **0081
Response: *Callback Acknowledge is Enabled.*

- **Snooze Delay** This is the amount of time an acknowledgement for a channel's alarm will last. During this time delay, no callouts for this channel's alarm will be made. If the channel's alarm condition persists after this snooze delay expires, callouts will once again be made for this channel's alarm.

*074	Review snooze delay time interval
**074DDHHMM	Program snooze delay time interval

Example- Command: **074001234
Response: *The snooze delay is one two hours three four minutes.*

- **System Telephone Number** A telephone number of up to 16 digits used as identification within a FAX header.

*010	Review System Telephone number
010p	Program System Telephone number

NOTE: FCC Regulations require a phone number be included in the header of any FAX. See Appendix for more on the FCC requirements.

Example- Command: **0105551212**
Response: *The system telephone number is five five five one two one two.*

Time And Date Setting

The *Series 1000* has an onboard real-time clock used to Time/Date stamp dialer events, as well as allow status call-outs to occur at specific times. Time and Date are maintained even if power is lost to the dialer. Use the following two commands to initialize your dialer's local time, or to set it back/ahead in conjunction with Daylight Savings Time.

- **Time** Current dialer time in 24 hour format (military format).

*060	Report Time
**060HHMM	Set Time

Example- Command: **0600327
Response: *The time is zero three two seven.*

- **Date** Current date in MMDDYY format.

*061	Report Date
**061MMDDYY	Set Date

Example- Command: **061061298
Response: *The date is zero six one two nine eight.*

The following is an example of when the date is May 14th, 2013.

Example- Command: **061051413
Response: *The date is zero five one four one three.*

Automatic Call Outs

Use the following two commands to program your dialer to deliver a spoken or FAX status report of the monitored site at specific times on a weekly or daily basis.

- **Call At Time** When a timer in the HHMM format matches the current time, a status update call will be placed to the system calling list (described below). The time that can be set as either once a week or once a day at a specified time. Once the command is entered, the response will report the next Call At Time.

*062	Report Next Call At time
**062wHHMM	Program Call At time

Use the table below to set the Call at Time dates.

w	0	1	2	3	4	5	6	7	9
Value	None	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Daily

Examples- Command: **06210832
 Response: *The Call At time is Sunday zero eight three two.*

If the current time is 11am on Wednesday,

Command: **06291210
 Response: *The Call At time is Wednesday one two one zero.*

-or-

Command: **06291010
 Response: *The Call At time is Thursday one zero one zero.*

- **Call At List** A list of phone numbers to call when the Call At Time occurs.

*063	Report Call At telephone list
**063t*	Program Call At telephone list

(t is a list of 0 to 9 digits followed by a *).

Example- Command: **06328*
 Response: *The system telephone list is two eight.*

When the system Call At Time is reached, phone calls will be placed to phone numbers 2 then 8 repeatedly until the alarm is acknowledged.

NOTE: When calling a fax machine, to prevent multiple faxes, embed the auto acknowledge escape code (*90) in the last telephone number in the call at list.

Telephone Numbers

MICROTEL Series 1000 Dialer

As described in the theory of operation in Chapter 1, the dialer can store up to nine (9) phone numbers in the System Telephone Directory. This section explains how to program the dialer's telephone numbers and shows how to customize the numbers for certain call-out situations.

Use the following command to enter each telephone number into the *Series 1000* dialer:

*01n	Review Telephone n (n=1 to 9)
01np	Program Telephone n (n=1 to 9)

p = telephone number of up to 60 digits with escape codes for one of 9 (nine) telephone numbers. The telephone data is terminated with '**' (two asterisks).

Example- Command: **0112760571**
 Response: *Telephone number one is two seven six zero five seven one*

Example- Command: **0152432400**
 Response: *Telephone number five is two four three two four zero zero*

These phone numbers may be customized to use the Call Progress features of the dialer. Refer to the *Advanced Topics* chapter for a full discussion about using these powerful features of the *Series 1000* Dialer.

Configuring Input/Output Modules

The *Series 1000* features true modularity--I/O channels operate completely independently of each other. Using the following commands, each I/O channel in your dialer can be configured to operate uniquely to satisfy your application requirements. For each I/O channel, you may record a voice message, choose the format of spoken status reports, program an alarm integration delay, alarm call out operation, and telephone number calling sequence. Analog inputs also have user-selectable low and high alarm setpoints.

NOTE: Always verify the I/O channel TYPE before proceeding to configure any other values for a channel. The dialer will reset a channel's settings when this channel's TYPE is modified. If you are adding a new I/O channel to your dialer, you must configure this channel's TYPE first. Refer to Advanced Topics for information on adding I/O modules to an existing configuration.

NOTE: Input modules come from the factory configured as STATUS only. At the very least, you must configure your inputs to Call On Alarm (described below).

The following commands configure and report the current values for the channel level operations of the *Series 1000*. They are in the order presented in the text. These settings include:

Section	Current Setting	Change Setting	Meaning
Channel Type	*c2	**c2nn	I/O Type of channel c
Alarm Configuration	*c8	**c8n	Determines how channel c's alarm operation will be handled
Report Status Flag	*c7	**c7n	Tells the dialer to report channel c's status as part of its answer message (n=0:Don't, 1:Do)
Channel Telephone List	*c41	**c41t*	List of telephone numbers that will be called to report an alarm condition for channel c
Channel Status	*c0		Reads back the current status for channel c
Clear Channel Counters		**c0	Clears the Counter, Runtime, Time In Alarm values for the channel c
Channel Voice Name	*c1	**c1~	Spoken name for channel c
Channel Report Format	*c3	**c3nn	Selection of status information that is spoken for channel c (*c0)
Channel ON/OFF Delay	*c5	**c5nMMSS	Time that a physical state change will have to occur for before channel c's alarm state changes
Analog High Setpoint	*c90	**c90aaa	High setpoint for an analog input (in percent). Used for analog alarm monitoring
Analog Low Setpoint	*c91	**c91aaa	Low setpoint for an analog input (in percent). Used for analog alarm monitoring

● **I/O Channel Type**

*c2	Report I/O channel c TYPE
**c20n	Program I/O channel c TYPE
**c208Cv	Program I/O channel c to Follow Channel C's Value

Selection of I/O channel type (c = 1 to 8 for I/O channels starting at leftmost slot).

n	Setting	Meaning
0	SPARE	No Type Selected
1	Digital Input Normally Open	Contact closure Normally Open
2	Digital Input Normally Closed	Contact closure Normally Closed
3	Digital Output	Digital Output that is user definable to be Open or Closed
4	Analog Output (00.0 - 99.9%)	Analog Output that is user definable to be at some setting
5	Analog Input (00.0 - 99.9%)	Current Percentage of an input value
6	Local Alarm Output	Digital Output that Closes when there is a local alarm
8	Follow Channel Output	Digital Output that Closes depending on the followed channel's state (see below)

Example- Command: **3201
 Response: *Channel three type is one normally open digital input.*

NOTE: When using **Digital** or **Analog Outputs**, see the section labeled **Site Control**.

**c208CV	Program I/O channel c to Follow Channel C's Value
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Value	Setting	Meaning
C	Followed Channel (1-9)	The I/O Channel whose channel status is being followed.
V	Type of Follow Channel (1-5) 0) Digital Output Follow Channel 1) Dout Follow Channel Status 2) Dout Follow Channel Alarm 3) Dout Follow Fill Algorithm 4) Dout Follow Empty Algorithm	The condition that this Output Channel is following.

Example- Command: **420832
 Response: *Channel four type is eight digital output following channel three alarm.*

● **I/O Alarm Configuration** Selection of channel c's alarm operation. For instance, latched, call on alarm, etc.

*c8	Review I/O channel c alarm configuration
**c8n	Program I/O channel c alarm configuration

The following table describes the different types of alarm configurations possible with the *Series 1000 Dialer*.

n	Value	Meaning
0	None	no alarms generated
1	LATCHED	no alarms generated
2	COA (call on alarm)	A call is placed when input changes from normal to alarm after the I/O delay time. If the monitored input goes back to a normal condition, no more alarm call-outs will be made for that previous fault.
3	COA LATCHED	A call is placed when input changes from normal to alarm after the I/O delay time. Calls will persist until the alarm is acknowledged.
4	RTN (call on return)	Same as call on alarm, with a second call made when the alarm condition goes away.
5	Remaining in current output state	For Digital and Analog Outputs. Please use this feature with Caution. The output state of this channel will remain the same even after the dialer gets turned off and back on. Make sure that this feature fits with your application.

When this value is modified, the alarm condition for this point will be reset.

Example- Command: **184
 Response: *Channel one alarm setup is call on alarm and return to normal.*

NOTE: When using **Digital Outputs**, see the section labeled **Site Control**.

- **Report Status Flag** When this is set, the dialer will report this channel's current status values in the opening message for a callout or callin.

*c7	Review Report Status Flag
**c70	Clear Report Status Flag (Default)
**c71	Set Report Status Flag

This is used to automatically relay certain channel status information during callouts and callins without the user having to enter any commands to retrieve it.

- **I/O Channel Telephone List** A list of selected phone numbers an I/O channel will call repeatedly upon alarm until the alarm is acknowledged.

*c41	Review I/O c Telephone selections
**c41t*	Program I/O c Telephone selections

t is a list of 0 to 9 digits.

Examples- Command: **14128*
 Response: *Channel one telephone list is two eight.*
 -and-
 Command: **241*
 Response: *Channel two telephone list is none.*

NOTE: When the channel's telephone list is none, it will skip over this channel when looking for the highest priority channel in alarm.

- **I/O Channel Status/Clear Counters** A spoken status message for I/O channel c only. The data spoken is dependent upon the user-configured report format for channel c. This will also speak the alarm condition for that channel. It will specify if the channel is currently in alarm, has an alarm that has been acknowledged, or is now normal (had an unacknowledged alarm that has since cleared).

*c0	Report I/O channel c status
**c0	Reset and Report I/O channel counter and runtime

Example voice messages-

Digital Input Type	<i>Channel one normally open digital input is Open.</i>
Digital Output Type	<i>Channel two digital output is ON.</i>
Counter Input	<i>Channel one normally open digital input zero counts.</i>
Analog Input	<i>Channel four analog input is at seven five point zero percent.</i>
Power Fail	<i>Channel 9 Power Normal.</i>

Example- Command: **10
 Response: *Channel one normally open digital input zero counts runtime is zero.*

- **I/O Channel Voice Name** An individual I/O channel's spoken voice name.

*c1	Play I/O channel c voice name
**c1~	Record I/O channel c voice name

Sample Message- *Channel one normally open digital input.*

A new channel name can be recorded with the '**c1' command. Once the command is typed and the dialer responds 'Ready', record your voice message. A maximum of 3.25 seconds of recording time is allowed for each I/O module. Pressing any key will trim the recording allowing a variable length message to be saved.

- **I/O Channel Report Format** Selection of spoken status Report Format. This entry selects which data is reported when playing a channel's status message (*c0). More than one data item can be chosen at a time by entering a value that is the sum of the desired data items, (for example, to report the counter value and run time, use the value of nn=06, 2 for counter plus 4 for run time). See table below.

*c3	Review I/O channel c status REPORT format
**c3nn	Program I/O channel c status REPORT format

nn	Voice Response	Spoken Status/Meaning
00	None	<i>Channel c report format is zero none.</i> Will only report the name and if it's in alarm
01	Report Current Status	<i>Channel c report format is one status.</i> The current setting of the I/O Channel
02	Report Counter Value	<i>Channel c report format is two count.</i> For Digital, the number of transitions from Open to Closed
04	Report Run Time	<i>Channel c report format is four run time.</i> Total length of time this channel has been in a fault condition
08	Report Time In Alarm	<i>Channel c report format is eight time in alarm.</i> Length of time this channel is currently in alarm (0 if out of alarm)
15	Report All	<i>Channel c report format is one five status, count, run time, time in alarm.</i> Combination of all Report formats

● **I/O Channel ON/OFF Delay**

When channel **c** changes state, this timer delays an alarm until the channel has been in the alarm state for this period. This parameter will filter out noisy, or temporary, state changes from placing undesired nuisance alarm calls.

*c5	Report I/O channel c delay
**c5nMMSS	Program I/O channel c delay

There is a difference between the ON and OFF delay. The ON delay is how long the alarm condition must be present before the dialer alarm takes affect. If the alarm condition clears before the ON delay time expires, the delay counter resets. The OFF delay is how long the alarm condition has to be clear before the dialer alarm clears. If the alarm condition reoccurs before the OFF delay time expires, the delay counter resets.

To program the ON and OFF delays, the command **c51MMSS will be used (n=1). This will set both the ON and OFF delay times to the set time period (MMSS). To program the OFF delay, the command **c52MMSS will be used (n=2). This will set only the OFF delay time.

Example- Command: **1510030
 Response: *Channel one alarm on delay is three zero seconds and off delay is three zero seconds.*

(another example for **Channel ON/OFF Delay**)

Example- Command: **1520004
 Response: *Channel alarm one on delay is three zero seconds and off delay is four seconds.*

● **I/O Channel Analog Input Setpoints**

High Setpoints This analog setpoint parameter sets a level that if it gets exceeded by the analog input, it will cause an alarm call after the I/O channel delay time is reached (0% disables this channel's high alarm).

*c90	Review I/O channel c analog input high setpoint
**c90aaa	Program I/O channel c analog input high setpoint

Example- Command: **190876
 Response: *Channel one analog input high setpoint is eight seven point six percent.*

Low Setpoints The value at which a low alarm occurs for this analog input (0% disables this channel's low alarm).

*c91	Review I/O c analog input low setpoint
**c91aaa	Program I/O c analog input low setpoint

Example- Command: **191123

Response: *Channel one analog input low setpoint is one two point three percent.*

NOTE: All analog inputs or outputs are expressed as a percentage of full scale with a range of 0% (zero) to 99.9%. A simple conversion from percentage to actual engineering values is made with a direct proportion. A conversion chart is provided in the Appendix to convert to and from commonly used engineering values. To use these charts, locate the percentage or engineering unit and read the corresponding conversion.

Operations

This section details the normal operation of a dialer, from both local and remote locations. Sections will detail the following actions:

- Alarm Acknowledgment
- System Status
- Site Control
- Printer Operations

A telephone connected to the *Series 1000* PHONE jack can be used both as a normal telephone by pressing a '9' for a connection to the line, or as the human-to-machine interface to configure and inquire the *Series 1000* dialer.

To use the outside line:

1. Pick up the local telephone connected to the *Series 1000* jack labeled PHONE.
2. Dial '9'.
3. The telephone will now be connected to the outside phone line.
4. Listen for the dial tone.
5. You may now place a telephone call.
6. To get back to the *Series 1000*, hang-up the phone, then pick it up again.

When the local telephone rings, you may receive the call by picking up the handset before the dialer's answer delay (ring count) elapses.

Alarm Acknowledgment

When the *Series 1000* calls you, you may wish to respond to the call differently depending on what type of alarm has occurred, who is on duty, the time of day, severity of the alarm, etc.

When the dialer calls you to report an alarm condition, if you wish the dialer to go to the next phone number on its calling list, simply listen to its message and hang up the phone. The dialer will continue on after the call spacing delay to the next phone number on the list until it receives an acknowledgment or the unlatched alarm goes away by itself.

If you wish to acknowledge the call from your touch-tone phone, press the “*” key on your telephone *while* the alarm message is being spoken. The dialer will respond by reporting that the alarms are acknowledged. If you then need access to the remote programming commands, enter the 4 digit access code. After gaining access to the dialer, you have a different set of choices available to acknowledging the dialer’s alarms. The first choice is to acknowledge all alarms (not just ones armed to call your telephone number), including any system errors that were enunciated. Use the following command to acknowledge all alarms:

**071	Acknowledge all alarms present
-------	--------------------------------

Example- Command: **071
 Response: *Acknowledge alarms accepted.*

A second choice is to only acknowledge an alarm on a specific channel. Use the following command to acknowledge an alarm on a single channel:

**072c	Acknowledge alarms on channel c
--------	---------------------------------

Example- Command: **0721
 Response: *Channel one alarm acknowledged.*

If no other unacknowledged alarms exist, no additional calls will be made. If any unacknowledged alarm exists, the calls will be made to that alarm's telephone list.

NOTE: An entry of **0720 will acknowledge System only alarms.

NOTE: If you don’t have a touch-tone phone, you can acknowledge the alarm call by hanging up the phone and calling the dialer back within the call-spacing period. When the dialer answers the telephone call, all channels armed to call the most recently dialed telephone number will be acknowledged. This feature can be disabled. See Section **Callback Acknowledge Enable Switch (*008, **008n)**.

System Status

The *Series 1000* allows for easy checking of system status and capability. Spoken or faxed status reports of your entire dialer-monitored system can easily be generated. The following paragraphs describe the commands necessary to generate such reports and test the dial-out capabilities of the *Series 1000*.

A spoken system status report can be received from the dialer by entering the following command from a touch-tone telephone either locally, or remotely after answering or calling the dialer: The dialer will speak a voice message of system name, software version, system errors if present, current alarms, counter values and run time accumulators of individual I/O modules. The data spoken for each I/O channel will depend upon the user-configured status report format.

This is an overview of the commands that are shown in this section.

Section	Command	Action
System Status	*000	Report System Status
Report Channel Status	*c0	Report status information for channel c
Clear Channel's Runtimes	**c0	Clear Runtime/Time In Alarm/Counter's for channel c
Make Callout/Fax Status Report	**056n	Make call to telephone # n . If to a fax (*991), this will send a status report
Make Callout/Fax Configuration Report	**057n	Make call to telephone # n . If to a fax (*991), this will send a configuration report

- **System Status** Gives a complete status of all points monitored by the dialer

*000	Report system status
------	----------------------

Example- Command: *000
 Response: *MICROTEL SYSTEM ONE THOUSAND three point zero
 Channel one normally closed digital input in alarm
 Channel two normally open digital input
 Channel three normally open digital input is open
 Channel nine power normal*

- **Individual I/O Channel Status** A spoken status message for I/O channel **c** only. The dialer response is dependent upon the configured report format for channel **c** and the current alarm condition for that channel: currently in alarm, alarm acknowledged, or now normal (an unacknowledged fault condition cleared).

*c0	Report I/O channel c status
-----	------------------------------------

Example voice messages-
 Digital Input Type *Channel one is Open now Normal.*

Digital Output Type *Channel two Digital Output is ON.*
 Power Fail *Channel nine Power Normal.*

- **Reset Counters and Runtime Registers** Clears I/O channel counter and runtime registers. Refer to the section on configuration of I/O channels for other types of channel report formats.

**c0	Reset I/O channel's counter and runtime
------	---

Example- Command: **10
 Response: *Channel one normally closed digital input zero counts runtime is zero.*

Use either of the following commands to force the dialer to call a specific telephone number and give a status report, or to fax a status or configuration report. Before using these commands, telephone number n must have already been entered into the System Telephone Directory. If a telephone number will be used to send a fax report, it needs to contain the *991 escape sequence (See *Telephone Numbers* in the Configuration section). Example FAXes are included in the appendix.

NOTE: These commands will not be accepted by the dialer if an unacknowledged alarm is present, or if the dialer called you.

- **Fax Status Report** This command will fax a snapshot system status report to telephone number n (n=1-9, telephone directory index). If telephone n does not have the *991 escape sequence embedded within it, then the dialer will just speak a voice status report.

**056n	Fax Status Report
--------	-------------------

Example- Command **0561
 Response: *Fax status report to telephone number one.*

- **Fax Configuration Report** This command will fax the system configuration data to telephone number n. This report can be kept as a record to verify that the dialer is configured correctly. If telephone n does not have the *991 escape sequence embedded within it, then the dialer will just speak a status report.

**057n	Fax Configuration Report
--------	--------------------------

Example- Command **0572
 Response: *Fax system data to telephone number two.*

Site Control

The *Series 1000* makes it possible to immediately begin equipment maintenance before arriving at a remote site, or teleservice a physical process. Use the following touch-tone commands to actuate digital outputs or control analog outputs over the telephone. An example use would be turning a pump on or off when responding to an alarm call from the dialer, or adjusting a variable-speed output device to control a measured parameter.

- **Controlling Digital Outputs** When a channel's I/O Type is **Digital Output** (*c2, **c203, see Section **Configuring Input/Output Modules** for more details), the user can set the output state by entering the proper touchtone command.

*c6	Report I/O channel c Digital Output status
**c60	Program Digital Output channel c to be OFF
**c61	Program Digital Output channel c to be ON

There are two types of **Digital Outputs**: **Latched** and **Momentary**. A **Latched** Output will maintain the last state the user commanded. A **Momentary** Output will cause the output to close for this channel's **On Delay Time** (*c5, **c51MMSS, see Section **I/O Channel ON/OFF Delay**), then reopen.

To make a Digital Output **Momentary**, the command is **c80. To make this Output **Latched** (Default), the command is **c81. To make this Output **Latched** and to remain in this output state even after the dialer's power has cycled, the command is **c85.

Before using **c85, make sure that this fits your application. Use this feature with caution since just the action of turning on a dialer can cause a pump to run.

Example- Command: **161
 Response: *Channel one output is ON.*

Example- Command: **160
 Response: *Channel one output is OFF.*

NOTE: If this command doesn't seem to control the output, make sure that the channel's Type is Digital Output (See **I/O Channel Type** (*c2, **c203).

- **Setting An Analog Output** This setpoint directly controls an analog output value where "aaa" represents the analog value in percent from 0% to 99.9% (aa.a%).

*c92	Report I/O channel c analog output setpoint
**c92aaa	Program I/O channel c analog output setpoint

Example- Command: **292250
 Response: *Channel two analog output is two five point zero percent.*

Printer Operations

If local printer logging is enabled, all dialer events--alarms, answered and originating telephone calls, diagnostic messages--are time/date stamped and logged to an external printer connected to the dialer's serial printer port. Also, "snapshot" status reports or printouts of all programmed configuration data can be initiated by entering one of the following touch-tone commands from a local or remote telephone. The commands to use the printer are given below.

- **Enable/Disable Printer** The enable command will enable continuous printer logging of all dialer status changes (input and output state changes, call-outs, alarm acknowledgments, power on/off cycles, etc.). The disable command disable continuous printer logging.

**052	Enable printing
**053	Disable printing

Example- Command: **052
 Response: *Printing Enabled.*

Example- Command: **053
 Response: *Printing disabled.*

NOTE: You must disable printing before you can enable the Testset feature described in the *Advanced Operations* Chapter.

- **Print Status Report** This command will cause a snapshot printed report of current status information.

**050	Print status report
-------	---------------------

Examples- Command: **050
 Response with printer enabled: *Printing status report.*
 Response with printer disabled: *Printing disabled.*

- **Print Configuration Report** This command will cause a printed report of all non-voice configuration information. The printer must be enabled to print a report.

**051	Print configuration report
-------	----------------------------

Examples- Command: **051
 Response with printer enabled: *Printing system setup report.*
 Response with printer disabled: *Printing disabled.*

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CHAPTER 4 - Advanced Topics

This chapter details more advanced topics concerning the setup, configuration, and operation of the *Series 1000* dialer. This chapter also includes information on using a personal computer to configure the *Series 1000*. The chapter is divided into setup, configuration, and operations sections.

Advanced Setup

Adding and Removing I/O From Your System

- **Adding I/O Modules to Your System** Normally, your *Series 1000* dialer comes from the factory with the exact I/O modules for your application pre-installed. The modular design of the *Series 1000* allows you to easily add I/O capability to your dialer without removing it from its location. The following procedure describes how to add an I/O point to the dialer. A list of the different types of I/O modules available from the factory, as well as field wiring diagrams, is included in the Appendix.
 1. Turn OFF power to dialer.
 2. Insert the new module into an unused I/O slot (numbered 1 to 8 from left to right) of the *Series 1000* Dialer.
 3. Screw in the new module and Turn ON power to Dialer.
 4. Configure the new I/O module's type.
 5. Record a voice message for the new I/O channel.
 6. Configure the spoken status report format for the I/O channel.
 7. Configure the telephone list to call during alarm.
 8. Configure the delay for the I/O channel.
 9. Set up the alarm configuration (i.e., Call-on-Alarm, LATCHED, etc.)
 10. For analog inputs enter low and/or high alarm setpoints.

After finishing configuration of the new I/O module, turn off power to the dialer, wait a few seconds, then turn on again. The POWER/FAULT LED of the *Series 1000* should be flickering at a 95% duty cycle indicating that the new configuration data has been stored securely in nonvolatile memory. Refer to Chapter 3, *Configuration* section for more information on configuring I/O modules.

- **Removing an Unused I/O Module** If an I/O module is no longer to be used, simply configure its type as SPARE, using the command '**c200', where c = channel index of module to be removed. I/O modules configured as SPARE are ignored by the dialer. Turn power OFF to the dialer before physically removing the module.

Advanced Configuration Options

Advanced Phone Number Features

- **Call Progress Coding Features** The *Series 1000* has very powerful call progress coding features which allow great flexibility in making phone calls to pagers, fax machines, other dialers, or regular telephones. The following table lists the different codes which can be used to customize how the dialer will make a call-out. These codes are used extensively in the following examples.

Telephone Number Escape Codes	
Code	Command
*0	Tone dial (default)
*1	Pulse dial
*2	2-Second Pause
*3	Flash Hook (go on hook for 100 milliseconds)
*4	Wait for Voice or Answer
*5n	Wait for Tone (n seconds)
*6n	Wait for Quiet (n seconds)
*7nn	Set Wait Timer to Abort (if condition does not occur in nn seconds)
*8nn	Set Wait Timer to Continue (if condition does not occur in nn seconds)
*90	Auto Acknowledge this Call
91	Dial ''
*92	Dial '#'
*93n	Close (Turn ON) Digital Output Channel n
*94n	Set this Call Alternate Message Repeat Count of n
*95n	Set this Call Alternate Voice Interact Delay
*96n	Open (Turn OFF) Digital Output Channel n
*980	Dial 'A'
*981	Dial 'B'
*982	Dial 'C'
*983	Dial 'D'
*984	Dial Channel Number ('0', '1', '2', ..., '9') That Caused This Callout
*985	Dial All Current Channel Numbers That Are In Alarm
*986	Dial All Current Channel Numbers That Have Unacknowledged Alarms
*990	Modem Callout
*991	Fax Callout

When entering call progress sequences in telephone numbers, you must *first* set the Wait Timer (*7nn or *8nn), *then* set the specific condition to wait for (*4, *5n, or *6n). Also, the Wait Timer stays in effect until overridden. So, when programming your telephone numbers into the dialer, always explicitly set Wait Time-outs (*7nn or *8nn) before waiting for Tone, Quiet, Voice or Answer detect. The following example should illustrate:

Example 1- Program phone number 3

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		Dial a pager system at 5551212				
				Wait for up to 30 seconds for answer		
						Wait 4 Seconds After Answer
						Wait 15 seconds for 2 seconds of quiet,
						then speak the message
						Terminate entry
Command	**013	5551212	*730*4	*2*2	*815*62	**
Response:	<i>Telephone number three is five five five one two one two STAR seven three zero STAR four STAR two STAR two STAR eight one five STAR six two</i>					

It is very important to enter the *730*4 wait-for-answer sequence in this example, because the intent is to wait *until* the pager system answers and finishes speaking its greeting *before* delivering the spoken alarm report. The following illustrates a case where this would not be necessary:

Example 2- Program phone number 1

		Dial 9				
				Pause for 2 seconds		
						Dial 555-1212
						Terminate telephone entry
Command:	**011	9	*2	5551212	**	
Response:	<i>Telephone number one is nine STAR two five five five one two one two.</i>					

Here, nothing comes after the actual dialed telephone number, so a default 30 second wait-for-answer will occur. In general, if the dialer must wait for some event to occur before continuing to dial the remaining digits, then you must program the Wait Timer and Wait For condition as shown in Example 1 above.

Example 3- Program phone number 2

		Key a P.A. (public address) with I/O channel 1				
				Repeat the status message one time		
						Auto Acknowledge all alarms with phone number 2.
						Terminate telephone entry
Command:	**012	*931	*941	*90	**	
Response:	<i>Telephone number two is STAR nine three one STAR nine four one STAR nine zero.</i>					

Example 4- Program phone number 4

			To send a Fax report		
			To 555-1212		
				Terminate telephone entry	
Command:		**014	*991	5551212	**
Response:		<i>Telephone number four is STAR nine nine one five five one two one two.</i>			

The *991 escape sequence shown must be embedded within telephone numbers calling to FAX machines. This tells the dialer to begin to generate a FAX report before it goes off-hook and dials the remote machine. Always put the *991 sequence, as well as any other non-call progress sequences (such as auto acknowledge), at the beginning of the telephone number string before the dialer goes off-hook to dial regular telephone digits.

Example 5-

		Program phone number 2											
		No Voice Message (Pager)											
		Auto acknowledge call											
		Dial Pager Terminal (Example Phone #)											
		Wait 30 seconds for Answer											
		Wait 4 Seconds After Answer											
		Dial No. for pager											
		Dial a '*'											
		Dial Current Alarm											
		Dial '*'											
		Dial All Alarms											
		Termination											
Command:		**012	*940	*90	5551212	*730*4	*2*2	5556565	*91	*984	*91	*985	**

This example illustrates using the Automatic Current Alarm Display feature with a pager system. When the escape code *984 is embedded within a telephone number, it causes a single digit ('0'-'9') according to the current alarm to be dialed. Thus, when dialing a numeric pager, the actual alarm index can be included in the page. Insert this code after the telephone number that is sent to the paging terminal. Use a '*' key to indicate that the following digit is the alarm index. The escape code *985 is used to show all current alarms on the system.

If channel 4 was the current channel in alarm and channels 6 and 7 are also in alarm when the page is sent, it will read '5556565*4*467' when you get your message.

NOTE: Some pagers do not accept the '*' (*91) or '#' (*92) dtmf tones as input. Also, some require the '#' (*92) to terminate the input sequence. See pager system documentation for details.

Advanced Operations

- **Configuring the Dialer from a Local Computer** In addition to its interactive touch-tone/voice interface, the *Series 1000* may also be configured from a local computer. In this case, Microtel suggest you use Microtel's state of the art **MicroWIN 2000** software. You may also use Microtel's **term8** software to configure the dialer, which is downloadable off the Microtel web sight (www.microtel-inc.com). Menu navigation and data entry is accomplished from the computer keyboard. If you wish to create custom text FAX report messages from the dialer, you must use a local computer interface to enter them. The following two (2) commands pertaining to operating the dialer's local testset are listed here for reference:

**054	Enable test set
**055	Disable test set

The enable command will allow for a local computer interface through the printer (RS232) serial port on the dialer to talk to either COM 1 or COM 2 on you computer. The printer must be Disabled for this action to work (See Printer Operations in Chapter 3 for more information).

Example- Command: **054
 Response: *Enabled.*

Example- Command: **055
 Response: *Disabled.*

- **Connecting to the Dialer via Modem** With **MicroWIN 2000** software, the *Series 1000* allows the operator to configure the dialer as a modem. By changing the **Answer Mode** with the following command, the dialer will answer an incoming call in either data or voice mode. The normal mode of operation is voice mode. When the answer mode is set to **Voice Mode (n=0 - **0580)**, the dialer will answer a call with voice prompts and operate in the normal manner. When the dialer is configured to **Data Mode (n=1 - **0581)**, the dialer will answer the telephone as a modem by emitting a carrier tone. If the dialer doesn't connect within ~15 seconds, it will switch to voice mode for this call to allow users to still make call-ins while the answer mode is in Data Mode. Once the dialer connects, the dialer will respond to ASCII commands sent to the dialer. Each command should start on a new line and followed by a carriage return. The following is a list of ASCII commands which can be sent to the dialer.

Command	Response
SETUP	Reports the current setup for the Dialer
STATUS	Reports current readings of the I/O Points on the Dialer
ACK	Will acknowledge the current alarms on the Dialer
HANGUP	The Dialer will drop carrier and hangup.

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A call should be terminated by the party calling the dialer. Once the dialer loses carrier and is hung-up on, the dialer will continue to answer call-ins and make call-outs as normal.

**058n	Program the dialer's answer mode (n - 1=Data, 0=Voice)
--------	--

Example- Command: **0581
 Response: *Data mode enabled.*

Note: When using a **MicroWIN 2000 System** to call the dialer, the dialer will need to be put in **Data Answer Mode** before any call from MicroWIN 2000 will be successful.

- **Disable Timers** The disable timers provide a way to temporarily prevent unwanted alarm calls from being placed.

When disable timer zero has been set to any non-zero value, no calls will be placed until either the timer counts down to zero or is programmed back to zero. Typical uses of this function would include disabling false calls during planned maintenance on equipment monitored by the dialer.

When disable timer one through nine is non-zero, then calls to that corresponding phone number alone are disabled. An example use would be disabling phone one for whatever time period required while the person responsible for responding to phone calls is not available.

Use the following command syntax to review/set disable timers:

*02n	Report disable timer current value
**02nDDHHMM	Set disable timer n

DDHHMM (00-99 Days, 00-23 Hours, 00-59 minutes)

n=0 This indicates the System Disable Timer. This setting disables all outgoing calls while this countdown timer is non-zero.

n=1-9 This indicates telephone number n Disable Timer. This disables the dialer from placing calls to phone number n while this countdown timer is non-zero.

Examples- Command: **020000105
 Response: *The system disable timer is one hour five minutes.*

 Command: **021010105
 Response: *Telephone number one disable timer is one day one hour five minutes.*

The Following is an example of use:

The on-call person is going out of town for 3 days. He wishes his family not to be disturbed while he is gone. The dialer is instructed to skip his phone number during an alarm call-out sequence. In this case, the command ****021030405** would prohibit alarm calls to be placed to phone 1 for 3 days, 4 hours, and 5 minutes beginning at the time the command is sent.

- **Initializing Configuration Data** These programming commands configure the dialer with default data. Before initializing, print or FAX a copy of your dialer's current configuration as described in Chapter 3, Operations section.

**009001973	<i>Initialize System Data</i>
**009102846	<i>Initialize Telephone Data</i>
**009200534	<i>Initialize Channel Data</i>

CAUTION: Programmed data will be reset to Defaults. These commands should only be used if it is necessary to clear out all configuration data.

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CHAPTER 5 - Maintenance/Troubleshooting

The *Series 1000* Dialer is built to require minimal maintenance. Only three items, the system battery, fuse, and internal clock, require your attention from time to time for your dialer to continue performing with no problems.

BATTERY: A battery in typical standby use will last approximately 2 to 4 years. Battery life is mostly dependent upon the number of power outages sustained and the age of the battery. A new battery should take no longer than 24 hours to gain full charge, capable of powering the system through a power outage of typically 6 hours. Battery backup time may vary by a few hours depending on your I/O module configuration; the battery backup time is proportional to the number and types of I/O modules you have installed in your dialer.

Check the System Battery by using a DC voltmeter to measure the open circuit (no-load) terminal voltage of the battery at room temperature (20 degrees Celsius). If the voltage is less than 12.5 volts, the battery has a residual capacity of less than 50%. If the voltage is less than 12.0 volts, the battery is completely worn out.

Refer to Chapter 2, *Battery Connection*, for instructions on installing a new battery and adjusting the dialer's battery charging circuit.

ONBOARD CLOCK: After initially setting time and date, periodically check the accuracy of your dialer's onboard clock. It may run a couple of minutes fast or slow per month. In addition, you will have to set the time back/forward to correspond with Daylight Savings Time. The time can be conveniently reviewed and adjusted over the telephone by entering the touch tone command with the new time in 24-hour format (**060HHMM). Refer to Chapter 3, *Time and Date*, for additional explanation and examples.

An internal 3 Volt lithium cell maintains time/date when power to the dialer is removed. It has a capacity of approximately a year. If power to your dialer is to be removed for an extended period, consult the factory about removing an internal jumper to preserve battery energy.

FUSES: Consult the following table for fuse replacement. Blown fuses can be indicative of other problems. Verify field wiring and sensor electronics if replaced fuses blow repeatedly.

For:	Use the following:
<i>Series 1000</i> Dialer	Littelfuse Micro 2A273 - Microfuse 2A/125V
Grayhill Output Modules	Littelfuse Metric (5 X 20 mm) - Use Amp/Volt rating of old fuse
Opto 22 Output Modules	Wickmann TR5 Sub-Miniature - Use Amp/Volt rating of old fuse

TROUBLESHOOTING:

- Symptom:** Voice data lost or clock and calendar lost.
Cause: 3v battery replacement.
Cause: Jumper J14 on processor board not installed.
- Symptom:** Unable to place telephone calls (Line LED comes on but no ring at called telephone number).
Cause: Phone number not entered correctly.
Cause: Call being placed to different number/list than expected.
Cause: Phone line not plugged-in, phone line broken or in use.
- Symptom:** Unable to program with local telephone even when Off Hook light is on.
Cause: Incorrect command format (all commands begin with * or **). To clear out the message buffer at any time, press the '#' key.
Cause: Touch-tone phone must be used (listen for tones when keys are pressed).
Cause: Phone not plugged in correctly (local telephone must be plugged into PHONE jack, and OFF HOOK LED should be on).
Cause: Dialer off-hook placing call (LINE LED is on).
Cause: You hear 'System Ready', but are not able to get a response. Loud or semi-noisy environment: program from a remote phone or use a mute button on the local phone.
- Symptom:** Not placing alarm call (Line LED does not come on at all) with Input channel in fault condition even though Power/Fault Indicator is blinking 50 On/50 Off.
Cause: Local telephone is off-hook.
Cause: System or telephone disable timer set.
Cause: Intercall (Snooze or Call-spacing) delay set.
Cause: No valid telephone numbers to call for channels in alarm.
- Symptom:** Not placing alarm call with Input channel in fault condition. Also, Power/Fault Indicator is still at a steady flicker.
Cause: No faults are currently recognized by the dialer.
Check to see what the dialer thinks it is reading for this channel Type in *c0 to listen to the channel's current condition.
If it says that the channel is 'Spare', the channel hasn't been programmed yet. It needs to be programmed (see Section **Configuring Input/Output Modules**).
If it says improper input condition, need to check external Wiring, I/O Module Type plugged into the dialer channel, and Dialer Channel Type Programming (*c2).
If it says the proper input condition, make sure the channel is properly set to being **Normally Open** or **Normally Closed** (*c2, see Section **Configuring Input/Output Modules**)
Then, you need to check the channel's **Alarm Configuration** (*c8). If set as 'None', no calls will be made from this channel. Need to set to **Call On Alarm** (**c82).
- Symptom:** Dialer is dead (Power LED is on steady, not flickering).
Cause: Possible external damage or non-recoverable CPU error (Call Technical Support).
- Symptom:** Dialer is dead (Power LED is off).
Cause: Check power to dialer. Make sure it is wired properly to the dialer.
Cause: Possible external damage or Non-recoverable CPU failure (Call Technical Support).

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Symptom: **MicroMax Surge Protector - Dialer is not responding locally and seemingly hangs up the call right after the first ring (Power LED is blinking).**

Cause: If you have a MicroMax surge protector on the line, the surge protector may be interfering with the dialer's operation. **Possible Cure:** Try unplugging the line connector from the dialer so it isn't connected to any device and then turn on and off the dialer a few times trying to get it to pick up locally (It may take a few times for it to work). If it still doesn't respond, try connecting the wall jack directly to the dialer and try cycling power a few times while trying to again connect locally. If none of this works, Call Technical Support.

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APPENDICES

APPENDIX A: Technical Specifications

A.1 Communications

Phone Interface:	FCC 68 Registration Number: 1QEUSA-21532-AL-E Pass-through Phone Handset Cellular Phone Connection or equivalent.
Ringer Equivalence Number:	1.2B(ac)
LED Indicators:	Dialer Off-hook/Ring Detect/Call Progress Telephone Off-hook/FAX-in-progress System Status/Power-fail
Dialing Capacity:	9 Phone Numbers, 60 Digits Each Tone or Pulse Dial Special Sequences for Selection of Pulse/Tone, Pause, Call Progress Detection, Turning ON/OFF Output Modules, Auto Acknowledging Alarms, Communicating with FAX machines or Computers.
Call Progress Detection	Dial Tone Detect Busy Detect Ring Back Detection Quiet/Voice/Answer/Pager Terminal Tone detect
Answer Delay:	1-99 Rings (Call Back Acknowledge)
Fax:	Group 3 Fax Compatible Single-page Alarm Status or Dialer Configuration Reports

A.2 Electrical

Input Power:	Plug in Wall Power Supply, 120 VAC to 14.5 VDC UL/CSA approved. or 12-16VDC @ 0.5 Amp (Dialer only) or 14.5-16VDC (Dialer with Battery) Solar Power Interface Compatible Power On/Off Switch Power-fail Indicator Externally Accessible Fuse Optional: Micromax Surge Suppressor
Battery Operational:	12 Volt 2.2 AH Lead Acid Battery Option

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(6 hour backup time typical)

Battery Internal: 3 Volt Lithium for Speech Storage/Real Time Clock

A.3 Printing

Interface: Serial RS-232, 2400 Baud, 8 Data, No Parity, 1 Stop Hardware Handshaking

Printer Modes: Continuous Event Log with Time and Date Stamp
Configuration Report
Snapshot Status Report

A.4 Environmental

Temperature: 20°F to 130°F operating
0°F to 130°F storage

Humidity: 0-95% RH, Noncondensing

Surge: 2500 V Per ANSI

EMI/RFI: Per FCC Part 15c

A.5 Enclosure

Options: Panel Mount Chassis
(7.7" wide 8.8" high x 4" deep)
Suitable for Wall or Panel Mounting
Battery Mounted Separately
Nema 4 Fiberglass Case with Hard Cover
(12" Wide, 15.5" High, 6.6" Deep)
Nema 12 Fiberglass Case with Hard Cover
Nema 12 Fiberglass Case with Clear Cover
(9" Wide, 10.5" High, 6.5" Deep)

Weight: Panel Mount Unit 4 lbs
Nema 12 case: 6 lbs
Battery and holder: 3 lbs
Full system: 13 lbs

A.6 Speech

Type: Digitized Resident and User-Recorded Messages
ADPCM

Recordable Message Lengths: 6 Seconds System Message
3.25 Seconds Each I/O Name

A.7 I/O Modules

Capacity: 8 I/O Socket Locations for Plug-in Modules

I/O Module Types:

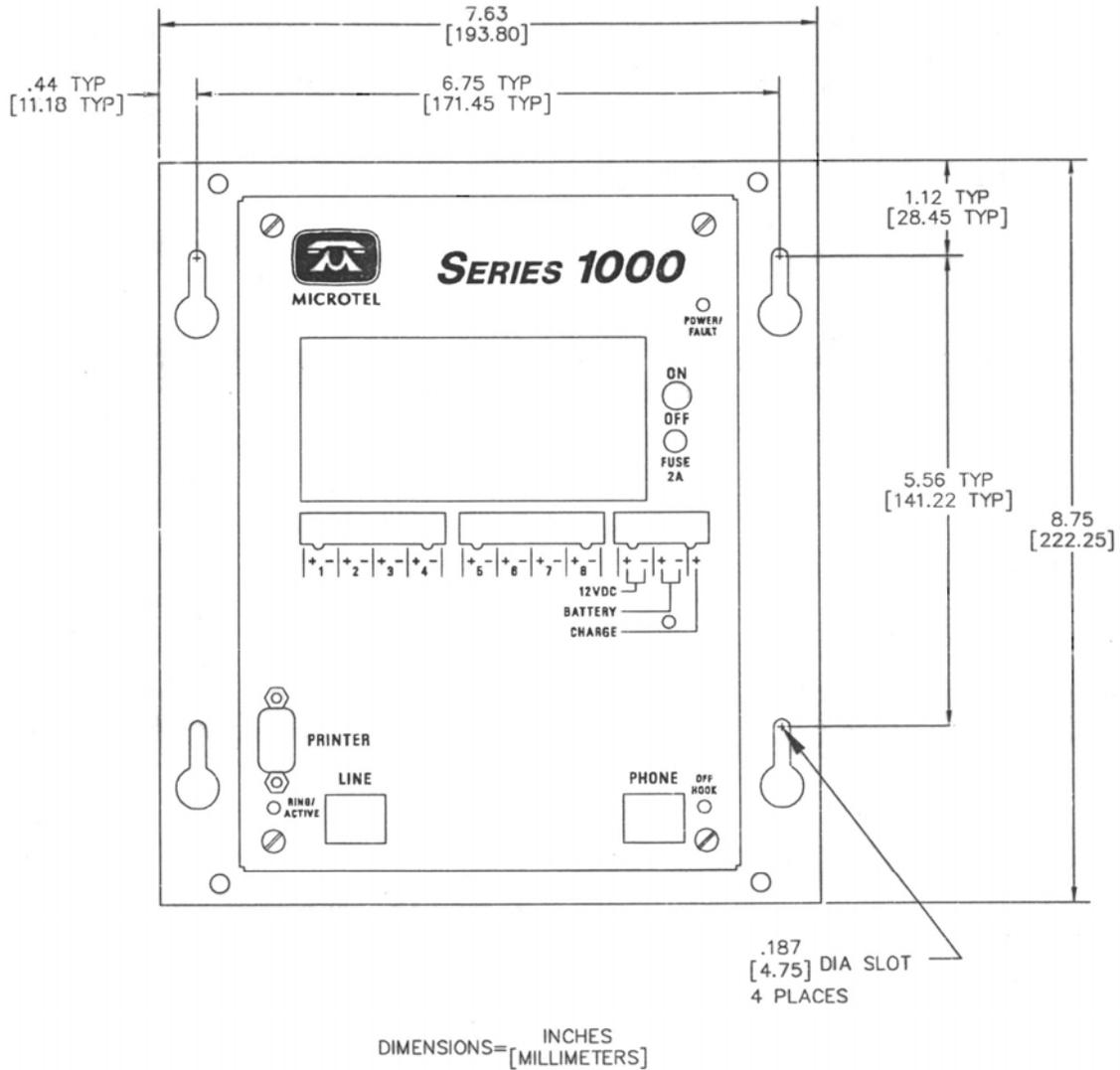
<u>Tin No.</u>	<u>Description</u>
61558	Digital Input, Isolated, Dry Powered
61567	Switch Module
61556	Digital Output Contact, Dry, N.O.
61557	Digital Output Contact, Dry, N.C.
61549	Analog Input, 4-20 mA, Isolated
61550	Analog Output, 4-20 mA, Isolated
61545	Digital Input, 120 VAC
61546	Digital Input, 3 to 32 VDC
61547	Digital Output, 60 VDC
61548	Digital Output, 120 VAC Output
61551	Analog Input, 1 to 5 VDC
61552	Analog Output, 1 to 5 VDC
61553	Digital Input, 5 to 60 VDC
61554	Digital Input, 5 to 200 VDC

A.8 I/O Functional Modes

Discrete Status: ON/OFF or OPEN/CLOSED
Discrete Alarm Inputs: ALARM/NORMAL/STATUS
Analog Status Inputs: 0.0 to 99.9%
Analog Alarm Inputs: High and Low Set Points
Analog Outputs: 0.0 to 99.9%
Accumulator: 32-Bit Accumulator, 50 pps. Channel 8
Low Speed Counter Inputs: 0.5 pps. Channels 1-7, (2 sec/pulse)
Run Time Inputs: 00:00:00 (DD:HH:MM)
Local Alarm Output: Alarm/Normal
Power Fail Detection: Power Fail/Normal

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A.9 Series 1000 Outline and Mounting Diagram



APPENDIX B: Glossary Of Dialer Terminology

Acknowledge	Stops the dialer from placing additional calls concerning an alarm condition. Acknowledgment can be made by entering the '*' during alarm playback, with the acknowledgment command (**071,**072c), with call-back acknowledge, or by an auto acknowledge phone escape sequence (*90) embedded within the telephone number.
Alarm condition	An event detected by the dialer usually causing a phone call.
Analog	An I/O channel type that uses a numerical value (0.0% to 99.9%).
Call-spacing	The time delay between successive answered unacknowledged telephone calls.
Interaction delay	A programmable time delay between a keyboard command and its voice message response, to allow the user to move the phone handset to the ear. If the keypad is located separately from the ear piece, then a 0 delay will speed Interaction delay.
I/O channel	A dialer to outside world connection.
Latched type	An I/O channel parameter that will store an alarm condition even if the alarm condition goes away. The alarm condition will be held until the alarm is acknowledged.
New alarm	Any alarm that has not yet initiated a call out sequence or an alarm still present after the snooze delay.
Phone list	A sequence up to 9 digits indicating which phone numbers to call from the telephone directory.
Phone number	A sequence of up to 60 digits used to dial a phone number or perform a dial escape sequence function.
Report format	A selection of what data is reported during a call within a status message.
Snooze delay	The time between when an alarm is acknowledged and when it begins to cause calls again.
Unlatched type	An I/O channel parameter that causes an alarm to self-clear if the alarm condition goes away.

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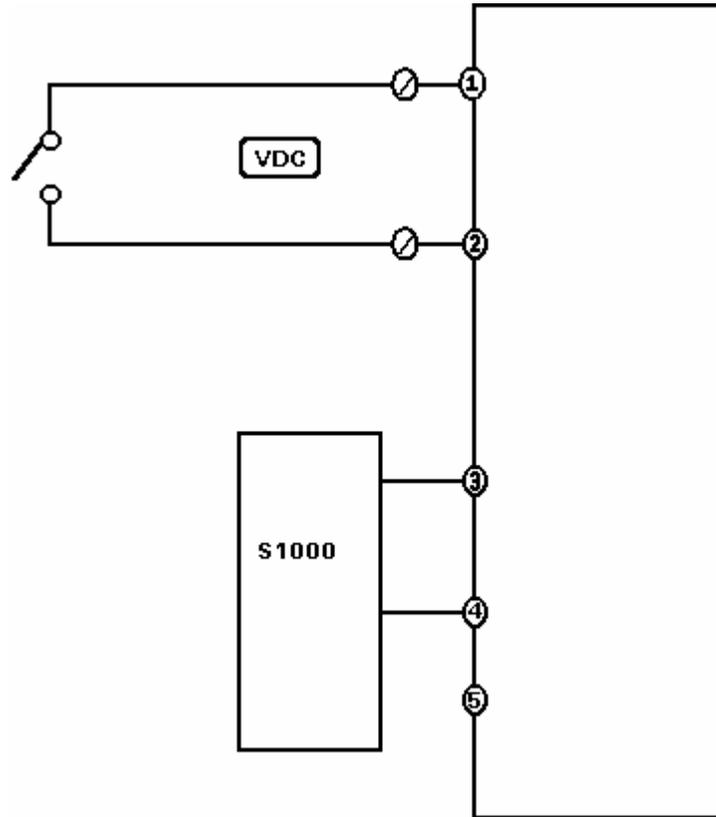
APPENDIX C: Percent/Current/Voltage/Temperature Conversions

0%	4.00ma.	1.00volts	-40°F	-40°C	50%	12.00ma.	3.00volts	50°F	10°C
1%	4.16ma.	1.04volts	-38°F	-39°C	51%	12.16ma.	3.04volts	52°F	11°C
2%	4.32ma.	1.08volts	-36°F	-38°C	52%	12.32ma.	3.08volts	54°F	12°C
3%	4.48ma.	1.12volts	-35°F	-37°C	53%	12.48ma.	3.12volts	55°F	13°C
4%	4.64ma.	1.16volts	-33°F	-36°C	54%	12.64ma.	3.16volts	57°F	14°C
5%	4.80ma.	1.20volts	-31°F	-35°C	55%	12.80ma.	3.20volts	59°F	15°C
6%	4.96ma.	1.24volts	-29°F	-34°C	56%	12.96ma.	3.24volts	61°F	16°C
7%	5.12ma.	1.28volts	-27°F	-33°C	57%	13.12ma.	3.28volts	63°F	17°C
8%	5.28ma.	1.32volts	-26°F	-32°C	58%	13.28ma.	3.32volts	64°F	18°C
9%	5.44ma.	1.36volts	-24°F	-31°C	59%	13.44ma.	3.36volts	66°F	19°C
10%	5.60ma.	1.40volts	-22°F	-30°C	60%	13.60ma.	3.40volts	68°F	20°C
11%	5.76ma.	1.44volts	-20°F	-29°C	61%	13.76ma.	3.44volts	70°F	21°C
12%	5.92ma.	1.48volts	-18°F	-28°C	62%	13.92ma.	3.48volts	72°F	22°C
13%	6.08ma.	1.52volts	-17°F	-27°C	63%	14.08ma.	3.52volts	73°F	23°C
14%	6.24ma.	1.56volts	-15°F	-26°C	64%	14.24ma.	3.56volts	75°F	24°C
15%	6.40ma.	1.60volts	-13°F	-25°C	65%	14.40ma.	3.60volts	77°F	25°C
16%	6.56ma.	1.64volts	-11°F	-24°C	66%	14.56ma.	3.64volts	79°F	26°C
17%	6.72ma.	1.68volts	-9°F	-23°C	67%	14.72ma.	3.68volts	81°F	27°C
18%	6.88ma.	1.72volts	-8°F	-22°C	68%	14.88ma.	3.72volts	82°F	28°C
19%	7.04ma.	1.76volts	-6°F	-21°C	69%	15.04ma.	3.76volts	84°F	29°C
20%	7.20ma.	1.80volts	-4°F	-20°C	70%	15.20ma.	3.80volts	86°F	30°C
21%	7.36ma.	1.84volts	-2°F	-19°C	71%	15.36ma.	3.84volts	88°F	31°C
22%	7.52ma.	1.88volts	-0°F	-18°C	72%	15.52ma.	3.88volts	90°F	32°C
23%	7.68ma.	1.92volts	1°F	-17°C	73%	15.68ma.	3.92volts	91°F	33°C
24%	7.84ma.	1.96volts	3°F	-16°C	74%	15.84ma.	3.96volts	93°F	34°C
25%	8.00ma.	2.00volts	5°F	-15°C	75%	16.00ma.	4.00volts	95°F	35°C
26%	8.16ma.	2.04volts	7°F	-14°C	76%	16.16ma.	4.04volts	97°F	36°C
27%	8.32ma.	2.08volts	9°F	-13°C	77%	16.32ma.	4.08volts	99°F	37°C
28%	8.48ma.	2.12volts	10°F	-12°C	78%	16.48ma.	4.12volts	100°F	38°C
29%	8.64ma.	2.16volts	12°F	-11°C	79%	16.64ma.	4.16volts	102°F	39°C
30%	8.80ma.	2.20volts	14°F	-10°C	80%	16.80ma.	4.20volts	104°F	40°C
31%	8.96ma.	2.24volts	16°F	-9°C	81%	16.96ma.	4.24volts	106°F	41°C
32%	9.12ma.	2.28volts	18°F	-8°C	82%	17.12ma.	4.28volts	108°F	42°C
33%	9.28ma.	2.32volts	19°F	-7°C	83%	17.28ma.	4.32volts	109°F	43°C
34%	9.44ma.	2.36volts	21°F	-6°C	84%	17.44ma.	4.36volts	111°F	44°C
35%	9.60ma.	2.40volts	23°F	-5°C	85%	17.60ma.	4.40volts	113°F	45°C
36%	9.76ma.	2.44volts	25°F	-4°C	86%	17.76ma.	4.44volts	115°F	46°C
37%	9.92ma.	2.48volts	27°F	-3°C	87%	17.92ma.	4.48volts	117°F	47°C
38%	10.08ma.	2.52volts	28°F	-2°C	88%	18.08ma.	4.52volts	118°F	48°C
39%	10.24ma.	2.56volts	30°F	-1°C	89%	18.24ma.	4.56volts	120°F	49°C
40%	10.40ma.	2.60volts	32°F	0°C	90%	18.40ma.	4.60volts	122°F	50°C
41%	10.56ma.	2.64volts	34°F	1°C	91%	18.56ma.	4.64volts	124°F	51°C
42%	10.72ma.	2.68volts	36°F	2°C	92%	18.72ma.	4.68volts	126°F	52°C
43%	10.88ma.	2.72volts	37°F	3°C	93%	18.88ma.	4.72volts	127°F	53°C
44%	11.04ma.	2.76volts	39°F	4°C	94%	19.04ma.	4.76volts	129°F	54°C
45%	11.20ma.	2.80volts	41°F	5°C	95%	19.20ma.	4.80volts	131°F	55°C
46%	11.36ma.	2.84volts	43°F	6°C	96%	19.36ma.	4.84volts	133°F	56°C
47%	11.52ma.	2.88volts	45°F	7°C	97%	19.52ma.	4.88volts	135°F	57°C
48%	11.68ma.	2.92volts	46°F	8°C	98%	19.68ma.	4.92volts	136°F	58°C
49%	11.84ma.	2.96volts	48°F	9°C	99%	19.84ma.	4.96volts	138°F	59°C

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APPENDIX D: I/O Module Wiring Diagrams

D.1 Isolated Dry Contact Input



PART NUMBER:

61558

COLOR:

WHITE

MAXIMUM DRY CONTACT VOLTAGE RATING:

25 Vdc

MINIMUM DRY CONTACT CURRENT RATING:

5 mA

CONTACT RESISTANCE (OUTPUT LOW):

$\leq 1.25 \text{ K Ohm}$

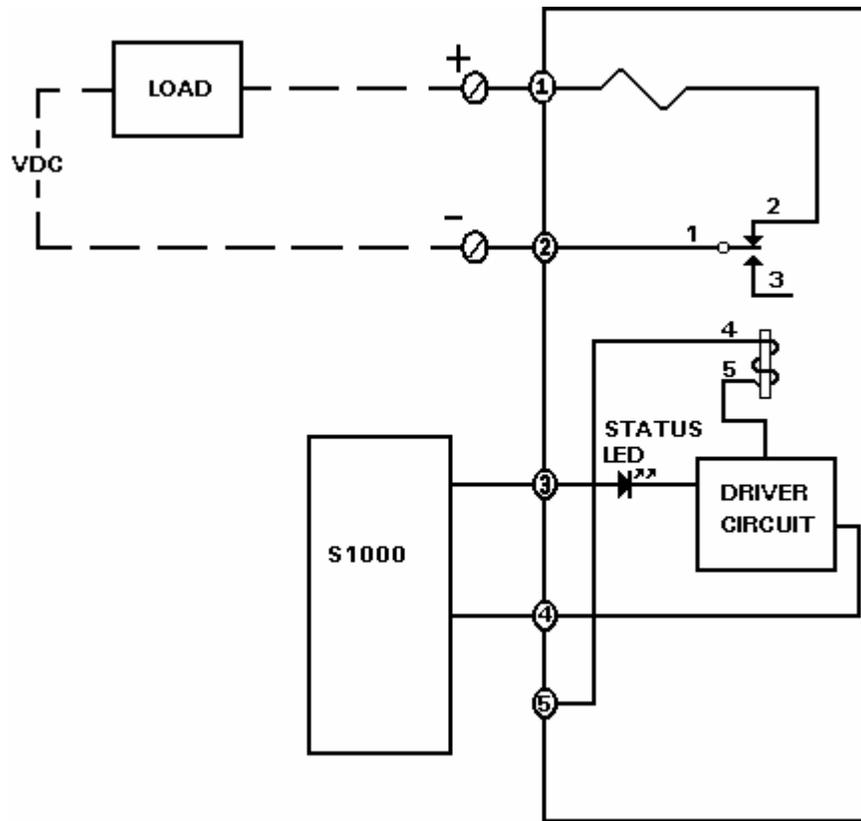
CONTACT RESISTANCE (OUTPUT HIGH):

$> 20 \text{ K Ohm}$

ISOLATION:

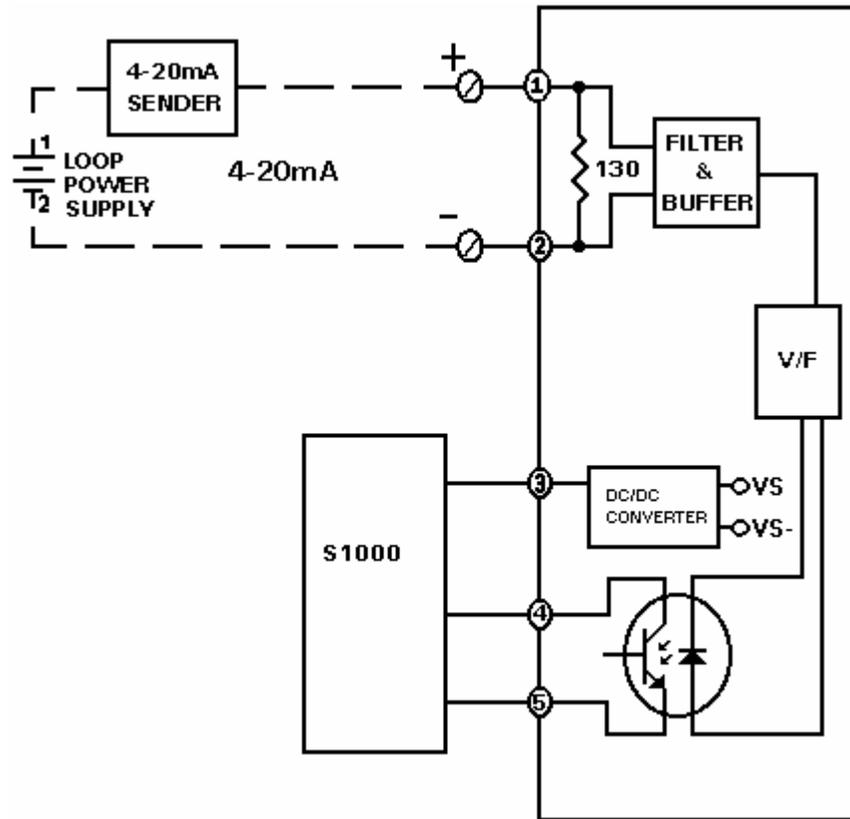
2500 Vrms

D.2 N.C. Dry Relay Output



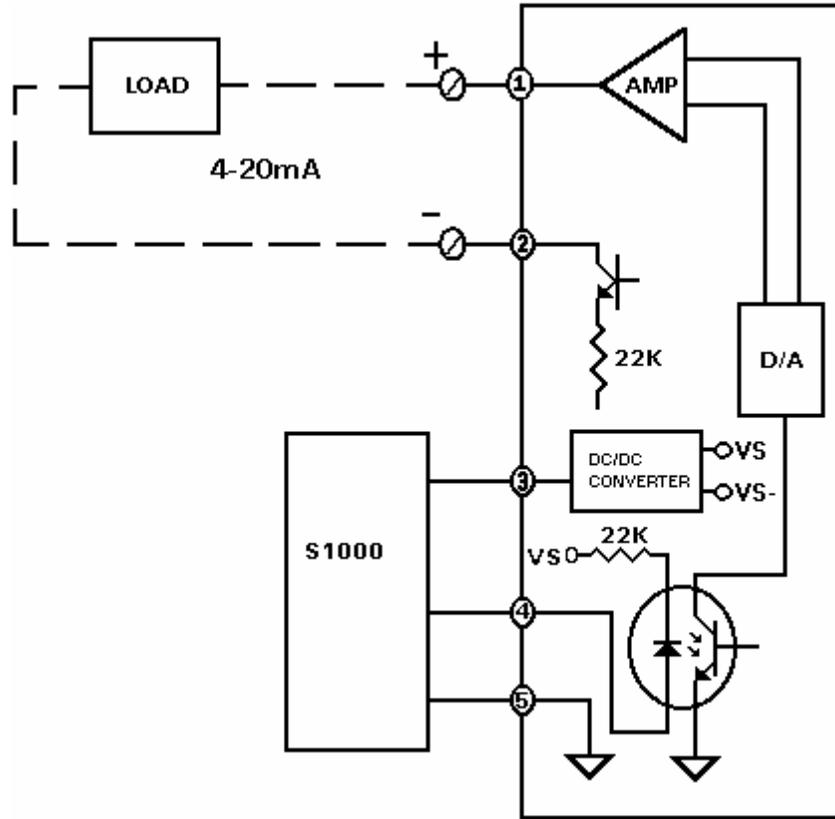
PART NUMBER:	61557
COLOR:	RED
CONTACT RATING:	10 VA
SWITCHING VOLTS:	100 Vdc/130 Vac Max.
SWITCHING CURRENT:	0.5 Amps Max.
CARRY CURRENT:	1.5 Amps Max.
CONTACT ON-RESISTANCE:	200 milliohms
MECHANICAL LIFE:	5 Million cycles
ISOLATION:	1500 VDC

D.3 4-20 mA Analog Input



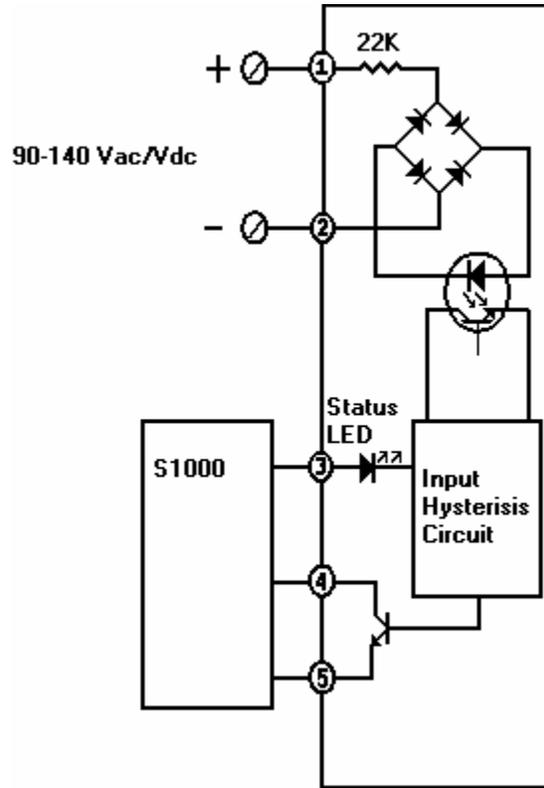
PART NUMBER:	61549
COLOR:	BLUE
INPUT RESISTANCE:	130 OHMS
COMMON MODE REJECT:	>-100 dB
ACCURACY, FULL SCALE AT 25C:	±0.1%
RESOLUTION:	3.9uA (12 BITS)
ISOLATION:	2500 Vrms

D.4 4-20 mA Analog Output



PART NUMBER:	61550
COLOR:	ORANGE
MAXIMUM OUTPUT CURRENT (SOURCE):	20 mA, 450 Ohm max. loop resistance
ACCURACY, FULL SCALE AT 25C:	±0.3%
RESOLUTION:	3.9uA (12 BITS)
ISOLATION:	2500 Vrms

D.5 120 Vac Input



PART NUMBER:	61545
CASE COLOR:	YELLOW
INPUT VOLTAGE RANGE:	90-140 Vac
NOMINAL INPUT RESISTANCE:	22K Ohms
MAXIMUM PICKUP VOLTAGE(LOW)	90 Vac
MINIMUM DROP OUT VOLTAGE(HIGH)	25 Vac

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APPENDIX E: Examples Of Fax Report

Notice the time/date stamp, custom system text message, and dialer's identifying telephone number printed at the top of each FAX report. Customized text messages must be configured using a local or remote computer.

The **Status Report** indicates any system errors, current alarm conditions, and current State, Runtime, and Counter data for each installed I/O module.

Microtel S1000 Status Report 2/27/02 08:20:50 -

Software Version: S1000 Version 3.0

The following channels are in ALARM:

I/O Module 2: Front Door
 - Time in Alarm: 00:04:57 (HH:MM:SS)

I/O Module Status Data

I/O Channel	State	Run Time	Current Alarm Time	Counter
		DD:HH:MM	HH:MM:SS	
1 Contact	Open	00:00:00	00:00:00	0000000000
2 Front Door	Open	00:00:06	00:05:53	0000000001
3 Alarm Output	Closed	00:00:05	00:00:00	0000000001
4 Follow Z	Open	00:00:00		0000000000
5 Glurg Setting	0.0%	00:00:00	00:00:00	
6 Tank In Inches	0.0%	00:00:00	00:00:00	
8 Local Light	Closed	00:00:05		0000000001
9 Power Fail	Closed	00:00:00	00:00:00	0000000000

The **Setup Report** lists all configured System parameters, the System Telephone Directory, Call At Schedule, and I/O Module Programmed Configuration Data. The example shown here lists default system and I/O configuration data.

Microtel S1000 Configuration Report 2/27/02 08:18:36 -

Software Version: S1000 Version 3.0

Snooze delay: 00:01:00 (DD:HH:MM)
 Call-spacing delay: 1 minute(s)
 Rings before answer: 2
 Message repeat count: 3
 Remote menu access code: 1234
 Voice interaction delay: 0.1 seconds
 Call at telephone list:
 Answer Mode: Data Mode

Printing: DISABLED Testset: DISABLED Callback Acknowledge: ENABLED

System Telephone Directory

- 1. *9912760574
- 2. -
- 3. -
- 4. -
- 5. -
- 6. -
- 7. -
- 8. -
- 9. -

Call At Schedule

Day: Sun Mon Tue Wed Thu Fri Sat
 HHMM 0000 0000 0000 0000 0000 0000 0000

I/O Module Programmed Configuration Data

I/O Channel	TYPE	Report Format	Delay (Secs)	Alarm Configuration	Setpoints Low High	Calling List
1 Contact	DI N.O.	01	0001/0001	COA		
2 Front Door	DI N.C.	01	0015/0003	COA		
3 Alarm Output	DO LA	01	0001/0001	STATUS LATCH		123456789
4 Follow 2	FOLLOW	01	Follow Channel 2.			
5 Glurg Setting	AO	01	0001/0001	STATUS LATCH	0.0% 100.0%	123456789
6 Tank In Inches	AI PER	01	0001/0001	COA	0.0% 100.0%	
8 Local Light	DO	01	0001/0001	STATUS LATCH		123456789
9 Power Fail	PF	01	0060/0010	COA		

APPENDIX F: FCC Requirements

This equipment complies with Part 68 of the FCC rules. On the side of the *Series 1000* metal case is a label that contains the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. If requested, this information must be given to the telephone company.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all of these devices ring when your number is called. In most but not all areas, the sum of the RENs of all devices connected to one line should not exceed five (5). To be certain of the number of devices you may connect to your line as determined by the REN, you should contact your local telephone company to determine the maximum RENs for your calling area.

If your telephone equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this telephone equipment, please contact **MICROTEL** service at 1-225-303-0436 for information on obtaining service or repairs. The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. (Contact your state public utility commission or corporation commission for information.)

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device to send any message via a telephone Fax machine unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and identification of the business or other entity, or other individual sending the message, and the telephone number of the sending machine of such business, other entity, or individual. Before sending a fax message, the sending telephone number must be programmed into the *Series 1000* Dialer. Refer to Chapter 3, *System Telephone Number*.

MICROTEL Series 1000 Dialer

APPENDIX G: Series 1000 Command Summary

Series 1000 Command Summary For v3.01

*000	Report system status
*001 **001~	Voice system name
*002 **002MM	Call spacing delay
*003 **003nn	Ring count
*004 **004nnnn	Access code (0000 = Disabled)
*005 **005nn	Message repeat count
*006 **006n	Keyboard/Voice feedback delay
*008 **008n	Callback Ack(n=1:Enable, 0:Disable)

*01n **01np**	Telephone n (n=0 to 9)(0=System)
*02n **02nDDHHMM	Telephone n disable timer
*03n	Alarms armed for telephone n

050/051	Print status/Print config. report
052/053	Enable/Disable printing
054/055	Enable/Disable testset
056n/057n	Fax status/configuration to phone n
0580/0581	Answer Mode - Voice/Data

*060 **060HHMM	Time (24 hour format)
*061 **061MDDYY	Date
*062 **062wHHMM	Call at time
*063 **063t*	Call at telephone list

**070	End call
**071	Acknowledge current alarms.
**072c	Acknowledge alarm on channel c
*074 **074DDHHMM	Snooze delay

*c0 **c0	I/O c status/clear counters
*c1 **c1~	I/O c voice name
*c2 **c20n	I/O c TYPE of module (0=Spare, 1=DI NO, 2=DI NC, 3=DO, 4=AO, 5=AI, 6=DOL, 8=Follow)
*c3 **c3nn	I/O c status REPORT format (00=None,01=Status,02=Counts,04=RunTime,08=TimeInAlarm)
*c41 **c41t*	I/O c telephone list
*c5 **c5nMMSS	I/O c delay (n=1 On/n=2 Off)
c60/c61	I/O c output force OFF/ON
*c7 **c70/**c71	I/O c report status Disable/Enable
*c8 **c8n	I/O c alarm configuration (0=None,1=Latch,2=COA,3=COA Latch,4=COA RTN,5=Power Latch)
*c90 **c90aaa	I/O c analog input high setpoint
*c91 **c91aaa	I/O c analog input low setpoint
*c92 **c92aaa	I/O c analog output setpoint

Phone Number Escape Codes	
*0	Tone dial (default)
*1	Pulse dial
*2	2 second pause
*3	Flash hook (go on hook for 100 milliseconds)
*4	Wait for voice or answer
*5n	Wait n seconds for tone
*6n	Wait n seconds for quiet
*7nn	Set wait time-out to abort call (nn seconds)
*8nn	Set wait time-out to continue (nn seconds)
*90	Auto acknowledge this call
91	Dial ''
*92	Dial '#'
*93n	Turn ON output module n
*94n	Set this call alternate message repeat count
*95n	Set this call alternate voice interact delay
*96n	Turn OFF output module n
*980	Dial 'A'
*981	Dial 'B'
*982	Dial 'C'
*983	Dial 'D'
*984	Dial channel in alarm (Digital Pager)
*985	Dial all channels in alarm (Digital Pager)
*986	Dial all unacked alarm channels (Dig. Pager)
*990	Modem Call
*991	Fax Call

~	speech (# while recording - mic cut off)
MM	time value in minutes (00-99 minutes)
n	one digit numeric value (0-9)
nn	two digit numeric value (00-99)
nnnn	numeric value (0000-9999)
DDHHMM	time value in Days, Hours, Minutes format
MMSS	time value in Minutes, Seconds format
c	input/output channel number 1-8 (9=pf)
t	telephone selections (1-9) upto 9 digits
aaa	analog value 00.0% to 99.9%
w	day of week selection (1=Sunday-7=Saturday,0=all days)
p	0-60 digit phone number, with escape codes



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MICROTEL Series 1000 Dialer

APPENDIX H: Site Worksheet (Example and Blank)

Use the table on the next page as a worksheet when configuring the Series 1000 for your site. An example is included below.

MICROTEL Series 1000 Dialer - Site Worksheet				
Site Name:				
Site Telephone #:			Site Call List: 4,7,8,9	
Electrical				
Channel	Name/Description	Alarm Delay	Module Type	Call List
1	High Water - Wetwell	30 Sec	ISO. N/O Dry	1,2,4,7,8
2	Pump 2 Fail			
3	Pump 2 Fail			
4	Pump 1 Start			
5	Pump 2 Start			
6				
7				
8				
9				
Telephone Directory				
Phone Number		Name	Type	
1.	*991 467 0261	J. Jones, Supervisor	FAX	
2.	1-476-439-3303	R. Miller, Tech	Voice	
3.				
4.				
5.				
6.				
7.				
8.				
9.				

MICROTEL Series 1000 Dialer

MICROTEL Series 1000 Dialer - Site Worksheet				
Site Name:				
Site Telephone #:			Site Call List:	
Electrical				
Channel	Name/Description	Alarm Delay	Module Type	Call List
1				
2				
3				
4				
5				
6				
7				
8				
9				
Telephone Directory				
Phone Number	Name	Type		
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				