

# IAE-16 MANUAL

Smith-Root, Inc.  
14014 NE Salmon Creek Ave.  
Vancouver, WA USA  
98686

## Registration Card for SMITH-ROOT Products

To validate your warranty and receive future technical support, please provide the following information: Product Model # \_\_\_\_\_

Name \_\_\_\_\_ Serial # \_\_\_\_\_

Title \_\_\_\_\_ Purchase Date \_\_\_\_\_

Organization \_\_\_\_\_ How did you hear about our products? \_\_\_\_\_

Address 1 \_\_\_\_\_

Address 2 \_\_\_\_\_ Comments \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Country \_\_\_\_\_ Zip \_\_\_\_\_

Phone # (        ) \_\_\_\_\_ Fax # (        ) \_\_\_\_\_

### NEW OWNERS

To validate your warranty please clip a card and mail it to us.

If you change your address, or if ownership of the equipment changes, please use the spare card. This will ensure that you receive the latest information on upgrades and new accessories.

## Registration Card for SMITH-ROOT Products

To validate your warranty and receive future technical support, please provide the following information: Product Model # \_\_\_\_\_

Name \_\_\_\_\_ Serial # \_\_\_\_\_

Title \_\_\_\_\_ Purchase Date \_\_\_\_\_

Organization \_\_\_\_\_ How did you hear about our products? \_\_\_\_\_

Address 1 \_\_\_\_\_

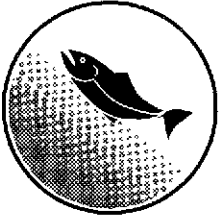
Address 2 \_\_\_\_\_ Comments \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Country \_\_\_\_\_ Zip \_\_\_\_\_

Phone # (        ) \_\_\_\_\_ Fax # (        ) \_\_\_\_\_

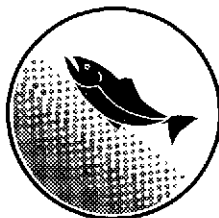
Place  
Stamp  
Here



## Smith-Root, Inc.

14014 NE Salmon Creek Ave.  
Vancouver, Washington, USA.  
98686-1699

Place  
Stamp  
Here



## Smith-Root, Inc.

14014 NE Salmon Creek Ave.  
Vancouver, Washington, USA.  
98686-1699

# CONTENTS

<b>1. How to use this manual</b>	<b>2</b>
<b>2. Features and Capabilities</b>	<b>3</b>
<b>3. Using the IAE-16</b>	<b>4</b>
Set-up	4
Reporting modes	7
<b>4. Voice Report</b>	<b>9</b>
<b>5. Status Reporting menu</b>	<b>10</b>
Alarm Status	10
Relay Status	11
Alarm History	12
Set-up Menu	13
Exit (Hang-up)	13
<b>6. Set-up Menu</b>	<b>14</b>
Set Time	14
Set Date	15
Set Unit Number	15
Set Password	16
Set Phone Numbers	17
Set Delay Before Calling	19
Set Channel Lockouts	19
Set Channel Polarities	20
Set Channel Descriptions	20
Set Relay Controls	21
Set Relay Descriptions	22
Set Interval Reporting	22
Set Default Baud Rate	23
<b>9. Troubleshooting</b>	<b>24</b>
<b>10. Specifications</b>	<b>25</b>
<b>Appendix A - Error Codes</b>	<b>26</b>
<b>Appendix B - Installation</b>	<b>27</b>

## 1 HOW TO USE THIS MANUAL

This manual is divided into several sections to suit the varying needs and experience levels of IAE-16 users. For those who wish to get the IAE-16 up and running as quickly as possible read sections 2, 3, 5 and 6.

New users of the IAE-16 should read sections 2, 3, 4, 5, 6, and 7. The material presented in these sections will help you to get your system running and customized to fit your needs quickly and easily.

Throughout this manual all output from the IAE-16 will appear in plain typeface whether that output is printed on a computer screen or spoken using the built in speech synthesizer. All input that you must supply will appear in *italics*. Section headings and important points will appear in **bold print**.

Appendix A contains a list of IAE-16 alarm error codes. When the IAE-16 is reporting alarm conditions by phone, using its voice, it will give you a set of numbers that correspond to the input channel numbers that are in the alarm state. The channel descriptions given in this list are valid when the IAE-16 is connected to a GFJB-6 monitor system. We suggest that a copy of this list, or one showing the actual channel descriptions, be made and placed near any phone that the IAE-16 may call.

## 2 FEATURES AND CAPABILITIES

The IAE-16, Sixteen Channel Intelligent Alarm Enunciator, is a complete automated monitoring system for Smith-Root Electronic Fish Barrier Systems. It continuously monitors the barrier system for any abnormal conditions, and has highly advanced reporting capabilities. The IAE-16 features automatic detection and selection of either **VOICE** or standard computer-to-computer data connections.

The IAE-16 can call up to 4 local or long distance phone numbers to report problems with the barrier system. These numbers can be any combination of human or computer monitored lines. If the IAE-16 calls and reaches a human being it will automatically report the alarm conditions in clearly spoken English. If it reaches another computer it will present a simple menu allowing the user to get a complete report of all input conditions.

The IAE-16 can also take limited corrective actions on various input conditions or combinations of input conditions. For example if three or more of the first six channels (i.e. the pulsators) fail, the unit can be set to operate a relay which drops the optional emergency gates, thereby preventing fish from getting past the barrier. These gates can also be set to drop automatically in the event of a power failure. Up to eight relays can be controlled by any of the sixteen input channels.

The menu system of the IAE-16 makes this powerful monitoring system extremely easy to use. When connecting by computer, the user is first presented with a menu for selecting status reports or accessing the setup menu. The reports are written in clear tabular form for easy reading. The setup menu is password protected, so unauthorized changes can be prevented. In almost all cases, the setup options show the current state before prompting for changes.

A front panel display is provided to allow visual monitoring of the input status. Each channel is represented by a dual color LED that will glow Green if the input is in a normal state, Red if the input is in an alarm state, Orange (both Red and Green on) if the alarm is one that has been acknowledged, and Off to indicate an inactive channel (one that has been locked out). A speaker is also provided with this display, to aid in testing the Voice feature of the IAE-16.

### 3 USING THE IAE-16

This section of the manual is for those who wish to get the IAE-16 into use immediately. You should read through the entire manual when you have time so that you will fully understand how the IAE-16 operates.

#### SET-UP

Before you can begin to use the IAE-16 it must be told about the system it is monitoring, and how you want it to handle alarm conditions. The IAE-16 default set-up is as follows:

- Time and Date set at factory.
- Unit id number is "DEFAULT"
- Set-up password is "Fish"
- No phone numbers entered.
- Delay before calling is 5 seconds
- All Inputs active (not locked out)
- All relays on manual and turned off.
- Generic channel and relay descriptions.
- Do not report status at intervals
- Modem data rate 1200 baud

If you don't want to make any changes to the set-up at this time then skip down to the next section called REPORTING MODES.

If you are going to change these settings you will need a terminal (or a personal computer with communication software) with a RS-232 serial port capable of being set as follows:

- 1200 Baud for modem connections
- 9600 Baud for direct terminal connections
- 8 data bits, 1 stop bit, no parity

The simplest way to make change in the set-up is to call the IAE-16 via modem. Otherwise you will need a null modem cable with a female 9-pin AT style connector to connect to the IAE-16's local terminal port. This port is the 9-pin connector closest to the center of the serial I/O board (The board with the RJ-11 phone jacks on it). When you set up the terminal as given above, and connect it to the 9-pin connector via this cable, the IAE-16 will automatically detect the connection and respond with its opening menu.

If you want to use a modem, you must first connect the IAE-16 to a normal phone line. **If you want the IAE-16 to report alarms by phone you must make sure it is connected to a direct outside phone line that supports Touch Tone dialing.** This line should be connected to the phone jack nearest the center of the serial I/O board. The terminal would then be connected to a modem and the modem connected to another normal phone line. Using the modem, you would call the number of the line the IAE-16 is connected to. The IAE-16 would answer the call, attempt a modem connection and then present its menu.

-- Setup Menu --

1. Set Time
2. Set Date
3. Set Unit Number
4. Set Password
5. Set Phone Numbers
6. Set Delay Before Calling
7. Set Channel Lockouts
8. Set Channel Polarities
9. Set Channel Descriptions
10. Set Relay Controls
11. Set Relay Descriptions
12. Set Interval Reporting
13. Set Default Baud Rate
14. Return to Main Menu

What is your choice?

For more detail on the following procedures, please see chapter 6 **Set-up Menu**. To start we recommend you change the factory set Time and Date to the current local standard time (not daylight savings time). Then set the unit number to the complete phone number (with area code) the IAE-16 will be connected to, so the number will be available to anyone the unit calls in case they want to make a change at that time. Then set the phone numbers you want the unit to call to report alarms. Keep in mind that the IAE-16 will call the numbers in order, starting with the first one, and that the first number it calls and gets an acknowledgment from will be the last number it calls for that report. Next you should lock out any channel inputs that you do not wish to monitor. By locking out a channel you are preventing it from reporting an alarm. However it can still be used to control relays if needed. Then you should set the channel polarities. The IAE-16 considers a high level on its inputs to be the normal (non alarm) condition. If this is not the case on some inputs, those inputs need to be inverted, and setting the polarities is how this is done. Finally you should set up any relay controls that are needed for the IAE-16 to meet the system design goals.

With the above items set up, the IAE-16 can now do the job it was purchased for. If you wish, you can also set up a different password, change the channel and/or relay descriptions, or set up the interval reporting feature. When you are through, choose the last item to exit the setup menu. You can then check the status reports to see if the changes you made were correct. If nothing else needs to be done, you can then choose item 5 on the main menu. If you were using a modem this will cause the IAE-16 to hang-up the phone. If you were connected to the local terminal port you should disconnect the terminal. The IAE-16 is now set-up and running.



## REPORTING MODES

The IAE-16 has 2 modes of operation, data mode and voice mode. When a terminal or computer is connected to the terminal port the IAE-16 will be in data mode. When the IAE-16 makes or receives a phone call it tests the phone line to see if the connection is data or voice. Data mode is selected if a modem signal is detected. Voice mode is selected if it hears a voice or other type of noise on the line. In either case the IAE-16 will sign on, give you it's report or main menu, then wait for a response. If no response is received after a period of time, it will hang-up the phone. It then either waits for the next call, or calls the next number if it is attempting to report.

When the IAE-16 detects an alarm condition it will call the phone numbers you programmed into it starting with the first number. It will try each number in turn until the alarms are acknowledged. If all the numbers are tried and the alarms are still not acknowledged the IAE-16 will wait 5 minutes and try the numbers again. If it goes through its list of numbers 3 times, it will increase the delay to 1 hour between calls and continue to try at that rate until it gets a response or the alarm condition goes away.

## DATA MODE

You will need a terminal or personal computer with a RS-232 serial port capable of being set as follows:

1200 Baud for modem connections  
9600 Baud for direct terminal connections  
8 data bits, 1 stop bit, no parity

In addition, if you are going to connect to the local terminal port of the IAE-16, you will need a null modem cable with a female 9-pin AT style connector. The local terminal port is the 9-pin connector closest to the center of the serial I/O board. Otherwise you will need a 1200 Baud modem and the right cables to connect it between the phone and the terminal/computer. After making the right connections (direct or by phone), you should soon see the main menu of the IAE-16, which will look something like this:

IAE-16 UNIT #1-206-573-0202  
Mon Oct.22,1991 12:00:00

1. Current Alarm Status Report
2. Current Relay Status Report
3. Alarm History Report
4. Setup Menu
5. Exit (Hang-up)

What is your choice?

At this point you can interact with the IAE-16 menus to see status reports or re-configure the current settings. Please refer to the chapters on the **Status Reporting menu** and **Set-up menu** for more information on how this is done.

## **VOICE MODE**

When the IAE-16 answers a phone call, it sends a modem connect tone and waits for a responding tone. When it makes a phone call, it will wait a short time for the other end to send a modem connect tone. In either case, if it hears a voice or other similar noise on the phone while it is waiting, it will automatically switch to voice mode. This switching may take a few moments, so please be patient. When it enters voice mode, the first thing it does is identify itself and give the current time and alarm status in a report like that shown below:

```
"IAE-16 ID number 1 206 573 0202"  
"The time is 12:04pm Monday 10/22/1991"  
"Status OK"  
"Please enter zero to exit."
```

The actual ID number will be the number you assigned during set-up. The IAE-16 then waits up to 15 seconds for a response. If you press *0* on your telephone keypad, the IAE-16 will say "Thank You, Good-bye", and then hang up the phone. If you press any number other than *0* or *1*, it will repeat the report it just gave. If you don't respond within 15 seconds the IAE-16 will repeat its report once and then wait another 15 seconds. If you still don't respond after the second 15 seconds, it says "Good-bye" and hangs up the phone. If it had placed the call and got no response, it would then go on and dial the next number in its list. Please see the chapter on the **Voice Report** for more information.

#### 4 VOICE REPORT

When the IAE-16 has no alarm conditions to report, the voice report will say something like the following:

```
"IAE-16 ID number 1 206 573 0202"  
"The time is 12:04pm Monday 10/22/1991"  
"Status OK"  
"Please enter zero to exit."
```

If it was reporting an alarm condition, say on channels 1 and 9, the voice report would sound more like this:

```
"IAE-16 ID number 1 206 573 0202"  
"The time is 12:04pm Monday 10/22/1991"  
"Warning, error number 1, error number 9"  
"Please enter one to OK status"  
"Please enter zero to exit."
```

The error numbers that it says correspond to the input channel numbers that are in the alarm state. At this point you would press the *1* (one) key on your phone's key pad to acknowledge the report and hang up the phone, press *0* (zero) to hang up the phone without acknowledging the report, or press any other key to repeat the report. If you press *0* or *1*, the IAE-16 will say "Thank you, good-bye" and then hang up the phone. If no response is given within 15 seconds, the IAE-16 will repeat the report. If there is still no response given 15 seconds after the report is repeated, it will say "Good-bye" and hang up without acknowledging the report.

If the IAE-16 is making the call, and you do not acknowledge the report (you pressed *0* or you did nothing until it timed out and hung up), it will go on to the next number in the list. It will continue to call the phone numbers it has until it gets an acknowledgment or the alarm condition goes away. Pressing *1* in response to a voice report will acknowledge the current alarms and prevent any more calls from being made until a new alarm is detected or a periodic report time comes up. If you call the IAE-16 and get a voice report, it will be the same as shown above. However it will not make any calls after you are done unless a new alarm is detected or a periodic report time comes up.

**NOTE: Only touch tone phones that can send the standard DTMF tones can be used to respond to an IAE-16 voice report.**

## 5 STATUS REPORTING MENU

When you make a connection with the IAE-16 via a modem or by using the direct terminal port, you will be placed in data mode and the main status reporting menu will be displayed like the one shown below:

```
IAE-16 UNIT #1-206-573-0202  
Mon Oct.22,1991 12:00:00
```

1. Current Alarm Status Report
2. Current Relay Status Report
3. Alarm History Report
4. Setup Menu
5. Exit (Hang-up)

What is your choice?

Typing the number of the item you want to select, followed by a carriage return (Enter), will select that item and display its screen. Only the first character you type on the input line is looked at for a match, so 12 will respond like 1, and so on. Any input that does not match a menu selection will cause the menu to be re-displayed. Errors that are made before a carriage return is typed can be corrected by using the Backspace key to erase the mistake and the line then retyped.

**NOTE: While in data mode, all input requests have a 60 second time-out. If you do not type something within 60 seconds, the IAE-16 will automatically do an exit and hang up the phone or disconnect the terminal.**

Following are descriptions of the items that can be selected from this menu.

### ALARM STATUS REPORT

Item number 1, Current Alarm Status Report, allows you to get a complete current status report of all of the inputs to the IAE-16. The inputs will be reported as normal, a new alarm, an acknowledged alarm or locked out. When a new alarm condition is reported for any of the inputs a beep will be heard from your terminal or computer to further call your attention to the alarm condition. An acknowledged alarm input is one that is still in the alarm state, but has been acknowledged and will not cause a phone call to be made. Acknowledged alarms are automatically cleared when the input goes back to a normal state, so that the next time they go into the alarm state they will be reported as new alarms. An input that is locked out is ignored by the alarm reporting system, although it can still be used to control relays.

An example of the alarm status report is shown on the next page.

-- Status Report --

1 - Channel 1	Normal
2 - Channel 2	Normal
3 - Channel 3	ALARM
4 - Channel 4	ALARM
5 - Channel 5	Normal
6 - Channel 6	Alarm Acknowledged
7 - Channel 7	Alarm Acknowledged
8 - Channel 8	Normal
9 - Channel 9	Normal
10 - Channel 10	Normal
11 - Channel 11	Normal
12 - Channel 12	Normal
13 - Channel 13	Normal
14 - Channel 14	Locked Out
15 - Channel 15	Locked Out
16 - Channel 16	Locked Out

Do you wish to acknowledge this report (y/N)?

Typing a 'Y' (in upper or lower case) will acknowledge the current alarms and prevent them from causing any phone calls to be made. Any other response will default to No, and will not acknowledge any alarms. Upon getting a response, you will be returned to the main status menu.

The channel descriptions used in the alarm status report (Channel 1, etc.) can be set to any string up to 30 characters in length. This is done in the set up menu and allows the user to better describe what is being monitored with each input. Please see the next chapter, **Set-up Menu**, for more details.

## RELAY STATUS

The IAE-16 has a relay board containing 8 relays that can be controlled independently. This gives it the ability to automatically open and close solenoid valves or emergency gates, start and stop pumps, or control other equipment. Each relay can be manually turned on or off, or it can be programmed to monitor the alarm inputs for a given condition and turn on when that condition becomes true.

The relay status report shows the current state of each of these relays (On or Off). It also shows if the relay is manually or automatically controlled, and the activation time if the relay is currently on. Like the alarm status report, these relays have description strings, of up to 30 characters each, that can be set so you can document what they are controlling. An example of the relay status report is shown on the next page.

-- Relay Status Report--

Num	Description	Control	State	Activation Time
1	Relay 1	Automatic	On	Mon Oct.22,1991 12:00:00
2	Relay 2	Manual	Off	
3	Relay 3	Manual	Off	
4	Relay 4	Manual	Off	
5	Relay 5	Manual	On	Mon Oct.22,1991 14:30:00
6	Relay 6	Manual	Off	
7	Relay 7	Manual	Off	
8	Relay 8	Automatic	Off	

Please press RETURN to continue.

Hitting the return or enter key will return you to the main status menu. Setting the relay controls is done as part of the Set-up Menu, and is described in more detail in the next chapter.

**ALARM HISTORY REPORT**

When a new alarm condition is detected, the IAE-16 logs the state of the inputs and the current time in a history table before it begins making phone calls to report the alarm. Only new alarms that start a phone calling sequence are logged this way, so the user can see what caused the phone call to be made. The table can hold up to 16 entries and is circular in nature. When the table is full, new entries are written over the oldest entry, so only the last 16 events are stored. An example of the alarm history report is shown below:

-- Alarm History Report --

Each line has the state of the channels [1-16], followed by the event time.

```
-----  
N N N A A N L L N N N N N N N N N Mon Oct.21,1991 11:42:55  
N N N N A A L L N N N N N N N N N Mon Oct.21,1991 11:55:53  
A A N N * * L L N N N N N N N N N Mon Oct.21,1991 12:32:45  
N N N N N N L L N N A N N N N N N Tue Oct.22,1991 14:22:23  
A N N N N N L L N N * N N N N N N Tue Oct.22,1991 17:15:54
```

N=normal, A=new alarm, \*=acknowledged alarm, L=locked out

Please press RETURN to continue.

The first letter on each event line is for channel 1, the second for channel 2, etc. The last event line will always show the latest event (the one that started the last phone call). Each event line will have at least one new alarm input indicated. RETURN takes you back to the main menu.

## **SET-UP MENU**

This selection on the main status menu takes you to the Set-up Menu. First you will be prompted to enter the set-up password. This password is there to protect the system from unauthorized changes. There is an option in the set-up menu to change this password and we recommend that you do this at least once a month to better insure system security. Once the correct password has been given, you will be presented with the set-up menu. While there, only the selection for returning to the main menu will allow you to exit set-up mode. This way you won't have to keep using the password to re-enter the set-up menu. However, as with the main menu, all input requests have a 60 second time-out and will cause a disconnect if this limit is exceeded. Please see the next chapter for more detail on the set-up menu.

## **EXIT (HANG-UP)**

This selection on the main status menu is the way you end a session with the IAE-16. When you choose it, the IAE-16 will respond by displaying the following message:

```
Exiting...  
Please Disconnect Now.
```

If you were connected by modem, the IAE-16 would then hang-up the phone. If you were connected to the terminal port, the IAE-16 will wait 15 seconds for you to disconnect. If you fail to disconnect your terminal in 15 seconds, the IAE-16 will sense that it is connected and display the main status menu again.

## 6 SET-UP MENU

When you select the set-up menu option from the main status menu, and give the correct password, you will be presented with a display that looks something like this:

-- Setup Menu --

1. Set Time
2. Set Date
3. Set Unit Number
4. Set Password
5. Set Phone Numbers
6. Set Delay Before Calling
7. Set Channel Lockouts
8. Set Channel Polarities
9. Set Channel Descriptions
10. Set Relay Controls
11. Set Relay Descriptions
12. Set Interval Reporting
13. Set Default Baud Rate
14. Return to Main Menu

What is your choice?

As with the main status menu, you make your selections by typing the number in front of your choice and then hitting the carriage return or enter key. We will examine each of these options in the following sections.

### SET TIME

This option allows you to set the time of day in the battery backed-up, real-time clock of the IAE-16. Please note that this is a 24 hour clock, so all time should be entered in 24 hour format. Since this clock's battery is independent of the main or backup power for the IAE-16, it will continue to run and keep the correct time even if the IAE-16 loses all power or is turned off. When you select this option you will be presented with something like the following:

```
The current time is 14:24:54
Please input the new time (HH:MM:SS 24Hr format):
```

At this point you would type in the correct time, including the colons, as shown in the example line above. If the IAE-16 cannot read a valid time from your response (say you forgot one of the colons), you will get a message saying Invalid format!, and will then be returned to the set-up menu without any changes being made to the stored time. A valid time input will set the clock and return you to the set-up menu.



## **SET DATE**

This option allows you to set the date and day of the week that is stored in the battery backed-up, real-time clock of the IAE-16. When you select this option you will be presented with something like the following:

```
The current date is 10/24/1991
Please input the new date (MM/DD/YYYY format):
```

At this point you would type in the correct date, including the slashes, as shown in the example line above. If the IAE-16 cannot read a valid date from your response (say you entered 13 for the month), you will get a message saying `Invalid format!`, and will then be returned to the set-up menu without any changes being made to the stored date. If you gave a valid date input, you would then be presented with the following:

```
0=Sun, 1=Mon, 2=Tue, 3=Wed, 4=Thu, 5=Fri, 6=Sat
```

```
Please input the number of the Day Of The Week:
```

At this point you would enter the number from the list above for the correct day of the week for the date you entered previously. A valid input would then set the real time clock and return you to the set-up menu. An invalid input would give you an `Invalid Format!` message and return you to the setup menu without changing the stored day of the week.

While this clock is designed to keep track of the date, it only uses the last two digits of the year (the 91 from 1991). The first two digits are stored in battery backed-up memory outside the clock. This means that the date will need to be corrected by hand at the turn of the century (going from 1999 to 2000). Since the clock makes its leap year calculations based on this limited idea of the year, it may also be in error sometimes and will need to be corrected by hand when this happens. Neither of these situations are critical to the operation of the IAE-16, they only effect the time given when it makes its reports or stores event times.

## **SET UNIT NUMBER**

This option allows you to change the Unit ID Number for the IAE-16. This number is given at the top of the main status menu, and in the voice report when reporting by phone. We recommend that you set this number to the phone number where the IAE-16 can be called. This will uniquely identify the unit and will remind you where the unit can be called if you need to make a change by phone.

When you select this option you will be presented with the following message:

The current unit number is "1-206-573-0202".  
Please input the new Unit Number (20 Char. Max.):

At this point you would type in the new unit number, which can include any printable ASCII characters but must be less than 20 characters in length. When you have typed in a number (say "1234") the IAE-16 will repeat it back to you and allow you to verify what you typed as follows:

"1234" - Is this correct (y/N)?

Typing 'Y', in either upper or lower case, will answer 'yes' to this question and the IAE-16 will store the new number and return you to the set-up menu. Any other input will be interpreted as a 'no' response and the IAE-16 will ask you to input the number again. It will repeat this cycle until you are satisfied with the number you typed and give it a 'yes' response.

### SET PASSWORD

When you select this option you will be presented with the following message:

The current password is "Fish".  
Please input the new password (20 Char. Max.):

At this point you would type in the new password, which can include any printable ASCII characters but must be less than 20 characters in length. **Case is significant in passwords, so be sure you remember this when selecting a new one.** When you have typed in a new password (say "Salmon") the IAE-16 will repeat it back to you and allow you to verify what you typed as follows:

"Salmon" - Is this correct (y/N)?

Typing 'Y', in either upper or lower case, will answer 'yes' to this question and the IAE-16 will store the new password and return you to the set-up menu. Any other input will be interpreted as a 'no' response and the IAE-16 will ask you to input the password again. It will repeat this cycle until you are satisfied with the password you typed and give it a 'yes' response.

Because of the variety of terminals that can be used with the IAE-16, no attempt was made to hide the password shown on the screen. So be careful you do not leave it displayed very long. If you forget the password you used (and, therefore, cannot get access to the setup menu to change it), contact Smith-Root, Inc. and we will do what we can to recover it for you. The default password, set at the factory, is "Fish".

## SET PHONE NUMBERS

This option allows you to set-up any one of the four phone numbers the IAE-16 can call to report an alarm. Each number also has settable lockout times that can be used to prevent the IAE-16 from calling that number when it is not monitored. When you select this option, you will be asked the following:

Which phone number do you wish to change (1-4)?

You would then select the number whose settings you wish to change. Keep in mind that the numbers will be called in the order they are stored in this list (number 1 first, number 4 last). When you have selected a number (say number 1), you will be presented with the phone number settings menu as shown below.

The current phone number for entry #1 is "1-206-573-0202".

1. Change Number
2. Delete Number
3. Lockout Days of the Week
4. Lockout hours of the day
5. Exit to setup menu.

What is your choice?

If you select option #1, you will be presented with the information on how to change the phone number stored in this entry, as shown below:

Valid phone number characters include the following:  
1234567890#\*ABCD~

All others will be ignored. (~ = A two second pause)

Please input the new phone number (30 Char. Max.):

At this point you would type in the new phone number. Remember that this number must be valid from the location of the IAE-16. If it is a long distance number, be sure to precede it with a one (1) and the area code (if needed). You may punctuate the number as you wish, and may even add short comments, as long as you do not exceed the maximum number of characters and avoid using the characters shown in the given list. The IAE-16 will ignore any characters that do not represent valid touch tone keys. The tilde (~ or ASCII 126) is a special case and, when placed in a phone number string, will cause a two second pause in dialing. This can be useful for those phone numbers that must go through a separate phone exchange.

If you select option #2 from the phone number menu, the selected entry will be cleared and will not be used to place any phone calls.

If you select option #3 from the phone number menu, you will be asked for the days of the week that you wish to lock out. Locking out a day means that the IAE-16 will not be able to call the selected number on that day to report an alarm. For instance, if you lock out Saturday and Sunday, the IAE-16 will only be able to call that number on weekdays. When you select this option, and you currently have no days locked out, you will be presented with the following:

You currently have no days locked out for this phone number.

0=Sun, 1=Mon, 2=Tue, 3=Wed, 4=Thu, 5=Fri, 6=Sat

Please input the number(s) of the day(s) you wish locked out, separated by spaces, or RETURN for none.

You would then input the numbers of the days, all on the same line, separated by spaces. For instance, if you want to lock out Saturday and Sunday you would type 0 6. The IAE-16 will then respond:

"0 6" - Is this correct (y/N)?

Answering 'Y' (for Yes) will lock out the selected days and unlock all others. A no response will cause the IAE-16 to ask for the numbers again.

If you select option #4 from the phone number menu, and you have not locked out any hours of the day previously, you will be shown the following:

This phone number will be called at all hours of the day.  
Do you wish to limit the time of day this number can be called (y/N)?

Answering 'Y' (for Yes) will cause the IAE-16 to ask for a start and stop hour. These times are given in 24 hour format, so 5pm would be 17:00, etc. You only need to give the hour number, no colons or trailing zeros. For a start time of 8am and a stop time of 5pm, the session would look like this:

Please input the starting hour (H<24): 8  
Please input the stopping hour (H<24): 17

After these numbers are given, you will be returned to the phone number menu. With these times given, the IAE-16 will only be able to call this number between the hours of 8am and 5pm. The IAE-16 will bypass this number at all other hours of the day.

The last option on the phone number menu will return you to the set-up menu.

## SET DELAY BEFORE CALLING

This option is used to set the calling delay. This is useful in preventing intermittent input conditions from generating phone calls. If the IAE-16 detects an alarm condition, it logs it in the alarm history and starts this delay timer. If the alarm condition does not go away before this delay is done, it starts making the phone calls. A quick check of the alarm history table will show if the alarm events are close together in time, indicating an intermittent input condition and showing which input is the cause. Setting this delay for a longer time can help prevent calls from being made until corrective action can be taken. If you wanted to change the delay from the default value of 5 seconds to 10 seconds, you would select this option and the session would look something like this:

```
The current calling delay is 5 seconds.  
Please input the new calling delay (in seconds): 10  
10 seconds, is this correct (y/N)? Y
```

## SET CHANNEL LOCK-OUTS

This option allows you to ignore alarm conditions on individual inputs if so desired. Since the IAE-16 has 16 available inputs, you may want to lock-out inputs that are not used and prevent them from generating alarms. As long as an input is locked-out an alarm condition will not be reported for that input. Locked-out inputs are reported as such on the input status report menu. For status reports given by voice, only inputs that are in the alarm condition and not locked-out are reported.

If you wanted to change the lockout status from the default of no locked out channels to channels 7, 9 and 13 being locked out, you would select this option on the set-up menu and the session would look something like the following:

```
You currently have the following channels locked out:  
(This line is blank since no channels are locked-out.)  
Do you wish to change these numbers (y/N)? Y  
Please input the channel number(s) [1-16] that you wish to lock  
out, all on one line, separated by SPACES:  
7 9 13  
"7 9 13" - Is this correct (y/N)? Y
```

Any input that does not represent a valid input channel number will be ignored. Once you decide to change the lockout status of any channel, you must type in all the channels you want locked out. All other channels will be set to the active state and can report alarms. While a locked-out channel cannot report alarms, it can still be used to control relays. This will be discussed further in the "Set Relay Controls" section of this chapter.

## SET CHANNEL POLARITIES

The default polarity for a IAE-16 input is a high level (logic 1) for the normal state (indicating a closed circuit), and a low level (logic 0) for the alarm state (indicating an open circuit). However, there may be some applications that require a low level (logic 0) to be the normal state on some of the inputs. We have provided for this by allowing you to invert the logic on selected inputs. Inverted inputs will report an alarm if they go to a high level (logic 1). Setting the inverted inputs is similar to setting the locked-out inputs described previously. If you wanted to change from the default of no inverted inputs, to channels 10, 12, 14 and 16 being inverted, you would select this option and the session would look something like this:

You currently have the following channels inverted:

(This line is blank since no channels are inverted.)

Do you wish to change these numbers (y/N)? *Y*

Please input the channel number(s) [1-16] that you wish to invert, all on one line, separated by SPACES:

*10 12 14 16*

"10 12 14 16" - Is this correct (y/N)? *Y*

When you decide to change the polarity of an input channel, you must type in all the inverted channels. All other channels will be set to the normal, non-inverted state. The inverting process is done before any tests are made on the inputs. So inverting an input also affects how the relay controls respond to that input, since the relay controls are looking for inputs in the alarm state and this state is determined by the input's polarity.

## SET CHANNEL DESCRIPTIONS

This option allows you to set the descriptions of the input channels that are shown in the alarm status report. These descriptions can be up to 30 characters in length. We suggest they be set to describe what each of the input channels is monitoring, so any reported system failure can be quickly identified. If you wanted to change channel number one's description from the default "Channel 1" to "Pulser Number 1", you would select this option and the session would look something like the following:

Which input description do you wish to change (1-16)? *1*

The current description is "Channel 1".

Please input the new description (30 Char. Max.):

*Pulser Number 1*

"Pulser Number 1" - is this correct (y/N)? *Y*

Each channel must be set individually, so you will need to select this option for each channel description that you wish to change.

## SET RELAY CONTROLS

The IAE-16 normally comes with a board that contains 8 power relays. These relays can be operated manually (set on or off), or they can be programmed to monitor the alarm inputs and turn on when a set of alarm conditions happen, otherwise they would stay off.

In automatic (or programmed) mode, the controls for each relay can be set to monitor any of the available input channels. From those selected inputs, you would then choose the minimum number that must be in the alarm state before the relay should be turned on (otherwise known as the "trip" condition). Finally, you can set a delay so that the relay would only be turned on after all the trip conditions had been detected and the delay had timed out. This delay can be useful in preventing a relay from turning on due to transient conditions like power flickers or operator errors.

As an example, say we wanted to put relay number one into automatic mode, have it monitor channel numbers 1, 2, 3, 4, 5 and 6, wait 5 seconds after 3 or more of those inputs goes into the alarm state, and then turn on. The default control state for each relay is Manual mode and turned off. To set this up, you would select this option and the session would look something like this:

```
Which relay control do you wish to change (1-8)? 1
Relay #1 is currently on "MANUAL".
Do you wish to change this (y/N)? Y
You are currently monitoring the following channel numbers:
  (This line is blank because no channels were being monitored)
Please input the channel number(s) that you want Relay #1 to
monitor, all on one line, separated by SPACES:
1 2 3 4 5 6
"1 2 3 4 5 6" - Is this correct (y/N)? Y
How many of these monitored channels must be active before the
relay is set? 3
How long after the right conditions have occurred do you want to
wait before setting this relay (in seconds)? 5
```

The input channels that the relays monitor can overlap. For instance, relay #1 can monitor channels 1, 2, 3 and 4, while relay #3 monitors channels 3, 4, 5 and 6. Since the relay controls are looking for inputs that are in the alarm state, they are affected by the polarity settings of those channels they are monitoring. In manual mode, you would be shown the current state of the relay and asked if you wanted to toggle it to the other state.

When a relay is turned on, manually or automatically, the time it turned on (otherwise known as the Activation Time) is stored and displayed in the relay status report. When a relay is turned off, this time field is cleared in the report.

## SET RELAY DESCRIPTIONS

This option is similar to the "Set Channel Descriptions" option noted earlier. It allows us to set the description of each relay that is shown in the relay status report. To change the description of relay number one from the default "Relay 1" to "Emergency Gate Drop", you would select this option and the session would proceed as follows:

```
Which relay description do you wish to change (1-8)? 1
The current description is "Relay 1".
Please input the new description (30 Char. Max.):
Emergency Gate Drop
"Emergency Gate Drop" - is this correct (y/N)? Y
```

## SET INTERVAL REPORTING

The IAE-16 has the ability to report it's status on regular intervals. This can be used as a check to automatically make sure the system is still functioning normally. The intervals that can be selected are hourly, daily, weekly and monthly. For all options longer than hourly, the hour of the day that you want it to call can be selected. For weekly and monthly reporting, the day of the week that you want it to call can be selected. In the monthly report option, the first time the selected day of the week comes up is when it will make it's report. To change from the default of no periodic reports to monthly reports, on the first Tuesday of the month, at 11am, you would select this option and the session would go something like this:

```
Currently set for no periodic reports.
1. Monthly
2. Weekly
3. Daily
4. Hourly
5. Never
How often would you like a periodic report? 1
At what hour of the day (0-23)? 11
0=Sun, 1=Mon, 2=Tue, 3=Wed, 4=Thu, 5=Fri, 6=Sat
What day of the week (0-6)? 2
```

After setting up for a monthly report, the first time the selected day of the week comes up, whether it is in the current month or the next, the report will be given. Then it will note the current month and wait for the next month before looking for the selected day of the week again.



## SET DEFAULT BAUD RATE

This option allows you to change the baud rate the modem will use when answering a call from another modem. The choices are 1200 (the default) and 300 baud. When the IAE-16 is the one making the call, it will automatically switch to the baud rate (either 1200 or 300 baud) of the modem that answers it, so this option only affects calls made to the IAE-16. When you select this option, you will see the following:

WARNING: Changing the baud rate will cause the modem to hang up.

The current Baud Rate is 1200.  
Do you wish to change this (y/N)?

Answering yes to this question will cause the IAE-16 to switch to the other value (300 baud) and force a hang-up of the modem so the new baud rate can be put into effect. A no response will just return you to the set-up menu.

## 9 TROUBLESHOOTING

No pilot light.	Switch off, No power to unit, Fuse blown, Lamp burned out.
Modem won't connect	Switch off, No power to unit, Fuse blown, Noisy or dead phone line, Local modem won't do 300 or 1200 baud.
No menus	Switch off, No power to unit, Fuse blown, Bad or improper data cable, Bad or disconnected phone line, Improper communications settings.
Calls continuously	Unacknowledged alarm.
Won't answer phone	Phone line disconnected from unit, Phone line dead, Switch off, No power to unit, Fuse blown.

## 10 SPECIFICATIONS

Size	24W x 25H x 11.5D (inches)
Weight	5 lb. (not including battery)
Power requirements	120VAC 60 Hz or 12VDC, 8W
Operating time on emergency battery	30 Hours max.
Number of inputs	16
Input requirements	Contact closure capable of handling 12VDC at 20 mADC
Number of relay outputs	8
Output control capability	120VAC at 1 Amp max. resistive or 120VAC 1/10hp inductive
Data rate	300 or 1200 Baud for modem, 9600 Baud for direct terminal connection.
Phone number storage	4 numbers (up to 20 digits each)

## Appendix A

### IAE-16 ALARM ERROR CODES

When the IAE-16 is connected to a GFJB-6 junction box, these are the normal channel descriptions.

ERROR NUMBER	CHANNEL DESCRIPTION
1	Channel 1 (pulsator output)
2	Channel 2 (pulsator output)
3	Channel 3 (pulsator output)
4	Channel 4 (pulsator output)
5	Channel 5 (pulsator output)
6	Channel 6 (pulsator output)
7	Auxiliary Generator (is running)
8	AC Power Failure ( <b>CRITICAL</b> All power is out)!!
9	Over Temperature (=> 90 deg. F in room)
10	Master/Alternate (Trigger source)
11	IAE-16 AC Power Supply (Running from backup battery)
12	Emergency Drop Gate Down
13	Low Water (Barrier is shut down because water level is too low)
14	Auxiliary Generator Fuel (at or below 30% of tank capacity)
15	Auxiliary Input 1 (Spare)
16	Auxiliary Input 2 (Spare)

## Appendix B

### INSTALLATION

To install the IAE-16 first choose a location that allows room for easy access to the front of the unit, and has at least 6 inches of clearance on the side where the power switch will be located. Be sure the on/off switch for the IAE-16 is in the off position. Also be sure the 120VAC source you are going to connect to is turned off.

Connect the IAE-16 to 120VAC via the terminals labeled GND, NUET, LINE on terminal strip TS1.

Connect the #10 black wire to the negative (-) terminal of the battery.

Connect the #10 red wire to the positive (+) terminal of the battery.

If necessary move the pilot light and on/off switch to the other side of the box so that they are clearly visible and easily accessible.

Route the data cable between the IAE-16 box and the GFJB-6 junction box. Then crimp a 26-pin connector on one end of the cable and plug it into the mating connector in the GFJB-6 or the IAE-16. Be sure you have enough cable to reach the similar connector in the other box and cut the cable and crimp another 26-pin connector on this end and connect it to its' mating connector.

**Note: Direct inputs require an external contact closure and an external source capable of supplying 12VDC at 20mA for each input used. This is provided when connected to a GFJB-6. When connecting inputs 11 through 16 to the IAE-16 motherboard, input 11 becomes an AC Power monitor and the other inputs have 12VDC drivers provided so they only require the external switch.**

Connect a DC voltmeter to the terminals of the 12V backup power battery. Turn on the 120VAC power and then turn on the IAE-16. The pilot lamp should light and you should see a slight rise in the voltage of the battery indicating that the battery is being trickle charged by the supply of the IAE-16.

Connect the phone line, if available, to the phone jack closest to the center of the serial I/O board. This completes the physical installation of the IAE-16, you now need to turn to the Set-up section of this manual to configure the IAE-16 to your specific site.

# **WARRANTY**

SMITH-ROOT, INC. (SRI) products are backed by SRI's reputation as a quality manufacturer, and often by years of proven reliable service.

In addition, the products are backed by the following SRI factory warranty:

Solely for the benefit of the original purchaser, SRI warrants all new products of its manufacture to be free from defects in material and workmanship; and will replace or repair, f.o.b. at its factories in Vancouver, Wash., or other location designated by it, any part or parts returned to it within one (1) year of original delivery, which SRI's examination shall show to have failed under normal use and service and non-corrosive application by purchaser. Such repair or replacement shall be free of extra charges for all items, and shall be return shipped pre-paid by SRI. SRI makes no warranty with respect to parts, accessories, or components manufactured by others. The warranty, if any, which applies to such items is that offered by their respective manufacturers.

SRI's obligation under this warranty is conditioned upon it receiving proper written notice of claimed defects which shall in no event be later than the one (1) year warranty period; and is limited to repair or replacement as aforesaid.

This warranty is expressly made by SRI and accepted by purchaser in lieu of all other warranties, including WARRANTIES OF MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE, whether written or oral, express, implied, or statutory. SRI neither assumes nor authorizes any other person to assume for it any other liabilities with respect to its products. SRI shall not be liable for normal wear and tear nor for any contingent, incidental, or consequential damage or expense due to partial or complete inoperability of its products for any reason whatsoever.

This warranty shall not apply to products or parts thereof which have been altered or repaired outside of an SRI factory (unless authorized by SRI), or damaged by improper installation or application, or subjected to misuse, abuse, neglect, or accident.

SRI shall not be responsible for any in-transit damage to goods unless inspection clearly reveals defective packaging where SRI was responsible for packaging. SRI will assist any purchaser or consignee of goods seeking recovery from a carrier for in-transit damage to goods and will, to the extent necessary, assign claims to said purchaser or consignee wherever required in order to provide said purchaser or consignee with complete recourse against said carrier.

Upon buying SRI products or parts, purchaser expressly agrees to the foregoing warranty provisions including limitations of remedies, and expressly waives any and all other warranties or undertaking in respect to such products.

**Smith-Root, Inc.**

# Repair Authorization



## Contact / Shipping Information

SRI Customer No.: *(if known)* \_\_\_\_\_

Bill To Agency: \_\_\_\_\_ Ship To Agency: \_\_\_\_\_

Address: \_\_\_\_\_ Address: \_\_\_\_\_

City: \_\_\_\_\_ City: \_\_\_\_\_

Country: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Country: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Attn: \_\_\_\_\_ Attn: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Auth. Contact: \_\_\_\_\_ Auth. Contact: \_\_\_\_\_

Customer Purchase Order No.: \_\_\_\_\_ E-mail: \_\_\_\_\_

Visa / Master card / American Express *(circle one)*

Card # \_\_\_\_\_ Exp. Date: \_\_\_\_\_ Name on card: \_\_\_\_\_

## Equipment Returned

Quantity	Item Description	s/n	Problem (use additional sheet if necessary)

I authorize Smith-Root, Inc. to repair the equipment listed up to the amount of \$400.<sup>00</sup>. If repairs should exceed this amount, SRI will call to receive further authorization. If the actual cost is less than this amount, the actual costs will be charged. **Or** I agree that SRI will charge \$91.00 *(will apply toward repair if accepted)* for a repair quote. *Prices subject to change.*

AUTHORIZATION UP TO \$400.00 REQUIRED: SIGNED \_\_\_\_\_

AUTHORIZATION FOR REPAIR QUOTE \$91.00: SIGNED \_\_\_\_\_

Requested Action:  Replace \_\_\_\_\_  Repair \_\_\_\_\_

Attach Packing Slip <sup>and</sup>/ Invoice if Applicable - Purchase Date: \_\_\_\_\_

**FROM:**

---

**SHIP TO:** **ATTN: RETURNS/REPAIRS**  
**Smith-Root, Inc.**  
 14014 NE Salmon Creek Avenue  
 Vancouver, WA 98686

**FROM:**

---

**SHIP TO:** **ATTN: RETURNS/REPAIRS**  
**Smith-Root, Inc.**  
 14014 NE Salmon Creek Avenue  
 Vancouver, WA 98686