

Model
H-219

Data / Voice Modem



Owner's Manual
Version 2.09

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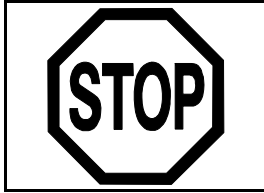
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Preface: A Message to the H-219 User



**PLEASE! PLEASE! PLEASE!
READ THIS MANUAL BEFORE YOU
ATTEMPT TO USE YOUR H-219!!**

Welcome to a new world of data and voice communications. Your new **WATERLOG®** H-219 is the end product of years of research and product development. The H-219 is a quality instrument that has been developed to suffer the rigors of field use. It has been designed using state-of-the-art, tried, and tested design methods and techniques. Further, only high quality parts have been used in its construction.

Your H-219 is suitable for many applications in the laboratory, office, or field. The H-219 was designed to perform plug and play operations for remote data logging applications. It will allow modem communication with most host systems and can also be accessed in a voice mode.

WARNING!

As mentioned above, your H-219 is a precision instrument. It must be handled and cared for with this in mind. Although it is very durable for field use, it should not be dropped or tossed. The following "Do's and Don'ts Guidelines" will help you avoid unnecessary problems and get good performance from the H-219 for years to come.

DO'S and DON'TS GUIDELINES

Don't expose the insides; this will void the warranty.

Don't install the unit in direct sunlight.

Don't drop the unit.

Don't toss the unit.

Do mount the unit to prevent dropping.

Do keep the unit dry.

Do call the factory if you have any questions about the unit.

Do make sure there is ample power for the system.

Preface: A Message to the H-219 User

User Agreement/ WATERLOG® Warranty

1. NATURE OF THE PRODUCT

This agreement accompanies an interface module comprising firmware, circuitry and other electronic equipment in an enclosed housing, and packaged together with written instructional materials. The packaged electronic circuitry and instructional materials herein are collectively referred to as the "PRODUCT." The PRODUCT is made available from DESIGN ANALYSIS ASSOCIATES, INC., of 75 West 100 South, Logan, Utah 84321 (hereinafter referred to as "DESIGN ANALYSIS"), and contains information and embodies technology that is confidential and proprietary to DESIGN ANALYSIS, and the availability and use of the PRODUCT is extended to you, the USER, solely on the basis of the terms of agreement which follow.

2. ACKNOWLEDGMENTS BY USER

Opening the package which encloses the accompanying PRODUCT indicates your acceptance of the terms and conditions of this agreement and constitutes an acknowledgment by you of the confidential and proprietary nature of the rights of DESIGN ANALYSIS in the PRODUCT.

3. DUTIES OF YOU, THE USER

In consideration for the access to and use of the PRODUCT extended to you by DESIGN ANALYSIS and to protect the confidential and proprietary information of DESIGN ANALYSIS, USER agrees as follows:

- (a) USER agrees that they will not remove from the exterior of the housing of the PRODUCT any safety warnings or notices of proprietary interest placed thereon by DESIGN ANALYSIS.
- (b) USER agrees that they shall not disassemble or otherwise reverse engineer the PRODUCT.
- (c) USER agrees to treat the PRODUCT with the same degree of care as USER exercises in relation to their own confidential and proprietary information.

4. TERM

USER may enjoy these rights only as long as their possession of the PRODUCT shall continue to be rightful. These rights will cease if the PRODUCT is returned to DESIGN ANALYSIS under the terms of any redemption offer, warranty, or money-back guarantee, or if USER transfers the PRODUCT to another party on terms inconsistent with this agreement.

5. LIMITED WARRANTY

(b) What is Covered

DESIGN ANALYSIS warrants that for a period of twelve months from the time of purchase the functions to be performed by the PRODUCT will be substantially in compliance with USER documentation. DESIGN ANALYSIS also warrants that the PRODUCT will be free from defects in materials and workmanship for a period of ONE YEAR from the date of purchase.

(b) What USER Must Do

If the product fails to satisfy the above warranty, USER must notify DESIGN ANALYSIS in writing within the applicable period specified above and reasonably cooperate with the

directions they received from DESIGN ANALYSIS.

(c) What DESIGN ANALYSIS Will Do

DESIGN ANALYSIS will repair the PRODUCT or will endeavor to provide a replacement of same within a reasonable period of time. In the event that DESIGN ANALYSIS is unable to make the necessary repairs or replacement within a reasonable period of time, the original purchase price will be refunded upon the return of the PRODUCT to DESIGN ANALYSIS.

(d) Limitations

- (i) THE ENTIRE REMEDY FOR BREACH OF THIS LIMITED WARRANTY SHALL BE LIMITED TO REPLACEMENT OF THE DEFECTIVE PRODUCT OR REFUNDING OF THE PURCHASE PRICE, AS SET FORTH ABOVE. IN NO EVENT WILL THE LIABILITY OF DESIGN ANALYSIS TO USER OR TO ANY OTHER PARTY EXCEED THE ORIGINAL PURCHASE PRICE OF THE PRODUCT, REGARDLESS OF THE FORM OF THE CLAIM.**
- (ii) EXCEPT FOR THE EXPRESS WARRANTIES ABOVE, DESIGN ANALYSIS SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING, WITHOUT LIMITATION, ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**
- (iii) UNDER NO CIRCUMSTANCES WILL DESIGN ANALYSIS BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL, INDIRECT, OR ANY OTHER DAMAGES OR CLAIMS ARISING FROM THE USE OF THIS PRODUCT, THIS INCLUDES LOSS OF PROFITS OR ANY OTHER COMMERCIAL DAMAGES, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT WILL DESIGN ANALYSIS BE LIABLE FOR ANY CLAIMS, LIABILITY, OR DAMAGES ARISING FROM MODIFICATION MADE THEREIN, OTHER THAN BY DESIGN ANALYSIS.**
- (iv) THIS LIMITED WARRANTY GIVES USER SPECIFIC LEGAL RIGHTS. USER MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS OR THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THOSE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY.**

6. GOVERNING LAW

This Agreement and its validity and interpretation shall be governed by the laws of the State of Utah, notwithstanding any choice of law rules of Utah or any other state or jurisdiction.

Chapter 1

Introduction

1.1 Introduction to the H-219

The H-219 data/voice modem operates in a fashion similar to many other modems, but it also has been designed with special features that make it ideal for remote applications. While not in operation, the H-219 draws very little power in a low-power sleep mode. When dialed, the H-219 will answer in a voice mode and later switch to a data mode if necessary. The voice mode allows the user to retrieve data by simply calling the H-219 from any touch tone phone. Data for the voice mode will come from a **WATERLOG**[®] series data logger. In the voice mode, the H-219 can also use the data for an alert warning system. The H-219 can be programmed to make calls to user defined phone numbers if the data surpasses a user defined alarm condition. The voice mode setups of the H-219 are easily programmed through the serial port. In the data mode, the H-219 may be used to program or retrieve data from any **WATERLOG**[®] series data logger through the serial port.

Uses, Functions, Features, and Attributes of the H-219

- Operation over a wide temperature range
- Data transfer via modem or voice communication
- Automatic voice call out from remote sites based on a user defined alarm condition
- Serial port speed up to 9600 BPS for data modem operation
- Low power sleep mode while not in operation
- Easy setup using a laptop or personal computer
- Useful for early flood warning systems, etc.
- Portable, compact, and lightweight

1.2 Unpacking Your H-219

You should have received the following items

- The H-219 Instrument
- Mounting Hardware
- Owner's Manual

1.3 About This Manual

This manual will show you how to install and operate your H-219. You will find the installation procedures and operational functions simple and easy to use. The chapters are compiled in a logical order to help you through the process of installing and operating your H-219.

Chapter 1:	Introduction
Chapter 2:	Installation
Chapter 3:	Operation
Chapter 4:	Modem Command Reference
Chapter 5:	Menu Mode Reference
Chapter 6:	Maintenance and Troubleshooting
Appendix A:	Specifications
Appendix B:	H-219 Worksheets

1.4 FCC Approval

Type of Service: The H-219 is designed to be used on a standard device telephone line. It connects to the telephone line by means of a standard jack called the USOC RJ-11C. *Connection to telephone company provided coin service (central office implemented systems) is prohibited.* Connection to party line service is subject to state tariffs.

Telephone Company Procedures: The goal of the telephone company is to provide the best service possible. In order to do this, it may occasionally be necessary for them to make changes in their equipment, operations, or procedures. If these changes affect your service or the operation of your equipment, the telephone company will give you a written notice in order to allow you to make any changes necessary to maintain uninterrupted service.

In certain circumstances, it may be necessary for the telephone company to request information from you concerning the equipment which you have connected to your telephone line. Upon request of the

telephone company, provide the FCC registration number and the ringer equivalence number (REN); both of these items are listed on the equipment label. The sum of all the REN's on your telephone line should be less than five in order to assure proper service from the telephone company. In some cases, a sum of five may not be useable on a given line.

If Problems Arise: If any of your telephone equipment is not operating properly, and you expect it may be affecting the telephone line, immediately remove it from the telephone line to prevent harm to the telephone network. If the telephone company notes a problem, they may temporarily discontinue service. When practical, they will notify you in advance of this disconnection. If advanced notice is not feasible, you will be notified as soon as possible. When you are notified, you will be given the opportunity to correct the problem and be informed of your right to file a complaint with the FCC. Contact your telephone company if you have any questions about your telephone line. In the event any repairs are required on the H-219, they should be performed only by Design Analysis Associates. In this event call Design Analysis Associates for assistance.

1.5 Connections

1.5.1 Phone Connection

The phone connection is a standard RJ11 connector allowing a simple connection to a phone system.

1.5.2 Power Connection

The terminal strip allows for easy power connections. It is important to use a heavy gauge wire (18 gauge or heavier) for power connections. The power connections are clearly labeled on the instrument housing. **When connecting wires to the terminal strip, it is best to use crimp terminal connectors and not bare wires. This will provide a better long lasting connection.**

1.5.3 Earth Ground Connection

There is a connection for an earth ground. It is very important that an earth ground be provided and connected to this grounding post on the H-219. Other equipment in the system should also be connected to an earth ground.

1.5.4 RS-232 Connection

The RS-232 port is a standard 9 pin D connector. It is configured as a standard type DCE (Data Communication Equipment) device. This will connect directly to the data logger or any other DTE (Data Terminal Equipment) type of device. The pin out is as follows:

SERIAL PORT PIN OUT		
PIN	DIRECTION	COMMENTS
1	Data Carrier Detect (DCD)	Always follows the state of the modem carrier signal.
2	Transmit Data (TD)	Transmit from the modem to the connected device.
3	Receive Data (RD)	Receive data from the connected device.
4	Data Terminal Ready (DTR)	Signal from the connected device that it is ready for communications. When active, this signal will take the modem out of the low power mode and ready to receive commands. This will prevent the modem from answering incoming calls. If an incoming call was already in process, then the H-219 will continue on with that call before accepting commands from the connected device.
5	Ground (GND)	System Ground.
6	Data Set Ready (DSR)	A signal from the modem to the connected device that it is ready for communications.
7	Request to Send (RTS)	Tied to Clear to Send. This prevents hardware handshaking.
8	Clear to Send (CTS)	Tied to Request to Send. This prevents hardware handshaking.
9	Ring Indicator (RI)	Goes active during the actual call in ring process.

Chapter 2 Installation

2.1 Installing the H-219

This chapter will help you to install and connect your H-219. For proper installation, you will need:

- The H-219 with mounting hardware
- The H-219 Owner's Manual
- Communication cables
- Standard phone line cable with RJ-11 jack connectors
- Screw driver to make the power connections
- 18 gauge wire for power and ground connections
- Power source (Battery, Solar panels, AC adaptor, etc.)
- Grounding rod and heavy copper wire for connecting the system to the grounding rod

The following paragraphs give a basic outline of the installation process. Your installation may vary according to your intended application and site conditions.

- Choose the best place to mount the equipment. Wiring should be kept as short as possible. Equipment with displays and keyboards should be easily accessible. Equipment with exposed wiring terminals should be mounted with the terminals toward the bottom of the case. Also consider any future expansion, function of the equipment, vandalism, etc.
- Physically mount all the equipment in the desired locations.
- Connect a power source to the H-219. This power source should be a 12 Volt power source, but not to exceed 16 Volts. Use 18 gauge wires or heavier. When the power is applied, the power LED will light up for a few seconds indicating the unit is ready for use.
- Connect the phone line to the phone line connection of the H-219 using a standard RJ11 connector.

- Connect the RS-232 cable to the XL series data logger or other equipment. When connected to the XL series data logger a straight through cable should be used, a NULL modem adaptor is not required.
- Provide an earth ground for the site. Connect the H-219 to the earth ground using the provided connection point.

2.2 Testing the Installation

The H-219 is designed to be a plug and play device. Once connected, it should function without any additional setup in the data mode and only a few in the voice mode. Normally the voice mode settings of the H-219 will be setup in the office, but they may also be done in the field. This includes recording the site ID message, alarm messages, and data messages. See the next chapter for details on the voice mode setups.

Before leaving a site, make sure the equipment is functioning properly. The best way to confirm that the H-219 is connected properly and operating properly is to call it. The voice mode is the easiest to test. If a cell phone is available, call the H-219 and the voice sign on message should be heard. Run through the different options to verify that they are all working correctly. A common problem is that the messages do not match the data, for example the first message may refer to stage when the data reported is temperature. Either change the messages to correspond to the data or rearrange the order of the data being sent to the H-219.

To test the data mode, it is again best to call the site and verify the connection and operation. When used with an XL series data logger, pressing the enter key a few times should produce the arrow prompt used by the command mode of the data logger or a menu will be displayed. If the command prompt is displayed then standard commands for the XL series logger may be used. If the menu is displayed then the menu may be accessed as usual.

It may also be helpful to hook a current meter to the H-219 and monitor the power consumption of the H-219 in its sleep mode, voice mode, and data mode. The current values below are typical of the modem in its different modes of operation.

MODE OF OPERATION	CURRENT DRAW
Sleep Mode	1 mA
Voice Mode	200 mA
Data Mode	175 mA

3.1 Overview

The H-219 is easy to set up and operate, and can be used as a regular data modem as well as a voice modem. The H-219 is set up and operated like most modems, using standard AT and S register commands. Options related to the voice mode of the H-219 are programmed using an extended set of commands, or from a built in menu.

3.2 Configuring the H-219 for the Data Mode

The main purpose of the H-219 in the data mode is to allow data communications between a PC and a remote **WATERLOG**[®] series data logger. This allows for remote data transfers, and the user may change the data logger setups remotely. If you are using the H-219 in operation with a **WATERLOG**[®] series data logger, all that needs to be done is to connect the power, the RS-232 cable, and the phone line to the H-219.

Although this may seem too simple, the system is designed to be a plug and play system, meaning that only a few setups are necessary for operation. If you are going to use the modem with something other than a **WATERLOG**[®] series data logger, standard AT commands and S registers may be changed for special mode if needed. In most cases no changes are needed.

Note: The H-219 is configured to always answer in the voice mode. When the H-219 is called it first expects a keyed response from a **touch-tone** phone in order to continue with the menu for voice capability. If it does not receive a keyed response within five seconds, the H-219 will automatically switch to the data mode and expect to communicate with another modem in a data mode. The voice mode can be disabled so when called the modem will automatically start in the data mode, bypassing the voice section and 5 second delay.

3.3 Configuring the H-219 for Voice Communication

Before proceeding, an explanation of how and what data will be sent from the data logger to the H-219 modem may be helpful. On the older H-350 and H-500 (Not the XL series loggers), the data options defined to be logged to the FLASH card also determines what data will be sent to the H-219. The only exception is that the time and date will not be sent to the modem even if set to be logged. On the XL series of loggers, there is a special menu option to define what data will be sent to the modem and the order in which it will be sent. For detailed instructions on operation this feature of the data loggers, please see the corresponding data logger owner's manual.

The data coming from the data logger will be stored in memory locations referred to as data value boxes within the H-219. There are ten data value boxes labeled BOX0 to BOX9. As data

is sent from the data logger to the modem it is placed in data box 0 and continues until no more data is sent or all the data boxes are full.

3.3.1 Voice Call In Options

The following worksheet is used to aid in organizing how the H-219 will be programmed for voice operations in conjunction with a **WATERLOG**[®] series data recorder. After filling out the worksheet, the H-219 will be easily programmed in a user definable format. **Take the time to fill out the worksheet before you begin programming the voice portion of the modem. Blank worksheets are provided in the back of the manual.**

H-219 Voice Modem Worksheet # 1		
Site ID Message:		
Data Value Box Number	Data Sources To Be Sent To The H-219	Voice Message Header To Be Recorded
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		

The following is an example of setting up the voice section of the modem using the worksheets. Let's say the application requires Stage, Temperature, and Rain to be logged by the data logger. It is also a good practice to log the battery voltage for diagnostic reasons. The data logger will be programmed to log the following columns of data:

Column Number	#1	#2	#3	#4	#5	#6
	Date	Time	Stage	Temp	Rain	Batt

If you are using an H-350/500, enter the data sources into the column labeled, Data Sources To Be Sent To The H-219, in the same order they will be logged to the flash card, leaving off the Date and Time.

If you are using an H-510 or an H-350/500XL™, enter the data sources into the worksheet in the column labeled, Data Sources To Be Sent To The H-219, in the order they are defined in the voice modem menu option of the data logger.

H-219 Voice Modem Worksheet # 1		
Site ID Message:		
Data Value Box Number	Data Sources To Be Sent To The H-219	Voice Message Header To Be Recorded
0	Stage	
1	Temp	
2	Rain	
3	Batt	
4		
5		
6		
7		
8		
9		

Note: The stage is assigned to data value box 0, the temperature to box 1, and so on. This is important to understand as this relates to the alarm setup section.

Now enter the message the modem should ‘speak’ before each data value is ‘spoken.’ This is referred to as the header message. Each value box will have its own header message. When someone calls the site and requests data, each header message will be played before the corresponding data is reported.

For example: If the river has reached a stage level of 9.5 feet and the header message for the stage is “The Stage in feet is,” the H-219 would ‘speak:’

“The stage in feet is” “nine point five”

The H-219 would then continue on to the next message.

Note: Header messages should be short and specific. The message should include the value (Stage, Temperature, Rain, etc) and the units (Feet, Meters, Degrees C or F, etc) the value is measured in.

H-219 Voice Modem Worksheet # 1		
Site ID Message:		
Data Value Box Number	Data Sources To Be Sent To The H-219	Voice Message To Be Recorded
0	Stage	The stage in feet is...
1	Temp	The temperature in degrees C is ...
2	Rain	The rain fall in inches is ...
3	Batt	The battery voltage is ...
4		
5		
6		
7		
8		
9		

Now enter a message that will identify the site in the space provided for the Site ID Message. It could be a name or a number by which everyone that will have access to the information can easily identify the site. A 5-second interval is provided in which to program the identifying message. Each time the station is called, this message will be the spoken in order to let the caller know which remote site is being called, or if the modem calls due to an alarm condition, the H-219 will identify itself using the Site ID Message. The example entered into the worksheet is: "This is the Logan River gauging station at Amalga."

The text written into the worksheet during this section will be programmed into the voice modem later.

The worksheet is now complete for this call in application example:

H-219 Voice Modem Worksheet # 1		
Site ID Message:	This is the Logan River gauging station at Amalga.	
Data Value Box Number	Data Sources To Be Sent To The H-219	Voice Message To Be Recorded
0	Stage	The stage in feet is...
1	Temp	The temperature in degrees C is ...
2	Rain	The rain fall in inches is ...
3	Batt	The battery voltage is ...
4		
5		
6		
7		
8		
9		

If the alarm call out features are to be used, fill out the Alarm Worksheet in the next section, or skip to the section on programming the H-219 with the information entered in the above worksheet.

3.3.2 Alarm Call Out Options

The H-219 has the ability to call out to user defined phone numbers when an alarm condition has been met. For instance, if the river level is six inches below flood stage and this is a condition that has been pre-programmed into the system, then it will begin to call a pre-programmed list of telephone numbers to warn users of the condition.

The following worksheet is used to aid in setting up the alarm options of the H-219. After filling out the worksheet, the H-219 will be easily programmed using the information on the worksheet. **Take the time to fill out the worksheet before you begin programming the alarm portion of the H-219. Blank worksheets are provided in the back of the manual.**

H-219 Voice Modem Worksheet # 2					
Alarm # 1	Source: (Value Box #)	Alarm Type	Set Point	Reset Point	Alarm Message
Section A					
Section B					
Section C					
Alarm # 2	Source: (Value Box #)	Alarm Type	Set Point	Reset Point	Alarm Message
Section A					
Section B					
Section C					
Alarm # 3	Source: (Value Box #)	Alarm Type	Set Point	Reset Point	Alarm Message
Section A					
Section B					
Section C					
Call Out # 1	Name:		Number:		
Call Out # 2	Name:		Number:		
Call Out # 3	Name:		Number:		
Call Out # 4	Name:		Number:		
Call Out # 5	Name:		Number:		
Call Out # 6	Name:		Number:		
Call Out # 7	Name:		Number:		
Call Out # 8	Name:		Number:		
Call Out Mode:					

Note: There are three separate alarms, and each alarm has three sections. In order for an alarm

to be triggered, the conditions defined in all three sections must be true. This allows for complex alarm conditions to be defined.

The following paragraphs give definitions of terms related to the alarm setup of the H-219:

Alarm: The H-219 has three alarms. The alarms are used to warn users when the data has reached a critical value or condition. The three alarms are independent of each other, and each alarm may be used for separate critical conditions.

Alarm Section: Each alarm has three sections. Each section tests for one condition only. Since there are three sections, each alarm can be configured to go active based on 1, 2, or 3 conditions being true. **Note that all three sections MUST be true for the alarm to go active.** If only one or two sections are used, be sure to set the unused sections to DON'T CARE. If alarms are not used, set at least one section to DISABLE ALARM.

Alarm Source: The alarm source is a value from 0 to 9 indicating which of the data value boxes contains the data value that will be compared against the user entered set point and reset point. The data contained in the data value boxes comes from the data logger as defined in the previous section.

Alarm Type: There are several condition types that can be used with each section. The following table lists the different alarm types.

Alarm Type
0 = DISABLE ALARM
1 = DON'T CARE
2 = LESS THAN
3 = GREATER THAN

Set Point: This is a user entered number that defines a critical threshold against which the data will be compared. If the alarm is enable and the data value exceeds this point based on the alarm type, then the alarm will be activated or triggered. If the alarm type is set to "Less Than" then the data value must be less than the set point in order to activate the alarm. If the alarm type is set to "Greater Than" then the data value must be greater than the set point to activate the alarm.

Reset Point: Once an alarm has activated or triggered it will call out to warn the users

of the alarm condition. If the user acknowledges the alarm, the modem will ignore this alarm until the reset condition is true, even if the alarm conditions are true. The reset point value is only used if the alarm type used is “Less Than” or “Greater Than” and then uses the opposite logic of the alarm type. For example if the alarm type is set to “Greater Than” and the set point is 10.0 and the reset point is 8.0, then the alarm will be true if the data value is greater than 10.0 and will reset when the data value is less than 8.0. It is possible to use a reset value that will allow the alarm to call out as long as the normal alarm condition is met. This may be desired in the case of a low battery. Use a set point of 11.5 volts for example and a reset point of 0.00 and the alarm type of “Less Than” so that when the battery is less than 11.5 volts the alarm is activated and even if acknowledged it will reset the next time the alarms are checked because the battery voltage would be greater than 0.00. When using the menu mode to enter the reset value, a warning message is displayed for this type of condition but it can be ignored.

Alarm Message: This is the message the H-219 will ‘speak’ when it makes an outgoing call to warn the user the data has reached a critical condition as defined by the user.

Call Out Number: This is a number the H-219 will call in the event an alarm is triggered. If the first character of the phone number is an asterisk (*), the number will be disabled. The user may define up to 8 phone numbers to be called. The number 911 is not allowed.

Call Out Mode: The call out mode defines which numbers the H-219 will call when an alarm is triggered. There are two separate modes, **Call Until Acknowledged** and **Always Call Everyone**.

Call Until Acknowledged: In this mode the H-219 will call the numbers in order until a user acknowledges or disables the alarms. If the alarms are acknowledged then the modem will not call any numbers that follow and will keep the alarms inactive until the alarm condition reaches the reset point. If the user disables the alarm, then the modem will not call any more numbers and will not evaluate the alarms any more until the user reenables the alarms.

Always Call Everyone: In this mode the H-219 will call the numbers in order until all numbers are called or a user disables the alarms. Acknowledging the alarms will not stop the modem from calling other numbers. If the user disables the alarm, then the modem will not call any more numbers and will not evaluate the alarms any more until the user reenables the alarms.

For example, suppose the data being sent to the H-219 was: stage, temperature, rain fall, and battery voltage, in that order. The data being sent to the modem in this order means the data boxes have the following meaning.

Box 0 = Stage Data.

Box 1 = Temperature Data.

Box 2 = Rain Fall.

Box 3 = Battery Voltage.

Box 4 to Box 9 are unused.

The user could define 3 separate alarms with 3 sections for each alarm based on the data corresponding to the stage, temperature, rain fall, and battery voltage; box0 to box3.

The user could set Alarm 1 to go active if the stage was near some critical level and it just started to rain. The user would set Alarm 1: Section A to be true if the stage was greater than 10.0 feet (some critical level), and set Alarm 1: Section B to be true if the rain fall was greater than 0.05 inches (just starting to rain). Alarm 1: Section C would be set to 'DON'T CARE' so that it would always be evaluated as true and not prohibit the alarm from triggering if both sections A and B were true.

Note: Remember that all three sections of an alarm must be evaluated as true in order for an alarm to be triggered. If one or more of the sections of an alarm is not being used, set the alarm type to 'DON'T CARE' so that the alarm will be triggered at the appropriate time.

The user could also set Alarm 2 to trigger if the stage was at some medium level but the rain was coming down hard. The user would set Alarm 2: Section A to be true if the stage was greater than 5.0 feet (some medium level), and Alarm 2: Section B to be true if the rain fall was greater than 0.15 inches (raining hard). Alarm 2: Section C would be set to 'DON'T CARE' so that it would always be evaluated as true and not prohibit the alarm from triggering if both sections A and B were true.

Finally, the user could also set Alarm 3 to trigger if the battery voltage was getting too low. The user would set Alarm 3: Section A to be true if the battery voltage was less than 11.5 volts (a minimum value). Alarm 3: Sections B and C would be set to 'DON'T CARE' so that they would always be evaluated as true and not prohibit the alarm from triggering if section A was true.

The user would also define a message that the H-219 would 'speak' when it called the users to warn them of a triggered alarm. Each alarm would have its own message so the user would know what the problem was at the site.

The user would also define the names and numbers of people to be called if an alarm was triggered. If fewer than 8 numbers are used then make sure the other numbers are disabled by

setting the first character of the number to the ‘*’ symbol. The user would also define a call out mode, to call until a user acknowledged the alarms or to always call everyone.

The following worksheet shows these options entered, making it easy to see how the alarms will react to the different conditions.

H-219 Voice Modem Worksheet # 2					
Alarm # 1	Source: (Value Box #)	Alarm Type	Set Point	Reset Point	Alarm Message
Section A	Box-0 (stage)	3 (>)	10.0	8.0	The river level is critical and it is starting to rain.
Section B	Box-2 (rain)	3 (>)	0.05	0.0	
Section C		1-Don't Care			
Alarm # 2	Source: (Value Box #)	Alarm Type	Set Point	Reset Point	Alarm Message
Section A	Box-0 (stage)	3 (>)	5.0	4.0	The river level is not too high, but it is raining hard.
Section B	Box-2 (rain)	3 (>)	0.15	0.0	
Section C		1-Don't Care			
Alarm # 3	Source: (Value Box #)	Alarm Type	Set Point	Reset Point	Alarm Message
Section A	Box-3 (batt)	2 (<)	11.5	0.0	The battery voltage is getting low.
Section B		1-Don't Care			
Section C		1-Don't Care			
Call Out # 1	Name: John Jones			Number: 789-0123	
Call Out # 2	Name: Jane Jones			Number: 1-234-567-8901	
Call Out # 3	Name: Jack Jones			Number: 765-4321	
Call Out # 4	Name: DISABLED			Number: *	
Call Out # 5	Name: DISABLED			Number: *	
Call Out # 6	Name: DISABLED			Number: *	
Call Out # 7	Name: DISABLED			Number: *	

Call Out # 8	Name: DISABLED	Number: *
Call Out Mode:	Always Call Everyone	

3.3.3 Programming Voice Messages into the H-219

With the information from the worksheets filled out in the last few sections of this chapter, the H-219 is ready to be programmed. The H-219 is normally programmed using the menu mode described in chapter 5. A command mode was used in the first versions of the modem but does not offer any commands for newer options added to newer versions of the modem. The command mode is still used for some manufacturing options and the original user commands are still usable. The command mode is described in chapter 4 but in most cases can be ignored.

Refer to chapter 5 to record voice messages, and enter in other values for alarms as needed. When recoding voice messages keep in mind the quality of the recording will affect the quality of the message when played back. The following are hints to a quality recording. Experiment with the unit to decide what works best.

- Speak in a normal voice with clear word pronunciation.
- Keep a distance of about 18 inches seems to work well when recording messages.
- Play back your message to verify a correct recording.
- Check to make sure the message fits in the time allotted.
- Press any key to eliminate long pauses if the message is shorter than the allotted time.
- Record messages with little or no background noise.

3.4 Setup and Testing

After setting up all the parameters there is a way to check the system making sure it's working as expected. This is done by manually manipulating the data and calling the H-219. Data values can be easily entered in for each data box using the main menu allowing the unit to be tested. Once data values are entered into the data boxes the use can exit the menu, disconnect the PC and call the modem to see that the voice messages and data are as expected, and that the alarm options are working.

3.5 Voice Call In Menu

When calling the H-219 it will respond with the message: “Press Zero For The Menu”. Pressing the '0' key on the phone will cause the H-219 to ‘speak’ its ‘Call In’ menu. This menu with its options is listed below:

Press: 1 for a new measurement.
2 for the last measurement.
0 to repeat the menu.

Pressing '1': This instructs the H-219 to request a new measurement from the H-350. This may take several seconds and is based on the type of sensors connected to the logger.

Pressing '2': This causes the H-219 to ‘voice’ or speak the last measured data from the logger.

Pressing '0': This causes the H-219 to repeat the menu.

NOTE: The following are valid options that are not part of the spoken menu.

Pressing '*123': This is a hidden option that will access the ‘Call Out’ menu. The call out menu has the extended options dealing with the alarms.

Pressing '7': When moving through the historical data, this key causes the H-219 to move forward in time. This is used in conjunction with the ‘9’ key which moves back in time. These options allow historical data to be reviewed to look for trends in the data. The modem will hold 12 historical data values for each data box. When these options are used the modem will ‘voice’ or say “Scan XX” where XX is a number 0 to 12 indicating scan number 0, the newest scan, to scan number 12, the oldest scan, after which it will voice the data in each data box for that scan.

Pressing '9': This causes the H-219 to move back in time so historical data can be reviewed to look for trends in the data. This is used in conjunction with the ‘7’ key. See the description above for the ‘7’ key for more information.

The modem will ‘voice’ a good-bye message and hang-up if there is no key press for 5 seconds.

3.6 Voice Call Out Menu

When an alarm is activated the H-219 will call out to the programmed phone numbers and if answered will respond with the message: "Press Zero For The Menu." Pressing the '0' key on the phone will cause the H-219 to 'speak' the 'Call out' menu. This menu with its options is listed below: If no key is pressed for 5 seconds the modem will speak a 'Good bye' message.

Press: 1 for a new measurement.
2 for the last measurement.
3 to repeat alarm messages.
4 to enable alarms.
5 to disable alarms.
6 to acknowledge alarms.
0 to repeat the menu.

Pressing '1': Instructs the H-219 to request a new measurement from the H-350. This will take at least 15 seconds and may be longer based on the setup options of the H-350.

Pressing '2': This causes the H-219 to 'voice' the last measured data received from the H-350.

Pressing '3': This causes the H-219 to repeat any alarm messages for alarms that have gone active.

Pressing '4': This causes the H-219 globally enable the alarms.

Pressing '5': This causes the H-219 globally disable the alarms.

Pressing '6': This causes the H-219 acknowledge the alarm call out action.

Pressing '0': This causes the H-219 to repeat the menu.

NOTE: The following are valid options that are not part of the spoken menu.

Pressing '7': When moving through the historical data, this key causes the H-219 to move forward in time. This is used along with the '9' key which moves back in time. These options allow historical data to be reviewed to look for trends in the data. The modem will hold 12 historical data values for each data box. When these options are used the modem will say "Scan XX" where XX is a number 0 to 12 indicating the scan number with 0 being the newest and 12 being the oldest scan, after which the data in each data box for that scan will be spoken.

Pressing '9': This causes the H-219 to move back in time so historical data can be reviewed. See the description above for the '7' key for more information.

Chapter 4

Modem Command Reference

4.1 Introduction

The modem commands are broken down into two main sections, one for the data commands and one for the voice commands. The data commands follow the standard modem AT command set, and the voice commands are specific for the H-219 only.

4.2 Voice/Alarm Commands

All voice commands must be terminated with a Carriage Return or a Carriage Return and Line Feed pair. This will not be shown in the descriptions below. All responses will be terminated with a Carriage Return and Line Feed pair.

Command: VOICE

Description: Places the modem in a mode to receive commands associated to the voice and alarm settings of the modem. **This command must be issued before any of the other voice/alarm setup commands are issued!**

Response: A prompt will be displayed '->' indicating that the H-219 is in the voice mode.

Command: SETBOX'x' vvvvvvvv

Description: Places value vvvvvvvv into data value box 'x'. When connected to a **WATERLOG®** series data logger, the data logger will automatically send this command to the H-219 for each data value box defined.
'x' = 0 to 9 for data value box 0 to 9.

Response: OK

Command: BOX'x'

Description: See the data in data value box 'x'.
'x' = 0 to 9 for value box 0 to 9.

Response: vvvvvvvv

Command: DATASTAT

Description: See the data in all the data value boxes on one screen.
The modem must be in the VOICE mode before using this command.

Response: All 10 values will be printed on separate lines.

Command: ALARMSTAT
Description: Print all information for the alarm settings.
The modem must be in the VOICE mode before using this command.
Response: The screen is filled with the alarm info.

Command: SETTRIGGER 'as' vvvvvvvv
Description: Set the Set Point for Alarm 'a' Section 's'
'a' is Alarm number 1 to 3.
's' is Section A, B, or C.
vvvvvvvv is the number value.
Response: OK

Command: TRIGGER 'as'
Description: See the Set Point for Alarm 'a' Section 's'
'a' is Alarm number 1 to 3.
's' is Section A, B, or C.
Response: vvvvvvvvvv

Command: SETTYPE 'as' t
Description: Set the Alarm Type for Alarm 'a' Section 's'
'a' is Alarm number 1 to 3.
's' is Section A, B, or C.
't' is the alarm type.
t = 0 = DISABLE ALARM
t = 1 = DON'T CARE
t = 2 = LESS THAN
t = 3 = GREATER THAN
Response: OK

Command: TYPE 'as'
Description: See the Alarm Type for Alarm 'a' Section 's'
'a' is Alarm number 1 to 3.
's' is Section A, B, or C.
Response: DISABLED
DON'T CARE
LESS THAN
GREATER THAN

Command: SETSOURCE'as' t
Description: Set the Alarm Source for Alarm 'a' Section 's'
'a' is Alarm number 1 to 3.
's' is Section A, B, or C.
't' is the Alarm Source, t = 0 to 9 for one of the data boxes 0 to 9.
Response: OK

Command: SOURCE'as'
Description: See the Alarm Source for Alarm 'a' Section 's'
'a' is Alarm number 1 to 3.
's' is Section A, B, or C.
Response: t, t = 0 to 9 for one of the value boxes 0 to 9.

Command: SETCALL'x' nnnnnnnnnnnnnnn
Description: Set the call out phone number x.
'x' is call number 1 to 5.
nnnnnnnnnnnnnnnn is the phone number, up to 15 characters.
A number beginning with '*' disables this number.
Response: OK

Command: CALL'x'
Description: See the call out phone number x.
'x' is call out number 1 to 5.
Response: nnnnnnnnnnnnnnn is the phone number.

Command: ENABLEALARMS
Description: Global alarm enable command.
Response: OK

Command: DISABLEALARMS
Description: Global alarm disable command.
Response: OK

Command: RID
Description: Record the Site ID voice message. This is internally limited to about 5 seconds. If the message is short, then pressing any key will stop the recording sooner than the internal limit. This may help the quality of the play back message.

Response: Recording...
OK

Command: PID
Description: Play the Site ID voice message.

Response: Playing...
OK

Command: RH'x'
Description: Record the data value x header message. This is internally limited to about 5 seconds. If the message is short then pressing any key will stop the recording sooner than the internal limit. This may help the quality of the play back message.

'x' = 0 to 9 for data box 0 to 9.
Response: Recording...
OK

Command: PH'x'
Description: Play the data header x voice message.

'x' = 0 to 9 for data box 0 to 9.
Response: Playing...
OK

Command: RA'x'
Description: Record the alarm x voice message.
'x' = 1 to 3 for alarm 1 to 3. This is internally limited to about 7 seconds. If the message is short, then pressing any key will stop the recording sooner than the internal limit. This may help the quality of the play back message.

Response: Recording...
OK

Command: PA'x'
Description: Record the alarm 1 voice message.

'x' = 1 to 3 for alarm 1 to 3.
Response: Playing...

OK

Command: INITVO CAB

Description: This is an advanced command used in the manufacturing process. The voice section of the modem has a chip that can store 120 seconds of voice information. All the voice messages are stored in this chip. This command partitions the chip into different segments based on the message to be recorded. Normally the user will never have to issue this command and if it is used then all the voice messages will have to be recorded again. This includes the messages normally not changed by the user such as the menus and the numbers, etc.

Response: The modem will make a series of clicking sounds and then respond with OK.

Command: EDITVO CAB

Description: This is an advanced command used in the manufacturing process. The voice section of the modem has a chip that can store 120 seconds of voice information. All the voice messages are stored in this chip. This command prints a prompt to the screen and the technician will record these messages into the modem by pressing the 'R' key to record the prompted text, 'N' to move to the next message, and any other key to play back the last recorded message.

Response: A series of prompts are displayed on the screen and the technician records these messages into the modem. The messages include the menus, the digits 0 to 9, alarm messages, etc.

4.3 Miscellaneous Commands

Command: INITSTRING

Description: Displays the current modem initialization string.

Response: The response is the current initialization string. If it is set to the default string it would respond with the following: ATE0Q1&K4&C1

This can be broken down as follows:

AT This tells the modem to pay attention, that a series of commands may follow.

E0 This turns the echo mode off.

Q1 This turns the quiet mode on.

&K4 This enables the XON / XOFF data flow control

&C1 This causes the carrier detect pin to follow the state of the actual carrier detect.

Command: SETINITSTRING string
Description: Allows the user to there own modem initialization string.
Response: OK
The new string is saved in the modem.

Command: SETINITDEFAULT
Description: Resets the initialization string to the default value of ATE0Q1&K4&C1.
Response: OK

Command: SETBAUD
Description: Sets the baud rate to 9600, 4800, 2400, or 1200. The default is 9600 and this will work fine for most all applications. Some applications may be more reliable at a slower baud rate.
Response: OK

4.4 Data Commands

The modem uses a standard AT command set for data connections. However, since the H-219 is intended for remote data logging applications several of the commands are set or changed as the H-219 sees fit. This prohibits the user from setting an option and expecting it to stay valid or active. The main options the H-219 uses for remote communications are listed below:

ATE0: Turn ECHO off.
ATQ1 Turn off command responses.
AT&K4 Turn on Xon / Xoff flow control.
AT&C1 Follow the state of the Carrier detect signal.

Other commands are used as needed. The S register 0 is available but is bypassed by the H-219. The H-219 does NOT use this register for auto answer, but is setup to answer all calls regardless of the modem settings.

Chapter 5

Menu Mode Reference

5.1 Introduction

The user normally programs the different options of the H-219 using a built in menu interface. The menu interface is easy to use and allows the user to record and play all voice messages as well as program the alarm conditions and insert test data for testing the H-219 setups. The menu interface can be accessed using any terminal emulation program running on a PC. The emulation software should have the following settings for proper operation and presentation of the menu mode options:

Speed:	9600 Baud
Data Bits:	8
Stop Bits:	1
Parity:	None
Duplex:	Full
Emulation:	VT 52

5.2 Menu Mode Options

Once the H-219 is connected, the user can type in 'VOICE' to enter the command mode or can type in 'MENU' to start the built in menu. If in the command mode, typing 'MENU' will still start up the menu interface. When the menu is first started the following menu will appear:

```
*** H-219 Voice Modem Main Menu (Version 2.09) ***
0 - DataBox 0 =                -- Current Data Values --
1 - DataBox 1 =                User May Change Values
2 - DataBox 2 =                As Needed For Testing
3 - DataBox 3 =                Press D to see all data values
4 - DataBox 4 =
5 - DataBox 5 =
6 - DataBox 6 =
7 - DataBox 7 =
8 - DataBox 8 =
9 - DataBox 9 =

B - Fixed Baud Rate:          9600
M - Data / Voice Mode:       Voice and Data
I - Modem Initialization String: ATE0Q1&K4&C1
V - Edit Voice Messages:
A - Edit Alarm Conditions:
C - Connected Device:        H-350XL / H-500XL

ESC to Exit

Enter Option>
```

- Notes:**
- 1 - The user must type the 'VOICE' command first before trying to enter the menu mode!
 - 2 - The communication software must use VT52 emulation to display the menu properly!

The H-219 main menu presents the user with several setup options. The user may enter test data values into any of the 10 data value boxes. The user may also change the communication Baud Rate

at which the modem operates, enable the H-219 for data communication only or for both data and voice communication, and edit the modem initialization string. The user may also edit all the voice messages and alarm conditions.

5.2.1 Entering Test Data and Historical Data

The user has the option to enter a data value into any of the modem's data value boxes for purposes of testing the modem setups. This is easily accomplished by selecting the desired data value box by pressing the corresponding number key, 0 - 9. After the number key press the H-219 will prompt for the value to be entered:

Enter Value for Data Box 0:

At this point the user can enter the test data value. The data value box default is empty, no value stored within the data value box. When the H-219 begins operation, the measured data sent to the H-219 will overwrite any test data entered into the data value boxes by the user.

Entering test data in this manor does not overwrite historical data. To see the historical data press the 'D' key. The historical data is used to check for trends in the data. Below is the screen that shows the historical data. The historical data will go back 12 scans based on the scan rate of the data logger. If the logger is scanning at a rate of once an hour then the historical data will go back a half day.

*** Current Data Values Screen ***											
Scan	Box	0	1	2	3	4	5	6	7	8	9
Scan 00		(Values here were scanned at the last scan time or by a pressing the 1 key on the phone)									
Scan 01		(Values on this line are from the last scan interval)									
Scan 02		(Values on this line are from 2 scan times ago)									
Scan 03											
Scan 04	42.87	(The example data for box 0 show a few historical values for box 0,									
Scan 05	42.85	Notice the trend is a rise in the value, 42.55 is the oldest displayed value,									
Scan 06	42.82	and 42.87 is the newest value displayed for this sensor)									
Scan 07	42.74										
Scan 08	42.69										
Scan 09	42.63										
Scan 10	42.55										
Scan 11											
Scan 12		(Values on this line are from 12 scans ago)									

The 'Scan 00' row of data is the last measured data wether from an automatic update based on the scan rate of the data logger or a forced measurement requested by the user.

The 'Scan 01' to 'Scan 12' rows of data are based on automatic updates based on the scan rate of the data logger, with 'Scan 01' being the newest data and 'Scan 12' being the oldest data.

During an automatic update of the data, all data will be shifted down one row. For example data in 'Scan 05' will be moved to the row for 'Scan 06'. The data in the row for 'Scan 12' will be discarded and the new data will be placed in the row for 'Scan 01'. The new data will also be placed in the row for 'Scan 00'. This will give a half days worth of historical data based on a 1 hour scan rate.

During a forced update, only the row 'Scan 00' will be updated. This prevents the forced updates to cause the historical data from being shifted and lost.

NOTE: The historical data can be accessed in the voice mode by using the '7' and '9' keys on the phone keypad to move back and forth through the data. There is no voice prompt on using these two keys.

In the voice mode a message identifier such as "Scan 1" or "Scan 12" will be spoken, and then the data for that scan will be spoken. Scan 1 is the last (newest) data scanned based on the scan interval of the data logger and scan 12 would be the oldest data scanned or 12 scan intervals ago. Pressing the 9 key moves back in time towards scan 12 and the 7 key moves forward towards scan 00. Again if a new measurement is manually requested it will overwrite the data as scan 00 but will not cause the historical data to be shifted.

5.2.2 H-219 Settings

The user may also change certain modem settings when using the menu mode.

Selecting B - Fixed Baud Rate:, allows the user to select, or change, the serial data baud rate between the H-219 and external devices. After the key press the following valid Baud Rate options will appear within the main menu screen

Baud Rate Options

- 0 = 9600
- 1 = 4800
- 2 = 2400
- 3 = 1200

Select the desired serial baud rate and enter that number at the prompt. The default value is 9600. The Baud Rate selected should match the speed at which the communication software is running.

Selecting M - Data / Voice Mode:, will allow the user to select the mode of operation for the H-219, either Voice and Data (default) or Data Only. Pressing 'M' to select the mode of operation will toggle the mode setting between the 'Voice and Data' and 'Data Only' options.

Selecting I - Modem Initialization String: prompts the user to enter a new modem initialization string. The modem initialization string are the AT commands that are automatically executed upon power up and initialization of the H-219. Upon selecting 'I' the user is prompted:

Enter New Modem Initialization String:

The user can enter the new initialization string at this prompt.

Selecting C - Connected Device option will indicate to the modem how it should disconnect when in the data mode. If the modem has not detected activity for some time period and it detects the connected device is an XL series logger or older 350 / 500 series logger, the modem will try to properly turn the logger off and return to the low power mode.

5.2.3 Programming Voice Messages into the H-219

Selecting V - Edit Voice Messages:, allows the user to play / record the voice messages. The following menu screen appears :

```
*** H-219 Voice Messages Menu      ESC to Exit ***
R - Record Mode: OFF
I - ID Message
0 - Data Message 0
1 - Data Message 1
2 - Data Message 2
3 - Data Message 3
4 - Data Message 4
5 - Data Message 5
6 - Data Message 6
7 - Data Message 7
8 - Data Message 8
9 - Data Message 9
A - Alarm Message 1
B - Alarm Message 2
C - Alarm Message 3
Enter Option->
```

This menu screen allows the user to play / record the voice data header and alarm messages. With the R - Record Mode: OFF, selecting any of the messages will play the current voice

message. For example, with the record mode OFF, selecting 'I' will play the current Site ID Message, or selection 'A' will play the current message for Alarm Message 1. After selecting the message to playback, the H-219 will respond with a message indicating what is being played back, for example:

Playing ID Message

To record new messages, first enable the record mode by selecting R, this will cause the record mode status to be displayed ON.

R - Record Mode: ON

Select the message you wish to record. It is recommended that you use the H-219 worksheets filled out in chapter 3 of the manual. Upon selecting the message to record, the user will have approximately 4 to 5 seconds to speak / record the desired message. Be ready to speak immediately after selecting the message to record. The H-219 will respond with a message indicating what is being recorded, for example:

Recording ID Message

If the message is shorter than the allotted time, pressing any key will stop the recording, thus eliminating long pauses in the playback; Otherwise at the completion of the allotted recording time, the H-219 will stop recording automatically.

The record mode will be disabled after each message is recorded. Therefore, in order to record multiple messages simultaneously, the user must enable the record mode each time prior to selecting a message to record.

The user may return to the main menu by pressing the 'ESC' escape key.

5.2.4 Alarm Call Out Options

Selecting A - Edit Alarm Conditions, allows the user to edit each of the three alarm sections, define the call out numbers, and select the call out mode. The following menu screen appears.

```

*** H-219 Alarm Menu          ESC to Exit ***

Alarm      S-Source  T-Type      P-Set Point  R-Reset Point
1 - A      IF  Box-0  IS  This Alarm Has Been Disabled
   B      AND Box-0  IS  DON'T CARE      0.000      0.000
   C      AND Box-0  IS  DON'T CARE      0.000      0.000

2 - A      IF  Box-0  IS  This Alarm Has Been Disabled
   B      AND Box-0  IS  DON'T CARE      0.000      0.000
   C      AND Box-0  IS  DON'T CARE      0.000      0.000

3 - A      IF  Box-0  IS  This Alarm Has Been Disabled
   B      AND Box-0  IS  DON'T CARE      0.000      0.000
   C      AND Box-0  IS  DON'T CARE      0.000      0.000

A - Phone # 1 = *1111111111111111  E - Phone # 5 = *5555555555555555
B - Phone # 2 = *2222222222222222  F - Phone # 6 = *6666666666666666
C - Phone # 3 = *3333333333333333  H - Phone # 7 = *7777777777777777
D - Phone # 4 = *4444444444444444  I - Phone # 8 = *8888888888888888

M - Call Out Mode: Call Until Acknowledged
G - Global Enable: Alarms are Disabled

Enter Option:

```

This menu screen allows the user to select or change the source, type, set and reset points of each of the alarms. Each of the three alarms have three separate sections: A, B, and C. To edit Alarm 1 Section A, the user must press 1, then press A, and then press S to select the Source or press T to select the Type or press P to define the Set Point and so on. Therefore, in order to edit an alarm condition, the user must issue three key presses: Select the Alarm Number, then the Alarm Section, and last the Alarm Option to be edited. Following each key press the H-219 will respond as follows:

- Alarm 'X' (For Alarm 'X', X = 1, 2, or 3.)
- Section 'Y' (For Section 'Y', Y = A, B, or C.)
- Enter New Source Box (0 to 9): (To select Source)
- Enter New Alarm Type (0 to 3): (To select Alarm Type)
- Enter New Set Point: (To define a set point)
- Enter New Reset Point: (To define a reset point)

Possible options for the Alarm Sources are any of the 10 voice Data Value Boxes, Box 0 - Box 9.

When selecting a new Alarm Type, the following table presenting the Alarm Type options will appear on the Alarm Menu:

- 0 = DISABLE ALARM
- 1 = DON'T CARE
- 2 = LESS THAN
- 3 = GREATER THAN

When entering a set point, the user enters a value that represents a critical threshold that when

reached by the selected data will cause an alarm. The reset point is entered the same way and represents the value the data source must reach to reactivate the alarm once it has been acknowledged. When the alarm has been acknowledged, the modem looks and uses the opposite logic on it as indicated by the alarm type to see if the alarm should be reactivated. The following example will help explain the operation of the set and reset points.

Alarm 1 section A is set to trigger when the stage (Box 0) is greater than 10.00 feet. And reset when it is 8.00 feet. As the water level fluctuates up and down but stays below the 10.0 foot level the alarm is never activated. When the stage goes over 10.0 feet the alarm is triggered and the modem starts making phone calls to the entered numbers. If the user acknowledges the alarm then the modem will not call out again until the stage goes less than the reset point of 8.0 feet and then above the 10.0 foot level again. This prevents the modem from calling out over and over again if the water level is fluctuating right at the set point.

This menu also allows the user to define the phone numbers that the modem will call out to in the case an alarm is triggered. The user may define up to 8 numbers by selecting a letter A through F, H and I. To disable a phone number, the first character of the phone number must be a '*'. After selecting the number to be edited, the H-219 prompts:

```
Enter New Number or '*' to Disable:
```

By selecting M, the user can select the Call Out Mode the H-219 will follow when an alarm is triggered. Selecting M will cause the H-219 to toggle between the two options, "Call Until Acknowledged" and "Always Call Everyone".

Call Until Acknowledged: In this mode the H-219 will call the numbers in the list, beginning with the first number and continuing through the numbers until a user acknowledges the alarms or the last number is tried. If the alarms are acknowledged then the reset condition must be met to reactivate the alarm. If the user disables the alarms then the modem will not call any other numbers activated, and will no longer check the alarms until the user reenables the alarms.

Always Call Everyone: In this mode the H-219 will call all the numbers in the list that are not disabled when an alarm is triggered. If the user acknowledges the alarms it will have no effect, later calls will still be made. If the user disables the alarms then the modem will not call any other numbers activated, and will no longer check the alarms until the user reenables the alarms.

This menu also has the option globally enable or globally disable the alarms. This allows the user to temporarily turn off the alarms without losing all the set up information. When the user desires to turn the alarms on again, the user must simply select 'G' to enable the alarms. Pressing 'G' causes the H-219 to toggle the alarms between enabled and disabled. **For the alarms to go active, the global enable must read: Alarms Are Enabled!**

To exit back to the command mode prompt, '->', press the escape key until the prompt is displayed. Exit the voice mode by typing 'EXIT' at the prompt.

Chapter 6

Maintenance and Trouble Shooting

6.1 Maintenance

Sustained operation of the H-219 is almost maintenance-free. There is no desiccant or serviceable parts to maintain. It is always best to keep the unit as dry as possible and out of direct sun light.

6.2 Trouble Shooting

It is unlikely that this manual will ever contain trouble shooting tips to cover every problem that may be encountered. Feedback from customers is very valuable and greatly aids in the quest for constant product enhancement. Please feel free to call the factory for technical assistance, and also to share solutions you have found to past problems. The following paragraph present some **possible** solutions to a few problems that may be encountered.

Will not answer when called:

1. The H-219 may be busy communicating with the connected device. If so, it will not answer the call. If connected to a **WATERLOG**[®] series data logger, the H-219 will be activated when the data logger turns on to make a measurement, the H-219 will be active until the measurement is complete and data has been sent to the H-219 data value boxes. This normally takes 15 seconds but can be longer based on the settings and the sensors that are connected. Wait for a minute or so and try again.
2. If the line is busy, someone else may be talking to the H-219 or it is trying to make out going calls based on some alarm condition.

The “Press 1 For New Measurement” option responds with “No Data Available”:

1. The connected data logger may not be responding to commands from the H-219 to take a new reading. Check the cable between the H-219 and the connected device. Make sure the connected device is functioning properly.
2. If the connected device is an H-350/500 then the data sent to the H-219 is the same data being logged to the FLASH card. If there is no data defined to go to the FLASH card then no data will be sent to the H-219. Make sure the data being logged to the FLASH card is the same as what is wanted for the H-219 modem. If you are using an H-510 or an H-350/500XL[™], check the voice modem setup menu option to ensure the data to be sent to the H-219 is defined correctly.

Voice data does not seem to be as expected:

1. The data being sent to the H-219 is in a different order than what is expected. If the connected device is an H-350/500 make sure the data being logged to the FLASH card is in the same order as expected by the H-219, or rearrange the H-219 data order to match that of the H-350. If you are using an H-510 or an H-350/500XL™, check the voice modem setup menu option to ensure the data to be sent to the H-219 is defined correctly.
2. The connected device is malfunctioning. The H-219 just reports what it is given. If errors are present the H-219 is not able to distinguish them from the normal data. Test the device sending data to the H-219.

Miscellaneous Problems:

1. The lack of a proper earth ground can result in several unexplained problems. Please make sure the complete system is properly grounded.
 - Double check that all the power cables are connected well.
 - Low power can cause the modem to function abnormally or not at all.
 - If the modem will not return to the low power mode make sure the device connected to the serial port is turning off properly. When connected to a PC that is running a terminal emulation program, the modem will stay on continuously.

Normally, a very high percentage of the problems can be related to power supply problems, bad or incorrect wiring, or system options are not set up correctly. In most cases these problems can easily be resolved. Whatever the problem, remember we are here to help with your application.

Appendix A Specifications

ENVIRONMENT

Temperature

Operating Range: -25 to 60 °C
Storage: -40 to 80 °C

Humidity

0-95% non-condensing

INTERFACE

RS-232 Input / Output

Baud Rate: 1200 to 9600 (Default is 9600)
Protocol: RS-232C, 8-bit no parity, 1 stop bit

Telephone

Connector: Standard RJ-11 modular
Approval: FCC part 68

MECHANICAL DATA

Physical

Enclosure: Extruded Aluminum base with metal shell
Size: 4.175 inches wide, 1.60 inches tall, 7.0 inches deep
Weight: Less than 1.5 pounds

POWER

Input Voltage: 10.0 to 16.0 volts DC
Input Current:
Sleep Mode: 2.0 milliamperes maximum
0.7 milliamps typical
Active Mode: 225 milliamperes maximum

MISCELLANEOUS

Warranty

WATERLOG® Series H-219 is warranted against defects in materials and workmanship for one year from date of shipment.

Notice:

Specifications subject to change without prior notice due to ongoing commitment to product testing and improvements.

Appendix A Specifications

Appendix B

H-219 Worksheets

H-219 Voice Modem Worksheet # 1 (Data Box Setup)		
Site ID Message:		
Data Value Box Number	Data Sources To Be Sent To The H-219	Voice Message Header To Be Recorded
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		

H-219 Voice Modem Worksheet # 2 (Alarm Setups)				
Alarm # 1	Source: (Value Box #)	Alarm Type	Set Point	Alarm Message
Section A				
Section B				
Section C				
Alarm # 2	Source: (Value Box #)	Alarm Type	Set Point	Alarm Message
Section A				
Section B				
Section C				
Alarm # 3	Source: (Value Box #)	Alarm Type	Set Point	Alarm Message
Section A				
Section B				
Section C				
Call Out # 1	Name:		Number:	
Call Out # 2	Name:		Number:	
Call Out # 3	Name:		Number:	
Call Out # 4	Name:		Number:	
Call Out # 5	Name:		Number:	
Call Out Mode:				

H-219 Voice Modem Worksheet # 3 (Historical Data Worksheet)

Date: / /		Scan Rate: : :			Site:			Notes:			
Scan Number	Scan Time HH:MM:SS	Box 0	Box 1	Box 2	Box 3	Box 4	Box 5	Box 6	Box 7	Box 8	Box 9
00	: :										
01	: :										
02	: :										
03	: :										
04	: :										
05	: :										
06	: :										
07	: :										
08	: :										
09	: :										
10	: :										
11	: :										
12	: :										

