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1. Introduction

Weather information is becoming an essential part of our daily lives. This information must be current, accurate and easily accessible. With the advent of microelectronics and smart software, Sphere Communications is able to provide an easy to use, low cost automatic weather reporting system. This system enables the user to call a remote weather station via telephone and listen to the current report in a digitally recorded voice. WeatherVox is a complete turnkey solution for all users with a compatible weather station such as the Peet Bros Ultimeter range of Weather Stations.

WeatherVox is able to provide the user with a detailed, intermediate or brief report. DTMF (dial tone) decoding on board allows for the user to send commands to WeatherVox which set parameters that allow user definable report lengths and thus the ability to set up WeatherVox to meet the customer's demands. Some basic features of WeatherVox include outdoor temperature, wind speed, wind direction, daily rainfall and historical data on maximum and minimum values.

2. Physical Description

The IVRS-3 WeatherVox is supplied in a grey plastic housing with dimensions of 200mm x 112mm x 30mm. A 9VDC plug pack rated at 600mA together with a telephone cable and a RS232 data cable are included. The data cable is supplied with a RJ11 and RJ12 style connector, the telephone cable is supplied with two RJ11 style connectors. All electronic components are mounted on a multi-layer printed circuit board (PCB) incorporating surface mount and plated through technologies thereby minimising electromagnetic interference (EMI). The housing includes power socket, RJ11 sockets and status LEDs.

3. Installation

Installation of WeatherVox is simple and straight forward. Instructions A. through C. should be followed prior to use. Two cables are provided with WeatherVox, one for connection to the telephone line and the other for connection to the RS232 output of the Weather Station. The unit itself has terminals labelled RS232, Line In and 9VDC. An approved 9VDC plug pack is also supplied with this unit for connection to the AC outlet. This is plugged into the 9VDC socket of WeatherVox.

A. Connect the 9VDC plugpack to the power supply socket of WeatherVox.

B. Connect the Ultimeter 2000 serial data output terminal, which is on the right hand edge of the keyboard display, to WeatherVox serial RS232 data input terminal.

C. Connect your dedicated phone line to the phone line connection on WeatherVox.

When power is applied to WeatherVox and the RS232 cable is connected, data flow can be verified by viewing the RD LED (receive data).The TD LED (transmit data) will only come on when WeatherVox is interrogating the weather station. On power up, the STATUS LED will flash three times and then remain on whilst power is applied to the unit. When a call is received this STATUS LED will flash with each corresponding ring received from the calling party.

4. Additional User Selected Features

A. Battery Backup Jumper

WeatherVox has the ability to hold important information in memory through the use of battery backed RAM, thus alleviating the problem of information loss due to power failure. This feature is disabled at the factory and requires the installation of a battery jumper when commissioning on site. The battery jumper, J15 is a two pin header located to the right of the battery and below a three pin header (J14). To enable battery backup, place the jumper across the 2 pin header, J15. In the event of the battery backup being disabled, historical data is still stored in a small amount of nonvolatile RAM contained in WeatherVox.

In this version of WeatherVox there is no need for the battery to be connected as all of the historical data that WeatherVox stores is maintained in a small amount of nonvolatile RAM inside WeatherVox. For this reason, it is not necessary to either insert the battery or enable the jumper J15. In future versions of WeatherVox the battery backup will be used to enable larger amounts of detailed historical data to be stored.

B. Dip Switch Settings

Eight user configurable dip switches are available on board. These dip switches are used to set the spoken units of measurements for WeatherVox . Units of temperature, wind speed and rainfall can be changed to suit the application. The factory default for temperature is degrees celsius, wind speed is kph, a rain gauge is assumed to be installed and measured in inches. A table with these settings is detailed in Appendix A.

C. PTT Connection for 2 Way Radio

This option can be set at the factory on the purchasers request. It allows for connection to WeatherVox by mobile radio instead of by telephone. The soft settings mode is still accessible.

5. Using WeatherVox

Firstly, connect WeatherVox, Ultimeter 2000 weather station and the telephone line as described in Section 3. Now, from another telephone line, call the number that the unit is connected to. WeatherVox will answer after two rings (by default) and will start to speak a brief report over the telephone line. The report is given once and WeatherVox will hang up at the end of the report unless the unit is given a DTMF command to stay on line. A DTMF code is sent to the unit by pressing a sequence of keys on your telephones key-pad.

6. Starting WeatherVox for the first time

When WeatherVox answers, the sequence of responses are as given in Appendix B. Depending on the report type selected, the responses will contain some or all of the data that WeatherVox has available.

At the completion of the report the message “Please press hash for more information” will be heard. The user then has 4 seconds to enter the 4 digit default pin number, which is 1234, and thus gain access to the soft settings mode. Input of an incorrect pin number will end the call. Once the user hears the “door open sound” the soft settings mode has been entered. Features of WeatherVox can now be changed, over the telephone line, on the user’s command from the telephones keypad. Some basic examples of these features include setting the time and date, the number of rings before WeatherVox answers, the pin number and the 12 or 24 hour clock mode. A detailed list of DTMF codes, and their applications are given in the section 7.

IMPORTANT INFORMATION CONCERNING RAINFALL.

After you have connected up WeatherVox to the phone line and Ultimeter 2000 Weather Station, it is important that you reset the rainfall values on the Ultimeter 2000 as well as in WeatherVox to ensure that valid values are obtained for the daily, weekly, monthly and yearly rainfall.

In performing this procedure you MUST reset the Ultimeter 2000’s rainfall values BEFORE you reset the rainfall values in WeatherVox with the code *903* in the soft settings.

To reset the rainfall values on the Ultimeter 2000 please consult its user manual.This ensures that Weathervox will sample the correct values from the Ultimeter Weather Station when you commence operation.

If you wish to leave WeatherVox on for extended periods of time (greater than one year) then it is necessary to clear the accumulated rainfall value on the Ultimeter 2000 Weather Station whenever a year is completed. The internal value stored in WeatherVox will be cleared automatically when a year is completed. To be sure that these two values remain synchronised you should perform the same process as you did when first starting the unit. That is, reset the rainfall values on the Ultimeter 2000 and then reset the rainfall values stored in WeatherVox with the code *903* in the soft settings.

It may be the case that the monthly rainfall is not always greater than the weekly rain fall. This is because the weeks are defined as Sunday through to Saturday, which may not correlate with the completion of a particular month. WeatherVox compensates for leap years as well.

If WeatherVox is started in the middle of a week or month, the first set of weekly and monthly rainfalls will be for the remainder of that week or month. After the completion of that week or month the rainfall values will correspond to the totals of the week or month.

7. DTMF Commands

DTMF codes are used to change the soft settings stored in WeatherVox and to interrogate WeatherVox for other information. 'Soft settings' simply refers to the settings that are stored in WeatherVox to control such functions as the ring count to answer on, etc.

It is important that once you enter the soft settings mode you prefix each code string that you enter with a star character (*) and also include a * after the code string has been entered. This is to ensure that the unit remains in synchronisation with the code strings that you are entering.

If, by accident, an invalid code is entered then the unit will disregard it and inform you with a short error message. After you have entered a code you should wait for at least 3 seconds for a response.

After Weathervox speaks "For more information, please press #" you should enter your pin number if you wish to use the soft settings mode. Only a short period of time is allowed for you to enter this code to ensure that users who should not have access will have even less chance of gaining unauthorised access to the soft settings mode. Due to this factor, you must enter your pin number as quickly as possible directly after the afore-mentioned statement is spoken. A detailed explanation of the function of each of the codes is given after the following table.

1nn	Reports ***1nn - reports**
100	Number of calls to date
101	Number of correct attempts at pin number
102	Number of incorrect attempts at pin number
103	Software version number
104n	Report type: brief n=0, intermediate n=1, detailed n= 2
105	Historical start time and date on the station
2nn	Soft Settings
200	Reserved
201	Reserved
202n	Ring count to answer, default = 2, 1<=n<=9

203yyyymmddn	Set date on the station. See Note 1.
204hhmmss	Set time on the station (24hour)
205	Reserved
206nn	12 or 24 hour time. Default = 12
207nnnn	Set four digit pin number. Default = 1234
208	Speak pin number
209	Speak current time & date on the station

9nn Clearing functions

900	Clear all historical data (Excluding rainfall values)
901	Clear the number of correct password attempts.
902	Clear the number of incorrect password attempts.
903	Clear all historical rainfall data

Note 1: In setting the date, ‘n’ is used to denote the day of the week with the following syntax : Sun = 1, Mon = 2, Tue = 3, Wed = 4, Thu = 5, Fri = 6, Sat = 7.

7.1 Detailed Explanation of DTMF Commands

1nn Reports

100 : Speaks the number of calls that the unit has received after being switched on for the first time. This value is cleared whenever *900* is entered in the soft settings.

101 : Speaks the number of correct attempts at entering the pin number. This value is cleared when *900* is entered in the soft settings.

102 : As above, except for the number of incorrect attempts at entering the pin number.

103 : Speaks the version number of the software running on WeatherVox.

104n : Sets the report type that you wish the unit to speak. There are three levels of reports possible with WeatherVox. These are detailed in Appendix B. The value entered for ‘n’ determines the report that is to be spoken. No response is given from the WeatherVox after a value is set here.

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105 : Speaks the time and date that WeatherVox was first switched on. This date is set to the current date whenever *900* is entered in the soft settings.

2nn Soft Settings

200 : Reserved
201 : Reserved
202n : Sets the ring count that WeatherVox answers on. This can be set from 1 to 9 by altering the value of ‘n’ appropriately. It is set to 2 by default and, in most circum

stances, should be left at this setting. No response is given from the WeatherVox after a value is set here.

203yyyymmddn : Sets the date on WeatherVox. Where yyyy represents the year, mm represents the month and dd represents the day of the month. The value of 'n' ranges from 1-7 and is used to denote the day of the week (Sun-Sat). Refer to Section 7 for the values of 'n' that correspond to the appropriate day. No response is given from WeatherVox after a value is set here.

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204hhmmss : Sets the time of day on WeatherVox. The time must be set in a 24 hour format and the values to be input are in the order hour, minutes and seconds. No response is given from WeatherVox after a value is set here.

205 : Reserved

206nn : Sets the format that WeatherVox speaks all times in. Enter nn as 12 or 24 to change the unit to speak in 12 hour mode or 24 hour mode. No response is given from WeatherVox after a value is set here.

207nnnn : Sets the pin number that is to be used to enter the soft settings mode. The pin is set to 1234 as a factory default and should be changed by the user to whatever code that they wish to use. No response is given from WeatherVox after a value is set here.

208 : Speaks the four digit pin number that is currently set in WeatherVox.

209 : Speaks the time and date that are currently set in WeatherVox.

9nn Clearing Functions

900 : Clears all of the historical data that is stored in WeatherVox. This involves clearing all of the following parameters :

Calls to date
Incorrect pin numbers entered
Correct pin numbers entered
High temperature of today and the time that it occurred at
Low temperature of today and the time that it occurred at
High temperature of the month and the date that it occurred on
Low temperature of the month and the date that it occurred on
High temperature of the year and the date that it occurred on
Low temperature of the year and the date that it occurred on
Peak gust today and the time that it occurred at
Peak gust yesterday and the time that it occurred at

901 : Clears the number of correct attempts at the user-defined password.

902 : Clears the number of incorrect attempts at the user-defined password.

903 : Clears the weekly and monthly rainfall values that are stored in WeatherVox. The daily value is calculated on a continuous basis and therefore is not cleared in this function. The yearly rainfall is simply taken as the upper rain value displayed on the Ultimeter 2000 and as such does not need to be cleared in this function either.

NOTE: If you happen to forget your pin number then please contact your supplier for further information.

APPENDIX A

Dip Switch Setting on the Main Board

1		Temp/Wind Chill/Dew Point
OFF		Fahrenheit
ON		Celsius

2	3	Wind Speed
OFF	OFF	Meters per second
OFF	ON	Knots per hour
ON	OFF	Kilometres per hour
ON	ON	Miles per hour

4	5	Rain Fall
OFF	OFF	No Rain Gauge
OFF	ON	Centimetres
ON	OFF	Millimetres
ON	ON	Inches

6	7	Barometric Pressure
OFF	OFF	Millimetres of Mercury
OFF	ON	Inches of Mercury
ON	OFF	hPa (hectopascals)
ON	ON	Millibars

8		Wind Direction
OFF		Degrees
ON		Cardinal points

APPENDIX B

Various Reports available on WeatherVox

REPORT 0: Brief

Time.
Current outdoor temperature.
Overnight low temperature, and the time at which it occurred.
Wind direction and speed.
Peak gust today and the time at which it occurred.
Average wind speed over the last ten minutes.
Average wind direction over the last minute.
Barometric Pressure.
Relative Humidity.
Today's rainfall.
This week's rainfall.

REPORT 1: Intermediate

Time.
Current outdoor temperature.
Overnight low temperature, and the time at which it occurred.
Wind direction and speed.
Peak gust today and the time at which it occurred.
Average wind speed over the last ten minutes.
Average wind direction over the last minute.
Barometric Pressure.
Relative Humidity.
Today's rainfall.
This week's rainfall.
This month's rainfall.
This year's rainfall.
Peak gust yesterday and the time at which it occurred.
Wind chill
Dew Point.

REPORT 2: Detailed

Time.
Current outdoor temperature.
Overnight low temperature, and the time at which it occurred.
Wind direction and speed.
Peak gust today and the time at which it occurred.
Average wind speed over the last ten minutes.
Average wind direction over the last minute.
Barometric Pressure.

Relative Humidity.
Today’s rainfall.
This week’s rainfall.
This month’s rainfall.
This year’s rainfall.
Peak gust yesterday and the time at which it occurred.
Wind chill.
Dew Point.
The highest temperature today, and the time at which it occurred.
The lowest temperature today, and the time at which it occurred.
The highest temperature this month, and the date at which it occurred.
The lowest temperature this month, and the date at which it occurred.
The highest temperature this year and the date at which it occurred.
The lowest temperature this year and the date at which it occurred.

APPENDIX C

Specifications

Size:	200mm x 112mm x 30mm (LxWxH)
Weight:	340 grams
Supply Voltage:	Idle: 9V @ 85mA
	On Line: 9V @ 135mA
Power Supply:	Input 240V AC @ 50 Hz
	Output 9V DC @ 600mA
Temperature Range:	0-150 degrees F
	-17 - 66 degrees C
External Connections:	RJ11 Connection to Ultimeter 2000 Serial Data Output Port
	RJ12 Connection to External Telephone Line
	NZ: BT Connector
Status Indicators:	Power LED
	Transmit LED
	Receive LED
Backup Mem Supply:	3V CR2032 Battery
Austel Approved:	A95/12/0464
NZ Telecom Approved:	PTC 212/95/026

FCC Statement

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different to that which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARRANTY

Each WeatherVox carries a limited warranty against defect of material or workmanship for a period of 1 year from the date if initial purchase.Our responsibility under this warranty is limited to the repair or replacement of units returned to us postage paid, together with proof of purchase date. This warranty shall not apply to units subjected to misuse, abuse, tampering or unauthorised service. Neither we nor our representatives,, distributors, nor dealers shall be liable for any incidental or consequential damages. Some statistics do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you, This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

DISCLAIMER:

All drawings, descriptions, illustrations, dimensions, weights, specifications, performance data and capabilities and the like, whether contained in this User’s Manual or by way of representation, have been provided by the manufacturer or its representatives in the belief that they are as accurate as reasonably possible but the manufacturer and its representatives do not warrant the accuracy or performance thereof. The accuracy of the information provided by WeatherVox is subject to the information and/or data received by this unit from a compatible meteorological weather station or meteorological service.