

WMR928NX Wireless Weather Station
With PC Software

VIRTUAL WEATHER STATION
USER MANUAL

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INTRODUCTION

Virtual Weather Station is a software package from Ambient Weather that allows you to connect your personal computer to the Oregon Scientific WMR928NX Wireless Weather Station to display, plot and store data for comprehensive monitoring and analysis.

Virtual Weather Station brings your PC to life with a rich array of dynamic and colourful gauges, dials, graphs and charts. The desktop is completely customizable – you can arrange the virtual instruments based on your own personal preferences or application. You have literally over 1,000 ways to display your data.

Virtual Weather Station runs on Windows 95 / 98SE / NT / 2000 / ME / XP.

HARDWARE / SOFTWARE REQUIREMENTS AND DISPLAY PREFERENCES

HARDWARE / SOFTWARE REQUIREMENTS

The following hardware is required for communicating to the WMR928NX weather station:

- PC running Windows 95, 98, NT 4.0 (or greater), 2000, ME and XP with at least 10 MB of free disk space
- 8MB RAM
- Serial Communication Port

DISPLAY PREFERENCES

Virtual Weather Station prefers high resolution or 16-bit colour. Some images may result in poor quality at lower resolution settings.

Virtual Weather Station is best viewed at 800 x 600 pixels or greater.

Computer power or energy saving features may result in distorted jpeg images.

GETTING STARTED

TIP Menu Shortcuts are displayed in bold font and can be accessed from the Virtual Weather Station menu bar at the top of the software program.


INSTALLING THE SOFTWARE

To install the software, run setup.exe from the Virtual Weather Station CD-ROM. If transferring the files to your hard drive, copy all of the files to a common directory and run setup.exe.

CONNECTING YOUR COMMUNICATION PORT TO THE WEATHER STATION

Connect your weather station directly to your PC using a standard DB9M/DB9F serial or RS-232 cable (included in this package). The serial port on your computer is generally a 9-pin, male connector, similar to the 9-pin female RS-232 connector on your weather station.

RUNNING VIRTUAL WEATHER STATION

Connect a serial cable to your computer's comport and verify your WMR928NX weather station is turned on. Connect the AC Adaptor to your Weather Station to activate the serial cable connection. Run Virtual Weather Station by clicking on the Virtual Weather Station icon  on your desktop.

LICENSE INFORMATION

Menu Shortcut: Help ► Registration Information

Enter the license information provided from the online registration or the inside cover of the CD-ROM. Enter your name, company name (optional) and registration number provided.

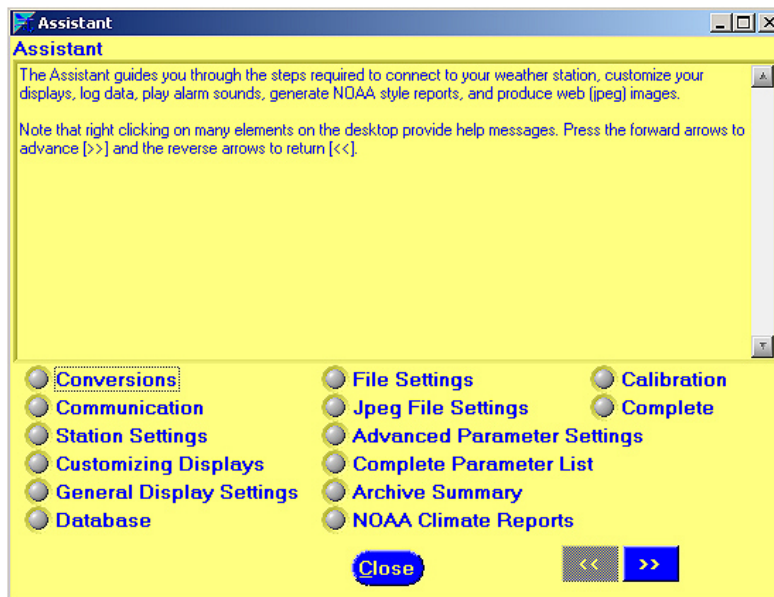
UPGRADE TO VIRTUAL WEATHER STATION PRO OR INTERNET EDITIONS

This user manual refers to the Virtual Weather Station Base Version. To upgrade to Virtual Weather Station Pro Edition, which adds detailed data analysis and reports, or Virtual Weather Station Internet Edition, which provides all of the features in the Base and Pro Edition and adds Internet features, contact Ambient for upgrade costs. A registration number will be sent to you via e-mail. Enter this registration number by selecting the Upgrade button.

VIRTUAL WEATHER STATION BASE EDITION FEATURES

THE ASSISTANT

Menu Shortcut: Help ► Assistant

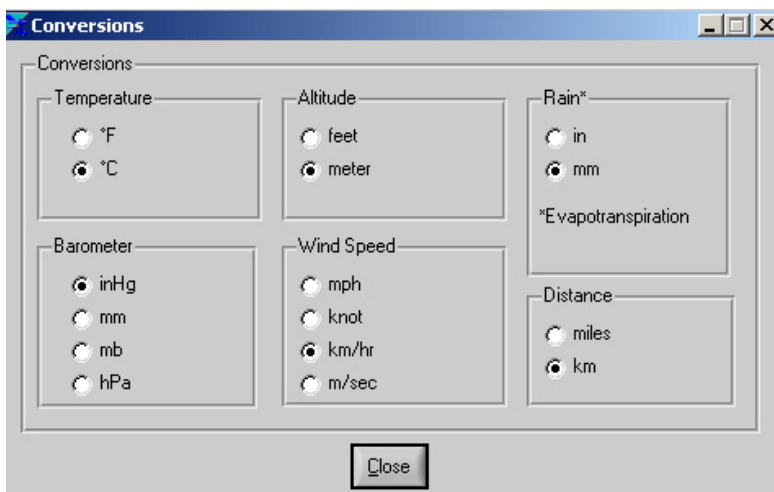


If you are a new user, it is advisable that you completely run through the assistant to understand all of the features of Virtual Weather Station.

When Virtual Weather Station is launched for the first time, the Assistant will automatically be displayed.

CONVERSIONS

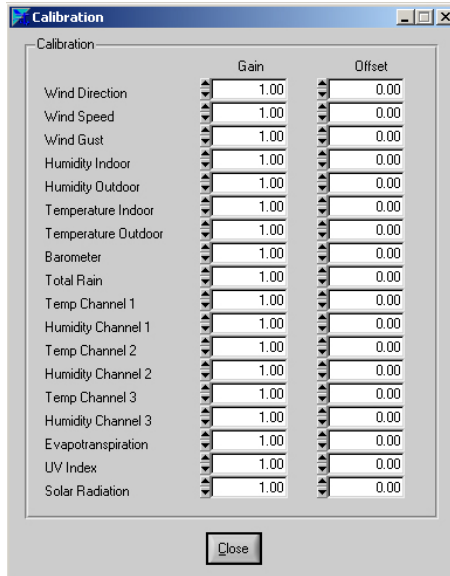
Menu Shortcut: Settings ► Conversions



You may select the units of measurement in which the data is displayed throughout the software. All program windows and files will display these units.

CALIBRATION

Menu Shortcut: Settings ► Calibration



Virtual Weather Station allows you to calibrate for improved accuracy. In addition, if your wind speed sensor is below the expected reading due to bearing life or trees obstructing the anemometer, these errors can be adjusted to provide realistic values.

The calibration takes the form of the following equation:

$$\text{Calibrated Value} = \text{Gain} \times \text{Measured Value} + \text{Offset}$$

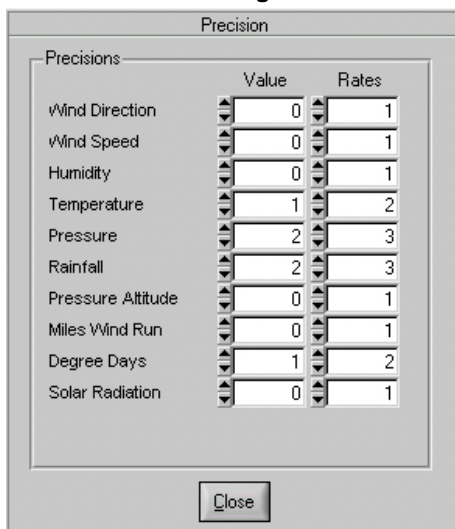
The table provides solutions for typical measurement problems:

PROBLEM	SOLUTION
The wind speed is reading 50% lower than it should be because the sensor is obstructed by trees. In other words, when the wind speed reads 4.8 km/h (3 mph), it is actually 9.6 km/h (6 mph).	Set the wind speed gain to 2.00.
One of my temperature sensors is off by 3°	Set the temperature offset to 3.00
I installed my anemometer incorrectly, and when it points north, it should measure south	Set the wind direction offset to 180.00

NOTE Changing the calibration settings in Virtual Weather Station will not adjust the parameters displayed from the console. Setting the gain to 0 will cause the value to always read 0. Only set the gain to 0 if you do not have the sensor in your system.

PRECISION

Menu Shortcut: Settings ► Precision

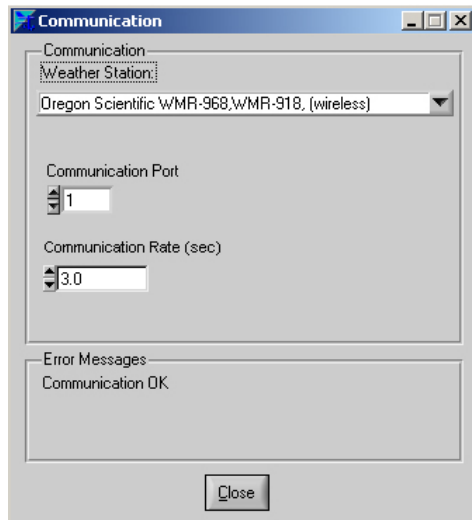


Precision is the number of decimal places that Virtual Weather Station allows you to customize for each variable unless otherwise noted on specific display panels. For example, a precision of two would be represented as 3.14, and a precision of three would be represented as 3.141. These precision values are represented in files, HTML tags and other various displays.

The precision can be changed for the values (which include averages) and rates of change. Changing the precision for the temperature will change all of the temperatures (i.e., indoor and outdoor).

COMMUNICATION

Menu Shortcut: Communication ► Communication



WEATHER STATION

Select "Oregon Scientific WMR968, WMR918 (wireless)" from the list to connect to the WMR928N or WMR928NX weather stations. If you do not own a weather station, select the Stationless mode of operation.

COMMUNICATION PORT

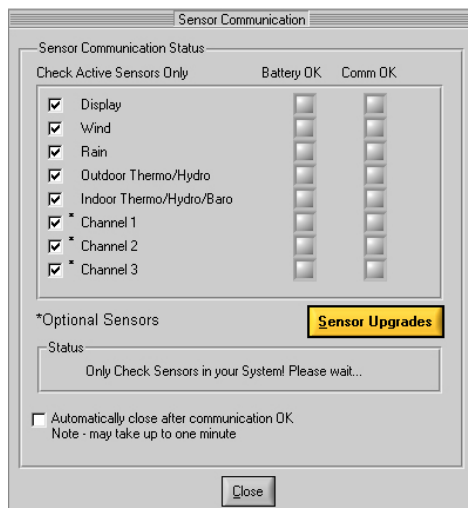
Select the communication port. Refer to the section on TROUBLESHOOTING for more information on selecting the correct communication port if you are unsure.

COMMUNICATION RATE

Specify the communication rate at which Virtual Weather Station with the weather station. If the computer performance is poor, try increasing this value.

SENSOR AND BATTERY STATUS

Menu Shortcut: Communication ► Sensor Communication



BATTERY OK

A status LED will provide you with the status of the remote sensor batteries. If the LED is red, it is time to change the batteries. If the station is not reporting, the battery may be low or interference may be present.

To allow Virtual Weather Station to execute without the sensor, deactivate the "problem" sensor by deselecting the Active checkbox.

COMMUNICATION OK

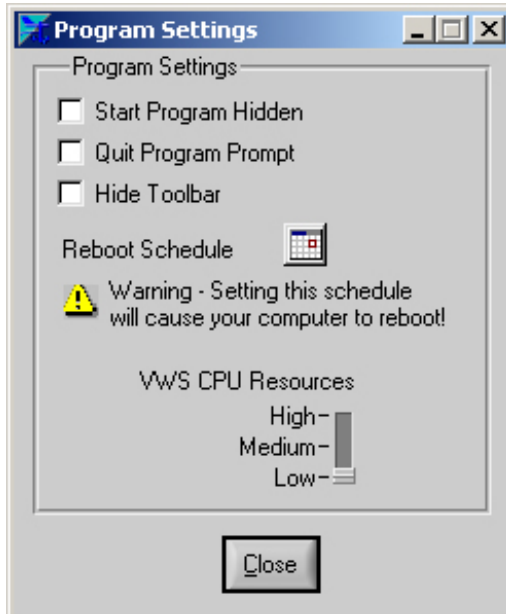
After communication with the WMR928NX weather station is detected, a green LED will be displayed. After all of the remote devices have reported, this window will automatically close. Virtual Weather Station will begin updating when all of the sensors have reported (this can take up to one minute).

NOTE If a sensor is not reporting, it can be deactivated to continue running Virtual Weather Station.

VIRTUAL WEATHER STATION SETTINGS

GENERAL PROGRAM SETTINGS

Menu Shortcut: Settings ► Program Settings



START PROGRAM HIDDEN

The program can be set to start hidden when the computer starts. To view the hidden program, double click on the icon in the taskbar.

QUIT PROGRAM PROMPT

Prompts the user prior to terminating the program.

HIDE TOOLBAR

Select this option to hide the toolbar and status bar. This will increase the display viewing area.

REBOOT SCHEDULE

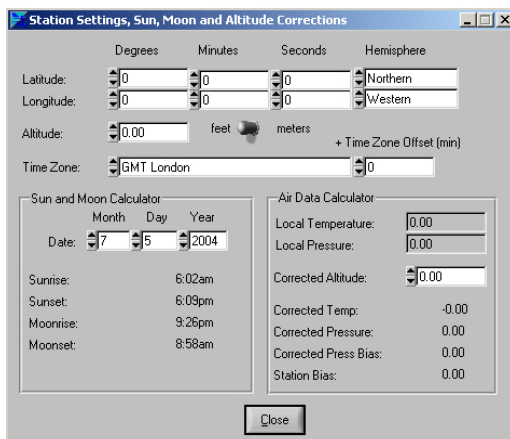
For remote monitoring applications, it is recommended you reboot your computer periodically to keep the program resources fresh.

CPU RESOURCES

You can adjust the CPU resources VWS (Virtual Weather Station) uses to run. The “High” setting will increase the performance of VWS but may decrease the performance of other programs. The “Low” setting will decrease the performance of VWS but increase the performance of other programs. If Virtual Weather Station “locks up” or is running slowly, try increasing the CPU resources.

STATION SETTINGS

Menu Shortcut: Settings ► Station Settings, Sun, Moon and Altitude



Station settings are required to calculate the sunrise, sunset, moonrise and moonset, and the barometric pressure corrected to sea level.

LONGITUDE AND LATITUDE

To calculate the sunrise, sunset, moonrise and moonset for your location, the longitude, latitude, and time zone is required. If the sunrise and sunset appear incorrect, see the section on TROUBLESHOOTING for more information.

There are several sources for determining the longitude and latitude for your location. The best source is the Internet. Astro.com provides this information at the following link: <http://www.astro.com/atlas>.

ALTITUDE

An air data calculator is included in Virtual Weather Station. Virtual Weather Station uses the same formulas used in airplane data computers flying throughout the world. The altitude and air data information provides air density, pressure altitude, corrected temperature and pressure to sea-level conditions.

TIME ZONE

The time zone is required for calculating the sunrise, sunset, moonrise and moonset. If you live in a time zone that does not adhere to the GMT standard and is offset by 30 minutes, enter the offset in the +Time Zone Offset (min) numerical field.

If the daylight savings time is not calculated properly by your Windows operating system, you can compensate by adding or subtracting 60 minutes.

The celestial calculator is a close approximation of the sunrise and sunset in your location and may be inaccurate by several minutes due to equation inaccuracy or your altitude (the equations are based on sea-level conditions).

CELESTIAL CALENDAR

Virtual Weather Station includes a celestial calendar for calculating sunrise, sunset, moonrise and moonset times. You can calculate these times for any calendar date.

AIR DATA CALCULATOR (CORRECTING PRESSURE TO SEA-LEVEL CONDITIONS)

To compare pressure conditions from one location to another, meteorologists correct pressure to sea-level conditions. Because the air pressure decreases as you rise in altitude, the sea-level corrected pressure (the pressure your location would be at if located at sea-level) is generally higher than your measured pressure. Thus, your pressure may read 28.62 inHg (969 mb) at an altitude of 1000 feet (305 m), but the corrected pressure is 30.00 inHg (1016 mb).

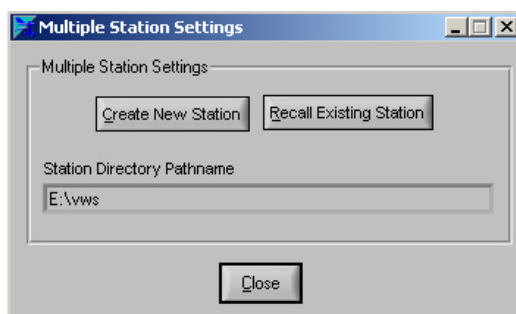
The standard sea-level pressure is 29.92 in Hg (1013 mb). Pressure conditions greater than 29.92 inHg (1013 mb) are considered high pressure.

Most weather stations instruct you to find a reporting station near your location to identify the corrected pressure, but Virtual Weather Station calculates this offset for you. To calculate this offset:

1. Enter your altitude. Virtual Weather Station displays your bias with respect to sea level.
2. Enter this bias in your weather station (see the weather station user manual for details).

MULTIPLE STATION SETTINGS

Menu Shortcut: Settings ► Multiple Station Settings



Virtual Weather Station supports multiple station configurations. Thus, the data and desktop settings can be different for each weather station in a network of weather stations.


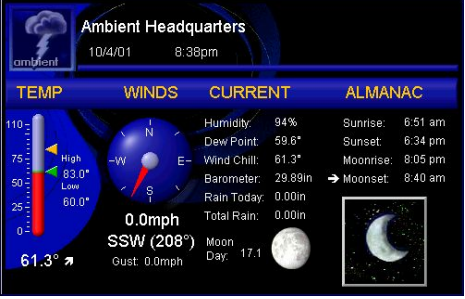
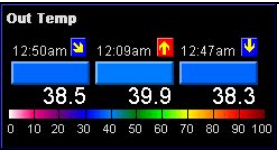

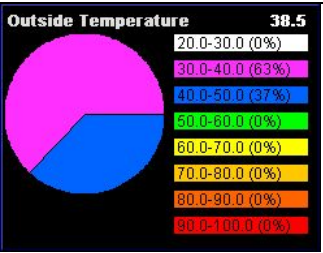

To create new station settings, select "Create New Station". To recall a station setting, select "Recall Existing Station". The data for each station is stored in a file based on the station name, as displayed in the **Station Directory Pathname**. To select this file, double-click on the filename.




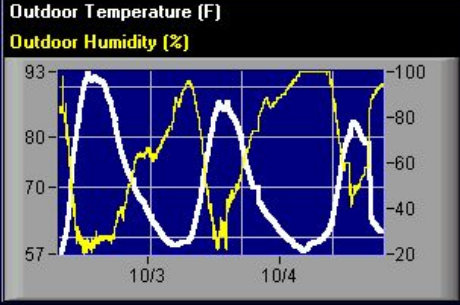
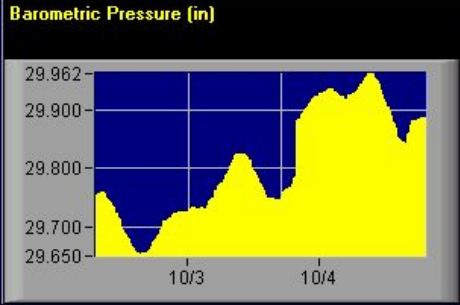
REAL-TIME DATA

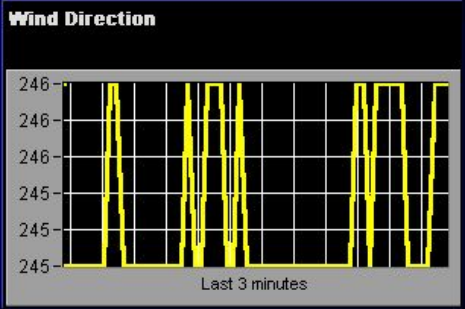


Virtual Weather Station continuously collects data from your weather station. The sample rate varies based on your weather station's specifications. See your weather station user manual for specifics on the sample rate.

WEATHER DISPLAYS

The table below provides a description of each weather display.

DESCRIPTION	DISPLAY
	<p>ICON</p> <p>Weather conditions based on weather station prediction. Switches from day to night based on sunrise and sunset times.</p>
	<p>BROADCAST</p> <p>TV broadcast display. Logo and location name can be modified by clicking the right-mouse button on the display.</p>
	<p>COLOUR SPECTRUM</p> <p>Colour bars change colour based on adjustable colour spectrum. Displays daily high, low and current value. Rate of change arrow represents rising, falling or steady.</p>
	<p>HIGH / LOW DISPLAY</p> <p>Simple daily high and low display. Displays daily high, low and current value. Rate of change arrow represents rising, falling or steady.</p>
	<p>DISTRIBUTION CHART</p> <p>Pie chart displays historical distribution. Range values are adjustable.</p> <p>NOTE The chart will be empty if (1) the database is empty (for example, when the program is first started), or (2) Data has not been collected in the plot time frame specified in the attributes window (the program was off).</p>
	<p>WIND DIRECTION</p> <p>Displays current wind direction. Display fills clockwise from the North.</p>

DESCRIPTION	DISPLAY
	<p>THERMOMETER</p> <p>Thermometer gauge with rate of change arrow and high / low pointers.</p>
	<p>GAUGE</p> <p>Rotary gauge with rate of change arrow. If the maximum limit of the gauge is exceeded, the gauge displays a red alarm box.</p>
	<p>METER</p> <p>Meter gauge with rate of change arrow. If the maximum limit of the gauge is exceeded, the gauge displays a red alarm box.</p>
 	<p>GRAPHS: OUTDOOR TEMPERATURE AND BAROMETRIC PRESSURE</p> <p>Plot one or two parameters vs. time. Data is based on database, and can be plotted over several hours or days.</p> <p>Provides an array of graphical styles and options, such as line style and auto scaling.</p> <p>NOTE The graph will be empty if (1) the database is empty (for example, when the program is first started), or (2) Data has not been collected in the plot time frame specified in the attributes window (the program was off).</p>

DESCRIPTION	DISPLAY
	<p>STRIP CHART</p> <p>Provides rapid real-time data (data is not stored). Intended for viewing data over minutes to view rapid trends (for example, wind speed and wind direction).</p> <p>The strip chart does not store historical data, and will start over each time the program is launched.</p>
	<p>TANK</p> <p>Colourful display fills based on colour spectrum. Includes high and low pointers and rate of change arrow.</p>
<p>In Humidity 25.0</p> <p>Wind Gust Avg 16.8 mph</p>	<p>ALPHA NUMERIC</p> <p>Simple alphanumeric display.</p>
	<p>MOON PHASE</p> <p>Current moon phase or moon day.</p>

DIFFERENCES BETWEEN GRAPHS AND STRIP CHARTS

The graphs and strip charts serve two very different purposes.

FEATURE	GRAPH	STRIP CHART
Plot long term trends, such as temperature, pressure and humidity over several days and weeks	✓	
Plot short term plots, such as wind speed and direction, over minutes or hours		✓
Uses stored data (database) for plotting	✓	
Looses data after program is restarted		✓

CUSTOMISING WEATHER DISPLAYS

ADDING AND DELETING DISPLAYS

Menu Shortcut: Modify Display ► Icon, Broadcast, Colour Spectrum, High / Low Display, Wind Direction, Distribution, Thermometer, Gauge, Meter, Graph, Strip Chart, Ribbon, Alpha Numeric, Moon Phase

The desktop can be completely customized, including size and location of the displays. There are hundreds of different display combinations.

1. Select the display type and parameter from the menu bar, and the display will be added to (or deleted from) the desktop.
2. Right-mouse-click on the display to modify the individual display attributes.

NOTE Some of the check boxes will be dimmed depending on the display. For example, the Forecast cannot be displayed from the graphs or strip charts because it is not saved in the database. All parameters can be viewed using the alphanumeric display.

NOTE Sensor options vary from station to station. Check the WMR928NX Weather Station user manual for the complete list of weather parameters.

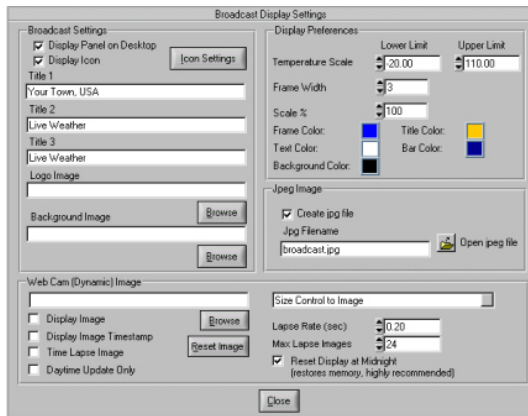
MODIFYING THE DISPLAY AND DISPLAY ATTRIBUTES

To modify any of the displays, right-mouse-click on the display. The following display attributes are adjustable:

ATTRIBUTE	DESCRIPTION
Display Title	Display Title can be modified for each display.
Display Title 2	Only valid for graphs and strip charts. Displays second graph title.
Title Colour	Changes the title colour.
Title Colour 2	Only valid for graphs and strip charts. Changes the title 2 colour.
Lower Limit	Lower display numerical limit.
Upper Limit	Upper display numerical limit.
Precision	Numbers to the left of the decimal point. For example, a precision of zero is 76, a precision of 2 is 76.03.
Background Colour	The display background colour.
Number Colour	The number colour for all of the numbers in the display.
Frame Colour	Weather display frame colour
Needle Colour	Needle colour for meter and rotary gauge
Fill Colour	Fill colour for gauges and graphs
Frame Width	The width of the frame
Scale %	Adjusts weather display size. Requires Scale Contents on Resize checkbox selected.
Scale Contents on Resize	Scales the contents of the display when resized manually by clicking and dragging the display image, or selecting a scale percentage.
Autoscale Plot	Auto scale y-axis on graphs and charts
Plot Previous x hours (or minutes)	Plots previous number of hours for graphs and minutes for strip charts. If unchecked, graphs all of the data in your database.
Plot Style	Customize different plotting styles for graphs and strip charts (thin line, fat line, vertical fill, step)
Add second plot	Adds a second plot to the graph or strip chart.
Plot Colour	Specify plot colour for both plots
Grid Colour	Specify grid colour
Jpeg Filename	Each graphical element has a specific jpeg filename when this option is activated. Provides a reference for each specific jpeg filename. See section on JPEG FILE NAMING CONVENTION for more information.
X and Y Gridlines	Change the number of gridlines displayed on graphs and strip charts.

BROADCAST DISPLAY SETTINGS

Menu Shortcut: Modify Display ► Broadcast Display

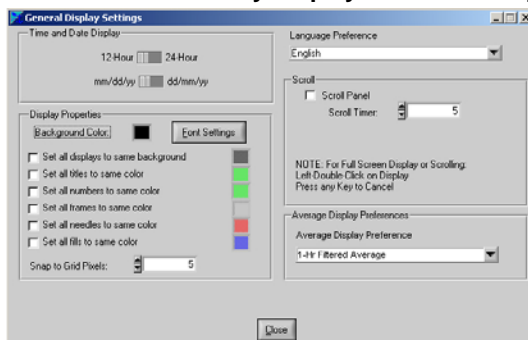


The broadcast display can be customized with your own logo image and title. To view settings, right-mouse-click on the broadcast panel.

SETTINGS	DESCRIPTION
Displaying the Icon	The icon can be displayed on the Broadcast display. To specify the method for updating the icon, select the Icon Settings Button.
Changing the Background Image	A custom image can be displayed in the broadcast display.
Changing the Logo Image	The default logo image is for Ambient. This can be customized to include your own personal logo.
Web Cams, Weather Cams and Dynamic Images	Web Cams or Weather Cams can be displayed in the broadcast panel. To display a Weather Cam image, a software package such as ImageSalsa is required to generate jpeg images. The images are then imported into Virtual Weather Station by defining the path to where the files are located. The images can be viewed as a still frame or a time lapse, providing a summary of weather over the course of the day. For more information on ImageSalsa, please visit the following: http://www.ambientweather.com/ExtDesc.asp?id=874
Displaying the Weather Cam Image in the Broadcast Panel	To display the Weather Cam image in the Broadcast panel, launch WeatherCam32 or ISpy and begin automatically generating the jpeg image. Once this image is created and automatically updated, browse to the location on your hard drive by selecting Browse in the Broadcast Panel.
Sizing the Image	The image can be sized to fit inside the control, or the control can be resized to fit the image size. Select the Size Control Image pull down menu.
Image Time Stamp	To display the last update time of the Weather Cam image, select the Image Time Stamp checkbox.
Daytime Update Only	Since nighttime Weather Cam images can be uneventful, select this checkbox to stop updating the Weather Cam image at night.
Time Lapse	A time lapse of the Weather Cam image can be displayed. Select the Time Lapse checkbox, the lapse rate and the number of images in the time lapse. The time-lapse feature can only be viewed on the computer and not over the Internet.
Reset Display at Midnight	Memory leaks may occur with some operating systems when updating images. To reset memory at midnight, select the checkbox and the panel will be discarded and reloaded.

GENERAL DISPLAY SETTINGS

Menu Shortcut: Modify Display ► General Display Settings



General display settings change all of the display settings at the same time.

To use the full screen display, double click anywhere on the background of the desktop (other than a weather element). To return to the normal display, hit any key.

DISPLAY SETTINGS	DESCRIPTION
Time and Date Display	Specify date and 24-hour vs. 12 hour format.
Background Colour	Specify the display panel background colour.
Font Settings	Changes the font setting for all of the displays.
Display Colours	Changes all of the display colours at the same time.
Language Preference	Virtual Weather Station provides limited foreign language support. To change the titles to the language of choice, edit each individual display
Scroll Display	Ideal for monitoring the display on a television or closed circuit. You can display weather images on the entire desktop and automatically scroll.
Snap to Grid Pixels	Specify the grid resolution for aligning the weather display images.
Average Display Preferences	Allows you to chose between a one hour filtered average, the daily average, the monthly average or the yearly average on the display.

DATABASE

Menu Shortcut: Settings ► Database Settings

Virtual Weather Station generates a database for storing data for plotting and graphing. This data is stored in a comma-separated file located in the following directory path: \\VWS\data\dbase.csv, where csv stands for "comma separated value". This database can be viewed, edited and deleted.

DATABASE TIMER

A database timer allows you to customize how often data is written to the database. The database is limited to 20,000 records, so the recommended minimum database timer is 10 minutes. Once the database reaches 20,000 records, is automatically resized to 15,000 records. A backup record of the database is stored in the following file: \\VWS\data\yyyydbase.csv, where yyyy is the current year. If the database is damaged or deleted, simply rename the backup database.

DATABASE FORMAT

The database format is outlined in the following table:

COLUMN NUMBER	PARAMETER
1	Date, with the following format: YyyyMonthDayHourMinute
2	Wind Direction
3	Wind Speed
4	Wind Gust
5	Indoor Humidity
6	Outdoor Humidity
7	Indoor Temperature
8	Outdoor Temperature
9	Barometric Pressure
10	Total Rain
11	Channel 1 Temperature
12	Channel 1 Humidity
13	Channel 2 Temperature
14	Channel 2 Humidity
15	Channel 3 Temperature
16	Channel 3 Humidity
17	Evapotranspiration
18	UV Index**
19	Solar Radiation
20	Wind Chill
21	Indoor Heat Index
22	Outdoor Heat Index
23	Dew Point

COLUMN NUMBER	PARAMETER
24	Sea-level Barometric Pressure
25	Pressure Altitude
26	Cloud Base
27	Air Density
28	Virtual Temperature
29	Vapor Pressure
30	Wind Direction Rate (per hour)
31	Wind Speed Rate
32	Wind Gust Rate
33	Indoor Humidity Rate
34	Outdoor Humidity Rate
35	Indoor Temperature Rate
36	Outdoor Temperature Rate
37	Barometric Pressure Rate
38	Total Rain Rate
39	Channel 1 Temperature Rate
40	Channel 1 Humidity Rate
41	Channel 2 Temperature Rate
42	Channel 2 Humidity Rate
43	Channel 3 Temperature Rate
44	Channel 3 Humidity Rate
45	Evapotranspiration Rate
46	UV Index Rate** or Battery Voltage**
47	Solar Radiation Rate
48	Wind Chill Rate
49	Indoor Heat Index Rate
50	Outdoor Heat Index Rate
51	Dew Point Rate
52	Sea-level Barometric Pressure Rate
53	Rain Daily
54	Rain Hourly
55	Last 24 Hour Rain
56	Rain Rate
57	Wind Run Daily
58	Degree Days Heating Daily
59	Degree Days Cooling Daily
60	Moon phase
61	Monthly Rain
62	Degree Days Heating Monthly
63	Degree Days Cooling Monthly
64	Wind Run Monthly
65	Degree Days Heating Yearly
66	Degree Days Cooling Yearly
67	Wind Run Yearly

** Not available on the Oregon Scientific WMR928N and WMR928NX weather stations.

EDITING AND DELETING DATABASE RECORDS

You can recall and edit any of the database records by date or record number. Once you retrieve a database record, the data can be edited to correct errors.

RESIZING THE DATABASE

To resize the database, select the Resize Database number. Decreasing the database size can improve the operating speed of Virtual Weather Station.

CHANNEL 1, 2 AND 3 OPTIONAL SENSORS

Optional sensors for the WMR928NX can be purchased and displayed as Channel 1, 2 and 3 Temperature and Humidity Sensors. The following section describes the sensor part number, functionality and where to purchase them.

CHANNEL	PART NO.	DESCRIPTION
Ch 1, 2, 3 Temperature	THGR268	Indoor / Outdoor Thermo/Hygrometer
	THC268	Waterproof temperature probe for pools, spas, lakes, pipes, AC Ducts
Ch 1, 2, 3 Humidity	THGR268	Indoor / Outdoor Thermo/Hygrometer

JPEG FILES

Menu Shortcut: **Settings ► Jpeg File Settings**

Jpeg is a standard image format for web pages. Virtual Weather Station periodically creates jpeg images for inclusion on your web page, providing real time weather conditions that can be viewed from a web browser. You can only generate jpeg images for weather displays currently on your desktop.

ADVANCED PARAMETER SETTINGS

Menu Shortcut: **Settings ► Advanced Parameter Settings**

Virtual Weather Station provides a number of advanced parameter settings.

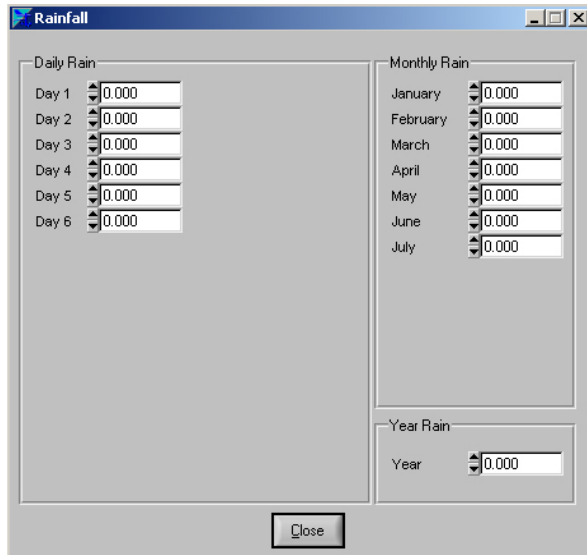
ADVANCED PARAMETER SETTINGS	DESCRIPTION
Degrees Days Heating and Cooling	<p>Because temperature plays an important part in the rate of development of plants and many pests, a measurement that takes into account the accumulation of heat with passing time is important to predict maturation. Degree-days provide a measure for calculating the effects of temperature on the development of plants or pests.</p> <p>One degree-day is the amount of heat that accumulates when the temperature remains one degree above the threshold for one day. One degree-day is also the amount of heat that accumulates when the temperature is 24 degrees above the threshold for one hour.</p> <ul style="list-style-type: none"> • Heating Threshold = the threshold for calculating degree-days heating. • Cooling Threshold = the threshold for calculating degree-days cooling.
Wind Run	<p>Wind run is the distance wind has traveled. For example, the wind run for a constant wind speed of 32 kilometers per hour (20 miles per hour) for 2 hours is 64 kilometers (40 miles), or: Wind Run = Wind Speed * Time</p> <p>There may be wind run calculation problems with specific computers due to the microprocessor and other hardware devices. If you find the wind run values are out of range, place the following line in your win.ini file: wuseDefaultTimer=True. To reset these values, select Settings►Recall Daily, Monthly and Yearly and edit the wind run for the day, month and year.</p>
Pressure Trend	Virtual Weather Station will calculate the pressure trend based on your own specified threshold. If the rate of change of pressure is above or below this threshold, Virtual Weather Station will report a rising / falling pressure trend.
Wind Gust	You can override your station's default wind gust calculation method and select the maximum within a specified number of samples.
Filtered Average Time Constant	The time constant for the filtered average can be varied. The filter is based on a low pass filter differential equation. The output value reaches 63% of the input value after one time constant (the default time constant is 60 minutes or one hour), and will reach 95% of the input value after five time constants (default = 300 minutes or five hours).

Wind Chill Calculation

The wind chill calculation formula makes use of advances in science, technology, and computer modeling to provide a more accurate, understandable, and useful for calculating the dangers from winter winds and freezing temperatures. In addition, clinical trials have been conducted and the results of those trials have been used to verify and improve the accuracy of the new formula.

RAINFALL SETTINGS

Menu Shortcut: Settings ► Rainfall



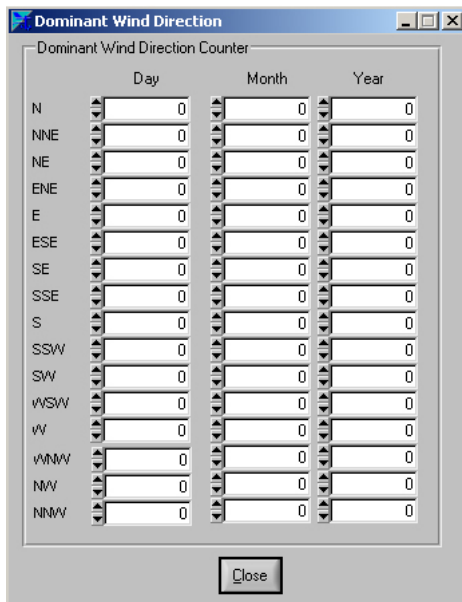
Some stations calculate the daily and monthly rain. In the event the daily and monthly rain is not calculated by the weather station, the daily rain is calculated by subtracting the minimum daily rain from the maximum daily rain. To change the daily, monthly or yearly rain, you must calculate the difference between the daily maximum and minimum rain, and enter it in the minimum rain field.

The daily rain is stored by Virtual Weather Station as the difference between the maximum daily rain and the minimum daily rain, or: $\text{Daily Rain} = \text{Maximum Daily Rain} - \text{Minimum Daily Rain}$. The same is true for monthly and yearly rain.

NOTE Changing the daily rain does not change the monthly or yearly rain automatically.

DOMINANT WIND DIRECTION COUNTER

Menu Shortcut: Settings ► Dominant Wind Direction



Virtual Weather Station calculates the dominant wind direction based on the day, month and year. The wind direction is only counted when the wind speed is greater than 0. The dominant wind direction values can be edited.

RESETTING DAILY MINIMUM AND MAXIMUM VALUES

Menu Shortcut: Settings ► Reset Min and Max

You can reset the daily minimums and maximums at any time by selecting the OK button.

COMPLETE PARAMETER LIST

Menu Shortcut: Window ► Complete Parameter List

You can view a complete list of the parameters (1) measured by your weather station, (2) calculated by your weather station and retrieved by Virtual Weather Station, or (3) calculated by Virtual Weather Station.

OPTION	DESCRIPTION
Daily Highs and Lows	Virtual Weather Station calculates daily highs and lows. Note that Virtual Weather Station must be running for the daily highs and lows to be recorded.
Average Values	Virtual Weather Station calculates average values for all weather parameters based on a one-hour time period. When Virtual Weather Station is restarted, the average values are reset to the current value.

RATE OF CHANGE VALUES

Virtual Weather Station calculates rate-of-change values for all weather parameters based on a one-hour time period. Like the daily highs and lows, Virtual Weather Station must be running for rate of change values to be recorded. When Virtual Weather Station is restarted, the rate-of-change values are reset to zero.

NOTE Available sensors vary based on your weather station. See the WMR928NX weather station manual for more details.

DAILY, MONTHLY AND YEARLY SUMMARY

Virtual Weather Station provides a daily, monthly and yearly summary. The high, low, averages and integrated values are recorded as well as the time and date of the highs and lows. You can edit the daily extremes.

OPTION	DESCRIPTION
Recalling the Daily, Monthly and Yearly Summary	<p>Menu Shortcut: Settings ► Recall Daily, Monthly and Yearly Archive</p> <p>To recall the daily summary, you will be prompted for a file with the following format:</p> <ul style="list-style-type: none"> • 2001, which corresponds to the yearly extremes, averages and rates for the year 2001. • 2001_10, which corresponds to the monthly extremes, averages and rates for October 2001. • 2001_10_01, which corresponds to the daily extremes, averages and rates for October 1, 2001.
Daily Summary	Daily Summary provides a daily summary of the high, low, average and integrated (degree day and wind run) values for the day. Entering the new number in the text field will change the existing values (with the exception of the predominant wind direction). The display includes the number of samples for the day. This panel is updated every minute. To review data from a previous date, enter the month, day and year in the Recall Archive Record text field.
Monthly Summary	Provides a monthly summary of the high, low, average and integrated (degree day and wind run) values for the month. Entering the new number in the text field will change the existing values (with the exception of the predominant wind direction). The display includes the number of samples for the month. This panel is updated hourly.
Yearly Summary	Provides a yearly summary of the high, low, average and integrated (degree day and wind run) values for the year. Entering the new number in the text field will change the existing values (with the exception of the predominant wind direction). The display includes the number of samples for the year. This panel is updated hourly.

ICON SETTINGS

Menu Shortcut: Settings ► Icon Settings

The forecast icon can be updated manually or automatically by several means. To view the icon, select the Display Icon checkbox. The icon is also displayed and updated in the Broadcast Display.

OPTION	DESCRIPTION
Display Attributes	The icon displays the current temperature. The colour, units and precision of the displayed temperature can be changed. The icon frame width and colour can also be modified.
Icon Automation	The icons can be updated manually or automatically as described in the following paragraphs. To manually update the icon, select Icon Automation None and select the weather conditions from the Weather Conditions pull menu. To update the icon based on the weather station's prediction, select Icon Automation Weather Station Prediction.

	<p>The WMR928NX weather station includes forecast predictions. The predictions are based on trends, and predict the weather 24-48 hours in advance.</p> <p>To view this extended forecast, select Menu Shortcut: Modify Display ► Alphanumeric ► Forecast. The icon can be updated based on the selected METAR station in your area.</p>
Editing Icon Images	<p>The icon images are located in the following directories:</p> <ul style="list-style-type: none"> • Daytime: \vws\icons\day • Nighttime: \vws\icons\night <p>You can create your own icons to replace the icons provided with the distribution kit. Make sure you save these icons as "read only" to prevent Virtual Weather Station from overwriting at the next installation of Virtual Weather Station.</p>

SMART FORECAST

Menu Shortcut: Settings ► Smart Forecast

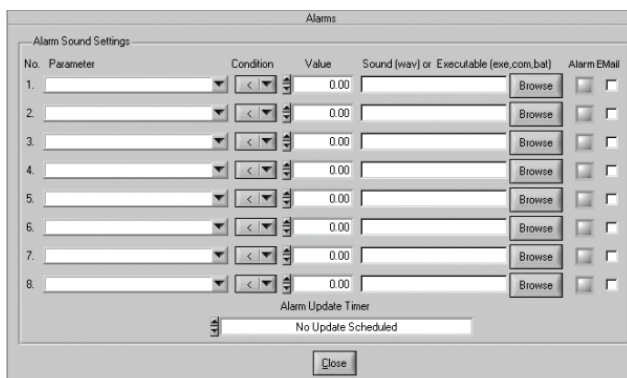
The Smart Forecast option allows you to display current weather conditions based on your own prediction. For example, if the rate of change of pressure is increasing rapidly, the weather is generally clearing. If the rate of change of rainfall is increasing, light rain, rain or heavy rain can be displayed. Fog or mist can be displayed based on temperature and humidity.

Boolean settings allow you to set conditions based on multiple parameters defined in the Smart Forecast section. Note that the Smart Forecast parameters need not be active to be used in the Boolean Settings.

SMART FORECAST SETTINGS	BOOLEAN SETTINGS
<p>Priority. The Smart Forecast is prioritized based on the Priority number, where 1 has the highest priority. Boolean settings have priority over the individual settings.</p> <p>Active. Activate the smart forecast.</p> <p>Parameter. Specify the forecast parameter</p> <p>Condition. Greater than (>) or less than (<). Specify the condition required for forecast to be active.</p> <p>Value. The value compared against the parameter.</p> <p>Forecast. The forecast if the condition is met.</p> <p>ON. The condition is met if the LED is red.</p>	<p>Priority. The smart forecast is prioritized based on the Priority number, where 1 has the highest priority. Boolean settings have priority over the individual settings.</p> <p>Active. Activate the Boolean forecast.</p> <p>P1. Parameter 1 as defined in the smart forecast section.</p> <p>P2. Parameter 2 as defined in the smart forecast section.</p> <p>Condition. (AND) or (OR). Specify the condition required for forecast to be active. For example, if Parameter 1 and Parameter 2 are TRUE, select P1 AND P2.</p> <p>Value. The value compared against the parameter.</p> <p>Forecast. The forecast if the condition is met.</p> <p>ON. The condition is met if the LED is red.</p>

ALARMS

Menu Shortcut: Settings ► Alarms



NOTE You must have a properly functioning sound card for this feature to work.

You can program Virtual Weather Station to play a wav sound, launch an executable or send an e-mail when a specific alarm condition occurs. For example, play a wind chime when the wind speed limit is exceeded, a lightning sound when the rain rate is exceeded, or a bird chirp when the temperature is high enough to open windows in the house. In addition, you can run an executable (*.exe, *.com, *.bat and *.pif) or batch file when a condition is exceeded.

SYNCHRONIZE DATE AND TIME

Menu Shortcut: Settings ► Synchronize Date and Time

Your computer may lose time because of accuracy of the system BIOS. Virtual Weather Station allows you to synchronize your computer clock to the Weather Station's clock automatically. This is particularly useful because WMR928NX is equipped with the RF Clock feature that synchronizes to the atomic clock. Check Weather Station user manual for more details on this feature.

DESKTOP ICONS

OPTION	DESCRIPTION
Taskbar	Virtual Weather Station displays an icon on your taskbar. To hide Virtual Weather Station, double click the Virtual Weather Station icon on your taskbar. To display Virtual Weather Station when hidden, double click on the Virtual Weather Station icon again.
Toolbar	Virtual Weather Station displays the following parameters on your toolbar (when minimized only): Outdoor Temperature Outdoor Humidity Wind Direction @ Wind Speed.
Sea-level Barometer Adjustment (418MHz Systems Only)	The sea-level barometer setting can be adjusted in the Rainwise Computer Interface. You can also adjust the barometer in the calibration offset.
Reset Barometer to Absolute Pressure	Removes the sea-level offset adjustment.
Reset Daily Min / Max Data	All minimum and maximum sensor values are set to the current sensor values and the current time. Note that the minimum and maximum values are automatically logged to memory and reset daily and midnight.
Reset Daily and Monthly Rainfall	Resets the daily and monthly rainfall in the logger's memory.
Reset High Windspeed	Resets the high windspeed to zero in the logger's memory.
Clear All Logged Data	Clears all of the data in the data logger's memory.
No. Items Logged	The number of items logged (preceded by the cursor prompt >).
Update Computer Interfaces Clock	Updates the computer interfaces clock, with the following format: MMDDhhmmss, where MM is the month, DD is the day, hh is hours (24 hour time), mm is minutes, ss is seconds.
Increment Logging Interval	The computer interface switches to the next logging interval, and outputs the new value: 1, 2, 5, 10, 15, 20, 30, or 60 minutes.
Battery Voltage	Sensor package battery voltage.
Version	EEPROM revision code for the interface and sensor package.

TROUBLESHOOTING

PROBLEM	SOLUTION
The program is not communicating to the weather station (the instrument panel is not updating)	<ul style="list-style-type: none"> • Verify you have selected the WMR928NX Weather Station. • Verify that you have the correct communication port selected. If you are unsure which comport is correct, select Start▶Settings▶Control Panel from the windows menu bar and select System▶Device Manager and Ports. If COM1 is designated, your comport is Communication Port 1. • Verify you are using the proper cable. A standard 9-pin serial cable is required. Do not use a NULL modem cable. • If another program is using the serial communication port, quit the program. Two programs cannot share the same serial port. • If you own a Palm or similar device (such as a digital camera), the software is often configured to open at startup of your computer, and "steals" the serial comport, even if the device is not connected. Select "Ctrl-Alt-Del" once, and see if any external device software is running. • Verify your station is not running on batteries and is connected to AC power. • Your communication port is locked-up. Cycle power to the computer. • Your weather station console's communication port is locked up. Cycle power to the console.

PROBLEM	SOLUTION
	<ul style="list-style-type: none"> • You have a hardware device conflict. It is recommended that you contact your PC vendor or PC technical support. • Your serial port uses a non-standard IRQ line. • Your serial port is defective. • Your weather station serial port is defective. Unplug the station's AC adapter from the utility and run the station on battery power. If the LEDs display communication, reconnect the station's AC adapter. If the unit stops communicating again, contact Oregon Scientific. • See section on ADVANCED COMMUNICATION TROUBLESHOOTING TIPS for more information.
Communication only occurs while on the batteries and not the AC.	<ul style="list-style-type: none"> • If RTS (request to send) control line is low, communications will only occur when on batteries. This condition will occur if you are using a 3-wire (pins 2,3,7) serial cable, or if for some other reason, the computer serial port is not asserting RTS. • Use a standard 9-pin serial cable.
A script error or fatal error occurs during installation.	<ul style="list-style-type: none"> • Close all programs before installation. If the problem persists, reboot your computer and make sure no programs are running. • Turn off the virus protection. This can interfere with the installation process.
The program crashes or you receive the following Windows Message: "This Program Has Received an Illegal Operation and Will Shut Down"	<ul style="list-style-type: none"> • If your microprocessor is overheating, you may receive this message from the operating system. Keep your computer in a cool place to reduce crashes • Some low power mode or power savers will cause the program to crash when communicating to the serial port. Turn off the power saver by selecting Right Click on the desktop, Properties, Screen Saver, Settings (Energy Savings Features of Monitor), and Turn off monitor. • Your graphics or display card driver may be outdated or incompatible. Virtual Weather Station uses high resolution graphics that all display drivers must support. However, display cards and their associated drivers are notorious for incompatibilities with the Windows operating system. You can determine your graphics card manufacturer by selecting Right Click on the desktop, then Display Properties►Settings►Advanced Properties. You may be able to download the latest graphics driver from the manufacturer by performing a search on the adapter part number and chip type.
The mouse moves on it's own or does not operate after launching the software.	You have an IRQ conflict between the serial port and the mouse. The solution is to replace your serial mouse with a bus mouse that resides on IRQ-12. This is not a problem with the software but is a hardware conflict associated with your computer. For more on IRQs, see Microsoft's troubleshooting hints.
The Sunrise and Sunset Times are Incorrect	<ul style="list-style-type: none"> • Verify that the time zone is entered correctly. • Verify that the longitude and latitude are entered properly. • Make sure you do not have the latitude and longitude switched • Verify that the hemisphere settings are correct. • The celestial calculator is a close approximation of the sunrise and sunset in your location and may be inaccurate by several minutes due to equation inaccuracy or your altitude (the equations are based on sea-level). You can account for this inaccuracy by entering a number in the offset (-60 minutes to +60 minutes).
Sunrise and sunset are off by one hour, or did not change with the Daylight Savings Time Change.	<p>This problem may be related to the operating system's daylight savings time clock. The clock may not be available on your system.</p> <p>To account for this problem, enter an offset of +60 minutes or -60 minutes.</p>
The strip charts lose the data when the program is shut down	Strip charts are intended for plotting data "real-time" and the data is not saved permanently to a file. Reference the section on graphs vs. strip charts.
The minimum and maximum daily values are not correct	Virtual Weather Station must be running to record daily highs and lows (data not stored in your weather station's memory).
Rate of changes are not correct	Rate of change is set to zero when Virtual Weather Station is started. Virtual Weather Station calculates the rate of change by calculating the

PROBLEM	SOLUTION
	<p>derivative of a parameter, and then filtering it over one hour. Thus, the rate of change equation factors all of the measurements taken in the last hour, and may not exactly match the change in one hour. Determining the actual change in one hour would require every measurement within the hour to be saved, which is not practical, and would require the software to be operational for more than one hour. Instead, Virtual Weather Station uses calculation techniques standard in the engineering community for calculating rate of change.</p> <p>Virtual Weather Station's rain rate may not agree with the rain rate calculated by the weather station because different techniques are used.</p>
How do I display more decimal points for a parameter?	Change the precision from the display's attributes panel. For example, changing the precision to three will add three numbers to the right of the decimal point (1/1000ths).
The jpeg images are distorted	Power save mode must be turned off to prevent distorted images
Weather display image colours are poor quality	Virtual Weather Station prefers to run at High Colour or 16 bit. Select Start►Settings►Control Panel from the windows menu bar and select [Display][Settings] and High Colour.
The software is consuming too much CPU resources	<ul style="list-style-type: none"> • Select Program Settings►Program Settings and set the CPU resources to Low. • Select Internet►FTP General Settings and set the FTP Priority to Below Normal and select the Max CPU During FTP to OFF. • Select Communication][Communiacion], and set the Communication Rate (sec) to 3.0 seconds or greater.
The graphical images are missing	You may be low on memory. Reduce the number of graphical images displayed.
The computer is low on memory	Reduce the number of displays. Too many displays may result in insufficient memory.
The graphs update slow or the program locks up when displays are updated	Reduce the length of time in your graphs. Select Plot Last x hours. Enter a number less than 240 hours (for example). Plotting 20,000 points on multiple graphs can cause long delays.
The font size is incorrect after changing the font type	Changing font type can also change the font size due to font size limitations. To restore default fonts, select the Default button from the font settings window and restart the program.
The Moonrise (or Moonset) is showing --- instead of the time	Approximately once a month, the moon does not rise (or set) on a given day.
There is no data in my graph or distribution chart when the program is started.	The chart will be empty if (1) the database is empty (example, when the program is first started, or (2) Data has not been collected in the plot time frame specified in the attributes window (the program was turned off).
The data in my graph is wrong. How can I fix it?	<p>This problem is generally a result of bad sensor data from your station, but can be repaired in your database.</p> <p>The data shown in graphs is stored in the database. To fix this data, go to Settings►Database Settings and edit the database.</p>
The data in my NOAA reports is wrong. How can I fix it?	<p>This problem is generally a result of bad sensor data from your station, but can be repaired in your archive memory. The data shown in the NOAA reports is stored in the archive memory.</p> <p>To fix this data, go to Settings►Daily Archive, Settings►Monthly Archive or Settings►Yearly Archive and edit the data.</p>
The data looks overwritten when opened from the file folder in Virtual Weather Station	Virtual Weather Station launches Notepad to view text files. This is a problem with Notepad. Use another text editor such as Microsoft Word or Wordpad to view the data.
The display image colours are poor quality	Virtual Weather Station prefers high resolution or 16-bit colour. Some images may result in poor quality at lower resolution settings.
The numerical markers on the ribbon and temperature displays are not evenly spaced	The software attempts to put a numerical marker at even increments, but this is not always possible. To improve your numerical marker increments, select a high and low range value that results in a difference of a multiple of 10. For example, a low of -40 and a high of 60 will provide a difference of 100. This will produce better marker increments than a low of -20 and a high of 100.

PROBLEM	SOLUTION
The Dew Point of the weather station is reporting "LL" or limited to 0°C (32°F) and Virtual Weather Station is reporting a value	The Oregon Scientific unit does not report dew points below 0°C (32°F) but Virtual Weather Station continues to report these values.
The sea-level barometer does not report what is entered in the Station Settings window.	Virtual Weather Station only reports the sea-level barometer from your station.
The software is reporting a cloud base when there are no clouds in sight.	This is only an estimate based on relative humidity and temperature. Other weather parameters affect the cloud base, and should only be used as an estimate.
A Virtual Weather Station parameter displays a different number than the station console	Make sure that you have not entered a calibration. Changing the calibration of a sensor will not change the value on the display.
The Daily Rain is not correct	The program must be running at midnight for today's daily rainfall to be correct. The Weather Station does not store daily rainfall.
The monthly rainfall reported in the NOAA report does not agree with the sum of the daily rainfall.	This is due to the station total rainfall reset by the user, or the values for minimum or maximum rain edited by the user.
How do I change my NOAA report data?	This is done in the Archive Settings window, and not the database.
When I update one of the fields in the daily summary data, this change is not updated in the monthly or yearly summary data.	You must edit each of these data fields. For example, if the minimum temperature on January 9, 2000 is changed, and it is the minimum for the month and year, you must change this field in the monthly summary panel and the yearly summary panel.
The Alarm Sound will not play	This feature requires a sound card. This is not a problem with VWS, but with your sound card. Contact your sound card manufacturer
Some of the check boxes on the Parameters Display Panel are dimmed	Not all parameters can be displayed with all of the weather elements. For example, graphs require historical data, and it does not make sense to plot sunrise.
The displays do not retain their position when exiting the program.	Make sure you have enough memory in your computer to save the displays. The display positions are saved in the file VWS\setup\position.bin. If this file is corrupted, close VWS, delete this file and restart Virtual Weather Station. You will need to reset the displays again. Try a different drive. The drive you installed Virtual Weather Station on may be read only.
After hiding Virtual Weather Station with the taskbar icon, and recalling the display by double clicking on the taskbar, the window does not refresh	This is a Windows problem. Minimize and maximize the application again to refresh.
One of the sensors is not updating, and VWS will not begin executing.	Virtual Weather Station requires all of your sensors to operate to properly obtain data. If one sensor is not functioning due to batteries or interference, deselect this sensor.
My system clock is losing time when I run Virtual Weather Station.	Use the Synchronization feature in Virtual Weather Station. Select Settings►Synchronize Date and Time from the menu bar. NOTE You must be the administrator on a Windows NT or above machine for this to work. You may have a bad ROM BIOS chip or your computer motherboard may need a new battery. Power management software in Windows can also cause clock time loss. When you connect your weather station to the communication port, Windows must process interrupts to read this data. With weather stations, this occurs every 3 seconds. This causes the clock to slow down. If your computer is running other utilities such as an anti-virus program, the clock speed may be affected even more.
The language does not change when changed from English	Virtual Weather Station provides limited foreign language support. To change the titles to the language of choice, edit each individual display.
What are channels 1, 2 and 3?	Channels 1, 2 and 3 are designated channels for the optional sensors.
I commonly receive timeouts during FTP	Increase the CPU usage during FTP operation by selecting Internet►FTP General Settings►Max CPU During FTP
Why does "WINOLDAP" run multiple times and not shutdown?	Virtual Weather Station accesses some applications through the command line. This is because WINOLDAP is not being automatically

PROBLEM	SOLUTION
	<p>closed when it finishes. In order to remedy this you need to modify the DOS box properties for CONAGENT.EXE, CONAGENT.PIF, or _DEFAULT.PIF (probably in \windows).</p> <ol style="list-style-type: none"> 1. Start Explorer. 2. Locate one of the above files in the \windows\system directory. 3. When over the file click the right mouse button. 4. Choose 'Properties' from the speed menu. 5. Choose the 'Program' tab. 6. Turn on the 'Close on exit' option.
My wind run values are out of range	<p>There may be wind run calculation problems with specific computers due to the microprocessor and other hardware devices. If you find the wind run values are out of range, place the following line in your win.ini file: wuseDefaultTimer=True. To reset these values, select Settings►Recall Daily, Monthly and Yearly and edit the wind run for the day, month and year.</p>
The sea-level and measured barometer readings are the same.	<p>Some stations only report the sea-level barometric pressure after adjusted from the console. To back-out this correction, set a negative bias in the calibration panel.</p>

ADVANCED COMMUNICATION TROUBLESHOOTING TIPS

If you followed the troubleshooting tips above and could not find a solution, you likely have a problem with your station's communication port, the cable or your computer. To verify that you are receiving data, launch Hyper Terminal, which is a terminal emulation program distributed with most Windows operating systems.

- Launch Hyper Terminal, Select **Start►Programs►Accessories►Hyper Terminal** from your Windows Desktop.
- Run Hyper Terminal by selecting the Hypertrm icon.
- Enter a Name (any name is OK) for the connection description.
- Select Connect Using and Direct to Com x, where x is the comport designation.
- Select 9600 baud, 8 data bits, Parity None, 1 stop bit, Flow Control Hardware Control.
- You should see binary data on the display every time your station sends data.
- If you do not see data streaming on the display, please contact Oregon Scientific or your PC Manufacturer for more information.

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