Peet Ultimeter 2100 Weather Station

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When I was a kid, I bought a book about weather from the Scholastic Book Club. The book described how to build a home weather station. I studied the book and became a weather maven. My goal was to build my own weather station, but for some reason, I lost interest in the project and put it on the back burner with my many other lost interests.

Instead of building my own weather station, I started saving money to buy a simple weather station advertised in the Edmund Scientific catalog. I saved for a while, but for some reason, I lost interest and spent my savings on something else.

As an adult, I bought a house on top of a mountain for ham radio propagation reasons. In addition to interesting radio propagation, I quickly became familiar with such interesting weather conditions as snow when there was none anywhere else in the area, rain clouds so low that they surrounded my home in a thick fog, very high winds and lots of precipitation. I looked it up and discovered that an environmental study claimed that my neighborhood had the highest average rainfall in the state of Connecticut!

My home begged for a weather station, especially in light of my heavy involvement in APRS (Automatic Position Reporting System), which includes an interstate network of weather stations. When the opportunity arose, I jumped at the chance to review a weather station for *QST*.

I "shopped" for weather stations at the last Dayton Hamvention and determined that among the stations shown at the Hamvention, the offerings from the Peet Bros Company were the most APRS-friendly. In fact, Peet had a handout at the Hamvention that described how to interface and program their weather station to a Kantronics KPC-3 Plus TNC, which I just happen to have in my collection of TNCs.

The station I put together for this review started with the Peet Bros Ultimeter 2100 Weather Station, which monitors indoor and outdoor temperature, barometric pressure, wind speed and direction. I upgraded its anemometer/wind vane to one that is heated to avoid lockups caused by frozen winter precipitation. I added the Ultimeter Pro Rain Gauge with heater (to affirm that I lived in the most precipitation-prone area in the state) and the Ultimeter Outdoor Humidity and Temperature Sensor to complete the station. (The Outdoor Humidity and Temperature Sensor made the outdoor temperature sensor included with the Ultimeter 2100 Weather Station redundant.)

Testing

Before installing the station, I tested all the components as recommended by the owner's manual. Before testing the components, I had to assemble one of them—the anemometer/wind vane unit. The assembly was simple and testing commenced thereafter.

Testing involved connecting all the components and using the weather station keypad and display to see if the connected components worked properly. Everything seemed to work out of the box as advertised.

Installation

I chose a sunny summer day to install the weather station.

The anemometer/wind vane installation requires a nonferrous mast. Too much iron could interfere with the magnets in the unit, but the mast must be metallic in order to provide proper grounding. (By the way, the system includes built-in static electricity discharge protection for all outdoor sensors.) I used a 5-foot aluminum mast mounted with two hose clamps to the drain/waste vent near the peak of my house's roof.

I used a level to make sure the mast was vertical and a GPS receiver to determine which way was north. I marked the north direction on the mast, slipped the anemometer and wind vane onto the top of the mast and rotated it so that the north calibration mark on the wind vane matched the mark I made on the mast. Finally, I clamped the unit and tie-wrapped its cable to the mast.

The rain gauge installation required that it be in the open, away from overhanging trees, well clear of the house or other structures that might block blowing rain, and easily accessible for periodic inspection and cleaning. That was a tough list of requirements to meet at my location because I am treed-in. Ground mounting was out of the question.

The solution was to install the rain gauge on a 10-foot PVC pipe and attach the pipe with U-bolts to the second-floor deck. After some judicious tree limb trimming, it was clear of trees and above the edge of the roof, but it was still accessible for inspection and cleaning by simply loosening the U-bolts and lowering the PVC pipe.

I installed the rain gauge on the top of the PVC pipe, leveled the pipe for near-perfect vertical alignment, tie-wrapped its two cables and tightened the

Bottom Line

Amateurs looking for a weather station to complement their APRS activities will find the Peet Ultimeter 2100 attractive—and not just because of its packet-generating capabilities.

U-bolts (see Figure 3). Interestingly, as I finish this review, most of the leaves have fallen from the trees around here, but when I inspected the rain gauge, it was free of any debris.

Installing the outdoor humidity and temperature sensor was comparatively simple. Its installation had to be in the shade, where it can never receive direct sunlight, protected from wind and rain, so air can circulate freely around it, away from incidental heat sources, such as roof circulation vents, and not directly above radiated or reflected heat sources, such as cement patios or large picture windows. The back outside wall of my house met all those requirements, and all it took was two screws to mount the unit to the house (see Figure 4).

I had to drill a hole through the back wall of the house in order to get all four cables into the house (the anemometer/wind vane and outdoor humidity and temperature unit required one cable each, while the rain gauge had two cables, one for the gauge and one for its heater).

Once I threaded all the cables inside the house, I connected them to the weather station's junction box. Another cable connected the weather station's keypad and display to the junction box.

I powered up the keypad/display and went through the set-up procedures. I had to set the date, time, formats for date and time and the units of measurement for wind speed, temperature, barometric pressure and rainfall. I also had to obtain the local barometric pressure and adjust the weather station's barometric pressure reading to match. The weather station was up and running, and I let it run a few days before interfacing it to my APRS station.

My Kantronics KPC-3 Plus TNC has two serial ports. One is for connection to a computer; the other is for connection to a GPS receiver. Since the TNC is not going anywhere fast, I do not have a GPS connected to it, so that frees up that serial port for connection to the weather station using the weather station's serial cable.

Byron Smith, WA6YLB, has a Web page that includes information for connecting the KPC-3 TNC to a weather station (**www.theworks.com/~wa6ylb/kpcdigi.txt**). This information was invaluable for programming the TNC to operate with the weather station. I used a variation of WA6YLB's setup for my station.

The primary differences, aside from call sign and location information, were that WA6YLB's setup was intended for a remotely controlled TNC whereas mine is in my ham shack, and WA6YLB's weather station connection was to the first serial port whereas I used the second serial port for the weather station connection. If you are interested in how I programmed my TNC for that setup, I dumped all my TNC settings to a text file you can view at my weather station's Web page, **www.tapr.org/~wa1lou/wx.html**.

Figure 3—The Ultimeter Pro Rain Gauge must be in the open, away from overhanging trees and clear of the house or other structures that might block blowing rain.

Figure 4—The Ultimeter Outdoor Humidity and Temperature Sensor must be installed in the shade, where it can never receive direct sunlight. It must also be protected from wind and rain, and in a place that allows air to circulate freely around it.

After I successfully interfaced the weather station to my APRS station, I built a quick and dirty Web page so that I could view the weather at my house from anywhere in the world. The APRSWXNET/Citizen Weather Observer's Program (**www.wxqa.com**) enlisted my station to be part of its network. The National Oceanic and Atmospheric Administration (NOAA) collects data from the network for research use by Forecast Systems Laboratory in Boulder, Colorado.

The weather station sends current weather data to its serial port in three ways. In the "data logging mode," the weather station puts out a steady stream of records, about one per second. Each record includes all current weather readings including time and date. In the "packet mode," the weather station puts out one record every five minutes. Each record includes all current values, plus the highest wind speed over the past five minutes with the associated wind direction, three-hour barometric pressure change, station calibration numbers, and current time and date. In the "complete record mode," the weather station puts out a steady stream of records, about 20 per minute. Each record includes all current values, three-hour barometric pressure change, today's high and low values, yesterday's high and low values, and long term high and low values, station calibration numbers, and current time and date. To minimize transmissions, most APRS weather stations using Peet equipment use the packet mode, as do I.

Operation

The keypad/display of the Ultimeter 2100 is easy to use. The unit is small, but its display is big relative to the size of the unit. The unit measures 7.75×2.75×1.25 inches; the LCD is 3.25×1.5 inches. The unit may be wall- or desk-mounted and has available a brilliant blue display backlighting to provide visibility in darkness or low-light conditions (see Figure 5).

To view data on the LCD, you press one or two keys. The LCD continues to display and update whatever data you selected to view last. You can choose to view wind speed, outdoor temperature, indoor temperature, rainfall, barometric pressure, outdoor humidity, indoor humidity (if you have an optional indoor humidity sensor, which I did not review), dew point, time and date. A compass displays the wind direction and shows up in each and every display.

Up and down arrow buttons indicate the daily, previous day's, and all-time high and low readings of whatever weather reading you are viewing. For example, with the outdoor temperature displayed, pressing the up arrow once displays the highest temperature reading since midnight and the time and date that high occurred. Pressing the up arrow twice displays the highest temperature reading during the previous day and the time and date that high occurred. Finally, pressing

Figure 5—The brilliant blue backlighting of the Ultimeter 2100 keypad/display provides excellent visibility in the dark

the up arrow three times displays the highest temperature reading ever recorded by the unit and the time and date the high occurred (97ºF on August 14, 2002 at 13:54 EDT). You can reset the unit to erase any of the stored records.

I like to leave the display set to the wind speed/direction display, because it is the most likely to change. But during a storm, I switch to the rainfall display to watch the inches of rain climb upward. During a particularly nasty storm earlier this fall, the storm alarm sounded, so I switched to the barometric pressure display and watched the mercury drop like a rock. (By default, the storm alarm occurs when the pressure has fallen more than 0.18 inch over the last 3 hours.) The system also has a rain rate alarm, which serves as an adjustable flash flood alert.

Conclusion

The Ultimeter 2100 weather station system has performed flawlessly through the summer and autumn. There have been no problems with any of the system components. As this issue was going to press, an ice storm hit my house, knocking down numerous limbs. The Ultimeter 2100 performed admirably, and the heating functions of the anemometer/weather vane and rain gauge worked until power was lost. Even then, the station continued to provide some weather data for a while, thanks to its internal 9-V battery. After a prolonged outage, I reprogrammed the weather station. It is now running fine.

The components of the Ultimeter 2100 weather station are sturdy and well constructed and should be able to sustain outdoor operation for many years to come.

The accuracy of the readings obtained from the weather station seems to correspond with weather reality. They closely match the readings of an indoor/outdoor thermometer and barometer installed in my home. They also closely match the readings from the National Weather Service and The Weather Channel.

The Internet allows me to view readings from 19 other weather stations in my area (select the "Wx Stations" link from my weather station Web page, **www.tapr.org/~wa1lou/wx.html**). The readings from the surrounding weather stations correspond favorably with the readings from my weather station. Interestingly, when it rains, my weather station is always near the top and usually at the top of the list with regard to the total rainfall amount.

During the installation and initial operation of the weather station, I had questions and called the Peet Bros technical support line for assistance. Each time I called, they quickly provided me with an accurate answer.

Overall, I have a very favorable impression of the Ultimeter 2100 and recommend it to anyone considering the purchase of a weather station for their Amateur Radio station. An added benefit using the weather station is that it is an education; it definitely expanded my knowledge of the weather.

Manufacturer: Peet Bros Co, 31 E 17th St, St Cloud, FL 34769; tel 800-872-7338; fax 407-892-8552; **peetbros@peetbros.com**; **www.peetbros.com**. Manufacturer's suggested retail price: Ultimeter 2100 Weather Station, $399; upgraded Heated Anemometer/Wind Vane, $29; Ultimeter Pro Rain Gauge with Heater, $190; Ultimeter Outdoor Humidity and Temperature Sensor, $110; serial cable, $20. QST

NEW PRODUCTS

80/75-METER VERTICAL FROM ARRAY SOLUTIONS

◊ Array Solutions of Sunnyvale, Texas, has recently added a full-size, ¼-wavelength, 80/75-meter vertical antenna to its wide selection of antenna systems and related products. The AS80-FS consists of a freestanding 70-foot aluminum radiating element that's attached to a steel foldover base.

The bottom portion of the antenna made of 4-inch-diameter aluminum tubing. A drilled radial plate, for connecting up to 120 radials, is included. The base assembly can be mounted in as little as one cubic yard of concrete while maintaining a wind survival rating of 110 MPH. According to the manufacturer, the 200-pound antenna can handle up to 15 kW of RF. 160-meter operation is possible with a tuner.

Price: $1340; the optional winch sells for $250. For more information, contact Jay Terleski, WXØB, at Array Solutions, 350 Gloria Rd, Sunnyvale, TX 75182; tel 972-203-2008, fax 972-203-8811; **wx0b@arraysolutions.com**, **www.arraysolutions.com**. QST