



## **WeatherHawk Series 600**



### **General Description:**

The WeatherHawk Series 600 family of weather stations measure and record wind speed and direction; air temperature and relative humidity; barometric pressure and solar radiation; rainfall and snowfall. In addition, the system calculates and exports an evapotranspiration (ET) value that can be used by third party systems for irrigation control. Series 600 weather stations are designed for applications where a minimal visual impact, high reliability, and a long interval between routine servicing are significant factors in the decision to purchase. The standard Series 600 system incorporates an integral 3 Ahr battery pack, which is continually recharged by an external primary power source. Model 620 and 610 systems can be interfaced with an optional solar panel, while Model 621 and 611 systems require an AC power converter. All Series 600 weather stations are suitable for applications requiring high reliability.

The Series 600 family is fully compatible with most versions of software, data management, input power and mounting accessories designed for the WeatherHawk Signature and 500 Series weather stations.

The Series 600 WeatherHawk systems utilize solid state sensors, with no moving parts. Solid state sensors enable a low profile design better suited to high visibility locations where a traditional weather station would be visually objectionable; they have higher reliability and a longer interval between routine service and inspection requirements; they are more robust and less susceptible to damage from wind carried debris; and they are not compromised by heavy snowfall or freezing conditions that produce rime ice (NOTE: Heated sensor versions, Models 611/621, must be used in snow or freeze zone applications).

### **Models 610/611**

These versions of the Series 600 weather station are directly connected to a host device (PC or server) through an RS232 serial data I/O located on the bottom of the weather station. The Model 611 incorporates a thermostatically controlled heater element in the sensor head that keeps the ultrasonic wind sensor elements and the radar precipitation sensor surface free of snow and ice to  $-50^{\circ}$  C.

### **Models 620/621**

These versions of the Series 600 weather station are wireless to a host device (PC or server) using fully integrated industrial grade 916 MHz spread spectrum RF communications technology. They also have an RS232 serial data I/O located on the bottom of the weather station, which can be used as a second serial communications port, or for programming and testing the system, or for direct data downloads using a PC or PDA. The Model 621 also incorporates a thermostatically controlled heater element in the sensor head that keeps the ultrasonic wind sensor elements and the radar precipitation sensor surface free of snow and ice to  $-50^{\circ}$  C. Optional configurations of both units enable replacement of the 916 MHz RF components with

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922 MHz and 2.4 GHz RF components to comply with local, regional or national radio frequency licensing requirements.

### ***Sensor Technologies***

Series 600 WeatherHawk weather stations employ the latest in weather measurement sensors. Wind speed and direction use acoustic techniques formerly available on only the most expensive professional wind velocity measurement systems. Precipitation is measured using a 24 GHz radar which can distinguish between rain and snow fall based on drop size and fall velocity. Barometric pressure, relative humidity, air temperature and solar radiation measurements are made by calibrated scientific grade sensors typically installed in the finest professional weather measurement and monitoring systems.

Wind Speed & Direction is measured by a sensor consisting of four ultrasound sensors which take cyclical measurements in all directions. The resulting wind speed and direction are calculated from the measured run-time sound differential.

Rainfall and Snowfall is measured using radar technology. The precipitation sensor works with a 24 GHz Doppler radar which measures the drop speed, and calculates precipitation quantity and type by correlating drop size and speed.

Air temperature is measured by a highly accurate NTC-resistor. The resistance value of this sensor changes in accordance with temperature thus providing an accurate temperature measurement.

Relative humidity is measured by a capacitive humidity sensor. Both the temperature and relative humidity sensor are housed in an aspirated radiation shield to prevent direct exposure to solar radiation.

Barometric pressure is measured with a capacitive silicon temperature corrected strain gauge device that is typically not degraded by environmental exposure and does not require calibration after manufacture.

Solar Radiation is measured by a silicon pyranometer with a cut filter limiting the spectral exposure to the 300-1100 nm wavelength. This device typically degrades at a rate of 2% of the full scale value each year and should be recalibrated, or replaced every three years, depending on the application.

### ***Data Transfer Protocols, Software and Data Interface Hardware***

All WeatherHawk systems communicate using a proprietary Pakbus protocol. Any qualified software developer may request a software development kit, at no charge, to assist in the development of software drivers for third party devices or software. WeatherHawk systems are also available with an optional MODBUS protocol for use in industrial control applications and other applications where necessary.

#### **Software**

WeatherHawk offers the following software applications for weather station management, data acquisition and logging, report generation and data display.

- Visual WeatherHawk – a single host, multi-site professional application that will communicate with any WeatherHawk weather station, as well as CR200 Series data loggers from Campbell Scientific, Inc. Visual WeatherHawk

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adapts to any data telemetry scheme including direct connection, wireless short haul RF (spread spectrum radio), wireless long-haul RF (VHF/UHF radio), satellite modem, IP modem/server module, or landline and cellular modems. The application also offers a variety of standard and user defined reports and export file formats, and it will support the generation, export and update of a weather data GUI for a website. This application runs on PC-Windows computers.

- *WeatherHawk-Pro* – a single host, single site consumer application that will communicate with any WeatherHawk weather station. WeatherHawk-Pro connects directly to the serial port on the WeatherHawk; or to the serial I/O of the supplied wireless short haul RF (spread spectrum radio) base transceiver, or IP modem/server module; or landline and cellular modems. The application also offers three export file formats, and it will support the generation, export and update of a weather data images for a website. This application runs on PC-Windows and Macintosh OS-X computers. It will also interface with the NOAA/NWS CAMEO application for First Responder applications requiring plume modeling.
- *LoggerNet* – a single host, multi-site professional application that will communicate with any WeatherHawk weather station, as well as any data loggers from Campbell Scientific, Inc. LoggerNet adapts to any data telemetry scheme including direct connection, wireless short haul RF (spread spectrum radio), wireless long-haul RF (VHF/UHF radio), satellite modem, IP modem/server module, or landline and cellular modems. The application also offers a variety of standard and user defined reports and export file formats, and with the RTMC module it will support the generation, export and update of a weather data GUI for a website. This application runs on PC-Windows systems.
- *Smart Phone App* – Smart phone apps are available for use with WeatherHawk stations when the station is used in conjunction with a WeatherHawk IP module. The smart phone app is able to display current data from WeatherHawk stations. Apps are available for iOS and Android systems

### **Data Interface Hardware**

*Weatherproof serial cables* are available in 25, 50 and 75 foot lengths for permanent direct connection to the RS232 I/O on any WeatherHawk weather station. These cables feature nickel plated brass DB-9 connectors for corrosion resistance and have a Sanoprene jacket which is suitable for both high UV and direct burial environments.

An *RF4xx spread spectrum RF transceiver* is supplied as standard equipment with every wireless WeatherHawk weather station. The unit comes with an AC power supply (120 VAC/60 Hz), a 6 foot serial cable and an antenna. Additional RF4xx kits can be purchased for simultaneous communication with any WeatherHawk wireless weather station, enabling multiple host computers to use the data from a single weather station. Typical applications for multiple receiver units are in home automation where a single weather station may support a whole house control unit, with touch panel data display units; and a discrete PC, which may act as the server for a local intranet or internet weather data display website.

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WeatherHawk IP server modules are a proprietary web server that is designed to interface the serial output of any WeatherHawk weather station, or companion RF4xx transceiver with an Ethernet. Output formats from the IP server module are HTML, XML and CSV (with headers).

### ***Mounting Systems***

All WeatherHawk weather stations will interface with the full range of mounting systems supplied by WeatherHawk. They consist of:

TP-1 Tripod – The tripod, with its range of accessories is the most rugged and adaptive weather station mounting system. It supports both rooftop (sloped and flat) and ground mounts, with mast heights to 10 feet. Accessories consist of a weather station alignment kit (optional), ground stakes (optional), a rooftop sealing kit (standard), grounding rod kit (optional), mast length extensions (optional), and a guy-wire kit (optional).

HM Series – The HM Series house mount kits are adapted satellite dish mounts that will support attachment to sloped and flat roofs, and to the vertical fascia and reinforced trim boards around the roofline of a home. The accessories consist of mast extensions, a Retro-deck base assembly that offers additional stability and support on composite roof coverings; and a Comm-deck mount that offers a weatherproof penetration through a roof for a directly connected weather station.

Various additional specialized mounting tripods are available for high environmental abuse environments, or quick deployment temporary applications.