WeatherHawk Signature Series

General Description:

The WeatherHawk Signature Series family of weather stations measure and record wind speed and direction, air temperature and relative humidity, barometric pressure, solar radiation, and rain. In addition, the system calculates and exports an evapotranspiration (ET) value that can be used by third party systems for irrigation control. They are designed for applications where a visual impact is not a concern; and high reliability is significant factors in the decision to purchase.

The Signature Series family is fully compatible with all versions of software, data management, input power and mounting accessories designed for the WeatherHawk Series 500 family. It is also compatible with all third party certified software drivers.

The principle difference between the Signature Series and Series 500 WeatherHawk systems is that the Signature Series utilizes conventional, lower cost sensors, resulting in a lower system price. All WeatherHawk systems are industrial grade products, and they are easy to install, feature high reliability, and can be user serviced or repaired with replacement components that do not require field calibration, specialized tools or training.

Model 232

This version of the Signature Series weather station is directly connected to a host device (PC or server) through an RS232 serial data I/O located on the bottom of the weather station.

Models 916/922/240

These versions of the Signature Series weather station are wireless to a host device (PC or server) using fully integrated industrial grade MHz spread spectrum RF communications technology. The various model numbers reflect the center frequency of the radio, and the various frequencies are specifically licensed for use in various countries. All frequencies are licensed within the Americas, with the 916 (916 MHz) being preferred due to its greater range; the 240 (2.4 GHz) systems are generally acceptable worldwide; and the 916 (916 MHz) is licensed for use in Australia and New Zealand. The Signature Series wireless systems 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.

Various external antenna configurations are available for these wirless systems that can extend their LOS (line of sight) range from ½ mile for 900 MHz systems, to over 7 miles; and from ¼ mile for 2.4 GHz systems to over 3 miles.

WeatherHawk, 185 West 1800 North, Logan, UT
International: 435-750-1802 TOLL FREE USA: 866-670-5982 FAX: 435-750-1749
http://www.weatherhawk.com sales@weatherhawk.com

Sensor Technologies

Signature Series WeatherHawk weather stations employ well proven weather measurement sensors. Wind speed and direction use rotating anemometer and vane devices commonly used on professional wind velocity measurement systems. Rain is measured using a volumetric tipping bucket, self-draining rain gauge for rainfall. Barometric pressure, relative humidity, air temperature and solar radiation measurements are made by a combination of industrial and scientific grade sensors.

Wind Speed is measured by a three cup rotating anemometer. The rotating component of the sensor spins in response to the wind and turns a magnet within a coil to generate a sine wave output proportional to velocity. This technique is well proven and reliable under normal conditions, but the rotating component can lock up in freezing or icy conditions.

Wind Direction is measured by a sensor consisting of a vane connected to a wire wound resistor. As the vane turns on its pivot point the resistance increases or decreases with respect to wind direction. This is translated by the weather station into a measurement in degrees with respect to a datum, typically magnetic North, which is physically established when the weather station is installed.

Rainfall is measured with a tipping bucket rain gauge. During a rain event drops are captured in a funnel of a know size and directed through an orifice to form a drip stream. This drip stream flows into a volumetric measurement device (a tipping bucket or spoon), which fills with a calibrated amount and then tips. The tipping motion dumps the water and activates a switch which produces an electrical pulse. The water then drains from the bttom of the rain gauge and the mechanism returns to its “catch” location to fill again. The pulses are counted by the weather station and multiplied by the known volume of the tipping bucket to produce a rainfall amount, and when compared to time, a rainfall rate.

Air temperature and relative humidity (RH) sensors are combined in an integrated, user replaceable unit that requires no calibration. The RH sensor is a thin polymer, resistive sensor that degrades with exposure due to age and airborne contaminates. It should be user replaced every 18-24 months to maintain accuracy, and at a shorter interval if the location is subject to high levels of air pollution or is subject to airborne chemical spraying. The air temperature sensor is a fine wire thermistor, with a rapid response, and it is typically not subject to environmental degradation.

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 scientific grade 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 3-5 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.

Software

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

- *Visual Weather Station* – 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 Weather Station 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-XP computers.
- *WeatherHawk-XP/X* – a single host, single site consumer application that will communicate with any WeatherHawk weather station. WeatherHawk-XP/X connects using a directly to the serial port on the WeatherHawk, or by wireless short haul RF (spread spectrum radio), or IP modem/server module, or landline and cellular modems. The application also offers a three 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-XP and Macintosh OS-X computers.
- *Virtual Weather Station* – a single host, single site consumer application that will communicate with any WeatherHawk weather station. Virtual Weather Station connects directly through the serial port on the WeatherHawk, or by wireless short haul RF (spread spectrum radio). The application also offers a two export file formats, and it will support the generation, export and update of a weather data GUI for a website. This application runs on IBM compatible computers.
- *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 IBM compatible computers.
- *PConnect* – a single host, single site professional application that will communicate with any WeatherHawk weather station, as well as a range of Campbell Scientific data loggers. PConnect is used for direct download and storage of data through the serial port on either the weather station or its companion RF4xx receiver (if wireless). The software is typically utilized for field data acquisition with later export to a PC for post-processing, display and long-term archiving. It also enables on-site reprogramming of the weather station by uploading pre-configured program files. It is not designed for long haul or automated data collection protocols. This application runs on a range of PDA devices, check with Campbell Scientific, or WeatherHawk for a list of compatible units.

- *Weather Display* – a single host, single site consumer application that will communicate with any WeatherHawk weather station. Weather Display connects directly through to the serial port on the WeatherHawk, or by wireless short haul RF (spread spectrum), or IP modem/server module. The application also offers a range of 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-XP computers.

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.

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 facia 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.