



WeatherHawk™

IP Server Module Manual



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WeatherHawk IP Server Module

Description

The WeatherHawk-IP Server Module (WH-IP) is specifically designed to support the WeatherHawk family of personal, school, industrial and home automation weather stations. WH-IP will not support other manufacturers' products.

The WH-IP is supplied in a splash-proof enclosure, designed for indoor or outdoor installations. WH-IP includes all items necessary for programming and interface with a WeatherHawk weather station. The user must supply a cable that will connect WH-IP to an Ethernet.

WeatherHawk IP Server Module components

- WeatherHawk IP Server Module
- Programming software CD, WHIPdownload.exe and associated documentation
- Null modem cable, for programming
- Serial cable, for interface to a WeatherHawk
- AC/DC power converter (120 VAC/60 Hz input, 12 VDC 0.8A output) with interface cable

Optional Items

- Weatherproof 50 foot serial cable for direct connection to a WeatherHawk weather station
- 250 foot pre-terminated CAT5 cable for connection to an Ethernet
- Weatherproof 20 foot power extension cable for connection to an outdoor mounted WH-IP



Connecting an incompatible power source to your WeatherHawk IP Server Module voids your Warranty. It is advisable for you to check with WeatherHawk Customer Service before connecting a power source not supplied by WeatherHawk.

Direct connection of a WH-IP to a WeatherHawk weather station may involve special considerations for earth grounding to protect from environmental ESD (lightning). Have your installation reviewed by an electrical engineer or installed by a qualified electrician if you have ESD concerns.

Application

WH-IP accepts the proprietary serial data output of any WeatherHawk weather station and converts it to simple text HTML, XML, or CSV (with headers) file formats. Access is browser based via a network IP interface using a static IP address assigned to the WH-IP. Initial set-up access is serial with the *WHIPdownload.exe* application provided.

WeatherHawk weather stations are available in both wireless and hardwire connection versions. The standard output of either the serial I/O on a WeatherHawk, or the radio base station is based on the proprietary serial data PakBus protocol from Campbell Scientific, Inc. The WeatherHawk-IP server interface enables weather sensor data to be widely distributed over a network that may have end location variable or user specific applications. For example, IP based home automation or industrial control systems can be configured to use data from WH-IP without the need to write specific embedded software drivers.

Programming

Software

WHIPdownload consists of three files (*WHIPdownload.exe*, *PakBusDLL.dll*, and *SimplePBD.dll*) supplied on a single CD. WHIPdownload should be copied into a user created folder on a PC for use. WHIPdownload is not available in a Macintosh version.

WHIPdownload enables a user to program the WH-IP with a static IP address, to verify an existing IP address, and to upload an operating system (OS) into the WH-IP. From time-to-time, WeatherHawk may update the WH-IP OS and all such updates are free to existing WH-IP owners.

The software CD also includes:

- WHIPdownload and supporting files
- Various documentation associated with the WeatherHawk weather station which may be changed or updated from time-to-time
- A weather station communication utility called PakCom, which is used to troubleshoot, configure, or download updated programs or operating systems into the weather station using the serial port on the underside of the station, or using the network IP address.

Set-up

Insert the supplied CD with WHIPdownload application in your PC CD drive, or copy the program files into a folder named WHIP.

NOTE: The word “download” in the context of this software application means to download settings, or an operating system, from the user PC into the WH-IP server module.

Open the WH-IP module by pressing on the center of the lower cover base to disengage the lock, and then lift up on the bottom of the lower case. The lower portion of the case will separate from the WH-IP module exposing three connectors arrayed on a connector panel (fig.1).

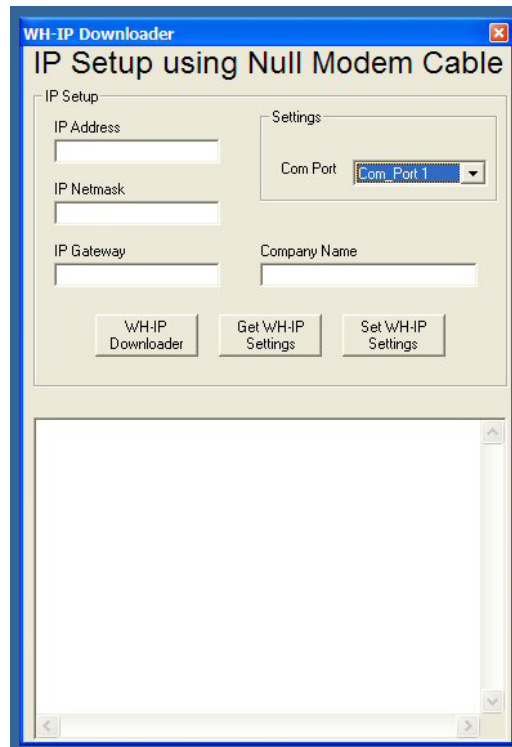


WH-IP Connector Panel (fig.1)

Apply power to the WH-IP by connecting the supplied AC/DC Converter into a 120 VAC/60 Hz wall outlet, then connect the other end to the pin plug adapter cable, and then plug the small green connector into the green mating *Power Connector* on the exposed connector panel of the WH-IP. A red *Power LED* should illuminate (fig.1).

Connect the Null Modem cable between an available serial port on your computer and the WH-IP *Serial Cable Connector* on the connector panel.

Close all applications that may share the serial port on your computer. Launch *WHIPdownload.exe* by double-clicking on the “Rabbit” icon and the set-up screen (fig.2) will appear:



WHIPdownloader Set-up Screen (fig.2)

The set-up screen enables a user to:

- Select the communications port (*Com Port*)
- *Get WH-IP* (current) *Settings*
- Input (set-up) an *IP Address*, *IP Netmask*, *IP Gateway*, and *Company Name* header for download into a WH-IP
- *Set* (download) new *WH-IP Settings*
- Download a new operating system using *WH-IP Downloader*

If you are downloading the static IP address for the first time to your WH-IP:

- Select the correct Com Port
- Input the IP Address, IP Netmask, and IP Gateway into the IP Set-up windows
- If you want a company or location identifier to appear on the browser screen, input this information into the Company Name window
- Use the mouse to select and click on the Set WH-IP button
- Verify the input by using the mouse to select and click on the Get WH-IP Settings button. Your settings inputs should appear in the lower screen window.

If you are verifying the set-up parameters of an existing WH-IP:

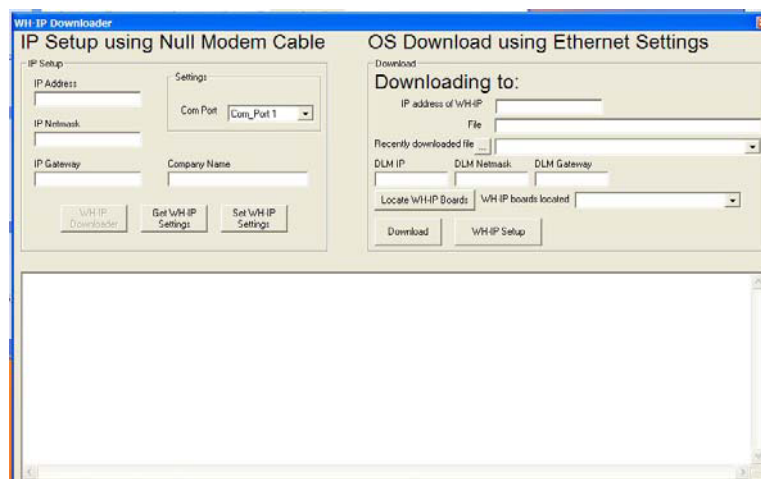
- Select the correct Com Port
- Use the mouse to select and click on the Get WH-IP Settings button. Your existing settings should appear in the lower screen window. If no settings appear, the WH-IP has not been previously programmed.

WH-IP Operating System Download

All WH-IP modules are delivered with an operating system (OS). There may be a future requirement to update an OS to implement new system features and an OS update must be downloaded through the network IP interface to the WH-IP. OS updates are not downloaded through the serial interface.

To download a new OS into a WH-IP (fig3):

- Use the mouse to select and click on the *WH-IP Downloader* button. The screen will scroll open to reveal the *OS Download using Ethernet Settings* window extension.
 - Input the IP address of the WH-IP
 - Use the ... button to browse for the OS you want to download, and then select that file
 - Input the DLM IP, DLM Netmask and DLM Gateway addresses
 - Click on the *Download* button
- NOTE: Downloading a new operating system does not erase the IP address in memory.
- Collapse the OS Download using Ethernet Settings window by clicking on WH-IP Set-up



OS Download using Ethernet Settings (fig.3)

Mechanical Installation

The WH-IP module is designed for both outdoor and indoor use and it is supplied with stainless steel hardware suitable for outdoor mounting to a mast of 1.25 – 2.0 inch ID. Hardware for alternate mounting locations is user supplied.

Wireless WeatherHawk (916/922/240) system installations will usually permit the WH-IP to be installed indoors, in the vicinity of the host PC or home control system. There are no user controls on the WeatherHawk-IP module and it may be located in an attic space or equipment room for indoor installations. In a wireless installation, the WH-IP is connected to the serial (RS-232) connector on the RF4xx radio transceiver unit. The RF4xx unit is transparent to system communications.

The typical outdoor installation involves a directly connected WeatherHawk 232 system. In those instances the WeatherHawk weather station will be mounted on top of a mast or tripod/mast, with the solar panel (if used) below it, and the WH-IP below the solar panel. In an outdoor location, the WH-IP should always be mounted on a vertical surface or mast, with the cable entry on the bottom. This is the only orientation that will assure a weather-proof installation of the WH-IP module.

In a direct connection installation, with the module outdoors, a weather-proof serial cable (available from WeatherHawk in 6 foot and 50 foot lengths), and a weather-proof power cable extension are required (available from WeatherHawk in a 20 foot length).

Many installation configurations for the WeatherHawk are possible. For questions about installation configurations not described above, contact WeatherHawk Customer Service.

Appendix

Specifications

Mechanical

Module Case: 7" long x 3 1/2" wide x 1 7/8" high (178mm x 89mm x 48mm)

Electrical

AC/DC Power Converter (supplied) – input: 100-240 VAC/50-60 Hz/0.5A; output: 12VDC@800m
WH-IP module input power: 7-16 VDC @ 200 ma.

Connectors:

Serial – DB9

Network – RJ-45

Primary Module Power – two pin, screw terminal connection

Cables and Maximum Lengths

- RS-232 Serial data cables should not be longer than 50 feet (15 meters).
- Network CAT5 cables should not be longer than 5000 feet (1535 meters).
- Input power extension cables should be sized to assure 7-16 VDC @ 200 ma at the WH-IP.

Displayed Screen functions and Data Values

WeatherHawk IP

User input Text Line

[Get Datalogger Clock HTML](#) DL 16:31:05 May 11, 2005
[Get Datalogger Clock XML](#)

2005-05-11 16:29:16

Set DataLogger Clock

☐ Change Time Manually

10

Set Data Update Rate

30

Set Web Update Rate

[Get Public Table HTML](#) [Get Public Table XML](#) [Get Public Table CSV](#)

Station ID	1
Time Stamp	16:31:05 05/11/2005
Record Number	67534
SaveSite	0.00
Latitude	0.00
Longitude	0.00
Altitude_m	0.00
BPOffset_KPa	0.00
Int_tuner	60.00
RainReset	0.00
BatVolt_V	11.94
Solar	0.79
AirTemp_C	23.21
RH	17.27
Barometer_KPa	85.81
WindSpeed_ms	0.00
WindDirect_deg	197.74
RainYearly_mm	0.00
DailyETo_mm	0.02
DailyTemp_Max	23.56
DailyTemp_Min	23.16
WindChill	23.21
DewPoint	-2.96
DailyWS_Max	0.00

Displayed Screen functions and Data Values (fig.4)

- **Header** – First line preset as *WeatherHawk-IP*, second line is user entered using WHIPdownloader application.
- **Set DataLogger Clock** –sets the clock in the weather station to the host computer clock
- **Change time manually** – when checked this enables the user to set a value different than the host PC clock (normally used to pre-program units going to a different time zone)

- **Set data update rate** (in seconds) – Valid values are 10-60 and this sets the data scan rate in the weather station. Default is 10 seconds and this default is related to standards for accurate wind measurements. Resetting this value will not affect the wind speed and wind direction averaging standards. It will change how often the data is pulled into the public tables until it is exported.
- **Set Web update rate** (in seconds) – Valid values are 10-n and this sets the rate at which data is requested and delivered to the IP address (30 seconds is the default). NOTE: For a wireless, solar powered system it is best to set this value at 60 seconds as a battery conservation measure. The radio uses a lot of power and high update rates can run the battery down in areas where there are short winter solar days, or consistently overcast skies. If a system is externally powered (not solar), then this is not relevant as the battery pack is continuously recharged. For directly connected systems this is also not a problem because they use much less power.
- **Station ID** – The unique weather station ID number (this is important for wireless systems in areas where there may be more than one wireless system within the line-of-sight range of the receiver). Default from the factory is 1, and this can be set using the PakCom application delivered on the IP module CD. It is recommended that a user changes the Station ID to the weather station serial number during initial set-up. A user connects to the system serially, or through the Ethernet with PakCom.exe to change the weather station OS, Program; or to download ID, location and altitude data into the station.
- **Save site** – Factory setting, not used by end user.
- **Latitude** – User provided GIS location of the station input as a set-up function using PakCom.
- **Longitude** – User provided GIS location of the station input as a set-up function using PakCom.
- **Altitude** – of the weather station location, in meters, above sea level that is user input as a set-up function with PakCom. Needed if the user wants to correct their BP for altitude.
- **BPoffset_Kpa** – a barometric pressure calibration offset value the user can input as a set-up function using PakCom. Weather station will need to be within a few miles of an airport or other calibrated site to establish a valid offset value. The National Weather Service on-line can often provide this value. It is the difference between the weather stations measured value and the calibrated reference station value.
- **Int_timer** – this is the data logging interval in the weather station in seconds. This is the interval at which it stores a complete set of data records in memory. It is mainly used in applications where data is post processed, or archived. The standard single user software and PakCom can change this interval.
- **RainReset** – If this is toggled between 1 and 0 it will reset the annual rain value and clear the counter. You will not typically use this and the default is 0.00
- **BatVolt_V** – current battery DC battery voltage in the weather station. Optional use to set an alarm toggle if it drops below 12 volts for a wireless system, or below 6 volts for a directly connected system.
- **Solar** – this is the output of the solar radiation sensor in watts/meter². The range is 0-1000 and this could be used to set thresholds for closing of window coverings. It can often be higher than 1000.....up to as high as 1250 due to reflected energy from light, scattered cloud cover. Reflected energy is why a person sunburns faster at the beach, or near water.....reflected energy from the water and cloud cover is additive to the solar value.
- **AirTemp** – ambient air temperature in degrees centigrade (programmers need to provide any conversions for deg F). This value can be used to display the current value, and as a way of setting thresholds for walkway heaters, etc.
- **RH** – ambient relative humidity in %
- **Barometer_KPa** – ambient barometric pressure (corrected if the user inputs an offset value). Programmers need to provide a conversion for inches of mercury, millimeters of mercury, or BAR value if one of those is preferable.

- **WindSpeed_ms** – wind velocity in meters/sec, so programmers need to provide a conversion to mph, etc if required. This is on a 10 second baseline, so it is effectively an average value that eliminates the effect of gusts.
- **WindDirect_deg** – this is the wind direction (0-360) and the standard is to give the direction “from which the wind is coming”. There is also a 10 second inbuilt averaging process so that the value doesn’t change with every small deflection of the vane. The zero datum is either magnetic or true North and this is physically set when the weather station is installed. The sensor is measuring a value from 0-360, with 0 as the North datum.
- **RainYearly_mm** – this is the cumulative value for rain from January 1, resetting each year at midnight on Dec 31. To get hourly and daily rain values a programmer needs to provide for a subtraction based on elapsed time. This is typically done on an hourly and a daily basis. For example: each hour store a value for RainYearly_mm and subtract it from the next hourly value to get the hourly rainfall.....accumulating those hourly values from midnight will give the daily rain. The value is in mm and users typically want the ability to toggle their displays from mm to inches.
- **DailyETo_mm** – ETo is Evapotranspiration and it is used to control an irrigation system. A programmer may or may not want to give this information to a homeowner. Some irrigation systems will allow a manual input for ETo, but professional systems will take it as a direct data input. The value resets to zero at midnight in the weather station. This value is the millimeters of water lost from the soil into the environment due to evaporation and plant transpiration. Providing this value to a smart irrigation system allows control of the amount of water applied to the grounds. Not many residential systems can take this input but it has been used by golf courses for years to conserve water and manage irrigation. This needs to be converted to inches in most cases.
- **DailyTemp_Max** – the high air temperature since the prior midnight in degrees C. This resets at midnight in the weather station.
- **DailyTemp_Min** – the low air temperature since the prior midnight in degrees C. This also resets at midnight in the weather station.
- **WindChill** – in degrees C and this is a current value calculated by the weather station based on temp, RH and wind speed.
- **DewPoint** – in degrees C and this is a current value calculated by the weather station.
- **DailyWS_Max** – this value is in meters per sec and it represents the highest wind gust during a day. It resets at midnight.