

# WX3IN1 Plus (v1.30)

APRS STANDALONE DIGIPEATER  
APRS TO APRS-IS IGATE  
APRS-IS TO RF MESSAGES FORWARDING  
WEATHER STATION SUPPORT  
WEATHERUNDERGROUND SERVICE REPORTING  
EXTERNAL TELEMETRY MODULE SUPPORT

WWW INTERFACE FOR ADMINISTRATION  
TELNET INTERFACE FOR MONITORING  
NTP SUPPORT FOR TIME SYNCHRONIZATION  
REMOTE FIRMWARE UPDATE VIA TFTP

Instruction manual  
Configuration software manual



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## 1. Technical parameters

Dimensions	126x99x43 mm
Weight	270g
Supply voltage	12VDC typ. (9 - 16VDC)
Power consumption	80mA
Operation temperature	-30 °C / +70 °C
Humidity	95% max.
Ethernet	10/100 Base-T
Power connector	5,5mm connector
Weather station connector	DB-9 male, RS-232 standard
PC connector	USB-B (printer cable type)
Radio connector	Mini DIN 6-pin (shared with telemetry)
Telemetry module connector	Mini DIN 6-pin (shared with radio), RS-485 2-wire standard

## 2. Device features

### 2.1. APRS standalone digipeater

The main purpose of the device is receiving and sending data packets via APRS radio network. WX3in1 Plus is capable of receiving an APRS packet, decoding the sender, destination, path and information field. Then actions are performed in accordance with the options configured by user:

- Packet forwarding via the APRS network,
- Sending a packet to the APRS-IS server,
- Possibility to ignore a packet if it does not meet the specified criteria.

The device firmware implements the following mechanisms:

- Checksum Verification - packets with errors are ignored,
- Anti-flood - packets repeated in a short time interval are not forwarded,
- Path checking - the decision to packet forwarding is based on a path, user defines whether to forward WIDEn-N, SPn-N, or other regional packets and the maximum value of N.

WX3in1 Plus also allows you to generate APRS and APRS-IS packets which contain:

- user-defined beacons and objects,
- weather data packets (with compatible weather station),
- telemetry data packets (with telemetry module).

### 2.2. APRS I-GATE

WX3in1 Plus allows you to connect to APRS-IS network servers. After logging to selected server, it is possible to send data received from the APRS radio network. All packets with correct format and checksum are forwarded to APRS-IS by the device.

### 2.3. APRS-IS to RF messages forwarding

The device allows you to receive messages from the APRS-IS server. Then the destination station is checked if it is heard in the immediate vicinity of the radio APRS network. If a station is heard then message packet is sent via APRS radio and repeated three times in the absence of confirmation ACK or REJ.

### 2.4. Weather station support

WX3in1 Plus allows you to receive weather data from compatible weather stations over RS-232 serial interface. Currently supported stations are:

- LaCrosse/Technoline WS-2300,
- LaCrosse/Technoline WS-2350,
- Peet Bros Ultimeter 100,
- Peet Bros Ultimeter 800,
- Peet Bros Ultimeter 2000,
- Peet Bros Ultimeter 2100,
- Davis Vantage Pro (with RS-232 datalogger),
- Davis Vantage Pro2 (with RS-232 datalogger),
- Davis Vantage Pro Plus (with RS-232 datalogger),

- Davis Vantage Pro2 Plus (with RS-232 datalogger),



## 2.5. WeatherUnderground reporting

WeatherUnderground is one of the biggest weather services available on the web. It allows you to create an account for your weather station and send weather reports which are stored in their database. Data is then available for view in form of graphs, tables or a simple web page applet showing current conditions in your location. Everyone can send his weather data using a simple internet protocol.

In WX3in1 Plus you can configure your WeatherUnderground account name, password and send weather data in preconfigured time intervals. You can also send your weather data in “rapid fire” mode every 5 seconds and see your weather changes realtime using their web page applet.

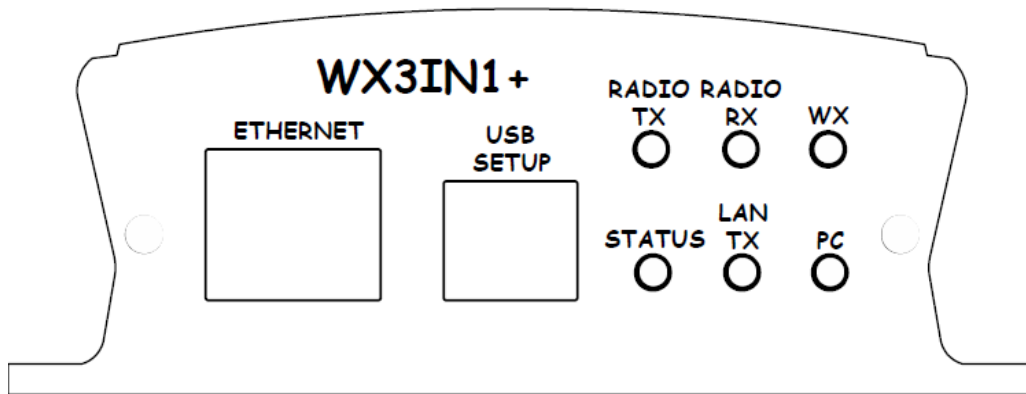
## 2.6. External telemetry module support

You can use an additional telemetry module for reporting of voltages and electric current values of your installation. This is especially useful for monitoring of solar panel powered systems on remote sites. WXTelemetry module allows you to read 2 voltages, 2 currents and one temperature, then sends these values as an APRS telemetry reports to RF or APRS-IS.

## 3. Connectors and device status leds

### 3.1. Front panel

There are 6 leds on the front panel that show the status of device operation. The following image shows the location of front panel LEDs and connectors.



Leds:

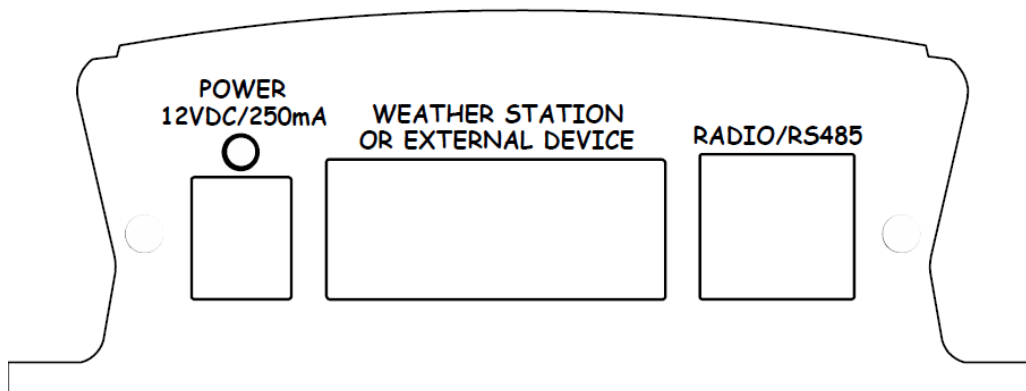
- **Radio TX** - The red led lights during transmission - the device sends an APRS data packet,
- **Radio RX** - Yellow led illuminates when receiving a signal from the radio (indicates the channel is busy),
- **WX** - Green led indicates proper communication with weather station, it blinks after correct weather data package reception,
- **Status** - Green led indicates the status of the device (led lights up regularly every 3 seconds, indicating correct operation),
- **Lan TX** - Blue led illuminates when sending TCP/IP packet to the Ethernet,
- **PC** - This red led has two purposes. In PC configuration mode it blinks regularly and in device working mode it blinks when there is a proper packet received from the radio.

Connectors:

- **Ethernet** - RJ45 (ethernet network connection),
- **USB** - a USB socket-B (printer type), used to connect to a computer,

There are two additional leds in the Ethernet connector that indicate the status of the connection with the router. One of them is lit all the time when the connection to the router is correct (it only indicates valid physical connection and not the correct IP address, gateway and netmask settings), a second led is lit only when sending or receiving data.

## 3.2. Rear panel



### Leds:

- **Power led** - The red led above the power connector indicates that the power is applied.

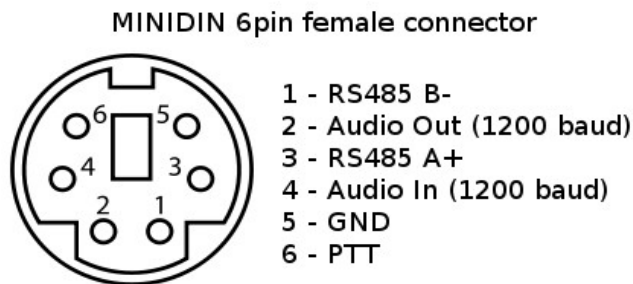
### Connectors:

- **Power** - 5.5-type power connector (center pin is a power supply plus),
- **Weather station connector** - DB9 - Weather station RS-232 connector,
- **Radio/telemetry connector** - Mini DIN 6-pin - Radio and telemetry unit RS-485 connector.



## 4. Connecting to radio

Radio MINI DIN 6pin connector is placed on the rear panel of WX3in1 Plus. Pinout of this connector is described in the following figure.



Connector pinout description:

1. RS-485 B- negative differential input/output
2. APRS audio output from the device to the microphone input of the radio. This output also acts as a PTT by shorting pin to ground through a 2k2 resistor - an option for portable radios that do not have a separate PTT input (selectable in configuration software, 2k2 resistor is built-in),
3. RS-485 A+ positive differential input/output
4. APRS audio input from radio to WX3in1,
5. Ground pin,
6. PTT output - if the external PTT output is selected in device configuration, this pin is shorted to ground while broadcasting.

The level of input and output should be individualized in such a way that packets are decoded correctly. Recommended input signal amplitude is about 0.7V.

### 4.1. Audio output level regulation

Audio output level is regulated after production to some default value. The most suitable value is dependent on the radio used, because of various input impedance of different radios (for example, most Motorola radios have a strong DC voltage bias on the front audio input connector, so the output driver should be set to drive a stronger signal on the output to overcome this bias voltage). If you need to adjust output level, you can use a POT located inside the device near Mini DIN connector. To do that, you will need to open the case and gain access to the PCB of the device. Output signal should be set to achieve the desired modulation depth at the output of the radio.

### 4.2. Audio input level

WX3in1 Plus audio input is designed to work with speaker output of most radios. It means that it has a low input impedance of about 200 Ohm. You should connect the device to your radio's speaker output rather than digital output (which often has a high output impedance resulting in a low signal output level when connecting to WX3in1 Plus audio input).

## 5. Connecting the weather station

### 5.1. LaCrosse/Technoline WS-2300, WS-2350 stations

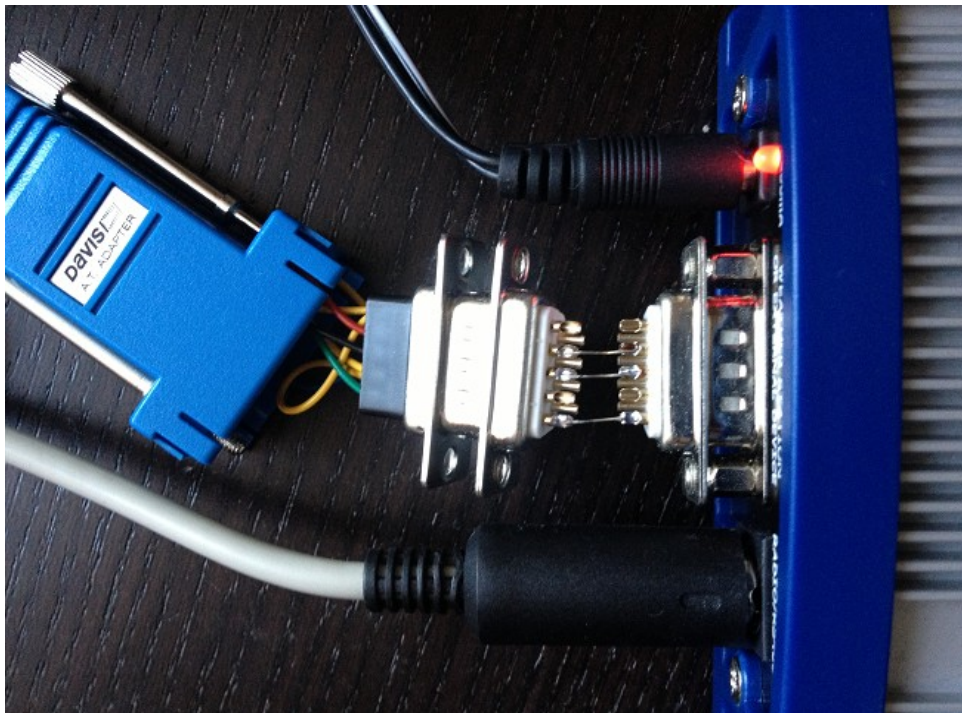
The only difference between WS-2300 and WS-2350 weather stations is that manufacturer has made an external USB to RS232 adapter, which is not used in case of WX3in1 Plus. Therefore, in both cases the weather station data cable must be connected directly to RS232 DB9 socket of WX3in1 Plus.

### 5.2. Peet Bros Ultimeter stations

For Peet Bros Ultimeter weather stations, RS232 cable must be connected from the station to DB9 socket of WX3in1 Plus. Stations must then be manually switched to "data logger" mode. According to the manufacturer's instructions, you should press CLEAR + WIND SPEED buttons for 3 seconds to activate the "data logger".

### 5.3. Davis Vantage stations

To connect WX3in1 Plus to Davis weather stations you need to use an additional RS-232 "datalogger" interface available from the manufacturer. Device part number is 06510SER. If you are going to use an original RS-232 "datalogger" cable, you will need to build a simple adapter which connects only pins 2, 3, and 5 of RS-232 interface. You can see below how it looks like (thanks to SP3LYR and EA3IK for research).



## 6. Connecting to PC

Initial configuration of WX3in1 Plus should be done via USB interface with WX3in1 Plus Configurator software.

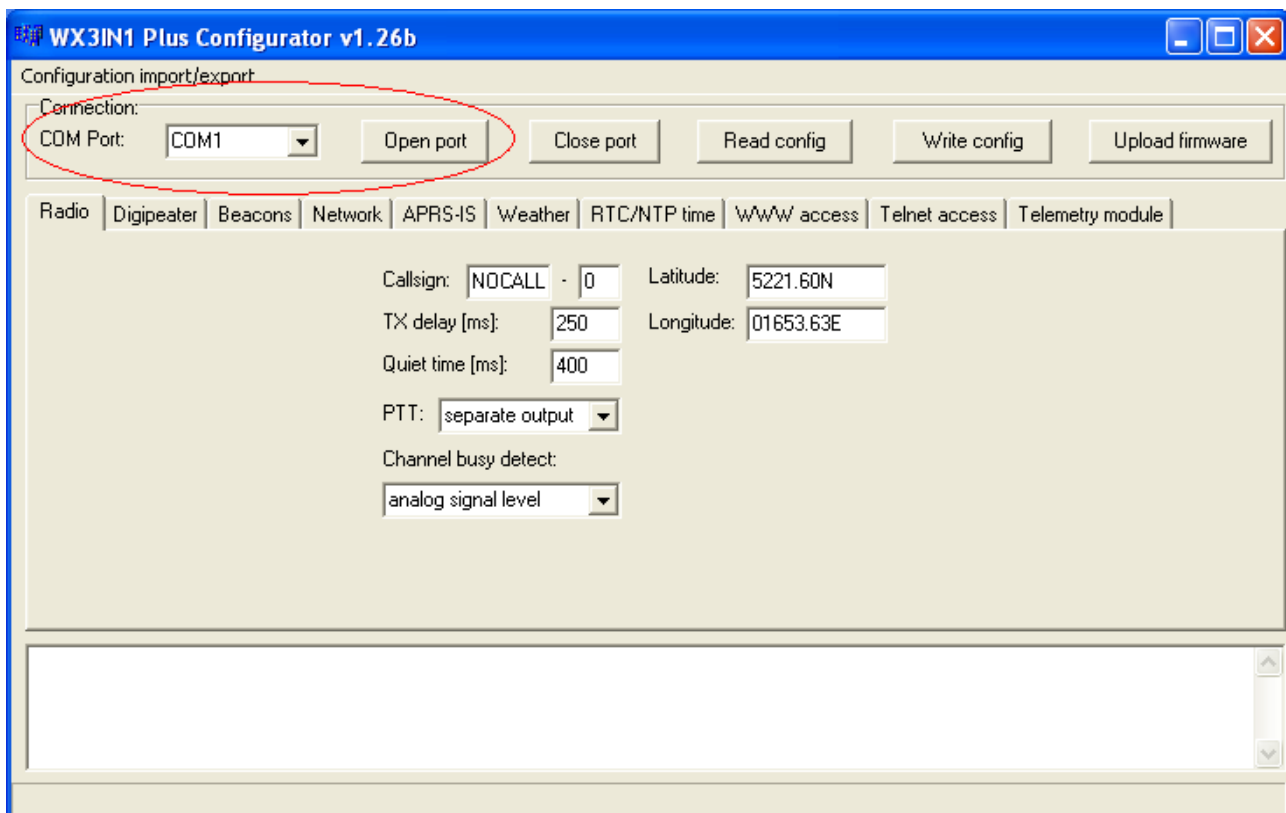
WX3in1 enters into configuration mode only when USB cable is detected while powering up and it is indicated by PC led blinking.

To connect to your computer, follow these steps:

- Power off the WX3in1 device,
- Turn of the Configurator application if it is turned on,
- Connect the USB cable to your computer,
- Power on the WX3in1 device,
- Turn on the Configurator application

After connecting and powering, WX3in1 Plus is detected in Windows as a new device, then system asks for the drivers that are available in the drivers directory of WX3in1 Plus software package. After this, run the configuration software and select the COM port where the device is installed. Then choose OPEN PORT (successful connection is indicated by a message window).

The following image shows the application window, the fields highlighted have been discussed above.



Sometimes WX3in1 can install on a higher port which is not available for selection from within the application configuration. In this situation, please use the Windows Device Manager to find the port of the device and change the COM port number to lower in range of 1-10. Then disconnect the USB and after reconnecting WX3in1 should appear on the appropriate COM port.

## 7. Description of configuration software

In this chapter we will discuss all the Configurator application settings and describe its influence on the device operation.

### 7.1. Opening a connection

After running the application, it is necessary to select the COM port of WX3in1 Plus assigned by Windows. Then use “**Open port**” button to connect to the device.

### 7.2. Reading configuration from the device

To read the configuration from the device you must use the “**Read config**” button, after this action, the program will download current configuration values from WX3in1 Plus internal memory.

### 7.3. Writing configuration to the device

After entering configuration values in Configurator application, choose “**Write config**” to upload current configuration to WX3in1 Plus internal memory.

### 7.4. Firmware update

If there is a new software update, you should upload the new firmware attached to WX3in1 Plus Configurator software package. For this purpose, click on the “**Upload firmware**” button, this operation will open a file selection window. From WX3in1 Plus Configurator folder please select the firmware file wx3in1plus\_firmware\_vXXX.hash (where XXX is the next version of the firmware). Then wait for the update to complete.

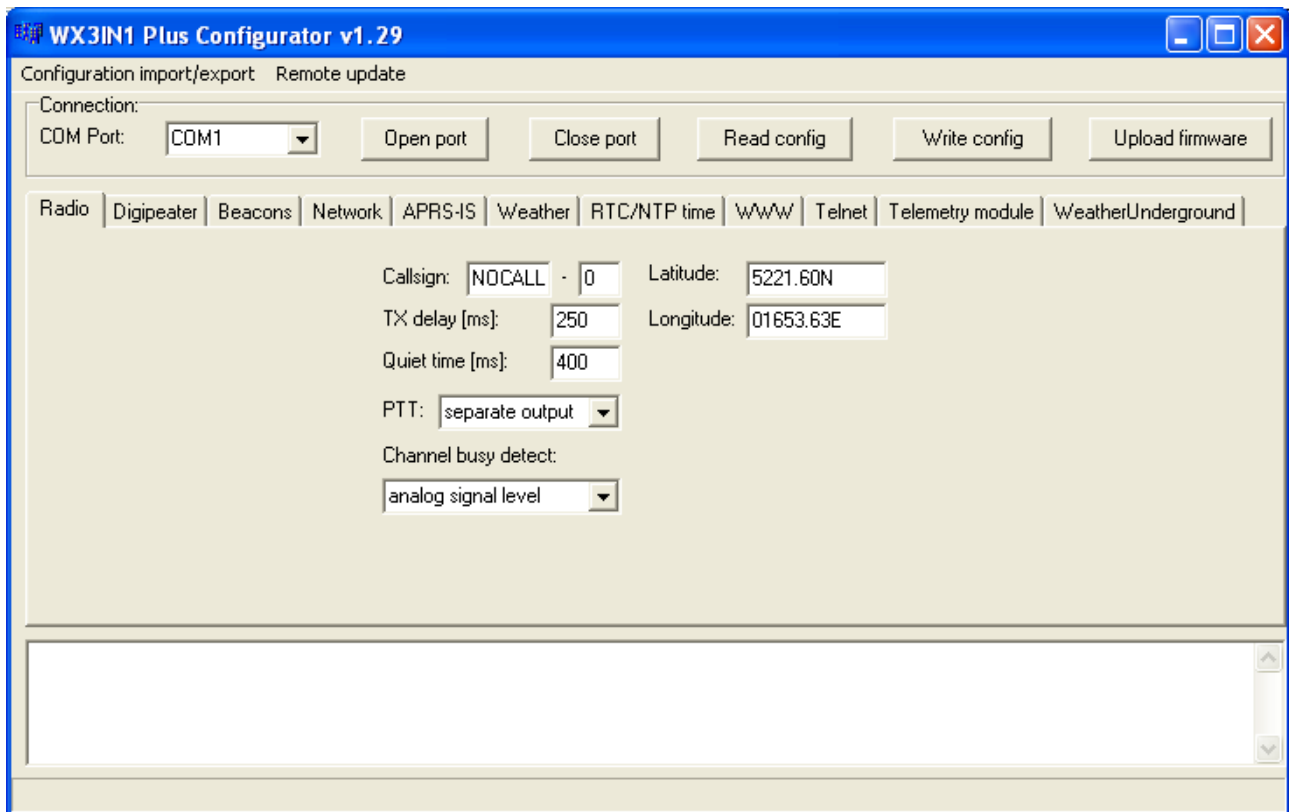
Don't worry, it is not possible to “brick” or damage the device with this operation. If anything goes bad, you will simply need to try again with firmware update function.

Please remember that you should update your device with the same Configurator and firmware version numbers. It is also always necessary to upload new configuration after flashing the device with new firmware versions. For versions starting with v1.26b and above the device will not start if configuration and firmware versions do not match. If your device simply blinks all the leds when powered up, it means that your configuration version does not match firmware version.

### 7.5. Configuration import/export

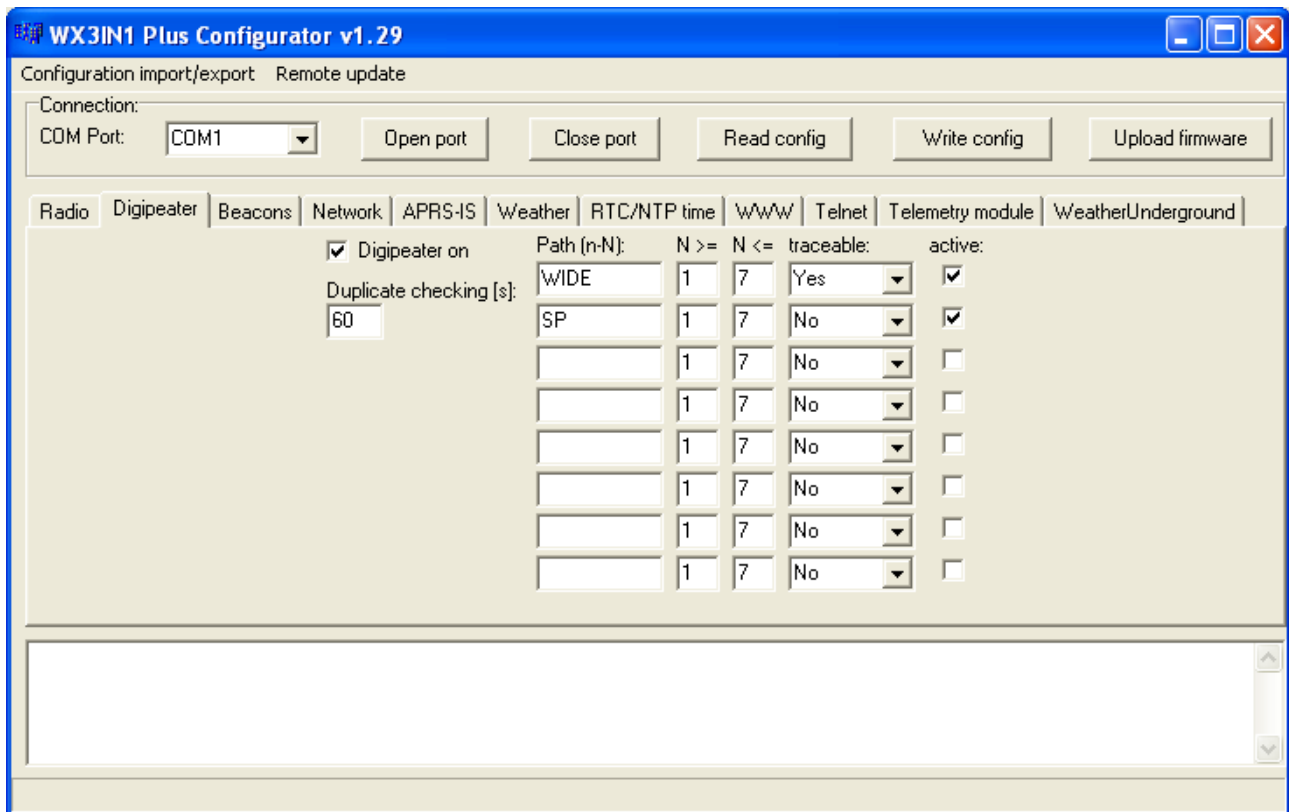
Starting with Configurator v1.26b, there is a function available to store the device configuration to a file on your PC's disk drive (it is located on a menu in upper left corner of the window). This function can be used to save your device's configuration and to transfer your device's configuration to recent Configurator and firmware versions.

## 7.6. Radio Tab



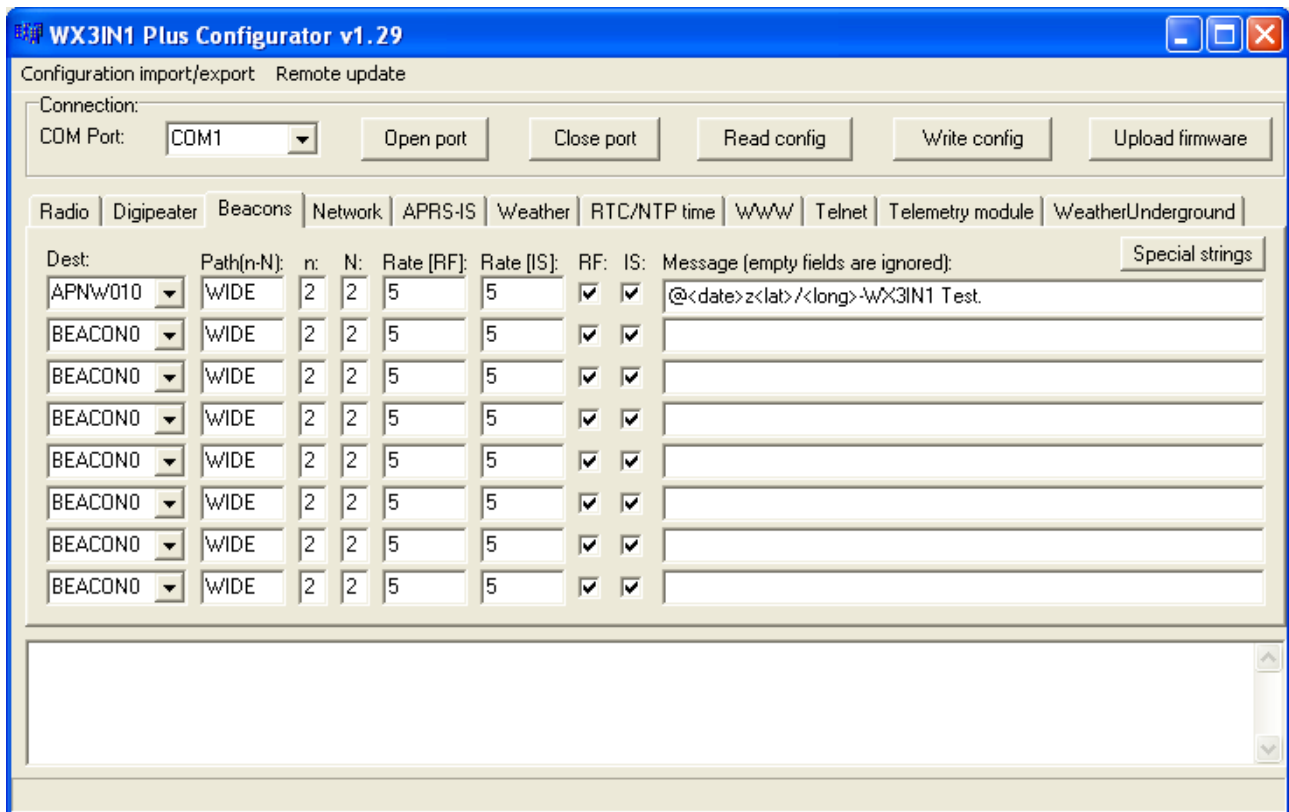
- **“Callsign”** - The sign of our station with SSID extension. This field can be up to 6 characters long. The default SSID is 0 and allowed SSID's are between 0 and 15,
- **“TX delay (ms)”** - The delay time in milliseconds for sending an APRS packet. It is the length of preamble sent before packet and necessary for radio receivers to synchronize with our packet. The recommended value is not less than 250ms,
- **“Quiet time (ms)”** - Minimum time off after the radio channel is busy. After this time next packet can be sent from the transmit buffer,
- **“PTT”** - push-to-talk output selection, we can choose between two options:
  - **“separate output”** - PTT output pin is shorted to ground while broadcasting,
  - **“2k2 resistor”** - audio output is shorted to ground via 2k2 Ohm resistor, function used in some handheld radios for broadcasting,
- **“Latitude”** - north-south position of your radio station,
- **“Longitude”** - east-west position of your radio station.

## 7.7. Digipeater Tab



- **“Digipeater on”** - Enables or disables a function of RF packets digipeating,
- **“Duplicate checking (s)”** - Time in seconds after which the next packet will be forwarded, if it has the same content as the previous one. This function allows you to ignore stations, which are flooding the network and also to ignore packets which were heard a while before and are heard again after being digipeated by other stations,
- Path (n-N) table - here you can insert New-N Paradigm paths to be handled by WX3in1 Plus digipeater function:
  - **“Path (n-N)”** - path name, WIDE, SP, etc.
  - **“N>=”** and **“N<=”** - minimum and maximum N for path to be forwarded, for example WIDEn-N with N>=1 and N<=3 will forward paths: WIDE3-3, WIDE3-2, WIDE3-1, WIDE2-2, WIDE2-1, WIDE1-1,
  - **“traceable”** - if Yes, WX3in1 will add its own callsign to the path, if No, it will not do that,
  - **“active”** - if not checked, current row will not be active.

## 7.8. Beacon Tab



- **“Dest”** - destination address for a beacon packet. You can choose a destination address of APNW010 or BEACON0.
- **“Path(n-N)”** - APRS path in New-N Paradigm format,
- **“n”** - small n value for PATHn-N path,
- **“N”** - big N value for PATHn-N path,
- **“Rate (RF)”** - beacon transmit rate to RF (expressed in minutes),
- **“Rate (IS)”** - beacon transmit rate to APRS-IS (expressed in minutes),
- **“RF”** - if selected, beacon will be sent to RF,
- **“IS”** - if selected, beacon will be sent to APRS-IS,
- **“Message”** - APRS packet information field content. Empty fields are ignored.

To properly generate a message field structure, please read the information on the APRS packet format. I recommend the website of the polish group's founder Andrew Bartosz SP3LYR APRS, where all is nicely described (in polish): <http://www.aprs.pl>.

Example frame:

```
@<date>z5223.13N/01658.09E_WX3IN1 Test.
```

- @ - APRS data ID,
- <date>z - time and date in the format DDHHMM (day/hour/minute), time is not a necessary parameter for each object, beacon, etc., it is dependent on whether you want to send frames with time or not,
- 5223.13N/01658.09E - Position of object, status, etc.,

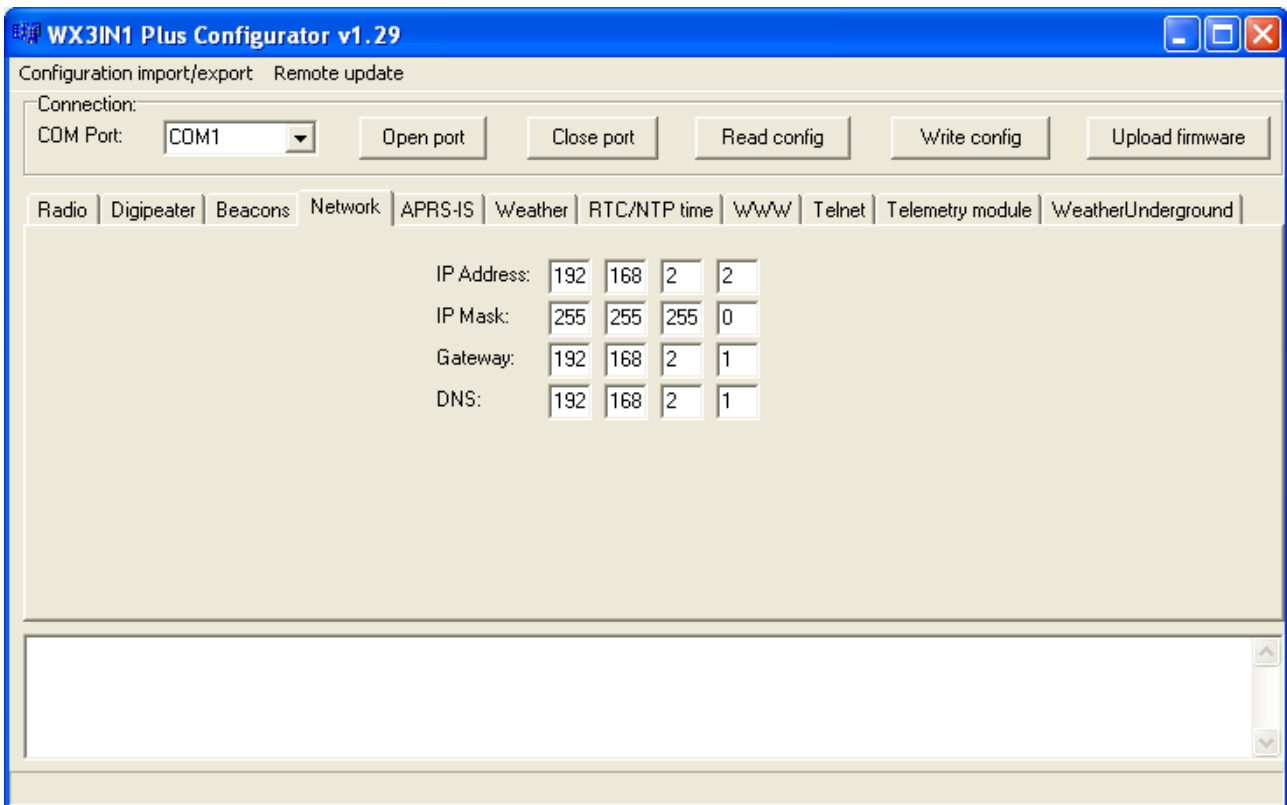
- „\_” - sign after coordinates is a symbol of our beacon station, object, etc., please refer to the table of symbols at <http://aprs.pl/ikony.htm>,
- WX3in1 test - here we can enter our information about the station, beacon, etc.

It is possible to use some special strings in message field:

- <date> - inserts current date in DDHHMM (day/hour/minute) format,
- <lat> - inserts your stations latitude defined in “Radio” Tab,
- <long> inserts your stations longitude defined in “Radio” Tab,

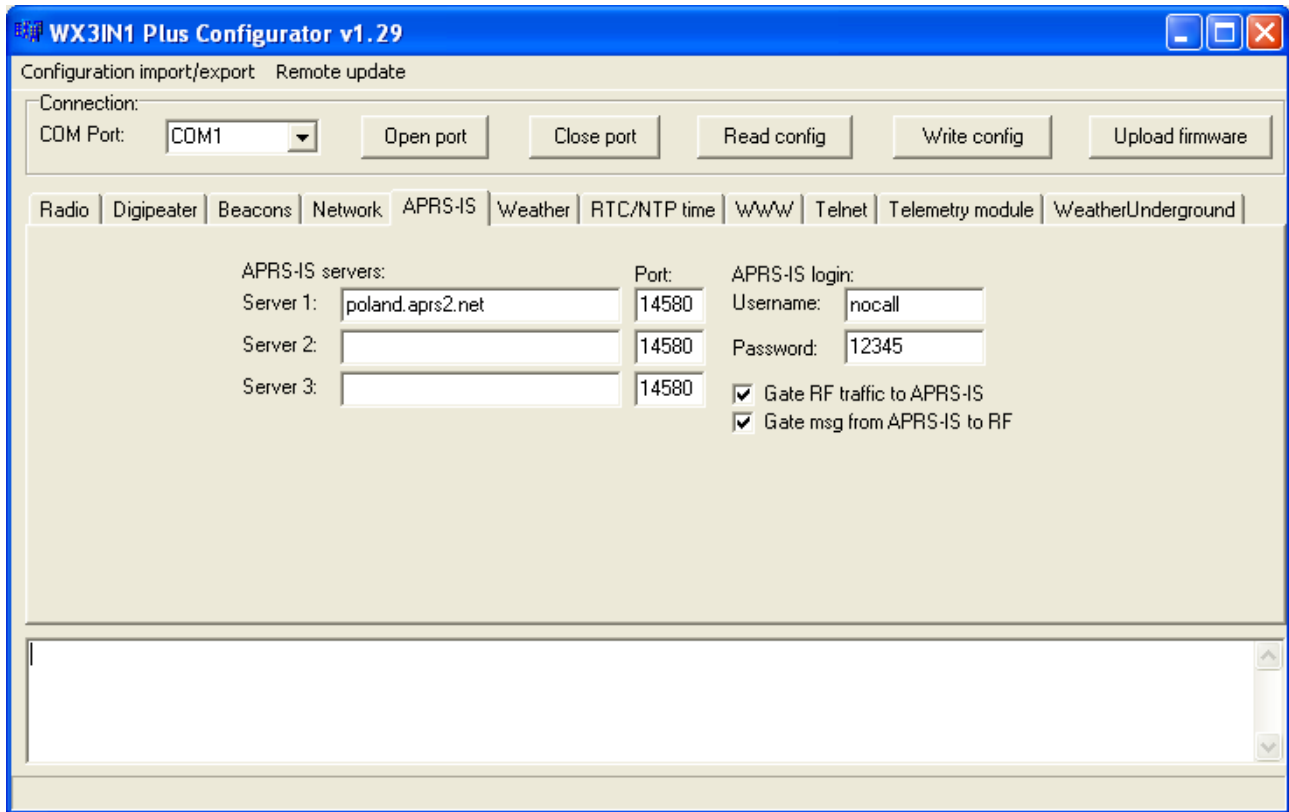


## 7.9. Network Tab



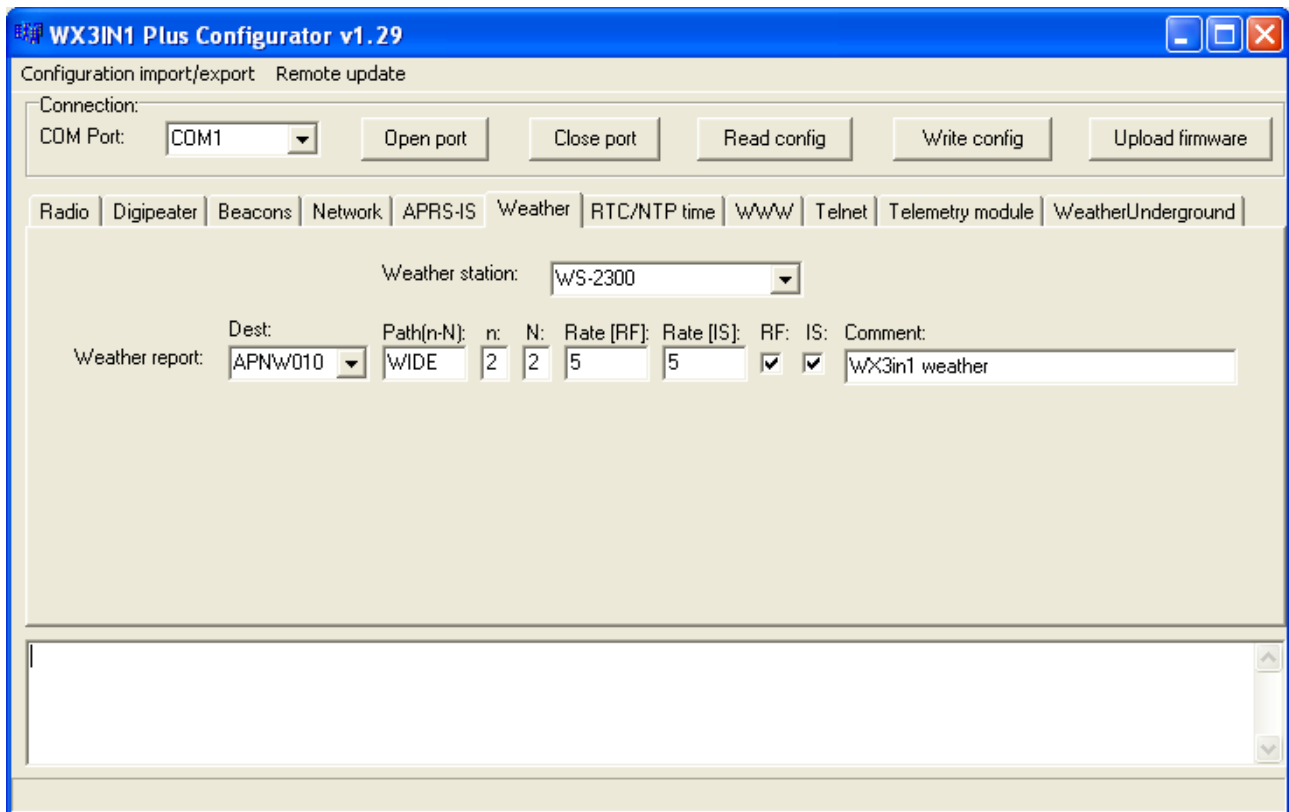
- **“IP Address”** - IP address of your WX3in1 Plus device, you should select a free IP address from your local network,
- **“IP Mask”** - subnet mask of your local network,
- **“Gateway”** - IP address of your network router or other device which provides internet access on your local network,
- **“DNS”** - this should be your internet providers domain name server address, in most situations you can also use your routers IP address, as most routers do DNS query relaying.

## 7.10. APRS-IS Tab



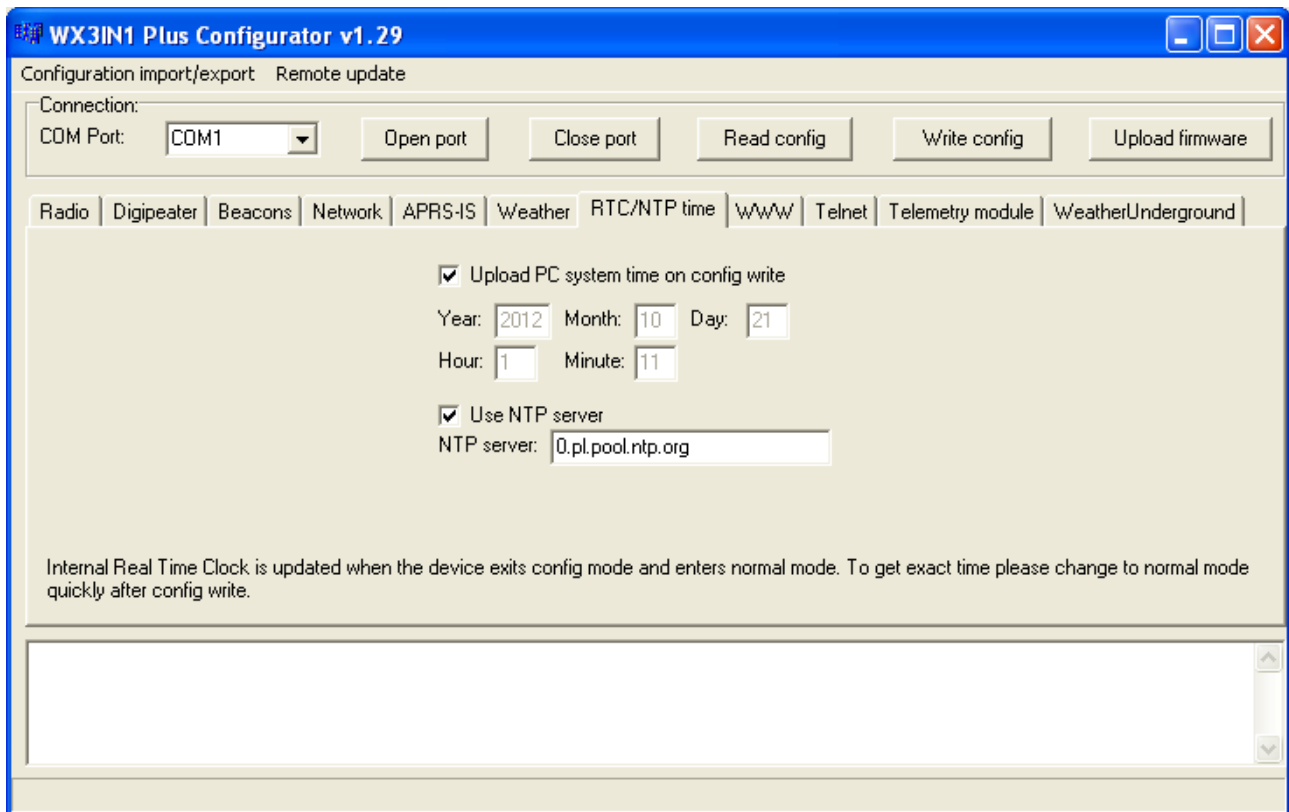
- **“APRS-IS servers”** - domain names or IP addresses of APRS-IS server which should be connected by WX3in1 Plus, APRS Tier 2 Network servers can be found on this page: <http://www.aprs2.net/serverstats.php>.
- **“APRS-IS port”** - IP ports of APRS-IS servers, in most cases default port 14580 should work fine.
- **“APRS-IS login username”** - this should be your callsign with ssid, the same as on Radio Tab,
- **“APRS-IS login password”** - this should be a password for your callsign, passwords should be generated by your APRS-IS server sysop,
- **“Gate RF traffic to APRS-IS”** - if this option is selected, WX3in1 Plus will work as na I-GATE by sending all the RF traffic to currently connected APRS-IS server,
- **“Gate msg from APRS-IS to RF”** - if this option is selected, WX3in1 Plus will send all messages received from APRS-IS to stations heard from RF side within limited number of digihops.

## 7.11. Weather Tab



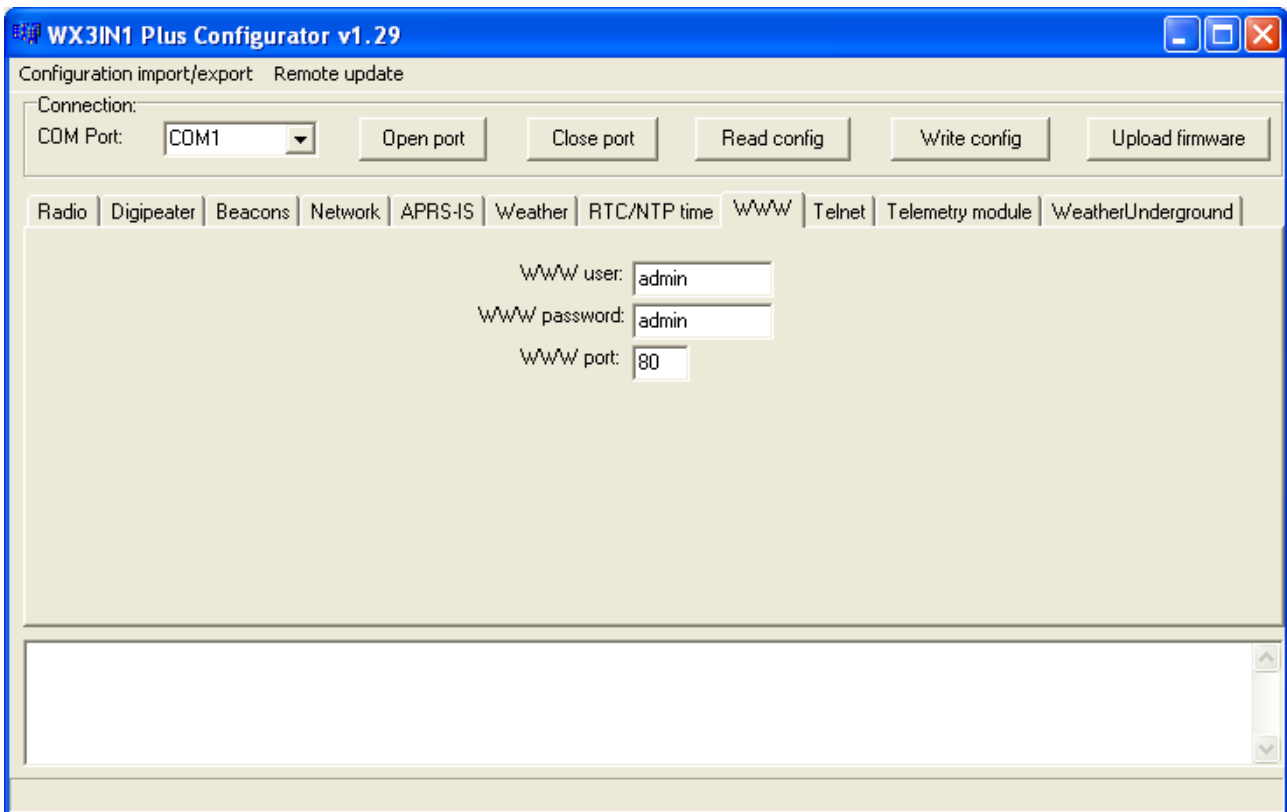
- **“Weather station”** - weather station type selection box,
- **“Dest”** - destination address for a weather packet. You can choose a destination address of APNW010 or BEACON0.
- **“Path(n-N)”** - APRS path in New-N Paradigm format,
- **“n”** - small n value for PATHn-N path,
- **“N”** - big N value for PATHn-N path,
- **“Rate (RF)”** - weather report transmit rate to RF (expressed in minutes),
- **“Rate (IS)”** - weather report transmit rate to APRS-IS (expressed in minutes),
- **“RF”** - if selected, weather report will be sent to RF,
- **“IS”** - if selected, weather report will be sent to APRS-IS,
- **“Comment”** - This is a short comment which will be appended at the end of weather report.

## 7.12. RTC/NTP Tab



- **“Upload PC system time on config write”** - if this option is selected, application will ignore date and time fields visible below and will upload your PC system time on configuration write,
- **“Year”, “Month”, “Day”, “Hour”, “Minute”** - user-defined date and time for WX3in1 Plus,
- **“Use NTP server”** - if this option is selected, WX3in1 Plus will periodically connect to defined network time server and will synchronize its clock,
- **“NTP server”** - domain name or IP of network time server, in some cases this can also be your router’s IP, if NTP option is active on your local network router.

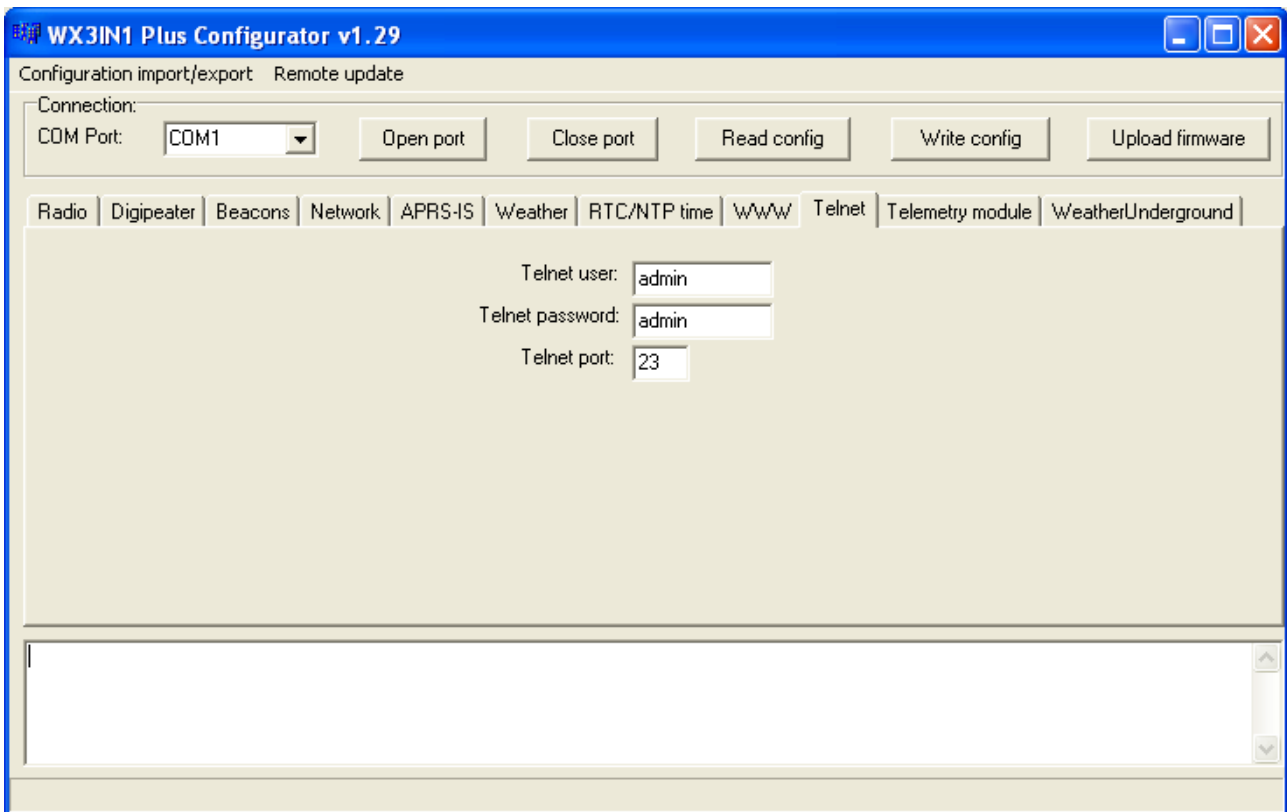
## 7.13. WWW Tab



- “**WWW user**” - username to access your WX3in1 Plus web service,
- “**WWW password**” - password to access your WX3in1 Plus web service,
- “**WWW port**” - web service IP port number.

To access your WX3in1 Plus web service you should use a web browser and connect to WX3in1 Plus IP address defined in Network Tab. For example, to connect to a device with IP address of 192.168.2.2 you should write <http://192.168.2.2/> in your web browser address field.

## 7.14. Telnet Tab



- “Telnet user” - username to access your WX3in1 Plus telnet service,
- “Telnet password” - password to access your WX3in1 Plus telnet service,
- “Telnet port” - telnet IP port number.

Telnet access can be very useful for debugging your WX3in1 Plus configuration and the whole RF installation. Skilled user can resolve most problems by analyzing debug messages sent by WX3in1 Plus in a fashion similar to Linux system log. Recommended telnet client is Putty, a free implementation of terminal for Windows and Linux platforms: <http://www.chiark.greenend.org.uk/~sgtatham/putty/>.

## 7.15. Telemetry module Tab

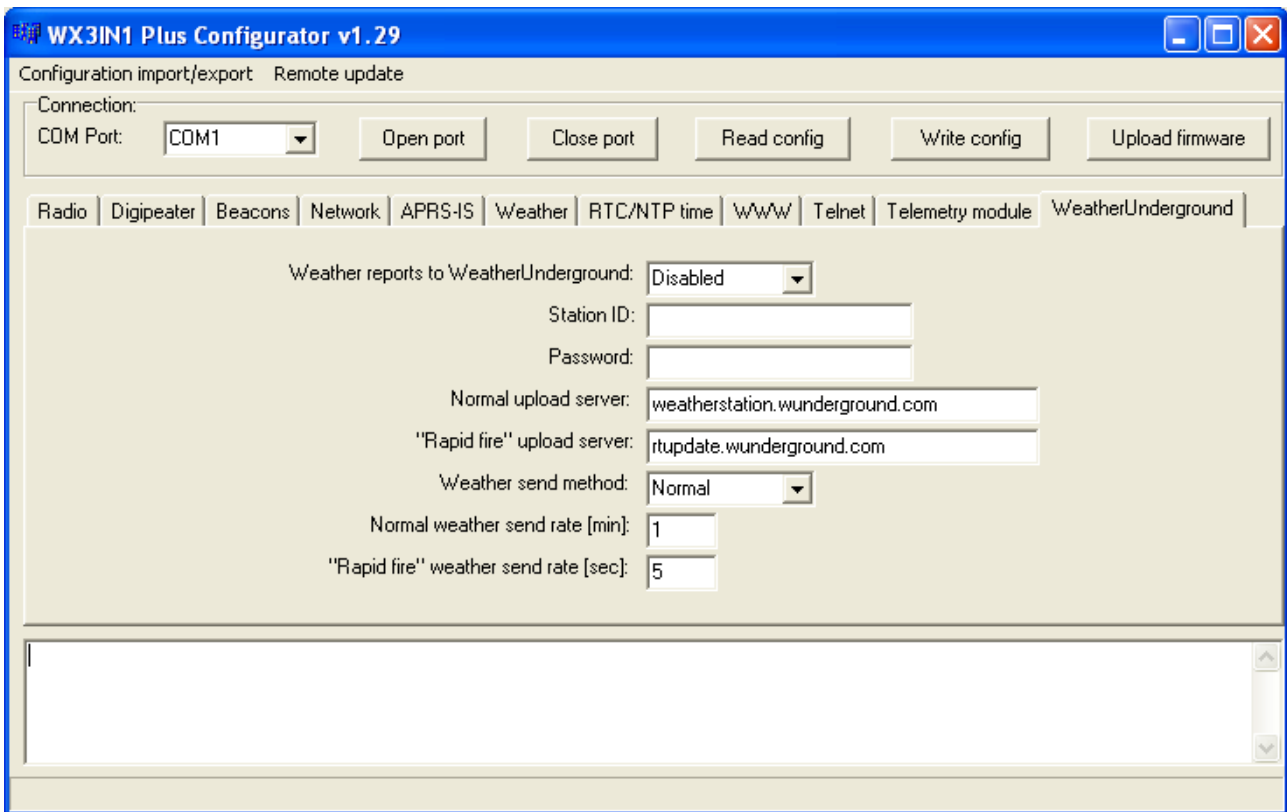
The screenshot shows the 'WX3IN1 Plus Configurator v1.29' window. At the top, there are options for 'Configuration import/export' and 'Remote update'. Below this is a 'Connection:' section with a 'COM Port' dropdown set to 'COM1' and buttons for 'Open port', 'Close port', 'Read config', 'Write config', and 'Upload firmware'. A navigation bar contains tabs for 'Radio', 'Digipeater', 'Beacons', 'Network', 'APRS-IS', 'Weather', 'RTC/NTP time', 'WWW', 'Telnet', 'Telemetry module' (which is selected), and 'WeatherUnderground'. The main area is divided into two sections. The first section is a table for configuring analog inputs:

	Name:	Units:	Source:	Coeff A:	Coeff B:	Coeff C:	1 min average:	
Analog 1:	I1	mA	Current1 (5A fullscale)	0	19.5	0	Off	Default parameters
Analog 2:	I2	mA	Current2 (5A fullscale)	0	19.5	0	Off	Default parameters
Analog 3:	U1	Volt	Voltage1	0	0.1	0	Off	Default parameters
Analog 4:	U2	Volt	Voltage2	0	0.1	0	Off	Default parameters
Analog 5:	Temp	C	Temperature (DS18B20)	0	0.5	-64	Off	Default parameters

The second section is for 'Telemetry parameters' and 'Telemetry data'. It includes dropdowns for 'Dest:' (APNW010) and 'Path(n-N):' (WIDE), and input fields for 'n:' (2) and 'N:' (2). There are also input fields for 'Rate [RF]:' (5) and 'Rate [IS]:' (5), and checkboxes for 'RF:' and 'IS:' (both checked). A 'Telemetry module:' dropdown is set to 'Disabled'. Below these settings is a large empty text area with a vertical scrollbar on the right.

This Tab is intended to be used if you have a WXTelemetry module connected to your WX3in1 Plus. You can find more useful information about telemetry reports format in APRS specification: <http://aprs.org/doc/APRS101.PDF>, page 68.

## 7.16. WeatherUnderground Tab



- Weather reports to WeatherUnderground - enables WeatherUnderground reporting in your WX3in1 Plus device,
- Station ID - ID of the station assigned when you were adding a station in WeatherUnderground account settings on their web page,
- Password - password of your WeatherUnderground account (as far as I know, it is the same for all stations on your account if you have more than one),
- Normal upload server - this is WeatherUnderground server name for report reception, you should leave it as is,
- "Rapid fire" upload server - this is WeatherUnderground server name for "rapid fire" report reception, you should leave it as is,
- Weather send method - this option allows you to select between "rapid fire" realtime frequent report update or normal report update every few minutes,
- Normal weather send rate [min] - Frequency of normal report update (in minutes),
- "Rapid fire" weather send rate [sec] - Frequency of "rapid fire" realtime report update (in seconds).

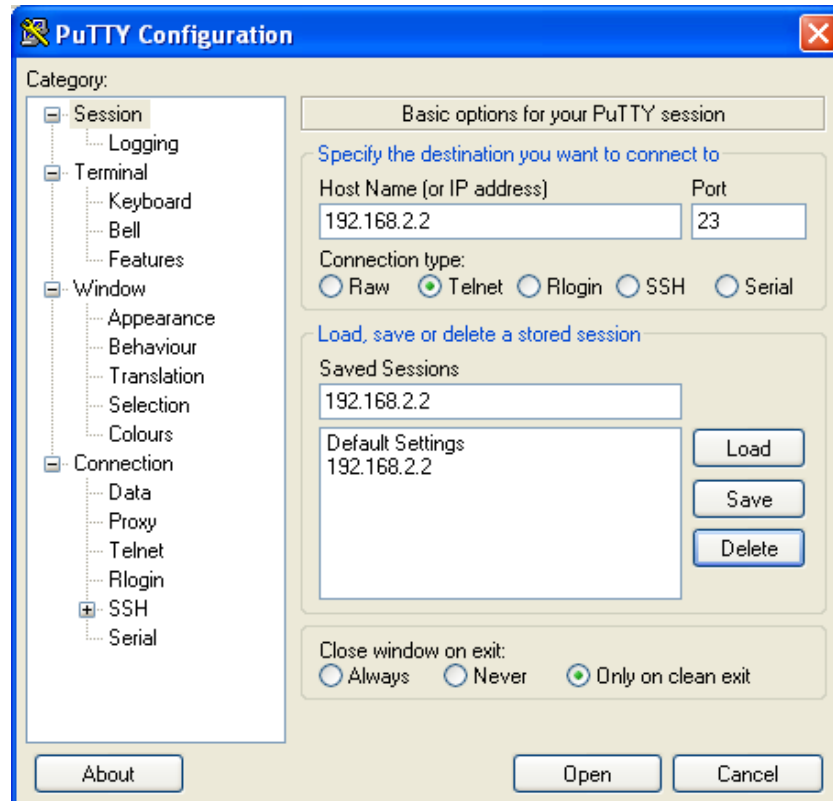


## 8. Telnet interface

Telnet interface is a very good method to see what happens inside of your WX3in1 Plus device. It provides you with a lot of debugging messages and statistics, which allows you to locate any potential problems and solve them.

### 8.1. Telnet client software

To connect to WX3in1 Plus telnet interface you will need to download one of telnet client applications available over the internet. I recommend you to use an open source “putty” application for this task. You can find it here: <http://www.putty.org/>.



To configure “putty” as a telnet terminal for WX3in1 Plus you need to set the following fields (visible above):

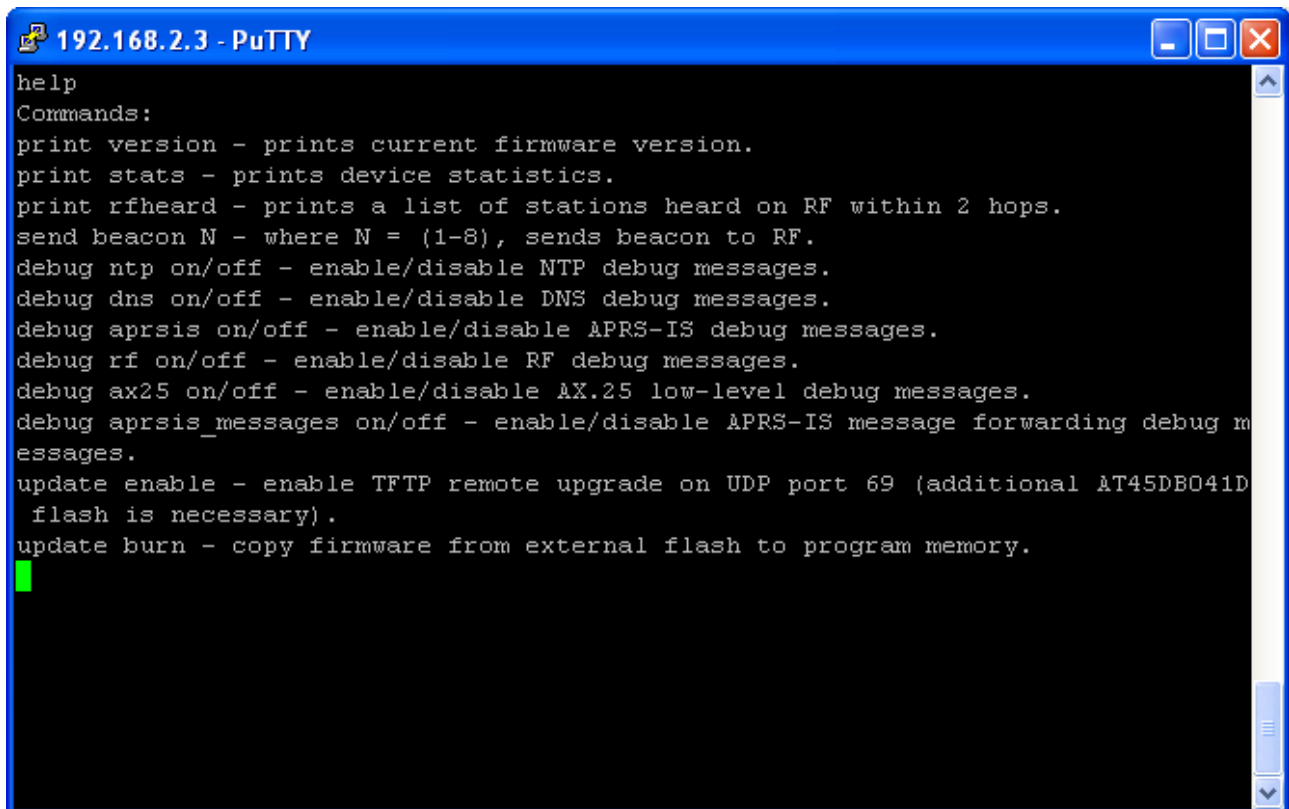
- Host Name (or IP address) - this is your WX3in1 Plus network IP address,
- Connection type: Telnet (this is important, as we want to use a simple telnet interface),
- Port - this should be set the same as “Telnet port” in your device’s configuration.

After setting proper values you can save them with a “Save” button.

Connect to your device with “Open” button. Then you should see a black window of your telnet terminal with a prompt for your “Username” and “Password”. Use the values from your device’s configuration.

### 8.2. Telnet commands

For a list of available WX3in1 Plus telnet commands please issue “help” command, you should see a full list as below:



```
192.168.2.3 - PuTTY
help
Commands:
print version - prints current firmware version.
print stats - prints device statistics.
print rfheard - prints a list of stations heard on RF within 2 hops.
send beacon N - where N = (1-8), sends beacon to RF.
debug ntp on/off - enable/disable NTP debug messages.
debug dns on/off - enable/disable DNS debug messages.
debug aprsis on/off - enable/disable APRS-IS debug messages.
debug rf on/off - enable/disable RF debug messages.
debug ax25 on/off - enable/disable AX.25 low-level debug messages.
debug aprsis_messages on/off - enable/disable APRS-IS message forwarding debug m
essages.
update enable - enable TFTP remote upgrade on UDP port 69 (additional AT45DB041D
flash is necessary).
update burn - copy firmware from external flash to program memory.
█
```

Telnet command list can be different for new firmware versions. We will not discuss all possible commands in this section. Just a short description of command types:

- print - used to print some data in your telnet terminal window,
- send - used to send something over RF,
- debug - used to turn on or off some debug messages in your telnet terminal window,
- update - used for remote firmware update function.

## 9. Troubleshooting

In this section we will describe some possible problem encountered by users of WX3in1 Plus device and try to help you to solve them.

### **Question: What should I set in APRS-IS Username and Password field?**

Answer: In Username field you should set the same string as your WX3in1 Plus callsign and SSID, separated by a hyphen. It should be written in uppercase. Example: SQ3PLX-5. For your APRS-IS password you should ask your APRS-IS server operator. Some password generators are also available on the internet, although they shouldn't be.

### **Question: I think that my device doesn't connect to APRS-IS or NTP (network time protocol server) or WeatherUnderground, etc. Why?**

Answer #1: Check your WX3in1 Plus device physical connection to you local network. After connecting RJ-45 network cable, green led below ethernet connector should be lit, indicating proper physical connection. If it is OK, go to answer #2.

Answer #2: Check your device's IP settings including IP address, IP mask, Gateway and DNS settings in "Network" Tab.

Try to ping your device with "ping <wx3in1 ip address>" command from your operating system's command prompt. It should answer to your pings. Make sure that your gateway IP is set to your network router's IP. If it is not, you will still be able to ping the device, but it will not be able to get out of your local network. If it is OK, go to answer #3.

Answer #3: There can be many other different reasons. But if you feel that your settings are correct and it doesn't connect to any of these services, then it can be problem of your DNS settings. Below you can see how to check this over telnet:

```
00:25:47 (DNS) Server name not found, need to nslookup: time.nist.gov.
```

```
00:26:03 (DNS) Server name nslookup timed out: time.nist.gov.
```

The first line means that server "time.nist.gov" is not known to your WX3in1 Plus device. That is OK, it just needs to ask DNS for this server's IP.

The second line means a problem: DNS server didn't answer to your query. You have probably misconfigured your DNS server IP.

You should check your internet service provider's proper DNS IP address. In some cases you can also use your network router's IP address as a DNS, because most network routers are able to do DNS relaying.

If your DNS settings are wrong, you will not be able to connect to any service with it's domain name.

### **Question: I'm not sure if my device receives APRS packets properly from my radio. How to check this?**

Answer: The first and most obvious indicator of proper packet reception is a red "PC" led of your WX3in1 Plus device. It should work like that:

- When there is something received and radio squelch is open, yellow "RADIO RX" led lights up,
- Shortly after packet reception red "PC" led lights up indicating proper packet reception and decoding.

You can also use telnet to check if anything was received properly. You should see a message indicating that an APRS packet was received.

Next method is to check telnet “print stats” command or check WWW Statistics page to see if there is a non-zero value in “APRS packet received (CRC OK)” field.

**Question: I'm not sure if my device sends APRS packets to RF properly. How to check this?**

Answer: Well, the simplest method is to check with the second APRS radio if it receives any APRS packets from you.

You can also check on aprs.fi if your packets appear on APRS-IS, i-gated by some other devices near you. But to use this method you should:

- make sure that there is an APRS i-gate near you that is able to hear your APRS packets,
- disconnect RJ-45 cable from your WX3in1 Plus device or turn APRS-IS off in your beacon settings, because otherwise all your packets will be visible on aprs.fi gated by your own device (even with radio disconnected).

You can also check telnet messages for any received packets which were sent by your device and then digipeated by other stations nearby.

**Question: How to check if my device receives data from weather station?**

Answer: Green “WX” led is an answer. It should blink in short time intervals indicating that your weather station interface connection is fine and that your WX3in1 Plus device receives correct data.

You should also see some weather station debug messages over telnet which will give you an exact answer if weather reports are properly received.

**Question: How to check if my device receives data from telemetry module?**

Answer: There is no led for telemetry in WX3in1 Plus device. But there is a led in WXTelemetry module which blinks when WX3in1 Plus sends a query for telemetry data. If it blink once per second, then your communication works fine.

**Question: After some configuration changes and/or firmware update, my device constantly blinks all the leds and doesn't start up. Why?**

Answer: It is necessary to use matching Configurator application, device configuration and device firmware versions. If you download new Configurator application version, you should always update device's firmware and rewrite device's configuration to make sure that all versions match.

Remember that you can't just update a firmware of the device. You always need to rewrite configuration. You also can't read your current configuration if you use different Configurator application and device firmware/configuration version.

Use “Configuration import/export” function to store configuration on your PC hard disk drive each time you change your device configuration settings. Then you will be able to import your configuration in new Configurator application.

Unfortunately these operations are unavoidable as device configuration often changes between firmware versions and new firmware does not understand older configuration.