

WXETH (firmware v1.08)

ETHERNET INTERFACE FOR WEATHER STATIONS
APRS-IS WEATHER AND BEACONS SUPPORT
WEATHERUNDERGROUND SERVICE REPORTING

TELNET INTERFACE FOR MONITORING
NTP SUPPORT FOR TIME SYNCHRONIZATION

Instruction manual
Configuration software manual



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1. Technical parameters

Dimensions	70x63x30mm
Weight	80g
Supply voltage	12VDC typ. (9 - 16VDC)
Power consumption	80mA
Operation temperature	-30 °C / +70 °C
Weather station interface	RS232, DB9 connector
Ethernet interface	100BASE-TX, 100mbit

2. Device features

This device allows you to send weather reports to the internet without the need to connect the computer. Simply plug WXeth to a computer network connected to the internet to get the opportunity to create weather statistics and graphs on-line. Communication between weather station and the device is via RS-232 interface. We intend to update the list of supported sites and weather stations on the basis of user comments and the available documentation of protocols and interfaces.

2.1. Weather station support

Currently supported are the following stations with RS232 interface:

- 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),

It is possible to add support for other stations, provided that their interface is electrically compatible and description of communication protocol is available.

2.2. Supported weather services

Currently following web services are supported:

- www.weatherunderground.com,
- APRS-IS amateur radio servers,
- PHP/mySQL programmers can easily add support for the device to their sites, because the data are sent over the Internet via HTTP GET method.

3. Connecting the weather station

3.1. LaCrosse/Technoline WS-2300, WS-2350 stations

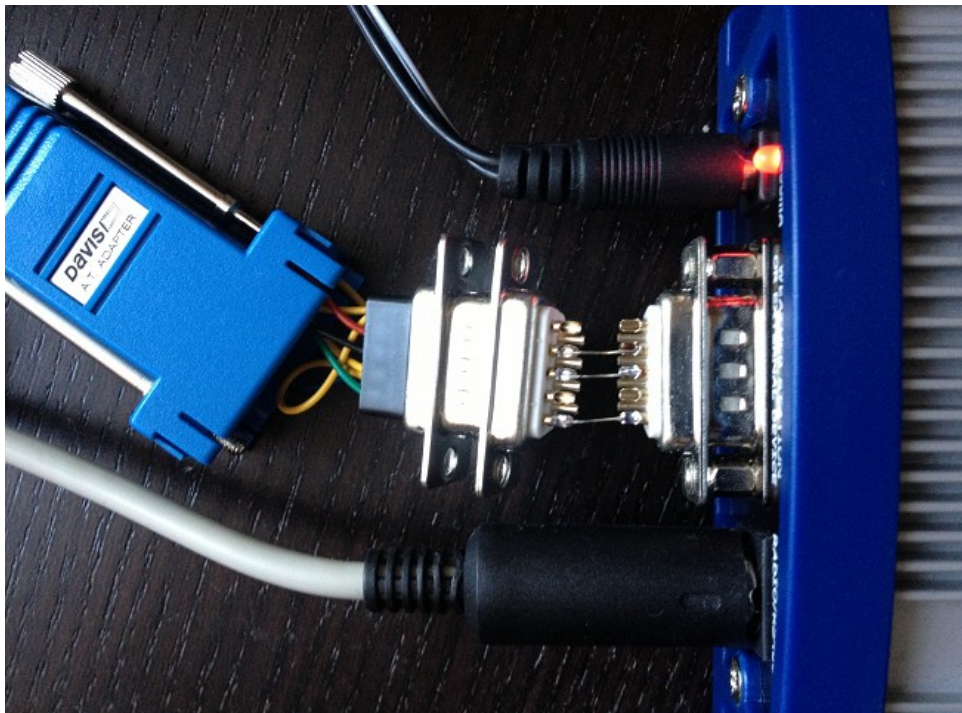
The only difference between WS-2300 and WS-2350 weather stations is that manufacturer has made an external USB to RS232 adapter, which is not used in case of WxEth. Therefore, in both cases the weather station data cable must be connected directly to RS232 DB9 socket of WxEth.

3.2. Peet Bros Ultimeter stations

For Peet Bros Ultimeter weather stations, RS232 cable must be connected from the station to DB9 socket of WxEth. 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".

3.3. Davis Vantage stations

To connect WxEth 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).



4. Device configuration

Device configuration is performed via USB interface from a Windows PC application.

4.1. Entering configuration mode

To enter configuration mode you should perform the following steps:

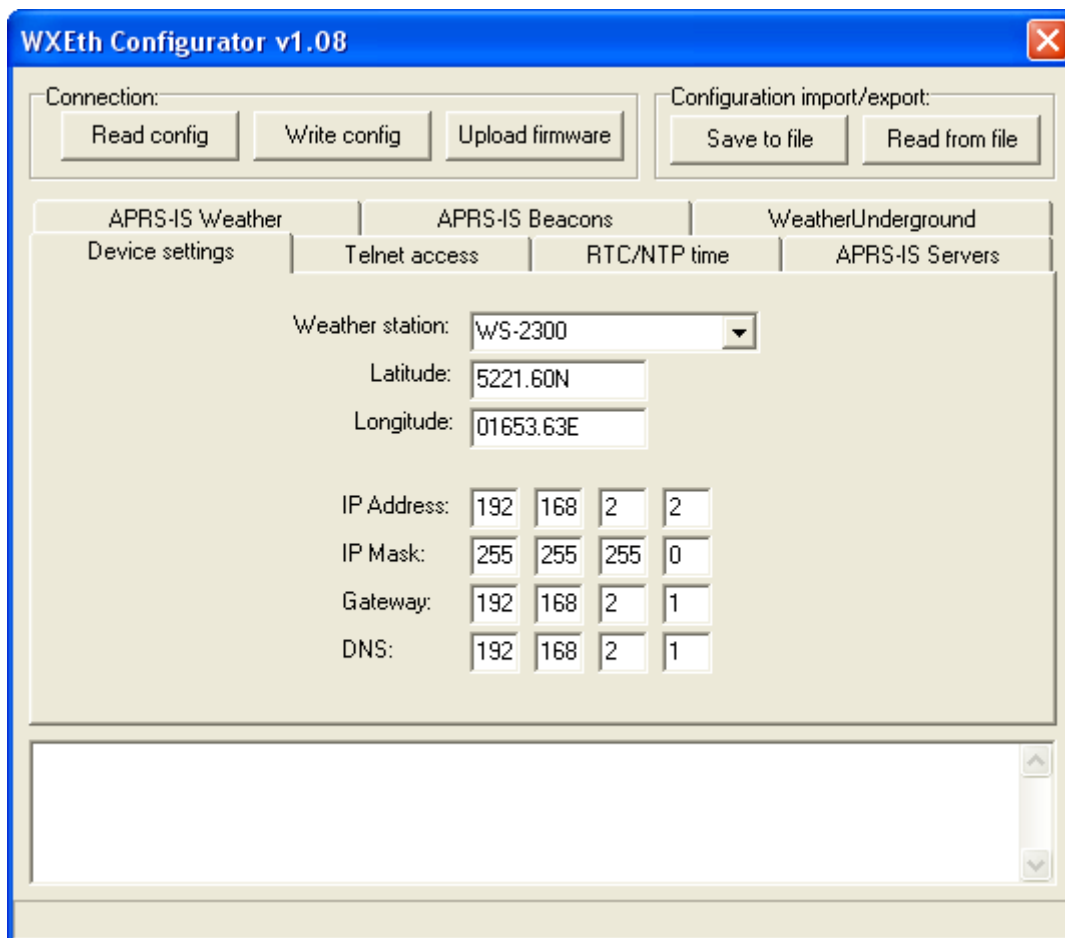
- disconnect power from the device,
- connect USB cable between PC and the device,
- connect power to the device,
- configuration mode is enabled in power-up if USB cable is connected between PC and WxEth. Therefore you should connect USB cable before connecting power to the device,
- configuration mode is indicated by blinking POWER LED.

4.2. Entering normal operation mode

To enter normal operation mode you should perform the following steps:

- disconnect power from the device,
- disconnect USB cable,
- connect power to the device,
- normal mode is indicated by POWER LED being lit.

4.3. “Device settings” Tab



Connection button:

- “**Read config**” - reads current configuration from the device,
- “**Write config**” - writes current configuration to the device,
- “**Upload firmware**” - uploads new firmware to the device,

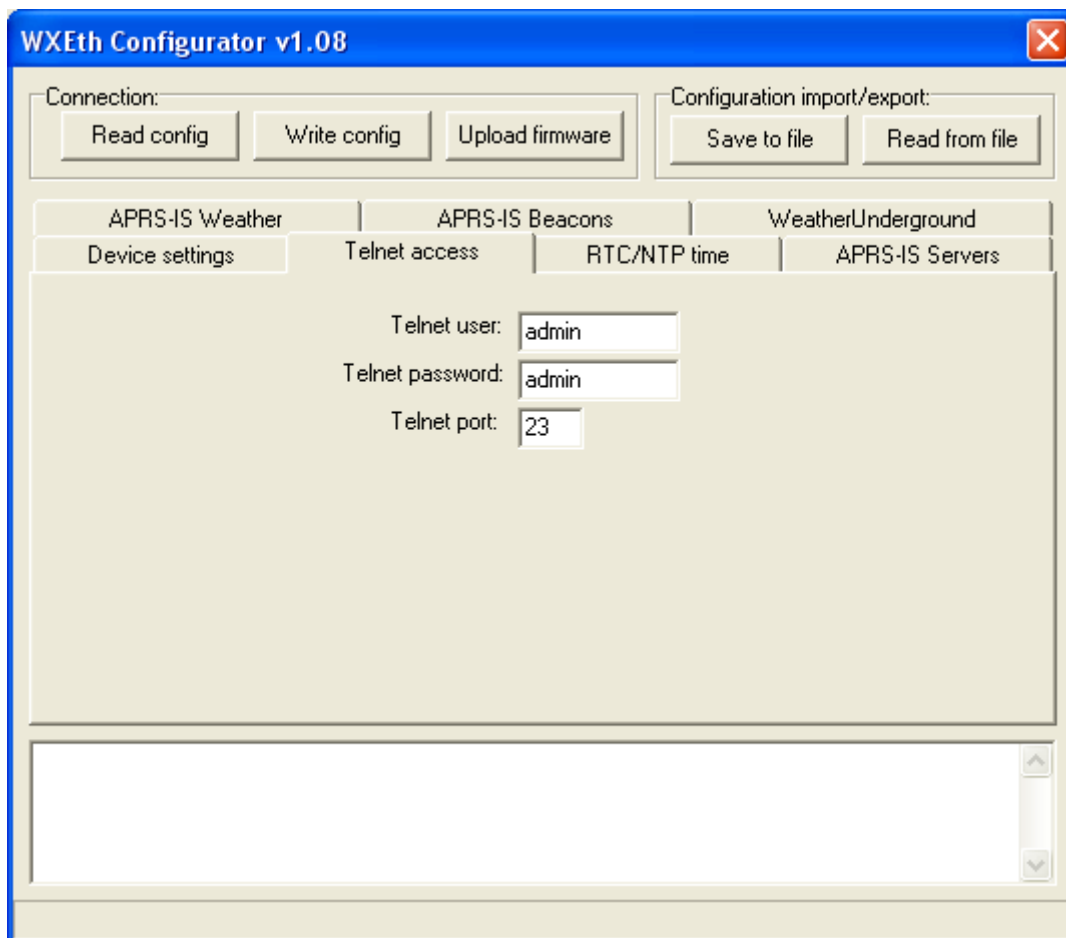
Configuration import/export buttons:

- “**Save to file**” - saves your current configuration to a file on PC disk,
- “**Read from file**” - reads your current configuration from a file on PC disk,

“Device settings” Tab options:

- “**Weather station**” - your weather station selection box,
- “**Latitude**” - your latitude (used for APRS-IS),
- “**Longitude**” - your longitude (used for APRS-IS),
- “**IP Address**” - IP address of your WXEth,
- “**IP Mask**” - network mask of your local network,
- “**Gateway**” - IP address of your network router,
- “**DNS**” - IP address of your ISP’s DNS server.

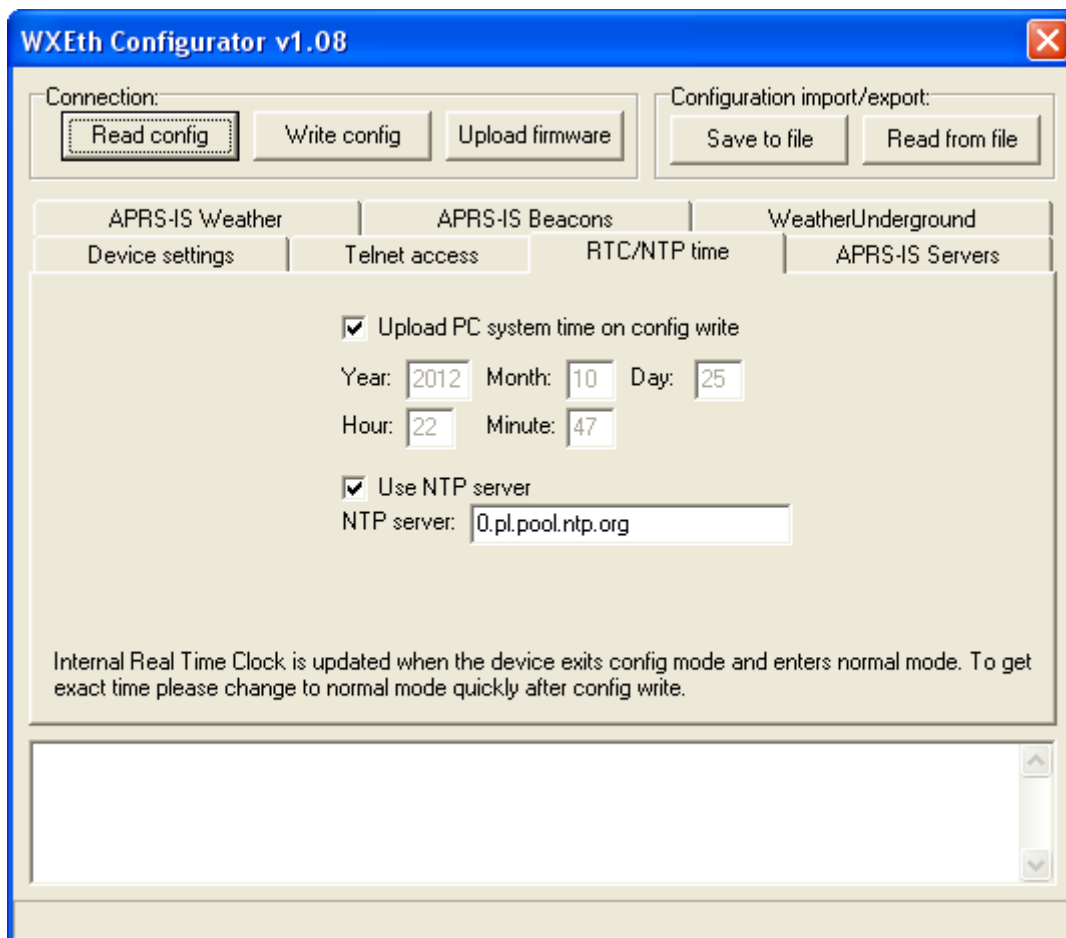
4.4. “Telnet access” Tab



“Telnet access” Tab options:

- “Telnet user” - username for your telnet access,
- “Telnet password” - password for your telnet access,
- “Telnet port” - port number of telnet service in WXEth.

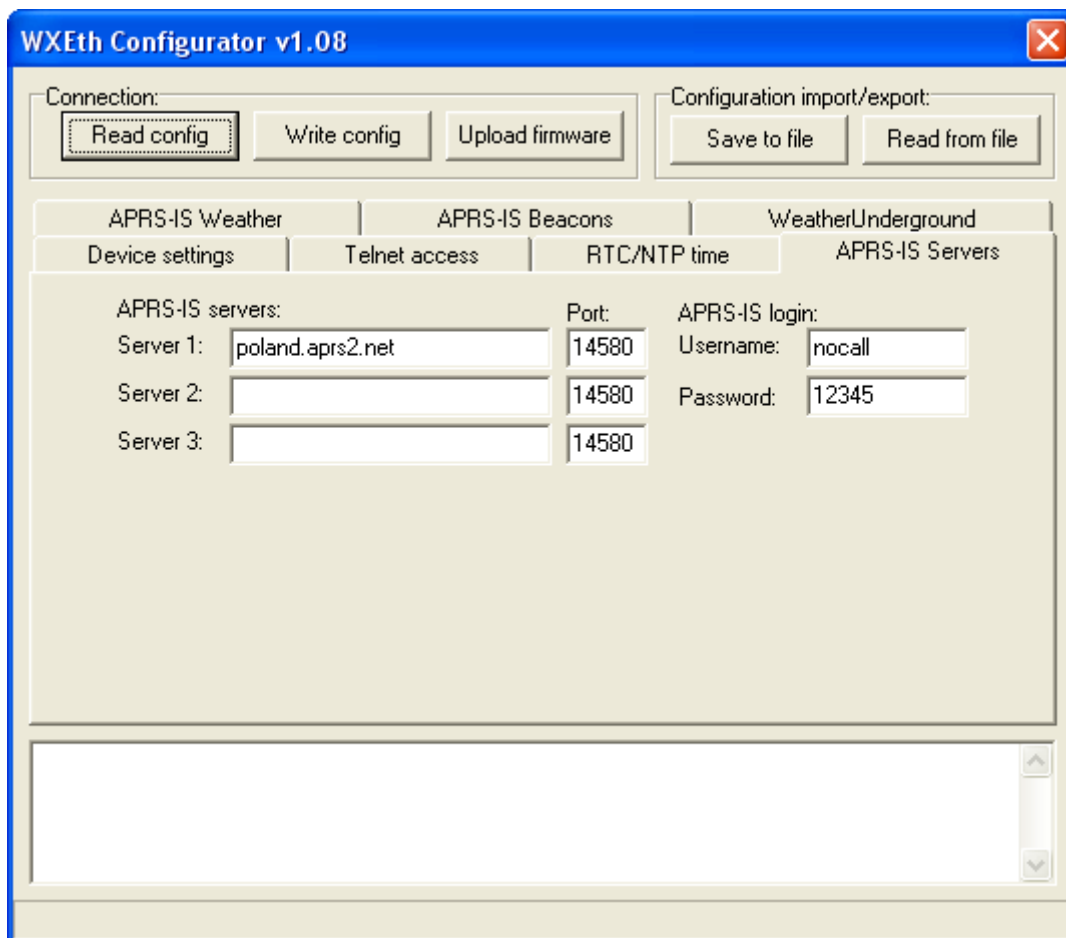
4.5. “RTC/NTP time” Tab



“RTC/NTP time” Tab options:

- **“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 WXEth,
- **“Use NTP server”** - if this option is selected, WXEth 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.

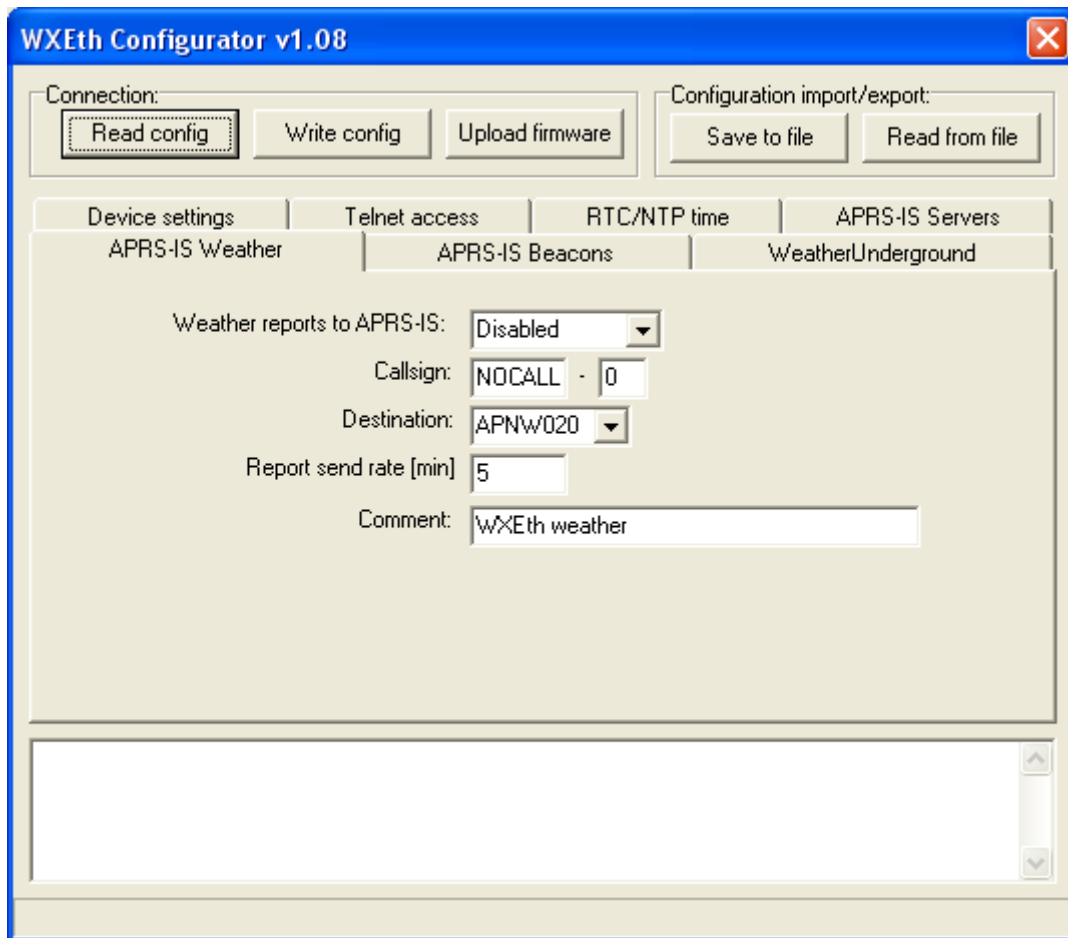
4.6. “APRS-IS Servers” Tab



“APRS-IS Servers” Tab options:

- “**APRS-IS servers**” - domain names or IP addresses of APRS-IS server which should be connected by WXEth, 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,

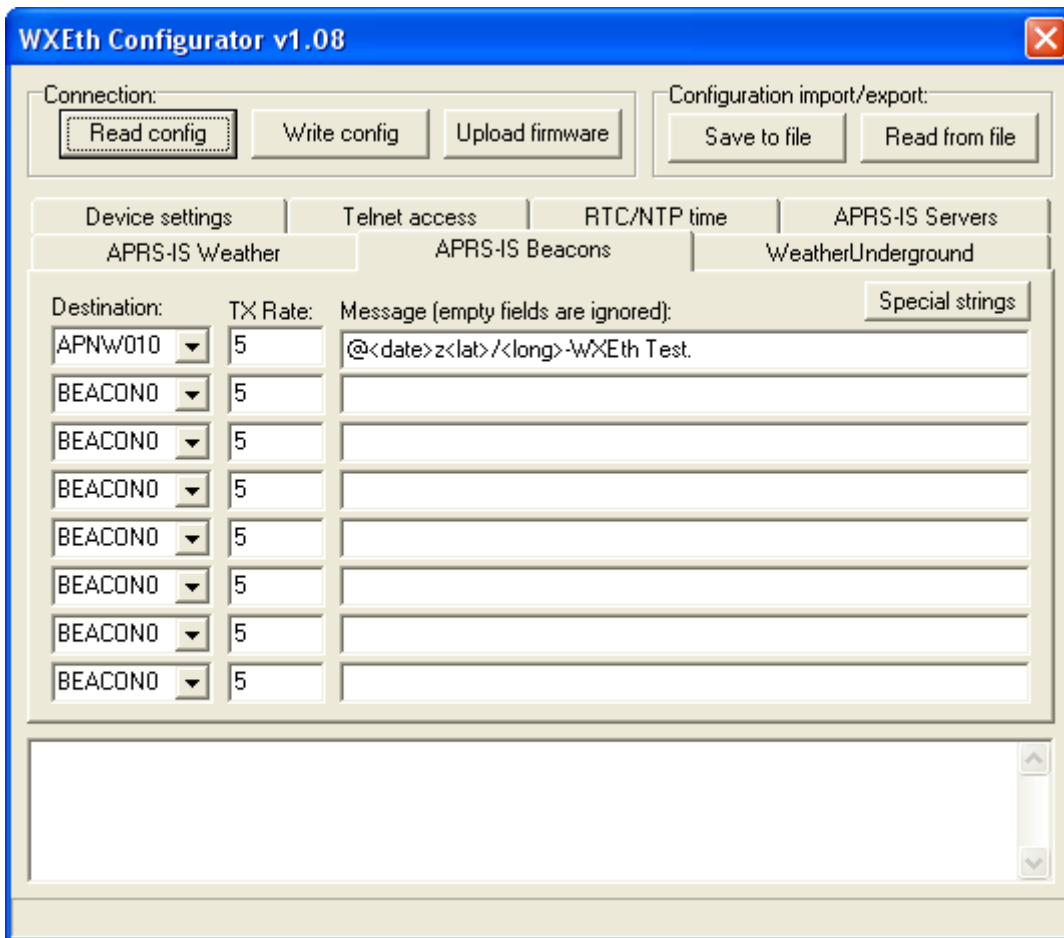
4.7. “APRS-IS Weather” Tab



“APRS-IS Weather” Tab settings:

- “**Weather reports to APRS-IS**” - this box enables or disables APRS-IS weather reports,
- “**Callsign**” - your radio amateur callsign for APRS-IS,
- “**Destination**” - APRS-IS packet destination field,
- “**Report send rate [min]**” - weather report transmit rate to APRS-IS (expressed in minutes),
- “**Comment**” - This is a short comment which will be appended at the end of weather report.

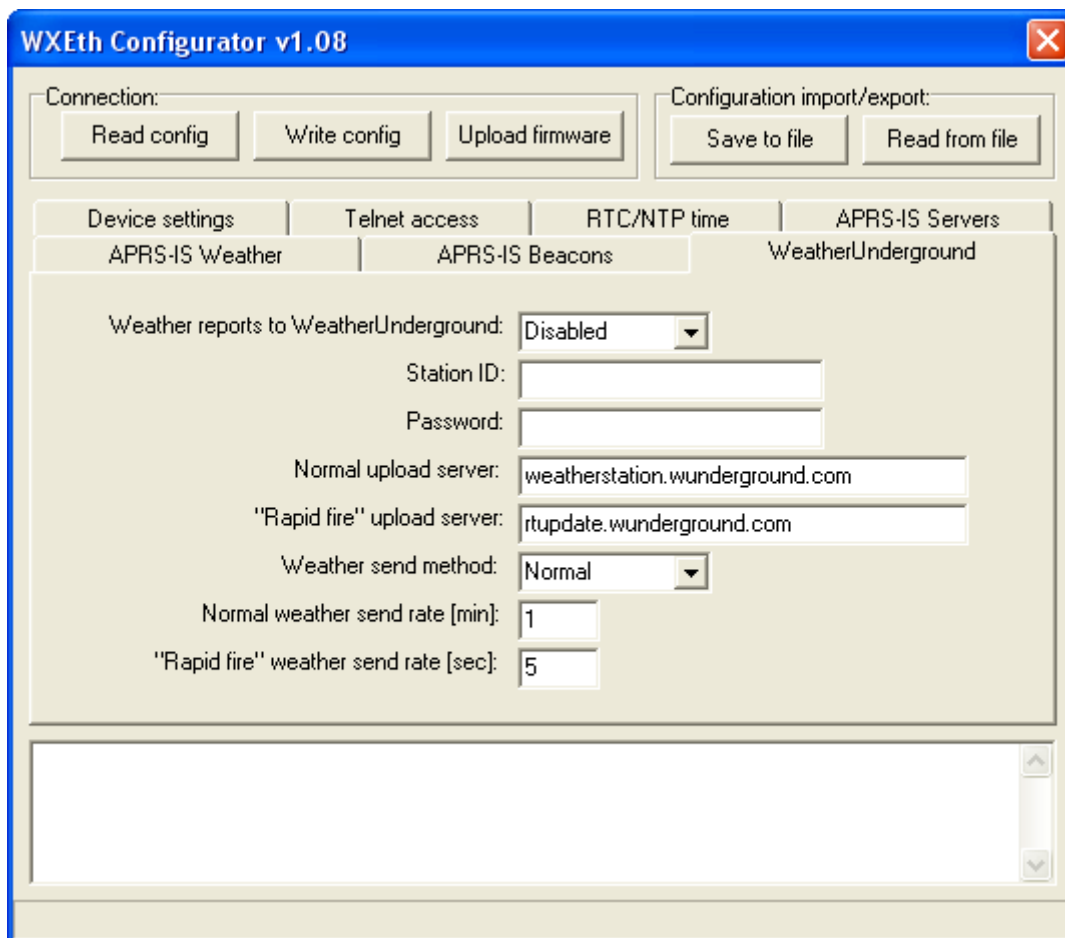
4.8. “APRS-IS Beacons” Tab



“APRS-IS Beacons” Tab options:

- “**Destination**” - destination address for a beacon packet. You can choose a destination address of APNW020 or BEACON0.
- “**TX Rate**” - beacon transmit rate to APRS-IS (expressed in minutes),
- “**Message**” - APRS packet information field content. Empty fields are ignored.

4.9. “WeatherUnderground” Tab



“WeatherUnderground Tab” options:

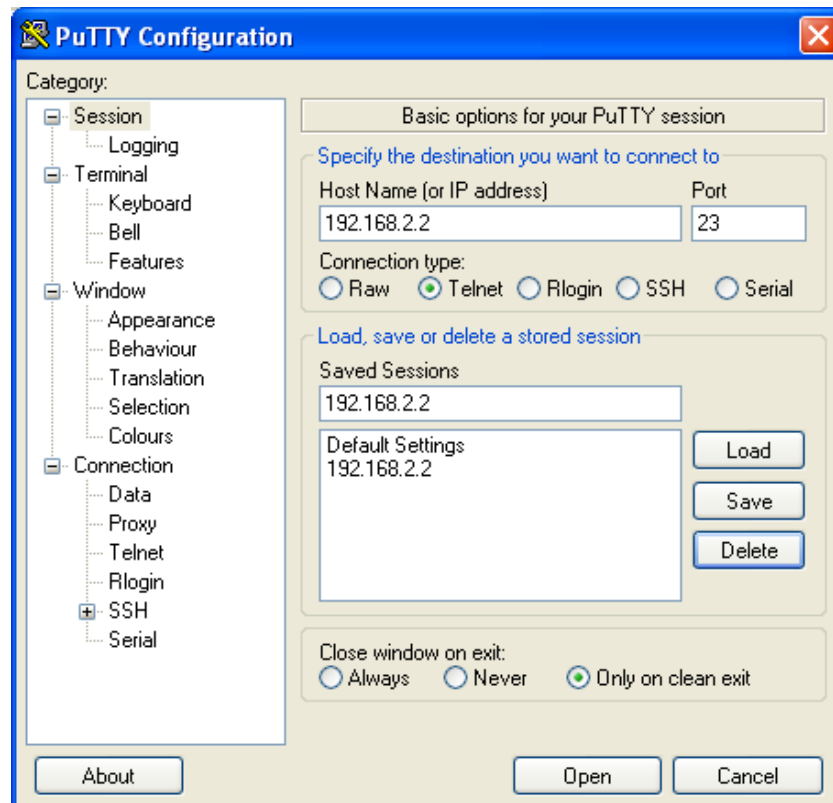
- **“Weather reports to WeatherUnderground”** - enables WeatherUnderground reporting in your WXEth device,
- **“Station ID”** - ID of the station assigned when you were adding a station in WeatherUnderground account settings on their web page,
- **“Password”** - password of your WeatherUnderground account (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).

5. Telnet interface

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

5.1. Telnet client software

To connect to WXEth 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 WXEth you need to set the following fields (visible above):

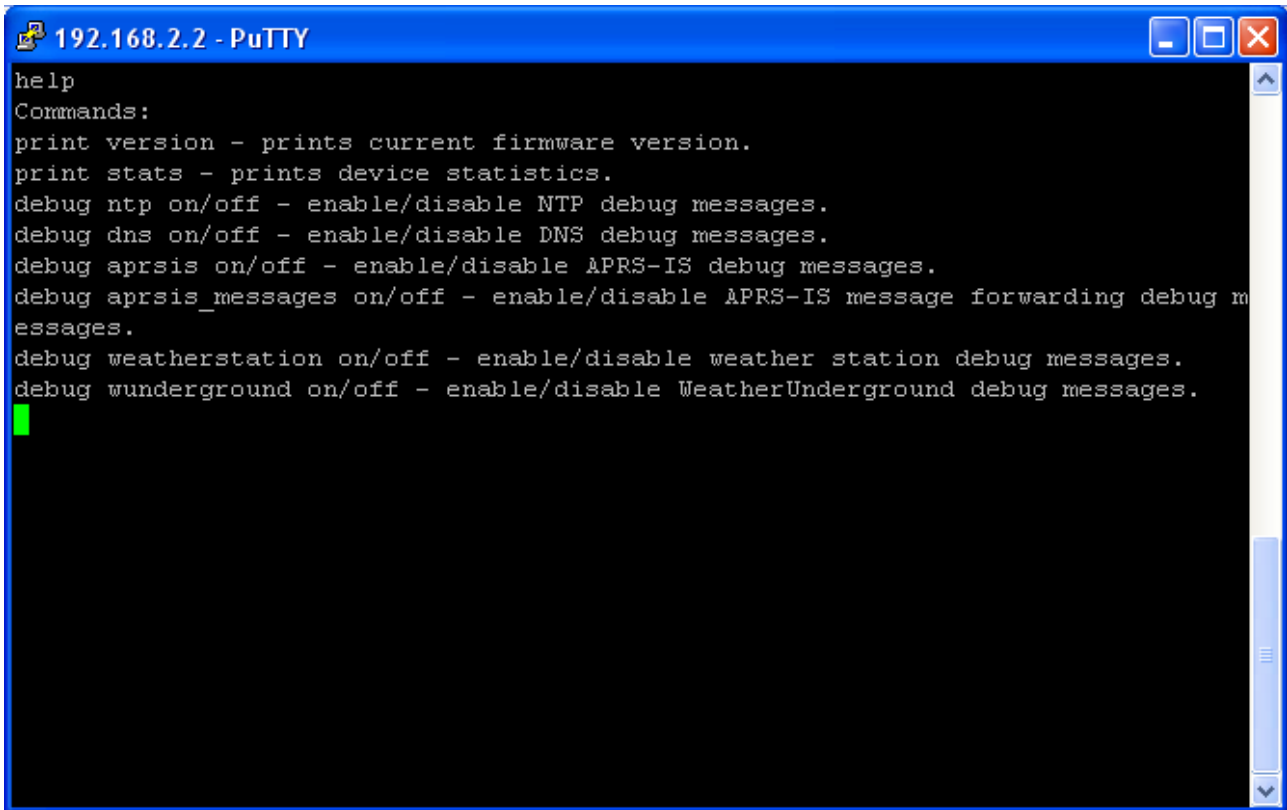
- Host Name (or IP address) - this is your WXEth network IP address,
- Connection type: Telnet (this is important, as we want to use a simple telnet interface),
- Port - this should be set the same as “Telnet port” in your device’s configuration.

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.

5.2. Telnet commands

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



```
192.168.2.2 - PuTTY
help
Commands:
print version - prints current firmware version.
print stats - prints device statistics.
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 aprsis_messages on/off - enable/disable APRS-IS message forwarding debug m
essages.
debug weatherstation on/off - enable/disable weather station debug messages.
debug wunderground on/off - enable/disable WeatherUnderground debug messages.
█
```

Telnet command list can be different for new firmware versions. Just a short description of command types:

- print - used to print some data in your telnet terminal window,
- debug - used to turn on or off some debug messages in your telnet terminal window,

8. Troubleshooting

In this section we will describe some possible problem encountered by users of WEth 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 callsign and SSID in “APRS-IS Weather” Tab, 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 WXEth 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 <wxeth 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 WXEth 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: How to check if my device receives data from weather station?

Answer: Yellow “WX READ” led is an answer. It should blink in short time intervals indicating that your weather station interface connection is fine and that your WXEth 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: 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.