

APRS-TW Functional Summary

“APRS provides situational awareness to all operators of everything that is going on in his local area, whether it be Weather reporting, traveler info, Direction Finding, objects pointing to ECHOLink and IRLP, or Traffic reporting and emergency response.” – Bob Bruninga, WB4APR

APRS-TW (APRS - Telemetry Watcher) monitors APRS traffic for telemetry packets, displays the information from each unit, and will alert the operator if specific conditions exist. Thus, the operator can focus attention on other activities but still have “situational awareness” of the monitored units without having to constantly monitor a stream of raw data and watch for telemetry data.

NOTE: APRS-TW requires administrator privileges to run. When the program is started, Windows will display a message box allowing you to grant administrator rights to the program before it can continue. This is normal and safe.

Interfaces with AGW and UZ7HO Soundcard Engines

- UZ7HO
 - Home - <http://uz7ho.org.ua/packetradio.htm>
 - Program - http://uz7.ho.ua/modem_beta/sm2ch44.zip
 - User Guide - http://uz7.ho.ua/modem_beta/user_guide_v036b.pdf
- AGW Packet Engine
 - Home - <http://www.sv2agw.com/ham/agwpe.htm>
 - Program - <http://www.sv2agw.com/downloads/agwpe.zip>
 - The AGW Packet Engine also supports KISS TNCs as well. This is handy as it allows the sharing of a single TNC with multiple computers and applications via the Packet Engine TCP/IP interface.
- DireWolf
 - Home - <http://home.comcast.net/~wb2osz/site/?/home/>
 - Program - <http://home.comcast.net/~wb2osz/Version%200.5/direwolf-0.5-win.zip>
 - User Guide - <http://home.comcast.net/~wb2osz/Version%200.5/Quick-Start-Guide-Windows.pdf>
- APRS-TW allows specifying the IP address of the Packet Engine so that the program does not have to run on the same computer as the soundcard packet engine.
- Visit <http://www.SoundCardPacket.org> for help in using soundcard packet on your system.

Interfaces with KISS TNC via your computer's serial port

- Serial port and parameters are available in the Configuration screen.
- APRS-TW presumes the TNC is already in KISS mode.

Web Server

The main display is also available as a static web page, served by APRS-TW. The page is updated on the server every time a telemetry unit is processed. The user will have to update his web page display manually. The server and its associated port are configurable. By default, the server is disabled, though the port defaults to 8080. The typical URL would be http://<ip_address>:8080/. Your use and configuration will cause this to vary. Also note, depending on the configuration of your computer, the program will need to run with administrator privileges.

Program Notes

For installation, APRS-TW can be installed and ran from any folder. There are no extra program files or DLLs. The supporting files are to be in the same folder with the program executable file.

All supporting files are ASCII text files, for easy editing.

- APRSTW.ini
 - Contains program configuration items: server IP address and port, network polling time.
- Cache.ini
 - Contains information on the telemetry units heard and processed. The program initializes the initial display state with this data so APRS-TW can remember where it had left-off when last terminated.
- PassList.txt
 - Contains the callsigns of units who telemetry data is to be processed. One callsign per line. If a callsign is not in this list, it is not processed. If there are callsigns in this file when the program starts, APRS-TW activates the filter that uses this information.
- BlockList.txt
 - Contains the callsigns of units who telemetry data is to be ignored. One callsign per line. If a callsign is in this list, it is ignored. If there are callsigns in this file when the program starts, APRS-TW activates the filter that uses this information.

These files do not exist when the program is first installed and executed. They are created as needed by APRS-TW, but can be copied from another installation.

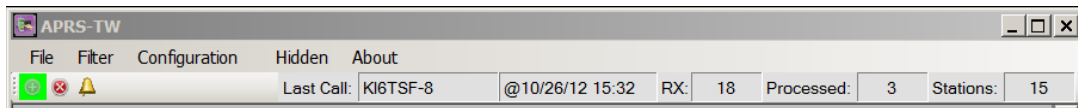
Protocol Conformance

APRS-TW Conforms to current APRS specifications and extensions for telemetry traffic




- T Packets that report telemetry data
- PARM Packets that report the names associated with the telemetry channels
- UNIT Packets that report the units for the analog values and labels associated with the digital channels
- EQNS Packets that report the coefficients for the analog channel value calculations
- BITS Packets that report digital channel states and the Project Title for the telemetry station
- Base91 compressed Mic-E telemetry data, as specified in the compressed APRS Telemetry Data extension
 - APRS-TW does not support the deprecated Mic-E telemetry spec.

User Controls

Main Window



- Menu Strip
 - File->Exit (<Alt-F,X> or Escape): Terminate the program
 - Filter->Use Pass (<Alt-T,P>): This is a check-style item that controls the use of the Pass List mechanism. When checked, all received callsigns are checked against this list. If they are in this list, the data is processed.
 - Filter->Use Block (<Alt-T,B>): This is a check-style item that controls the use of the Block List mechanism. When checked, all received callsigns are checked against this list. If they are in this list, the data is ignored.
 - Filter->Edit Lists (<Alt-T,E> or 'F'): This opens the Filter List editor, where the user can add and remove entries from the Pass List and Block List. Entries in these lists can take on one of two forms.
 - Unit ID: A reference to a specific Callsign-SID, i.e. K6ABC-12
 - Group ID: A reference to a group of units with the same base callsign, ignoring the SID. So a group preference of K6ABC* will validate against K6ABC, K6ABC-5, etc. Such an entry in the Pass List would pass all units with the base callsign of K6ABC. In the Block List, all units with the base callsign of K6ABC would be ignored.
 - Configuration (<Alt-C> or 'C'): This opens the dialog box that allows the user to specify:
 - The use of a TCP/IP connection to a Soundpacket driver is enabled or disabled via a checkbox.
 - The IP Address of the APRS data server. The default address is the loopback address, 127.0.0.1, which means the server is on the same computer as APRS-TW.
 - The Network Port number of the APRS data server. The default value is 8000 decimal. This number has to match the port number set in the APRS data server configuration. The default value is 8000 decimal in both servers supported by APRS-TW.
 - The Network Polling Time of APRS-TW. This time, entered as milliseconds (i.e. 5000 = 5 seconds), controls how often the program checks the network and KISS buffer for data from the APRS data server. The default value is 5000 (5 seconds) and the valid range for this value is 5000 to 60000 (5 to 60 seconds).

- The use of a KISS TNC via a local COM port is enabled or disabled via a checkbox.
 - KISS COM port
 - KISS COM Port Bit Rate
 - KISS COM Port Data Bits
 - KISS COM Port Parity
 - KISS COM Port Stop Bits
 - Hidden (<Alt-H> or 'H'): This opens the Hidden Node Editor, which allows the user to see a list of hidden units by callsign and enable them to be shown again.
 - About (<Alt-A> or 'A'): This opens the About information box. This is where the program compile date and time are found to determine the program version.
- **Toolbar**
 -  **Start Processing:** Opens the network connection to the APRS data server and starts processing data. The network buffer is queried every time the Network Polling Time elapses, and any data in that buffer is processed. When the program is running, the background of this button is changed to green.
 -  **Stop Processing:** Closes the network connection to the server and ceases processing of data. The background color of this button is red when the program is not connected to the server and processing data.
 -  **Cancel Audio Alert:** When the user has configured APRS-TW to provide audio alerts, the program will play an audio alert when specified thresholds have been exceeded. The sound will be played at the rate of the Network Polling Time. Clicking this button will silence the playing of the audio alert until another packet is processed for a callsign configured to generate an audio alert.
 - **Last Call:** Displays the last callsign that was displayed or updated by APRS-TW, and the date and time it was updated.
 - **RX:** The number of packets received from the APRS data server.
 - **Processed:** The number of packets received from the APRS data server that contained valid telemetry data and were processed by APRS-TW.
 - **Stations:** The number of stations displayed in the main window. Depending on the size of the parent window, not all entries will be displayed.

Callsign Nodes



Active Channels		Analog					Digital								
Analog	Digital	Parameter	Value	Unit	Low	High	En	AR	Label	A1	A0	AR	Label	A1	A0
5	8	Battery	13.6	Vdc	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bit1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bit2	<input type="checkbox"/>	<input type="checkbox"/>
		Temp	66.3	DegF	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bit3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bit4	<input type="checkbox"/>	<input type="checkbox"/>
			0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bit5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bit6	<input type="checkbox"/>	<input type="checkbox"/>
			0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bit7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bit8	<input type="checkbox"/>	<input type="checkbox"/>
			0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
		Last Updated	10/26/12 15:51												

Data received for each callsign is displayed in a node, like the one shown, in the parent MDI window. Each node has many controls with which the user can interact.

Context Menu

Right-clicking on a node presents a context menu with the following options:

- **Delete and Block:** This option causes the node to be deleted from the display and the callsign added to the Block List. From that point on, a node for this callsign will not be presented.

- Delete: This option causes the node to be deleted from the display. If traffic for this unit is received again, it will be displayed again.
- Add to Passlist: This option causes the callsign for this node to be added to the Passlist. If this is the first callsign to be added to the Passlist, the Passlist Filter is activated.
- Hide: This option causes the node to be hidden and no longer displayed. Information for this unit is still processed and updated internally. Use the Hidden Node Editor, accessed in the Main Menu bar, to show hidden units.
- Ignore Ext Params: Normally, APRS-TW processes PARM, UNIT, and EQNS packets received. These packets provide external parameters that set specific data for the related node. These same data values can be set by the user, who may not want these settings to be changed by the processing of these packets. This is a toggled function, and a check mark will show if this option is enabled or not.
- Log This: This option causes the program to log the final values in CSV format. This is a toggle function. When logging is active, the background color of the Alias is Yellow. Logging files are created in the same director with the program file. The file name is a composite of the Alias and the date and time logging was started. While logging is active, the user cannot change the Alias, delete, or block the unit. All log files are properly closed when the program is terminated.

Node Label

By default, APRS-TW displays the callsign attached to the received packet. In reality, what is being displayed is an alias. By default, that alias is the callsign on the processed packet and the displayed list is sorted by the alias. The user can change the alias by clicking on the callsign and entering the alias in the displayed dialog box. The original callsign is not lost, only the alias is changed. When the alias is changed, the list is resorted and updated.

In the example above, the alias is "SAG3".

If the mouse cursor hovers over this area, the tooltip will display the original callsign. In the example above, the tooltip would show "K6ARC-14"

To display the original callsign again, click on the label, then click the OK button in the dialog box, leaving the entry box empty. The original callsign will again be displayed.

Active Channels (Analog and Digital)

APRS-TW makes a best effort to determine from the received data how many channels are active for a given callsign. The user can change either value by simply clicking on the value and enter the correct information in the dialog box that appears.

Sequence Number (Seq)

APRS telemetry data packets carry a sequence number for the data it carries. APRS-TW displays this information, but it is not changeable.

Last Updated

This field displays the date and time this node was last updated. When the mouse hovers over this field, the tooltip shows the last telemetry data string processed for this node.

Analog Data Area

This area displays analog telemetry information and the controls associated with it.

- The Parameter field shows the name of each channel. APRS-TW provides default names. The names can be set by the processing of a PARM packet or by clicking on a channel's name and supplying that info in the dialog box.
- The Value field shows the analog value. This value is updated every time a telemetry data packet is received. When the mouse pointer hovers over this field, APRS-TW displays the coefficients and raw value used in the binomial expression that is used to calculate the final value.
- The Unit field displays the units for the value. APRS-TW does not supply any default value for this field. The units can be set by the processing of a UNIT packet or by clicking on a channel's unit and supplying that info in the dialog box.
- The Low field displays the low value threshold used for generating audio alerts. To set this value, click in a channel's low threshold box and supply the value in the dialog box that appears.
- The High field displays the high value threshold used for generating audio alerts. To set this value, click in a channel's high threshold box and supply the value in the dialog box that appears.
- The En field is a checkbox that enables threshold checking for the checked channel by APRS-TW. When the value for the checked channel goes below the low threshold or exceeds the high threshold, audio alerts will begin to sound. The background color of the Value field will be changed to green if the value goes below the low threshold and changed to red if the value exceeds the high threshold. The normal background color is restored and alarm condition reset by unchecking the En box. **NOTE: Both the HIGH and LOW thresholds MUST be set before threshold testing can be enabled.**

Digital Data Area

This area displays digital telemetry information and the controls associated with it.

- The area at the top of the Digital Data area displays the Digital Project Name. APRS-TW does not supply any default value for this field. The Digital Project Name can be set by the processing of a BITS packet that contains a Digital Project Name or by clicking on the Digital Project Name field and supplying that info in the dialog box.
- The AR control is the Alarm Reset button. When a bit-change alarm is enabled for a given channel, this button clears the alarms condition for this channel. When a bit alert is caused by the bit changing to "0", the button will turn red. Conversely, if the bit changed to a '1', the button will be green. Clicking the button will set the button color back to normal.
- The Label field displays the descriptive name of the digital channel. The label can be set by the processing of a PARM packet that contains digital labels or by clicking on the label field and supplying that info in the dialog box. APRS-TW supplies default names for these fields.
The background color of this field will be red when the digital value is '0', and will be green when the value is '1'.
When the mouse pointer hovers over this field, APRS-TW displays the label information supplied by the processing a UNIT packet that contains digital unit names via a tooltip.
- The A1 field is a checkbox that enables alerting by APRS-TW when the checked channel digital value changes from '0' to '1'. The associated AR button color is changed to green.

- The A0 field is a checkbox that enables alerting by APRS-TW when the checked channel digital value changes from '1' to '0'. The associated AR button color is changed to red.

Startup Logic

When APRS-TW is started, the following events occur in this order:

1. Display Splash Screen.
2. Read and process APRSTW.ini.
3. Read and process PassList.ini. If there are entries in this file, Passlist processing is automatically enabled.
4. Read and process BlockList.ini. If there are entries in this file, Blocklist processing is automatically enabled.
5. Read and process Cache.ini.
6. Paint the main form.

Filter Operation Logic

The Filter system is used by APRS-TW to include and/or exclude RF channel traffic from processing. In this way, the operator need only see the traffic from units of interest. It uses two separate lists; one for traffic to pass and the other for traffic to block. The lists can be activated independent of each other. The ability to view and change the activation status of each list is under the "Filter" item in the program menu strip. Clicking on Filter->Use Pass will enable the Pass list filter. After doing so, clicking on Filter will reveal a check mark by Use Pass, showing that the Pass list filter is active. The same logic applies to the Block list.

These lists are mutually exclusive in that any given callsign can only be in one list at a time, never both at the same time.

The callsigns in these lists can be in one of two types:

- Specific: A Specific Callsign is a complete callsign with an SSID, i.e. NA6BR-5. The dash is necessary.
- Group: A Group Callsign is a complete callsign followed immediately by a '*', i.e. NA6BR*. To the filter system, just the callsign will be matched and the SSID will be ignored; any SSID paired with the Group Callsign will be matched.

It is allowed for a Group callsign to be in one list and a specific callsign in another. For example, you can have NA6BR* in the Pass list and NA6BR-3 in the Block list. This means that telemetry traffic from NA6BR with any SSID will be processed EXCEPT for traffic from NA6BR-3.

When radio channel traffic arrives, APRS-TW first checks with the Filter system to see if this traffic is allowed for processing. The following logic is used when a callsign is tested by the Filter system in the following order:

1. If Pass list processing is not active, process the traffic.
2. If Pass list processing is active and the Specific callsign is in the Pass list, process the traffic.
 - a. Ex: If NA6BR-5 is being tested and NA6BR-5 is in the Pass list, the traffic will be processed.
3. If Block list processing is active and the Specific callsign is in the Block list, ignore the traffic.
 - a. Ex: If NA6BR-5 is being tested and NA6BR-5 is in the Block list, the traffic will be ignored.
4. If Pass list processing is active and the Group callsign is in the Pass list, process the traffic.
 - a. Ex: If NA6BR-5 is being tested and NA6BR* is in the Pass list, the traffic will be processed.
5. If Block list processing is active and the Group callsign is in the Block list, ignore the traffic.
 - a. Ex: If NA6BR-5 is being tested and NA6BR* is in the Block list, the traffic will be processed.
6. Anything else gets ignored.

Note that Specific callsigns are tested first and have "priority" over Group callsigns.