

BYONICS

TinyPack Addendum Version 1.00

<http://www.byonics.com/tinypack>

Overview

TinyPack is a firmware replacement for the popular TinyTrak line of APRS transmitters. It creates an easy way to send any simple text message as an AX.25 packet transmission. ASCII text is sent to the TinyPack via the serial port J2 in one of several baud rates. Once a complete message is received, TinyPack will key a radio connected to the radio port J1 and send the message as a UI packet. Messages can be up to 80 characters long, and should be terminated with a carriage return or line feed character, similar to the Enter key on a keyboard. The TinyPack will wait for a clear channel before sending the information.

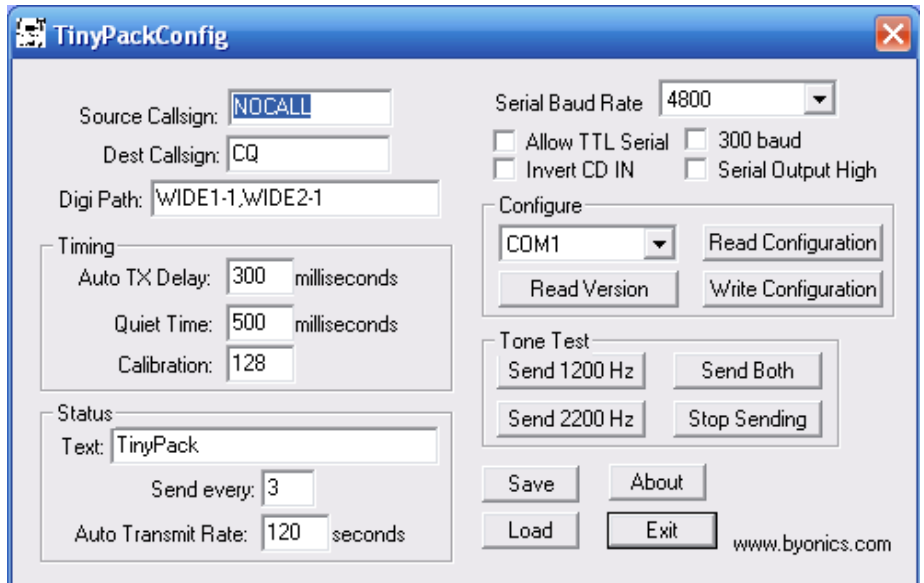
TinyPack runs on the Byonics TinyTrak3 and compatible hardware and printed circuit board. An existing TinyTrak3 or WXTrak can be converted to a TinyPack by removing the existing PIC microcontroller and replacing it with a TinyPack chip, a PIC microcontroller with the TinyPack firmware.

TinyPack was originally created to allow Davis Weather Stations with the Weather Link APRS adapter to transmit weather data to the APRS network without the need for a full TNC (terminal node controller). TinyPack can be used by anyone wanting an easy way to send out AX.25 UI packets over a radio. All packet parameters are set using a simple Configuration program, and saved in the TinyPack chip.

This document only covers information that makes TinyPack different from TinyTrak. Much more information can be found in the TinyTrak3 User's Manual, such as a schematic and parts lists, detailed assembly instructions, and information on interfacing to radios, computers, power, and more. There is also information on adjustments, and frequently asked questions. The TinyTrak3 User's Manual can be found at <http://www.byonics.com/tinytrak>

Configuration Software

To set user options, such as call signs and timing details, use the TinyPackConfig.EXE program, available from www.byonics.com. First, power TinyPack via an external battery or other power source and connect it to a computer serial port. The computer serial port will NOT power the TinyTrak3. Be sure to use a gender-changer, and a null-modem adapter. Launch TinyPackConfig.EXE, and select the connected serial port under Configure. Click "Read Version" to confirm the config program can communicate with TinyPack. If a firmware version number is reported, the software and circuit are communicating. If not, re-check all previous steps. Click "Read Configuration" to upload the current configuration, edit all fields for desired options, and click "Write Configuration" to download options to the chip. Reading the Configuration is always performed twice and compared in the program to insure correct data. Writing the configuration is always followed by a read and compared to insure correct data. A dialog will notify the user when the read or write is complete, and if it was successful. A read or write operation may fail if the unit is transmitting. If this happens, simply try again. Detailed information about each configuration parameter is included below.



Source Callsign

This is the identification of the transmitting station. It can be an amateur radio call sign such as N6BG, or a tactical call such as STAT1. No more than 6 characters (excluding SSID) may be used. If a tactical call is used, an amateur radio call sign should be included in the status text for compliance with FCC identification requirements. As with normal packet radio, an optional SSID between 1 and 15 can be included, such as N6BG-2 or STAT1-15.

Dest Callsign

This is the identification of the destination. Since these are unconnected packets, and no acknowledgement will be sent, the dest callsign may not be important. It can be an amateur radio call sign such as N6BG, or generic destination such as CQ or APRS. No more than 6 characters (excluding SSID) may be used. As with normal packet radio, an optional SSID between 1 and 15 can be included, such as N6BG-2.

Digi Path

This optional path will allow the transmission to be repeated by digipeaters. It should be entered in the form of call signs or aliases with optional SSIDs, separated by commas, such as RELAY,WIDE. WIDEn-n format is also supported, such as WIDE2-2. More call signs in the digipeater path will limit the space available for the status beacon.

Timing

Auto TX Delay

This sets the delay in milliseconds after the transmitter is keyed, until the data begins. It is similar to the TXD setting in most TNCs. A value of 200 ms would be equal to 1/5 second. Maximum delay is about 1700 milliseconds.

Quiet Time

This setting controls the approximate delay in milliseconds that must occur after the receiver squelches, before a transmission will occur. It can keep transmissions from occurring on a busy channel. During the quiet time, the CD LED will flash quickly.

Calibration

This setting is included to help compensate for inaccuracies in the ceramic resonator. By adjusting the value, packet rates can be sped up or slowed down. A value of 128 represents no correction. Experiment with different values to see which has the best results on a receiving TNC. Usually the default 128 works best.

Status

Text

TinyPack can send a status text / comment message after a certain number of normal transmissions or after a set amount of time. This setting sets the beacon text. A status text prefixed with a > will show up on some internet sites. The number of digipeaters in the path limits the length of the beacon message.

Send Every

This setting controls how often a status beacon is sent, in units of normal transmissions. A setting of 1 would send the beacon with every normal transmission, a setting of 2 would beacon with every other normal transmission. A setting of 0 means so not send after normal transmissions.

Auto Transmit Rate

This setting controls how often a status beacon is sent, in units of seconds. A setting of 60 would send the text beacon every minute. A setting of 0 would not send status beacons based on time.

Additional Options

Serial Baud Rate

This setting controls the baud rate of the incoming serial text. Valid speeds are 4800, 9600, and 19200. For the Davis Weatherlink APRS adapter, make sure this option matches the speed set with the Streaming Data Utility.

Allow TTL Serial

If this option is enabled, TinyPack will check the serial input level at power-up to determine if it is connected to a RS-232 or TTL level GPS. If not using a TTL level GPS, this option should be left disabled. If enabled, and TinyPack detects a TTL GPS, it will flash the yellow and green 3 additional times at powerup. This will invert the polarity of the input serial signals.

Invert CD IN

If this option is enabled, the sense on the CD input will be inverted. This is used when connecting a radio's carrier detect output out to J1 pin 2. R9 should be removed, or set to center when using J1 pin 2.

300 Baud

If this option is enabled, TinyPack will send data suited for HF transmissions. Data will be sent at 300 baud, rather than at 1200 baud, and the tones will be 1600 Hz and 1800 Hz rather than 1200 Hz and 2200 Hz. The Tone Test buttons below will send the new tones when in 300 Baud mode.

Serial Output High

If this option is enabled, TinyPack will set the serial output line to 5V rather than 0V. Since the serial output is not normally used, this should not be a problem. It is included for devices that require a voltage on their serial input before they send serial data out. For the Davis Weatherlink APRS adapter, this option should be enabled.

Configure

Com Port

This setting selects which communication port the TinyPack is connected to during configuration. Only the first eight serial ports (COM1 – COM8) are supported.

Read Version Button

This button will get the current firmware version from the connected TinyPack. This is a useful, simple test to confirm the computer and TinyPack can communicate.

Read Configuration Button

This button will upload all configuration settings from the connected TinyPack, and populate the settings field in the software interface. This step is useful to change a single setting on the TinyPack configuration.

Write Configuration Button

This button will download all configuration settings entered in the software interface into the TinyPack. The settings are stored in non-volatile memory, so they will persist when power is removed from TinyPack. The TinyPack should be power cycled after writing a configuration to allow new options to be used

Tone Test

These buttons will cause TinyPack to transmit a 1200 Hz tone, a 2200 Hz tone, or alternate between the two on a connected radio. When in 300 baud mode, the tones sent are 1600 Hz and 1800 Hz. This is useful for setting transmission levels, and measuring audio frequencies when adjusting calibration.

Save / Load

These buttons will allow saving and loading of all current TinyPackConfig parameters to and from a file. The file format is the binary data stored in the TinyPack on-chip EEPROM.

Hints, Tricks, & Notes

- When used with a Davis Weatherlink APRS adapter, be sure to set TinyPack serial baud rate to match the rate set with the Streaming Data Utility program. Also, be sure to check the "Serial Output High" option to enable the WeatherLink to output data.
- The TinyPack should be power cycled after writing a configuration to allow new options to be used.