X-TRACK
TNC-X APRS Tracker
Daughter Board

Assembly, Configuration, and Operating Instructions

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X-Track is a TNC-X Daughter Board that will allow you to connect an external GPS receiver directly to your TNC-X to transmit MIC-E encoded packets containing your position and beacon information. At the same time, all of the functions of the TNC-X are preserved. Thus you can, for example, run an APRS program on your computer, connect the computer to TNC-X through either the TNC-X's primary serial port or USB port, and connect a GPS receiver simultaneously to the TNC-X auxiliary serial port.

X-Track can be configured using any standard terminal program on any computer that has a serial port. This manual contains some assembly tips as well as configuration and operating instructions.

Assembly Instructions

The kit is supplied with the following parts. Please verify that all parts are included before proceeding:

1. Printed Circuit Board
2. 28 Pin IC Socket
3. Programmed 18F2520 (IC1)
4. 10 MHz Resonator (PAD1) (this is brown with 3 leads)
5. .1 uf Capacitor (C3)
6. 2 Headers (14 pin, 4 pin)
7. 750 ohm Resistor (R1)
8. LED (LED1)
9. 8 Pin SIP Socket (J1)
10. 3 shorting jumpers

C1 and C2 are not used in this kit. Installation of the parts is pretty straightforward. Note the following:

1. The SIP Socket should be installed on the BOTTOM of the PC board. This enables it to be plugged into the 8 pin header on the TNC-X.

2. Make sure that the IC socket and IC are installed with the notch as indicated on the PC board.

3. The only other polarized part is the LED. Install it so that the shorter lead is inserted in the hole with the flat side of the LED outline (furthest from the edge of the board). If you like, you can install 2 wires instead of the LED and mount the LED on your TNC-X box.

To install the X-Track Daughter Board, first remove the two jumpers on header J1 on the TNC-X (this is the 8 pin header). Then insert the X-Track board so that the LED in the corner of the X-Track Board is closest to J3 The notch on the 18F2520 should be toward the back of the TNC-X. The two jumpers that you removed from the TNC-X can then be used on XTrack header JP1 to set the serial port speed. Note that these headers do not set the speed for the GPS (it is fixed at 4800 baud). Instead, they set the speed that data is transferred to and from the TNC-X. These jumpers must be set for the same speed that the TNC-X is set. Configure these jumpers as follows:

1200 Baud	Connect 1 to 4 and 2 to 3
4800 Baud	Connect 2 to 3 only
9600 Baud	Connect 1 to 4 only
19200 Baud	Don't connect any pins

Also place the enclosed jumpers on JP2 as shown below:

Corner of board  ➔

Your GPS should be connected to the AUX232 port, which is the upper right hand corner of the TNC-X near the standard RS232 port. Set your GPS to send 4800 baud NMEA data.

Configuration Instructions

The X-Track Daughter Board is configured via the standard TNC-X serial port. Connect your computer to the RS232 port. You can use either the serial port connection or the USB port (if you have this option installed). See the TNC-X manual for information on wiring a connector for this port. You can even use a hand held device like a Palm Pilot running a terminal program to configure the device. However, you cannot connect the USB port on a Palm Pilot to the USB port on TNC-X. This is

because both of these USB ports are “slave” devices and without a master USB device, communication cannot occur.

Run a terminal program on the PC that you have connected to the TNC-X serial or USB port. If you are running a Windows computer, Hyperterminal will do fine. If you are using a Palm Pilot, SimpleTerm should work. Set your terminal program for the same data speed that you have configured both X-Track and the TNC-X. Set the terminal program for no flow control. Send a CNTRL-C on the terminal program. You should see the following menu:

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   Current APRS Parameters:

C. Station Callsign:              N0CALL
1. First Path Callsign:           WIDE1-1
2. Second Path Callsign:          WIDE2-2
3. Third Path Callsign:
D. Delay Between Xmit (x10 sec): 000
I. Icon Number:                   3E
T. Alt. Icon Table (Y/N):         N
M. Mic-E Message (0-7):           1
R. Transmit Beacon Every:         003
V. Send Only Valid Pos (Y/N)      Y
X. Beacon Text:                   XTrack Test
Q. Quit and Save

Enter Selection:
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Most of these parameters are self-explanatory. Parameter D specifies the length of time between position reports. It is denominated in 10s of seconds. So, for example, if you want to send a position every 30 minutes, you would enter (30 X 60 = 1800/10 =) 180 for this value. Any value between 0 and 255 may be entered for this item. If you enter 0, it turns beaconing off.

Parameter I stores the icon number that will be used with your position report. This is a hexadecimal value, which can be derived from an ASCII table. For example, if you want the car symbol (normally a greater than (>) sign), look up the greater than sign in an ASCII table you will find 3E. This is the value to be filled in for I. The R parameter is the rate at which the unit will transmit the beacon text. If you enter a 1 for this item, the beacon text will be transmitted with every position report. A 2 will result in the beacon text being transmitted every other position report, etc. For both items D and R you must enter 3 digits. If, for example, you want to beacon every 3rd transmission enter “003” not “3”.

The V parameter allows you to determine whether X-Track only sends “valid” position data. Most GPS receivers stream data continuously regardless of whether they are “locked” on the GPS satellite constellation or not. They contain a byte in the data stream that says whether the data is “valid” or not, that is whether they are locked on the satellites or not. If the data is invalid, the GPS sends whatever the last valid position data was. The V parameter allows you determine whether this old data will be transmitted over the air.

Operating Instructions

In general, operation is automatic, according to the configuration parameters that you have specified. Assuming you have a computer running KISS software (such as UIView or WinAPRS) attached to the RS232 serial port (or the USB port) at the same time you are using X-Track, the tracker function will operate relatively independently of the other software function. You computer will be able to send and receive data in KISS mode and every now and then X-Track will take over for a moment and send a position report. If you are running an APRS program on the computer, you will probably want to disable it's position reporting capability, since the tracker board will take care of that. You will still be able to use the computer software to send APRS messages (or anything else) for that matter. In fact, the computer can be running virtually any KISS packet program… it need not be APRS.

Finally, X-Track won't work miracles. if you attempt to transmit from your computer program at the same time that your tracker is in the middle of sending a position report, X-Track will receive priority and the TNC will ignore the data from your computer. Similarly, you will not be able to receive packet data at the same time that you are transmitting (though your radio is probably not capable of this either!).