Argent Data Systems Tracker2 model T2-135 User's Manual

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Introduction

The Tracker2 fills the gap between a traditional terminal node controller (TNC) and a transmit-only APRS™ tracker, and adds features not found in either. While it may be used in KISS mode with a PC for general purpose packet radio communications, its feature set is focused on APRS™ applications, including position reporting, messaging, and telemetry.

Firmware updates and enhancements are published frequently, so check the Tracker2 website at http://www.argentdata.com/support/tracker2.html to make sure you have the latest firmware and documentation.

The T2-135 model is designed specifically for the Alinco DR135 radio, and takes the place of the optional EJ-41U TNC.

Major Features

APRS Tracker - The Tracker2 is first and foremost a full-featured APRS tracker. It works with GPS receivers using either the industry-standard NMEA format or the proprietary Garmin binary protocol. In addition to transmitting its own position, it can also decode incoming positions and plot them as waypoints on the screen of a supported GPS receiver.

KISS Mode - The KISS protocol defines an interface between a TNC and its host, typically a PC. This mode allows the Tracker2 to be used with PC-based APRS programs like Xastir, WinAPRS, and UI-View32. It can also be used with non-APRS applications, subject to the limitations of the Tracker2's transmit and receive buffers.

Digipeater - A digipeater acts as a simplex digital repeater, receiving packets and retransmitting them, typically on the same radio channel. The Tracker2's digipeater function is designed specifically for APRS use, and supports advanced features such as WIDEn-N operation, hop count limiting, duplicate elimination, preemptive digipeating, and multiple aliases.

Weather Station – The Tracker2 can be connected to several models of weather station, including the Peet Bros. Ultimeter 2000 series, Dallas/AAG 1-Wire Weather Station, and LaCrosse WS-2310 wireless weather station, to provide remote weather telemetry.
Command Console – While the Tracker2 comes with a Windows-based configuration program, it can also be configured, tuned, and upgraded through a traditional console interface with command syntax similar to that of the classic TNC2 and its clones. Keyboard-to-keyboard QSOs are supported through a 'converse' mode as well as APRS messaging commands.

Installation

Installation of the T2-135 is identical to that of the EJ-41U TNC described in the DR-135 manual.

1. Remove the radio's bottom panel, secured by four screws
2. Attach the included Dual Lock fastener to the metal VCO case
3. Remove the multi-colored cable from connector CN107
4. Plug it in to the connector on the bottom of the T2-135
5. Plug the short cable from the T2-135 into CN107
6. Carefully press the board into place on the VCO case
7. Replace the bottom panel

You may have to install the board slightly off-center, in the direction of the volume knob, to avoid hitting capacitors on the radio's main board with the connector on the bottom of the T2-135. Route the multi-colored cable carefully to avoid pinching it when you replace the bottom cover.

Connections

Once installed, the T2-135 board is connected to both the front-panel 'Data' jack and the rear-panel 9-pin d-sub connector. The 3.5mm data jack has the following pin-out:

Tip: Data in
Ring: Power out
Sleeve :   Ground

The power output may vary slightly, but is typically around 4.5 volts and is sufficient to power most 5-volt GPS receivers. Note that since this jack provides only a data input, it can't be used for waypoint output or Garmin binary mode operation.

The rear-panel connector is wired so that it may be connected to a PC using a standard straight-through serial cable. A null-modem adapter is needed to connect a GPS receiver having a typical serial cable. The pin-out of the d-sub connector is as follows:

2:              Data out
3:              Data in
5:              Ground
6:              Profile select
8:              1-wire data bus

Setup and Configuration

Once installed, you can use a PC to connect to the Tracker2 either the Windows configuration program (otwincfg.exe) or a terminal emulation program of your choice, such as Hyper-Terminal or SecureCRT. Note that the radio **must be in data mode** to power up the TNC board.

To use the command console, connect at the proper baud rate (4800 baud is the default) and press enter several times until you see a command prompt. To use the Windows configuration program, simply start the program, select the COM port, and set the radio to data mode.

The only setting absolutely required for normal APRS tracker operation is the callsign. The defaults for all other settings should be reasonable, but you should check on locally recommended settings, particularly for the digipeater path.

Command Reference

1WIREWX

Enables 1-Wire Weather Station mode. The TAI8515 weather station should be connected to pins 8 (data) and 5 (ground) of the rear-panel d-sub connector.

ABAUD 1200 | 2400 | 4800 | 9600 | 19200 | 38400 | 57600 | 115200

Sets baud rate for the primary serial port (rear-panel d-sub on the DR-135). Default is 4800 baud.

ALIAS <n> <callsign>

Sets digipeater alias for slot <n>. This will typically be a generic alias like 'WIDE'. No SSID is allowed in this field.

ALTITUDE on | off

Report altitude in position packet.

AMODE AUTO | GARMIN | KISS | WS2300

Sets mode for primary serial port. AUTO mode automatically selects between console mode, NMEA input/output, and Peet Bros weather input. GARMIN selects Garmin binary protocol input/output and forces the baud rate to 9600 baud. KISS selects the KISS host interface protocol. WS2300 selects La Crosse WS 2300 series weather input and forces the baud rate to 2400 baud.

AUTHLIST +/-<callsign>

Displays or changes the list of callsigns authorized for remote access. +callsign adds a callsign to the list, -callsign removes a callsign from the list, and 'none' erases the entire list.

AUTOBAUD on|off

 Enables automatic baud rate detection. When a baud rate mismatch is detected, the unit will attempt to automatically select the proper baud rate.

AUTOSAVE on|off

 When enabled, the tracker will save its last-known GPS position as a permanent fixed position if the GPS fix is lost. This may be used in the case of a temporary digipeater or weather station where a GPS receiver is installed only during setup and is removed to conserve power.

BBAUD 1200 | 2400 | 4800 | 9600 | 19200 | 38400 | 57600 | 115200

 Sets baud rate for the secondary serial port (front-panel data jack on the DR-135). Default is 4800 baud.

BEACON

 Causes an immediate transmission.

BMODE AUTO | GARMIN | KISS | WS2300

 Sets mode for secondary serial port. Functions like the AMODE command with the exception of console mode, which is not supported on the secondary serial port.

CALIBRATE low | high | alt | packet

 Calibration functions to set demodulator tuning and transmitter deviation. 'Low' transmits a 1200 hz tone, 'high' transmits a 2200 hz tone, 'alt' transmits alternating 1200 and 2200 hz tones, 'packet' sends a test packet repeatedly, and 'tune' displays a tuning indicator for adjustment of the demodulator. Use the '[' and ']' keys for coarse adjustment of the transmit audio level, and '-' and '+' for fine adjustment. Press any other key to exit calibration mode.

CDINVERT on|off

 Inverts carrier detect input polarity (not required for T2-135).

CLIMB on|off

 Enables rate-of-climb indication. Climb rate is reported in feet per minute immediately following the altitude. Available only in Garmin binary mode.

CNTRESET on|off

 Causes counter to reset with each transmission (not used in T2-135).

COMMENT <string>

 Sets beacon text / comment string.

COMPRESS on|off

 Enables Base91 compressed format for position transmissions.

CONFIG 1|2

Selects configuration profile to modify.

CONVERSE

In converse mode, text entered at the console is transmitted when the ENTER key is pressed. Hit CTRL-C to exit.

COUNTER on|off

Transmits counter value in status text (not used in T2-135).

CUSTSYM on|off

Enables the use of custom symbols if they have been uploaded to a compatible Garmin GPS receiver (using the Garmin xImage utility).

DAO on|off

Enables transmission of the !DAO! extended-precision construct. This provides an extra digit of precision over the standard APRS position format, but results in a longer packet and may not be supported by all APRS clients.

DEVLIST

Lists addresses of all connected 1-wire devices.

DIGI on|off

When enabled, the tracker will digipeat packets having its own callsign (MYCALL) in the next digipeater address field.

DIGIID <n> on|off

Enables callsign substitution for digipeater alias <n>. This should normally be enabled.

DISPLAY

Lists all configuration parameters.

DUPETIME <0-255> (seconds)

Sets digipeating duplicate suppression period.

FAHRENHT on|off

Reports temperatures in Fahrenheit when temperature output in the status text is enabled.

GPSDATA on|off

Reports GPS quality data in status text: Horizontal dilution of precision and number of satellites for NMEA mode, or estimated position error for Garmin mode.

HBAUD 1200|300

Selects transmission baud rate. This setting does not affect reception.

HEADERLN on|off

> Breaks MONITOR packets into two lines, with header and payload separated.

HOPLIMIT <n> <hops>

> For digipeater alias <n>, sets the maximum number of digipeater hops allowed. This can be used to limit excessively long paths that may cause network degradation.

INFO

> Displays general system and diagnostic data, including number of packets heard, packets digipeated, and frame check sequence errors detected.

INTERVAL <0-65535> (seconds)

> Sets the interval between automatic transmissions.

LOADFIRMW

> Loads firmware image using XMODEM protocol. The firmware file is provided in a binary (.bin) format. The tracker will reset when the firmware load is complete.

LVINHIBIT <0-255> (* 0.0196 volts)

> Not supported for T2-135.

MAXRANGE <0-255> (miles)

> When set to a non-zero value, waypoints will only be created for stations and objects within the specified range.

MONITOR on|off

> Displays incoming packets on the console.

MYCALL <callsign>

> Sets the unit's callsign.

NICE <n>

> When the tracker hears one of its own packets digipeated, it will skip the following <n> transmissions. This allows a faster beacon rate to be used in areas with poor coverage, without increasing the load on the network in areas with better coverage.

OUTPUT1 on|off

> Not supported for T2-135.

PATCH <hex string>

> The patch command allows direct modification of the contents of the Tracker2's flash memory. This command should only be used as directed by the manufacturer. Improper use of this command may render the Tracker2 inoperable.

POSITION <hhmm.mmx hhhmm.mmx> | GPS

> Sets fixed position or enable GPS. Position must be entered in degrees and decimal minutes, including leading zeros. Setting position to 'GPS' reverts to GPS tracking mode. Example: POSITION 4851.49N 00217.66E

POWER on|off|<0-255> (seconds)

> Not supported for T2-135.

PREEMPT <n> on|off

> Enables digipeater preemption for alias <n>. If preemption is enabled, packets will be digipeated on this alias even if it isn't the next address in the packet's digipeater list.

PTTINPUT on|off

> Not supported for T2-135.

PATH <digipeater list>

> Comma-separated digipeater path list.

PULSE <0-255>

> Not supported for T2-135.

QUIET <0-255>

> Time channel must be free before transmission can occur.

REARM <0-255>

> Not supported for T2-135.

REPLY <message>

> Sends a text message to the last person who sent a message addressed to this unit's callsign

RETRIES <0-255>

> Number of times to retransmit an outgoing message.

RETRYTIME <0-255> (seconds)

> Time between message retry attempts - interval increases by this value with each transmission.

REQALL on|off

> Require all configuration switch parameters to be met before switching profiles.

RESET

> Perform software reset.

RING on|off

> Sends a bell character whenever an incoming message arrives.

SEND <callsign> <message>

> Sends a text message to the designated recipient.

SHAREDPTT on|off

> Not support for T2-135.

SLOT <0-65535>

> Time slot for transmission (if TIMESLOT is on).

SMARTBCON <low speed> <high speed> <low rate> <angle> <time>

> Configures SmartBeaconing. The SmartBeaconing algorithm allows the tracker to operate more efficiently by changing how often it transmits depending on its speed and turn rate.
>
> When stopped or moving at a speed below the low speed setting, the tracker will transmit at a fixed rate determined by the lower rate setting. Above the specified high-speed threshold, the higher rate setting is used. Between these two extremes, the interval varies between the low rate and high rate (specified separately with the INTERVAL command) depending on the speed.
>
> The <low speed> and <high speed> settings define these two limits. For storage efficiency, the speeds are represented in units of 32 centimeters/second. To convert from miles per hour, multiply by 1.397. To convert from kilometers per hour, divide by 1.152.

Setting	MPH	Km/h
5	3.6	5.7
10	7.2	11.5
15	10.7	17
25	17.9	29
40	28.6	46
60	43	69
80	57	92
100	71	115

> <low rate> and <high rate> are specified in seconds. <angle> indicates the change of direction, in degrees, that will cause an immediate transmission. <time> specifies, in seconds, the minimum time required between transmissions, regardless of speed or turns.

SQUAWK <0-255> (seconds)

> Transmits alternating tones for specified number of seconds. May be used for testing or direction finding.

SWDCD on|off

Enable software data carrier detect mode. Forced on for T2-135.

STATUS <0-255>

Interval between status packets. If 0, status text is sent as part of the position packet.

SYMBOL <1-2 characters>

APRS symbol character, optionally preceeded by symbol table or overlay identifier.

TELEMETRY on|off

Enable transmission of telemetry packets

TEMP on|off

Not supported for T2-135.

TEMPADJ <-128 to 127> (degrees C)

Not supported for T2-135.

TIMEHMS on|off

Sets timestamp mode to hour/minute/second when enabled. Default is day/hour/minute. Applies only to NMEA mode – hour/minute/second format is always used in Garmin binary mode.

TIMESLOT on|off

Force position packets to be transmitted only in designated time slots, expressed as the number of seconds from the start of the hour to the first transmission.

TIMESTAMP on|off

Report time information in the position packet.

TXDELAY <0-255>

Delay between start of transmission and start of data.

TXLEVEL <1-255>

Sets transmission audio level.

TXNOFIX on|off

Allows transmission of last position if GPS fix is lost for more than 30 seconds.

TXONCHG on|off

Causes a transmission when switching configuration profiles.

USEALIAS <n> on|off

Enables digipeating for alias <n>.

VELOCITY on|off

Enables transmission of velocity (course and speed) information in the position packet.

VERSION

Displays firmware version number.

VOLTAGE on|off

Not supported for T2-135.

WAYPOINTS on|off

Enables output of waypoints from received positions

WPTLEN <6-9>

Sets maximum waypoint name length.

WXINFO

Displays weather information from attached station.