

# Tracker2

**Scott Miller, N1VG**  
**2006 ARRL/TAPR DCC**



# Successor to the OpenTracker

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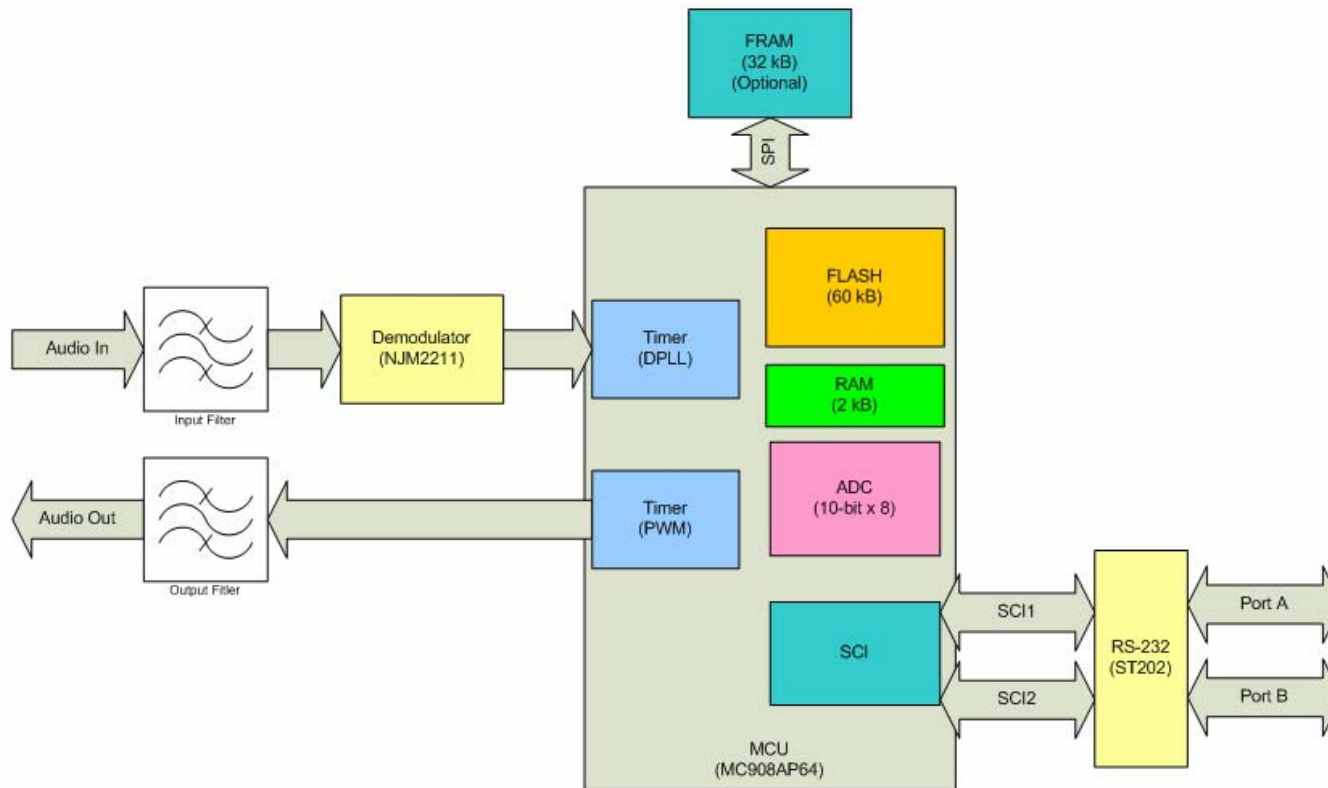
- **Still Open Source**
  - **GPL instead of BSD license**
  - **Name changed to avoid confusion**
- **Larger processor**
  - **8 times more Flash,  
10 times more RAM**
- **Receive capability**

# Tracker2 Design Goals

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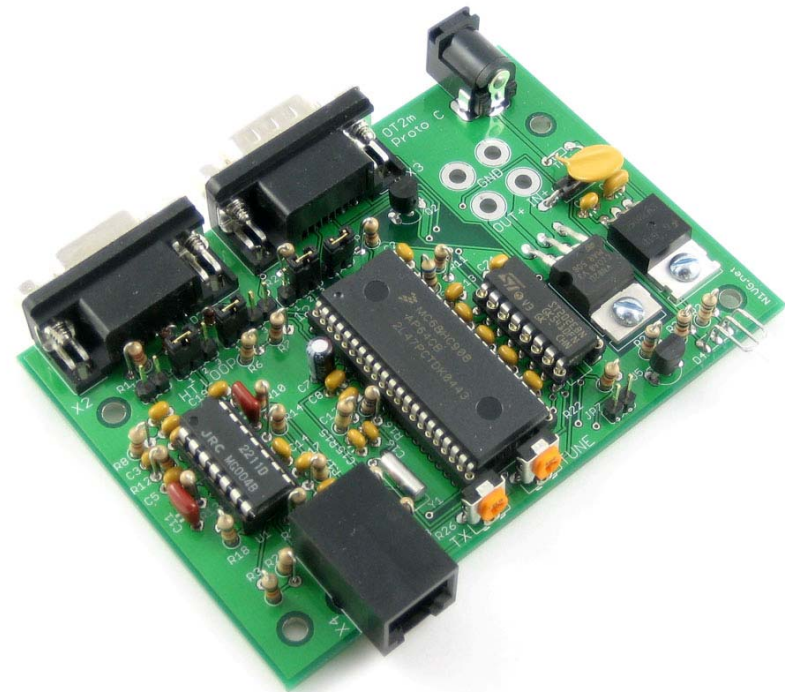
- **Low cost**
- **Readily available components**
- **Flexible**
- **APRS-oriented feature set**
- **Open source firmware**

# Block Diagram



# Hardware

- **Tracker2 model OT2m**
  - Temperature and voltage sensors
  - 20-amp high side switch
  - True RS-232 interface
  - RJ11 accessory jack
  - Available as a kit



# Hardware

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- 'M'-type case
  - Same as OpenTracker OT1m



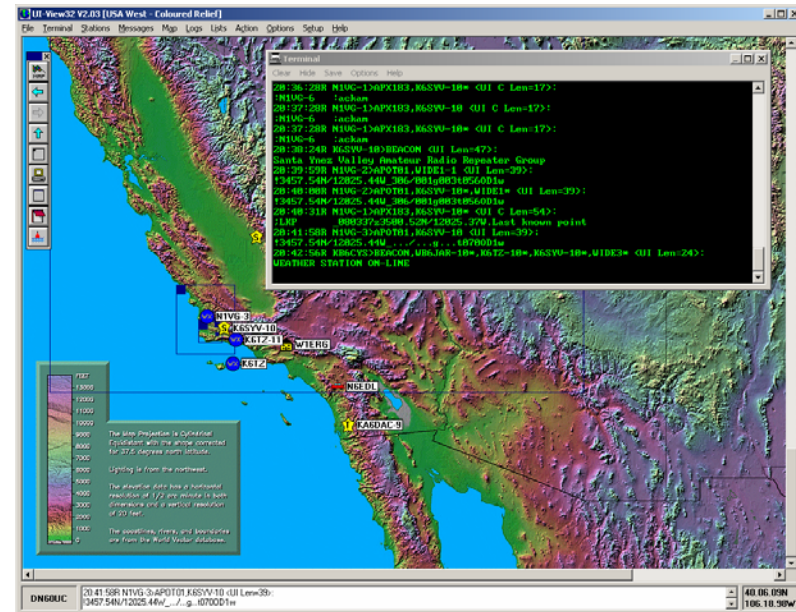
# Tracking

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- **All OpenTracker features**
  - **SmartBeaconing™, timeslotting, low voltage inhibit, compressed format, telemetry, profile switching, relay control**
  - **On-board temperature and voltage sensors**
- **Garmin binary protocol support**
- **Responds to ?APRS? queries**

# KISS Mode

- Use with most APRS applications
- Works concurrently with digipeating, tracking, etc.





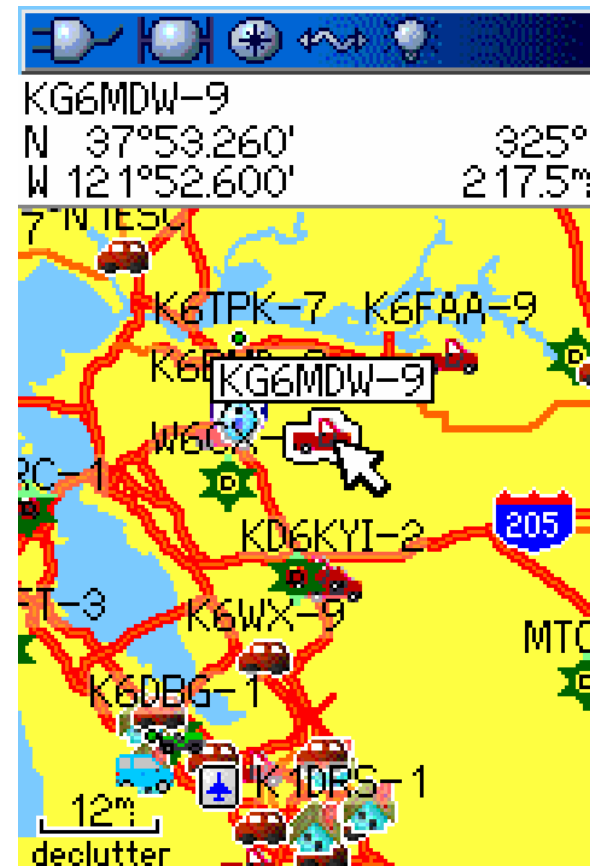
# Waypoint Output

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- **Decodes (almost) all APRS positions**
  - Standard, Mic-E, Base91, NMEA (four kinds)
  - Stations, Objects, Items, Third Party
- **Outputs waypoints to GPS receiver**
  - NMEA (\$GPWPL)
  - Magellan (\$PMGNWPL)
  - Garmin binary
- **Optional range limit**
- **Intelligent name truncating**

# Waypoint Output

- **Symbol translation**
- **Custom symbols supported on some Garmin models**
- **Additional symbol translation table for old units with only 16 icons**



# Waypoint Output

- Comment text preserved to limit of GPS receiver
- Altitude field extracted and displayed as elevation

| Elevation        |     | Depth   |  |
|------------------|-----|---------|--|
| 3248'            |     | 0'      |  |
| From Map Pointer |     |         |  |
| 140°             |     | 239.87m |  |
| Delete           | Map | Go To   |  |

# Waypoint Truncation

- Optionally truncate names to specified size
- Truncation is automatic in Garmin mode
- Avoids overwriting callsigns with multiple SSIDs

```

WAYPOINT
-----
KFGHJS 🚗
N 34°08.460'
W 118°15.620'
KFGHJS@ARRL.NET
-----
REF:  -----
   BRG      DST
   100°     118%
-----
RENAME? NEW?
DELETE? NO

```



```

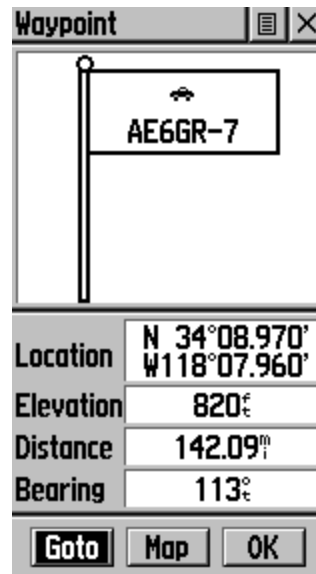
WAYPOINT
-----
6HJS14 🚗
N 34°07.920'
W 118°09.060'
KFGHJS@ARRL.NET
-----
REF:  -----
   BRG      DST
   099°     123%
-----
RENAME? NEW?
DELETE? NO

```

# Garmin Support



GPSmap 60CS



eTrex Vista



GPS 5

- Most models and waypoint formats supported
- Additional formats will be added in future updates

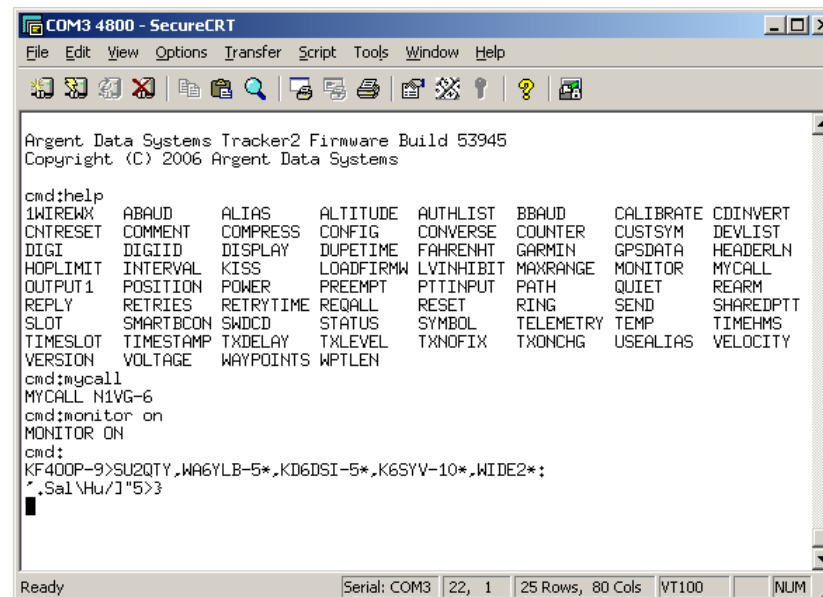
# Digipeater

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- **WIDEn-N, TRACEn-N support**
- **Up to eight aliases**
- **Hop count limiting**
- **Duplicate elimination**
- **Optional preemption**

# Command Console

- TNC2-style serial console
- APRS messaging
- XMODEM firmware upload



```

COM3 4800 - SecureCRT
File Edit View Options Transfer Script Tools Window Help

Argent Data Systems Tracker2 Firmware Build 53945
Copyright (C) 2006 Argent Data Systems

cmd:help
1WIREHX  ABAUD  ALIAS  ALTITUDE  AUTHLIST  BBAUD  CALIBRATE  CDINVERT
CNTRESET COMMENT COMPRESS CONFIG  CONVERSE  COUNTER  CUSTSYM  DEVLST
DIGI     DIGIID DISPLAY  DUPETIME  FAHRENHT  GARMIN  GPSDATA  HEADERLN
HOPLIMIT INTERVAL  KISS     LOADFIRMW LVINHIBIT MAXRANGE  MONITOR  MYCALL
OUTPUT1  POSITION  POWER   PREEMPT   PTTINPUT  PATH    QUIET     REARM
REPLY    RETRIES  RETRYTIME REQALL   RESET     RING    SEND     SHAREDPTT
SLOT     SMARTBCON SWDCD   STATUS   SYMBOL   TELEMETRY TEMP    TIMEHMS
TIMESLOT TIMESTAMP TXDELAY TXLEVEL  TXNOFIX  TXONCHG USEALIAS VELOCITY
VERSION  VOLTAGE  WAYPOINTS WPTLEN

cmd:mycall
MYCALL N1VG-6

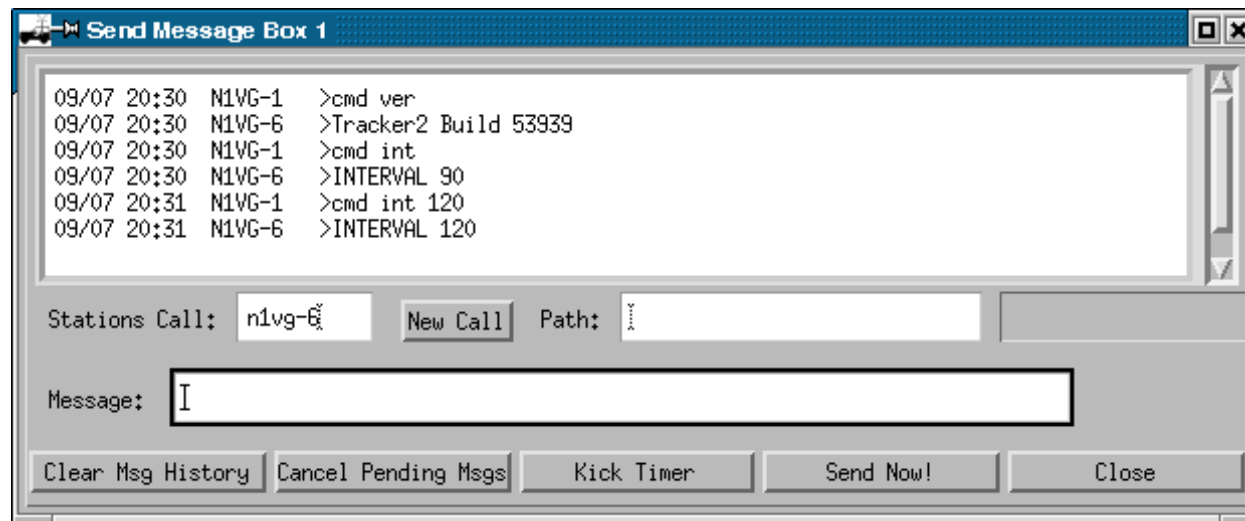
cmd:monitor on
MONITOR ON

cmd:
KF400P-9>SU2QTY ,WA6YLB-5* ,KD6DSI-5* ,K6SYV-10* ,WIDE2* :
".Sal\Hu/J"5>3

```

# Remote Access

- Use most console command remotely
- Can be used through IGates
- Multiple authentication options





# T2-135 Board

- Installs in place of EJ41U TNC
- Front panel data jack for GPS input



# T2-135 Installed



# Upcoming Features

- **Scripting language**
  - **Similar to PLC ladder logic**
  - **Remotely editable**

| <b>Inputs</b>                       | <b>Outputs</b>          |
|-------------------------------------|-------------------------|
| <b>Digital I/O</b>                  | <b>Digital I/O</b>      |
| <b>Messages</b>                     | <b>Console Commands</b> |
| <b>Timers</b>                       | <b>1-wire bus</b>       |
| <b>Proximity (point or station)</b> | <b>Power switch</b>     |
| <b>Velocity, Altitude, etc.</b>     | <b>Counters</b>         |

# Upcoming Features

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- **Garmin database emulation**
  - **Stores incoming positions in memory**
  - **Appears as a Garmin GPS receiver**
  - **Transfers positions in response to waypoint download command**
  - **Allows non-APRS mapping programs to access near real-time APRS data**

# Upcoming Features

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- **Garmin waypoint monitoring**
  - Periodically polls attached **Garmin GPS**
  - Transmits changed waypoints as **objects**
  - Acts as **Rino to APRS gateway**

# Upcoming Features

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- **Antenna tracking**
  - **Sends commands to rotor controller**
  - **Set direction manually or track a specified APRS station**
  - **Use for ATV downlink from aircraft, balloons**

# Project Status

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- **First hardware tested last November**
- **Currently on third beta test revision**
- **Approximately 50 units operational**
- **Documentation in progress**

