

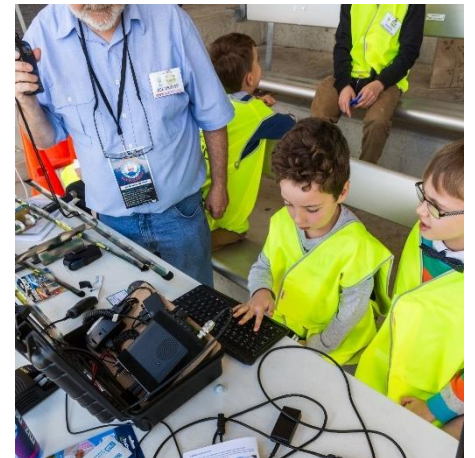
2017

APRS on HF

By

Julie VK3FOWL and Joe VK3YSP

APRS at Hahndorf Oval



APRS Network



- RF User
- Portable User
- Mobile User
- Weather Station
- Fill-In Digipeater
- Wide Digipeater
- IGate
- APRS Database
- Internet User

Automatic Packet Reporting System

- For broadcasting location, telemetry data, text
- Over both RF and Internet networks
- Nodes are identified by Callsign-SSID format
- Messages are unnumbered AX.25 datagrams
- Each node can store and forward messages
- The message “Path” contains a routing list
- Digipeaters modify Path to avert “ping-pong”

APRS Secondary Station ID (SSID)

- 0 (No SSID) Home Station
- 1 Digipeater, or Home Station running a Fill-In Digi,
- 2 Digipeater [#2] on 70CM
- 3 Digipeater [#3]
- 4 HF to VHF Gateway
- 5 IGate (Dedicated system, not home station)
- 6 Operation via Satellite
- 7 Kenwood D7 Handheld
- 8 Secondary Mobile usage (also Maritime vessels) (VHF / UHF)
- 9 Mobiles (VHF / UHF)
- 10 Operation via Internet Only (No RF capability)
- 11 is for APRStouch-tone users (also high altitude balloons)
- 12 Portable Units such as Laptops, Camp Sites etc
- 13
- 14 Interstate Truckers
- 15 Operation via HF**

APRS Paths

- Path is a routing list: VK3ABC-1, VK3XYZ-1, etc
- Can use callsign aliases for special nodes: WIDE1-1, WIDE2-1
- The SSID of aliases sets the number of hops allowed
- The path is modified by each digipeater
- The SSID is decremented in each hop, but -0 is omitted.
- An asterisk (*) signifies when a callsign or alias was used
- Example:
 - WIDE1-1, WIDE2-2 (Original path)
 - <callsign1>*, WIDE2-2 (First hop)
 - <callsign1>, <callsign2>, WIDE2-1* (Second hop)
 - <callsign1>, <callsign2>, <callsign3>* (Third hop)

APRS Rules for HF

- No Digipeating on HF!
- Most receiving Gateways will route to APRS-IS
- So, Path = WIDE1-1 is sufficient
- Use 300 Baud, 200Hz FSK, 1600Hz/1800Hz
- For SSB must be spot on frequency
- LSB & USB both work because AX.25 is NRZI
- Avoid any ALC action on TX to limit distortion
- Beacon time \geq 10 minutes: Permits up to 70 users
- Good luck – Because APRS has no ACK or FEC

APRS Frequencies and Gateways

40m	7048.600kHz LSB	
	VK2IO-4	Sydney Primary Net Station (also 7.047.17 LSB)
	VK7HSE-4	Kingston Secondary Net Station
30m	10147.600kHz USB	
	VK1IAN-1	Canberra RX Only
	VK2ACW-1	Orange
	VK2HL-1	Sydney Part Time RX Only
	VK2IO-4	Sydney Offline
	VK2OL-5	Sydney Full Time RX Only
	VK2ZSZ-4	Queanbeyan Full Time RX Only
	VK2ZZM-5	Sydney Full Time RX Only
	VK3MY-4	Melbourne Primary Net station
	VK4AB-4	Ipswich Full Time
	VK4DMI-4	Pine Rivers Secondary Net station
	VK4MQ-5	Toowoomba Full Time RX Only
	VK4RM-4	Mackay Full Time
	VK4UN-4	Tewantin Full Time
	VK5RR-4	Waikerie
	VK6LD-4	Perth Full Time
	VK7ZRO-4	Bothwell Full Time
	VK8KMD-10	Alice Springs
	ZL3GR-4	Tauranga RX Only
20m	14103.00kHz LSB	
	VK2IO-4	Sydney Offline

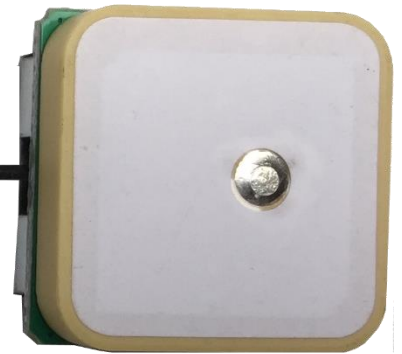
APRS TNC With GPS



Argent Data Systems
T3 Mini TNC



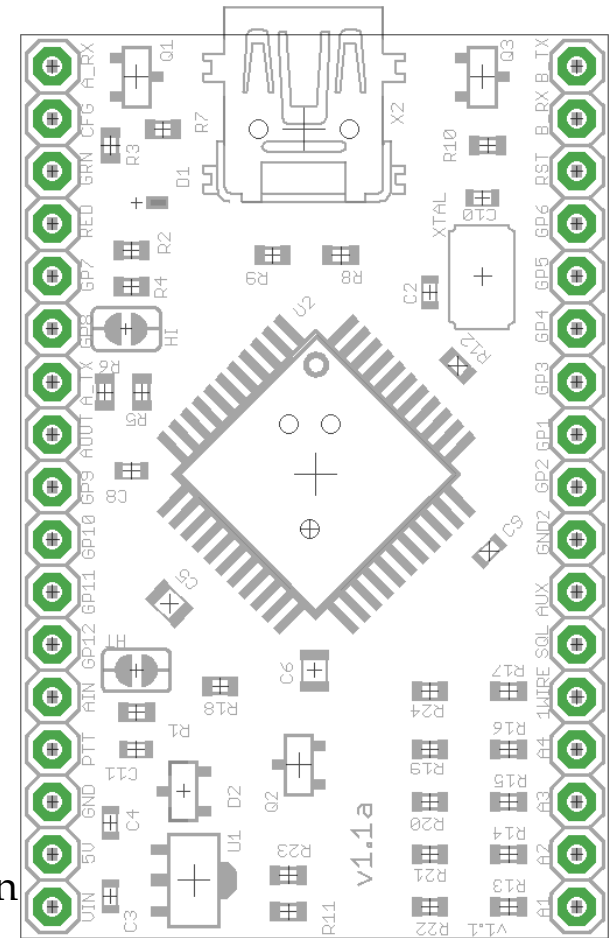
Ublox NEO-6M
GPS Receiver



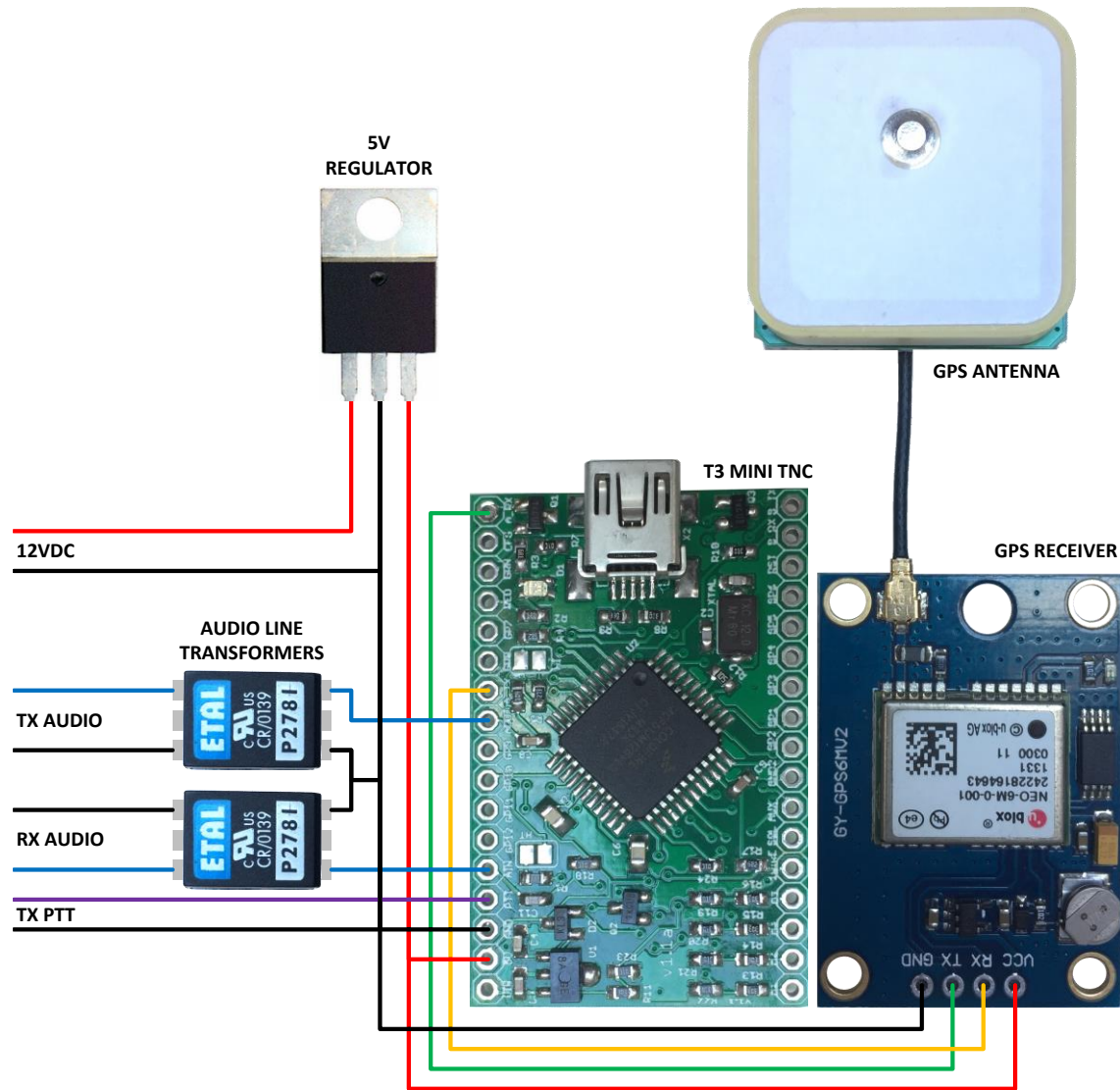
GPS Patch Antenna

T3 Mini TNC Pin Assignments

A1-A4	Analog inputs 1-4 (max voltage 4xVdd)
1W	Dallas 1-Wire data bus
SQL	Squelch input
AUX	Auxiliary I/O pin
GND	Ground
RST	Reset (active low)
B-RX	Serial port B input
B-TX	Serial port B output
A-RX	Serial port A input
A-TX	Serial port A output
CFG	Configuration select
AOUT	Audio output (to radio)
AIN	Audio input (from radio)
GRN	Green LED output for external LED
RED	Red LED output for external LED
PTT	Push-to-talk (open collector)
5V	Regulator output or Vdd input, 5v max, 2.8v min
VIN	Unregulated supply voltage, 6v to 28v
GP1-GP12	General purpose digital input/output pins

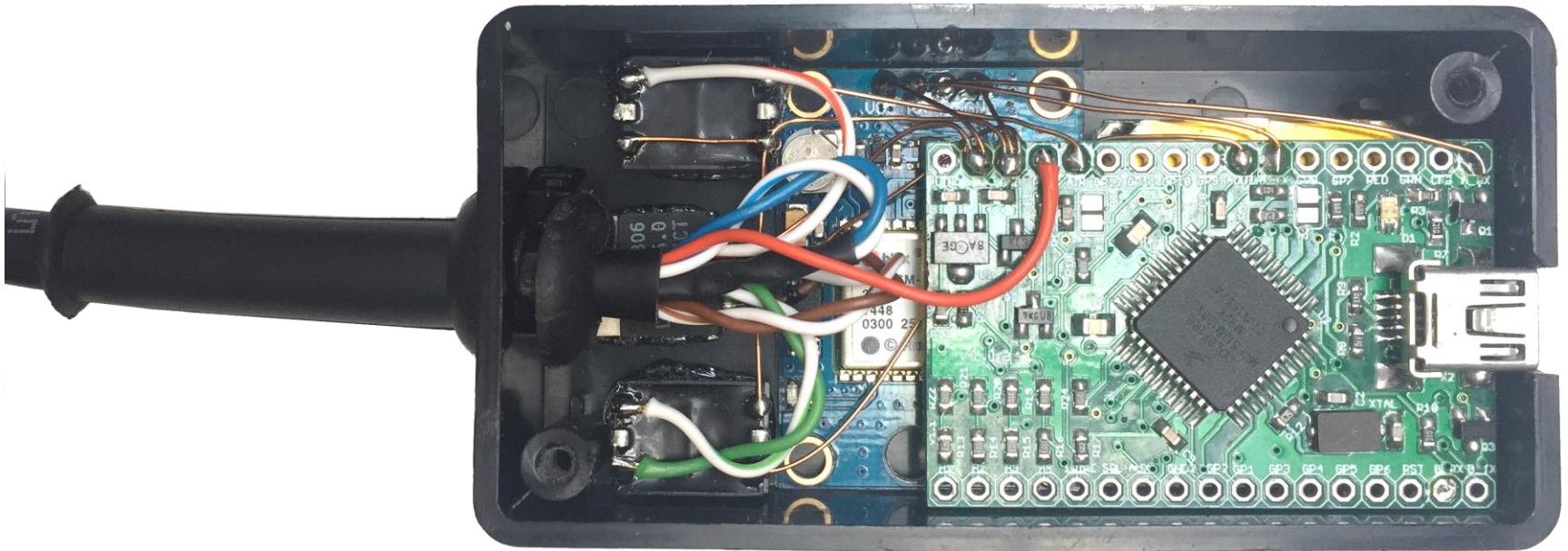


Pictorial Schematic Diagram



APRS TNC Assembly

- Hammond H9004 ABS Enclosure
- Transformers and regulator glued to base
- Sleeved grommet for CAT-5 cable



APRS TNC Enclosure

- APRS dongle needs a clear view of the sky
- Starts transmitting when 3D GPS fix is valid



Codan 2110 Manpack Radio Cable



TNC Configuration Tool

OpenTracker Configuration

Profile 1 | Profile 2 | Firmware Build 57130

Callsign ☐ 1200 Baud ☒ 300 Baud

Path ☐ Alternate Paths

Symbol Table Code

Temp. Adjust °C Quiet Time

Text

In ☒ Comment ☐ Status Every Transmissions

Transmission Control

TX Every Sec Skip if heard

☐ Use SmartBeaconing

☐ Use PTT Input

☐ Enable timeslotting Timeslot

Tuning/Diagnostics

Profile Switching

Access List

Digi Config

Script Editor

Reporting Options

☐ Altitude ☐ DAO

☐ Course/Speed

☐ Time ☒ DHM ☐ HMS

☐ GPS Quality

☐ Temperature ☐ °F ☐ Ext

☐ Voltage

☐ Compressed

☐ Telemetry every

Serial Ports

Baud Rate Mode

A

B

☐ Autobaud ☐ USB KISS ☐ NMEA P/T

Load Firmware From

Position

☒ GPS ☐ Fixed ☐ Save

☐ Don't require GPS fix

Waypoint Output

☐ Enable

Characters

☐ Use Custom Symbols

☐ Limit To Miles

Counter

☐ Enable

☐ Reset on Transmit

debounce (mSec)

Power Control

☐ Enable

☐ Active Low

delay (seconds)

Radio Interface

min TX Delay (mSec)

TX Audio Level

☐ HT PTT

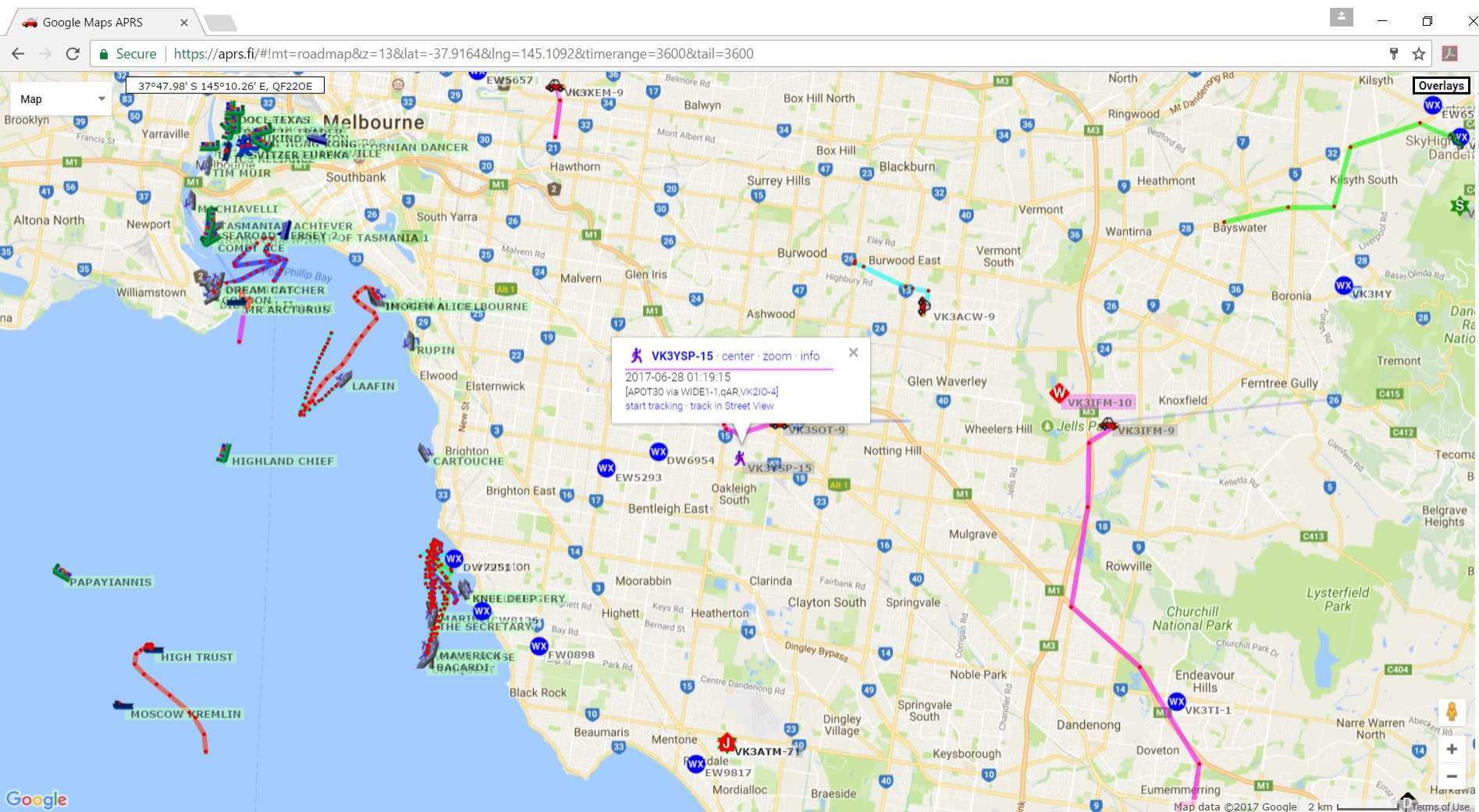
☐ Don't transmit if supply < Volts

☐ Invert Carrier Detect ☒ Software DCD

☐ No PTT out on PTT in ☐ External Squelch

☒ Metric ☐ English

APRS Display



APRS Info

Station info for VK3YSP-1

← → ↻ Secure | https://aprs.fi/info/?call=VK3YSP-15

Station info - map view · info · telemetry · weather · raw · status · beacons · messages · bulletins · browse · moving · my account

Callsign, ship name or locator: Completed generating statistics (took 0.021 s).

It is possible to search using wildcards (*) after a prefix. Example: OH*

Satellite View My House - HD Satellite Image You House

Enter Any Place For Satellite Maps Find Satellite View Of My House

Wellington NZ Tourism

Resources, Maps, Weather Forecast & More. Official Wellington Website. wellingtonnz.com/Routes

View Navigation

Step 1- Click Here Step 2-Download Step 3- Get Maps w/ MyTransitGuide mytransitguide.com

TAFE Courses 2017 - Open Colleges Australia

Find Flexible Courses You Can Study Anytime & Anywhere. Enquire Today!

APRS station **VK3YSP-15**  - show graphs

Location:

37°54.45' S 145°05.53' E - locator **QF22NC12BE** - [show map](#) - [static map](#)
1.4 miles South bearing 187° from [Chadstone, Monash, Victoria, Australia](#) [?]
2.9 miles South bearing 194° from [Ashwood, Monash, Victoria, Australia](#)
9.5 miles Southeast bearing 133° from [Melbourne, Melbourne, Victoria, Australia](#)
43.1 miles East bearing 68° from [Geelong, Greater Geelong, Victoria, Australia](#)

Last position:

2017-06-28 01:24:20 CDT (28s ago)
2017-06-28 16:24:20 AEST local time at Chadstone, Australia [?]

Device:

Argent Data Systems: OpenTracker (tracker)

Last path:

VK3YSP-15>APOT30 via WIDE1-1,qAR,VK2IO-4 **Good path!**

Positions stored: 31

Packet rate:



104 seconds between packets on average during 731 seconds.

Other SSIDs:

VK3YSP-10 



Stations near current position of **VK3YSP-15** - [show more](#)

callsign	distance	last heard - CDT	callsign	distance	last heard - CDT
CG152H 	1.1 miles 179°	2017-06-16 22:19:37	VK3SIR-10 	1.4 miles 282°	2017-06-20 16:57:25
DW6954 	1.6 miles 276°	2017-06-28 01:11:03	FW0862 	1.8 miles 343°	2017-06-28 01:24:46
VK3AJO-9 	2.4 miles 115°	2017-06-27 23:13:18	VK3BQ-5 	2.5 miles 32°	2017-06-25 06:16:49
EW5293 	2.6 miles 266°	2017-06-28 01:22:37	VK3MV-9 	3.3 miles 312°	2017-06-12 00:39:45

Links

- <http://www.sarcnet.org/projects.html>
- <http://www.aprs.org>
- <http://www.aprs.net.au>
- <http://info.aprs.net>
- <http://aprs.fi>
- <https://www.argentdata.com>