



MPT1327 Trunked Radio Direct Connect GPS

Issue No.: AN015-01

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General

This note details the modification required to Tait T2030, T2035 and T2040 trunked radios to handle NMEA-0183 GPS data streams. The GPS receiver is connected to the T2000 trunked radio via a single port Uart, the GPS data being transmitted as an NPD data message.

Mobile trunked radio units must be fitted with a T2000-A66 single port Uart and require special radio firmware to handle the GPS data. Radios fitted with the special GPS firmware behave as normal trunked voice radios and are also able to transmit GPS positional data on request. A T2000 trunked radio fitted with GPS firmware will not respond to MAP 27 commands.

Note TaitTrak polling software is required to interrogate the mobile units. The Tait T2000 fixed trunked radio, interfaced to a polling computer, must be fitted with standard firmware and programmed for MAP 27 operation. A mobile radio with special GPS firmware cannot be used as a base polling radio.

Parts

The parts required are as follows:

Part Number	Description	Supplier	Qty.
T2000-A66	Single port UART Kit (some radios may already have this item installed)	Tait	1

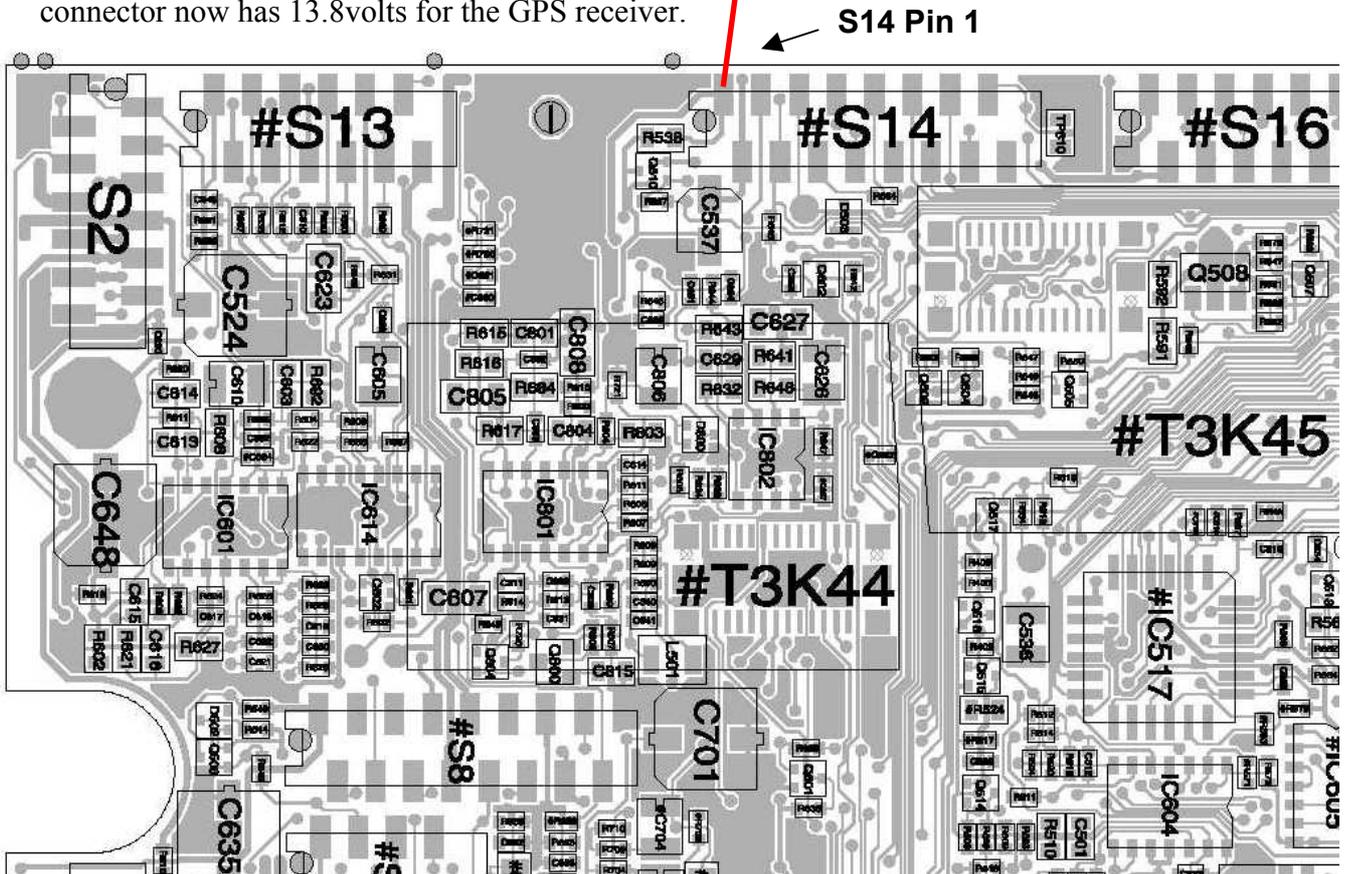
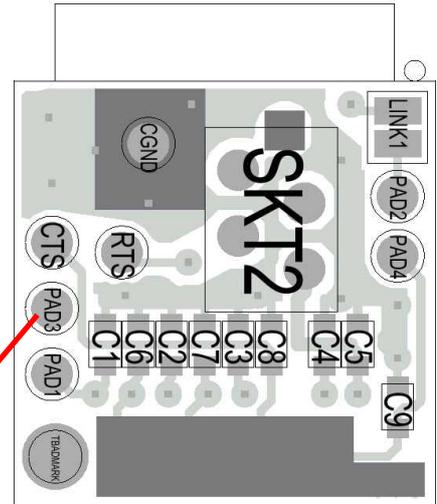
9 Way D Range Board

Procedure

1. Read the radio program and save the file.
2. Install the T2000-A66 Single Port UART Kit by following the instructions provided with the kit.

Wiring Modification

3. To provide power to the GPS receiver it is necessary to connect 13.8 volts to the 9 way D connector supplied with the T2000-A66. Solder a suitable length of red wire from Pad 3 of the rear 9 way D-Range board. Pad 3 is connected to Pin 6 of the 9 way D range connector. Solder the other end of the wire to pad 'S14 Pad 1' (13.8 switched volts) on the Control Board. Pin 6 of the rear D range connector now has 13.8volts for the GPS receiver.



T2000 Control Board – S14 Position is the Same for all T2000 Trunked Models

Upgrading the radio firmware

4. Install special radio Firmware to handle GPS data. Contact Tait Electronics to confirm the current version of firmware for trunked GPS radios.

Conclusion

5. Close and secure the control board PCB, ensuring the ribbon cable connectors are secure.
6. Replace the radio top cover, taking care to ensure the wiring to the rear D range connector and flexible ribbon cable is not fouled by the cover or securing screws.
7. Modify the radio program for GPS operation as detailed in the following pages.
8. Reprogram the radio with the modified program file.

Specifications

MAP27 and Line Interface 'Enabled'

The screenshot shows a software window titled 'Specifications' with a 'Print' button in the top left. The window contains the following configuration fields:

Radio Type	2040-3XX (136-174 MHz)
CBSN	Not Set
Configuration	Not Set
ESN	
Manufacturer's Code	0
Model Code	2
Serial Number	0
Chassis Serial Number	0
Handsfree Interface	Disabled
Map27 Interface	Enabled
Line Interface	Enabled
Signalling Interface	Disabled
Network Name	BISCOM
Network One State	Enabled
Network Two State	Disabled
This Database Number	1

Unit - Alert Parameters

Tone on speech Enabled - all other tone alerts Disabled

Parameter	Value
Tone On Emergency Calls	Disabled
Tone On Speech Calls	Enabled
Tone On Data Calls	Disabled
Tone On Group Calls	Disabled
Tone On Individual Calls	Disabled
Tone On Include Calls	Disabled
Tone On Status Calls	Disabled
External Alert	Disabled
Delay Time	0 seconds
Active Time	10 seconds
Cadence	Steady
Alert On All Calls	Disabled
or	
Alert On Emergency Calls	Disabled
Alert On Speech Calls	Disabled
Alert On Data Calls	Disabled
Alert On Include Calls	Disabled
Alert On Status Calls	Disabled
Alert On Group Calls	Disabled
Alert On Individual Calls	Disabled

Unit - Dialling Facilities

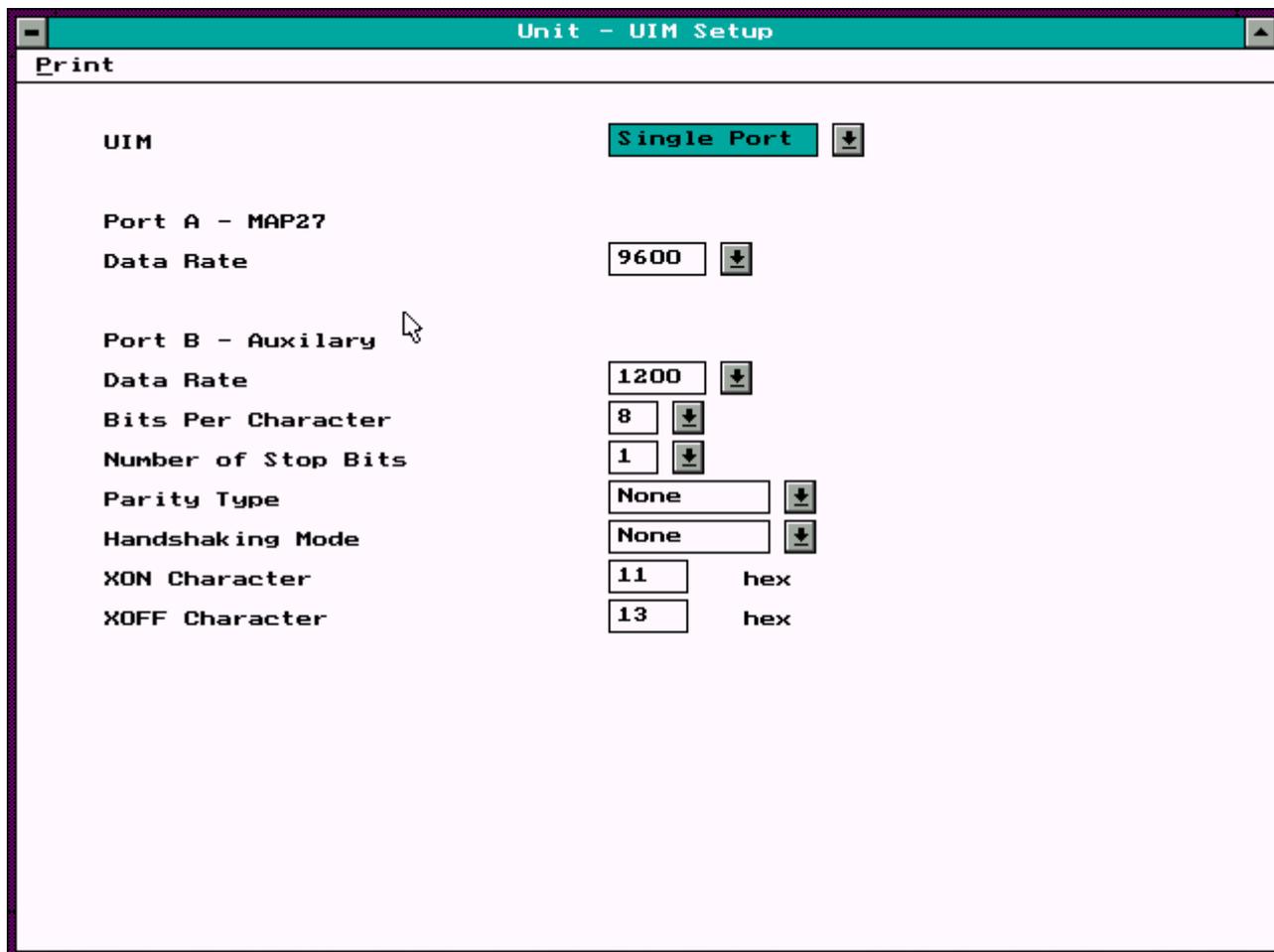
Data calls 'Enabled'

The screenshot shows a window titled "Unit - Dialling Facilities" with a "Print" button in the top left. The window contains a list of call-related settings, each with a text input field and a dropdown arrow button. The settings and their values are as follows:

Setting	Value
PABX Calls	Enabled
PSTN Calls	Enabled
Interfleet Calls	Enabled
Interfleet Group Calls	Enabled
ALLI Calls	Disabled
Network Operator Service Calls	Disabled
Abbreviated Dialling	Enabled
Abbreviated Dialling Limit	49
Technician Calls	Disabled
Status Calls	Enabled
Data Calls	Enabled
Divert Own Calls	Enabled
Divert Third Party Calls	Disabled
Don't Disturb	Enabled
Direct Despatcher Calls	Enabled

Unit - UIM Setup

Set to 'Single Port' and Data Rate to '9600'



Unit - Data Parameters

Copy as detailed below

Unit - Data Parameters

Print

Short Data Messages Enabled

SDM Timers: TGI seconds TGG seconds

Incoming Call Queued Tones Enabled

SDM Despatcher Call String

Tait Data Protocol Enabled

Number Of TDP Retries

TDP Timers: WAITACK seconds DCI ms AWAIT seconds BWAIT seconds

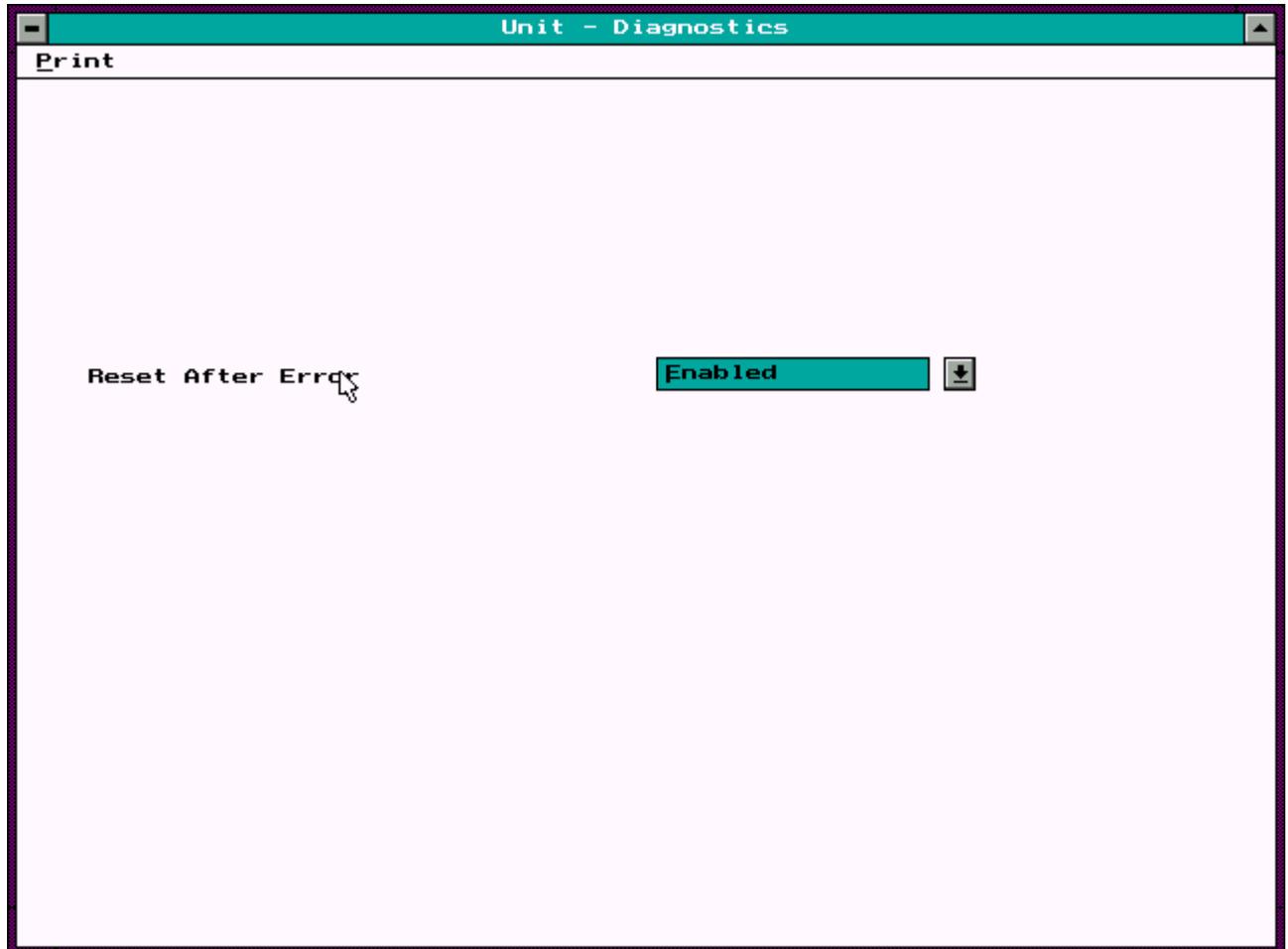
Lead In Tone ms

Lead Out Tone ms

SYND SEQUENCE

Unit - Diagnostics

Reset After Error to 'Enabled'



T2002-A00 GPS Specifications

The following specifications refer to the Talon unit supplied under Tait Part No T2002-A00

GENERAL	12 Parallel channels integrated receiver module
Colour	White or Black
RF Input	1575.42MHz (GPS L1); At a level between -130dBW and -163dBW
RF Bumout Level	-10dBW
DGPS	Accepts RTCM SC-104 Type1, Type2 and Type9 message.
Datum	188 built-in + 5 user definable. WGS84 default.
Real Time Clock	Onboard battery back up

PERFORMANCE

Velocity	2125mph (950m/s)
Acceleration	4Gs (39.2m/s/s)
Position Accuracy	25 meters CEP (S/A off)
Time To First Fix	
Normal Operation	48 sec typical; 60 sec 90% probable
Cold Start	120 sec typical; 150 sec 90% probable.
Re-acquisition Time	< 10 -sec blockage: 2 sec typical

INTERFACES

Supply Voltage	4.5~16 VDC, suitable for direct connection to an automotive 12 V supply.
Current Consumption	55mA typ @ 12 VDC; 125mA typ @ 5 VDC
Input Message	
NMEA-0183 ver 2.01	PRWIBIT, PRWILOG, PRWINIT, PRWIPRO, xxGPQ
Or Rockwell Binary	
Output Message	
NMEA-0183 ver 2.01	GGA, GSA, GSV, RMC, VTG PRWIRID, PRWIBIT, PRWIZCH Sentences. Updated once per second.
Or Rockwell Binary	

PHYSICAL

Operating Temperature	0°deg;C to 60°deg;C
Storage Temperature	-20°deg;C to +80°deg;C
Humidity	5% to 95% non-condensing

T2002-A00 Tait Talon GPS Receiver Termination

The cable from the GPS receiver is terminated with a DB-9 male connector. Termination details are as follows:

Radio DB9 (Female)	GPS DB9 (Male)	Cable Details	Function
Pin 5	Pin 5	Shield(Gnd)	Signal Gnd
Pin 6	Pin 6	Red	+13.8 V
Pin 3	Pin 3	White	GPS Tx Data
Pin 2	Pin 2	Yellow	GPS Rx Data