

TECHNICAL NOTE TN-1063-AN-d
**Tait AVL Radio &
SmartTRAC Workstation Configuration
Guide**

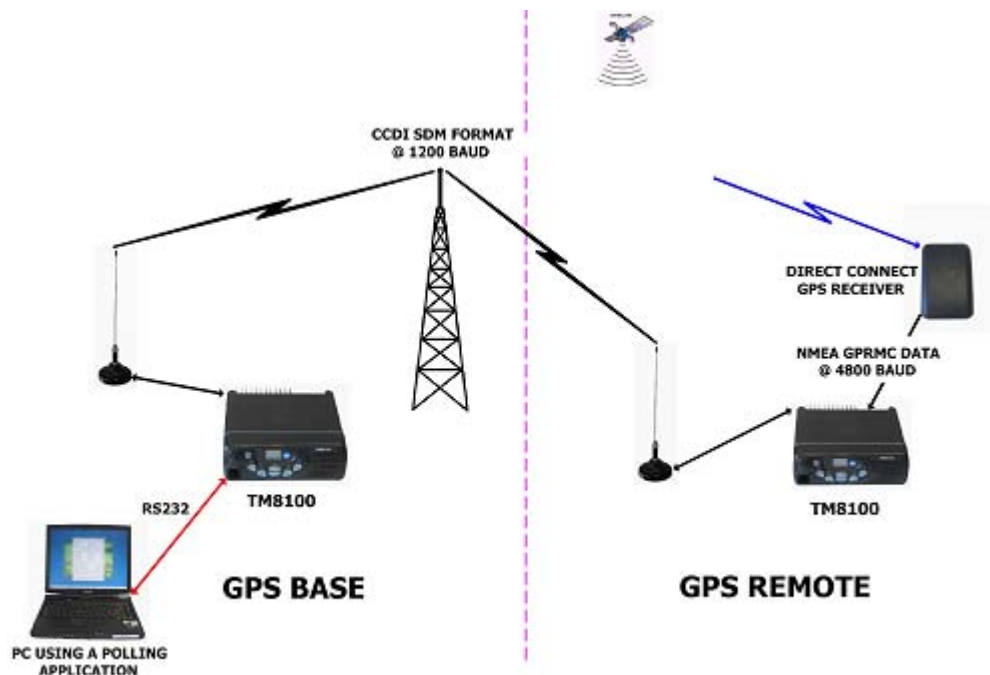
1st March 2006

Applicability

Applies to anyone who is setting up an Automatic Vehicle Location (AVL) system using Tait equipment and SmartTRAC tracking software.

1. Introduction

This application note contains information relevant to setting up a SmartTRAC AVL package with equipment from Tait Electronics LTD. It is broken into 3 sections. Section 1 deals with conventional installations, section 2 deals with MPT1327 installations and section 3 deals with components that are common to both Conventional and Trunked MPT1327 versions of the SmartTRAC application. Below is an example of a typical conventional AVL system using Tait TM8100 radios.



1. INTRODUCTION.....	1
2. ARCHITECTURE.....	3
3. SMARTTRAC SOFTWARE INSTALLATION.....	3
4. CONVENTIONAL (PMR) INSTALLATION	3
CONFIGURING THE BASE RADIO	4
PROGRAMMING THE BASE RADIO	4
<i>Programming the T2000-A75 (T201x) and T2000-A77 (T2020).....</i>	<i>4</i>
<i>Programming the TM81xx</i>	<i>6</i>
<i>Programming the TM825x.....</i>	<i>7</i>
CONFIGURING THE REMOTE (OR VEHICLE) RADIO.....	9
PROGRAMMING THE REMOTE (OR VEHICLE) RADIO.....	11
<i>Programming the T2000-A76 (T201x) and T2000-A78 (T2020).....</i>	<i>11</i>
<i>Programming the TM81xx remote/vehicle radio.....</i>	<i>12</i>
<i>Programming the TM82xx remote/vehicle radio.....</i>	<i>14</i>
SMARTTRAC BASIC CONVENTIONAL CONFIGURATION	15
<i>Adding Mobile Units to SmartTRAC.....</i>	<i>15</i>
5. MPT1327 TRUNKED INSTALLATION	18
CONFIGURING THE BASE RADIO	18
PROGRAMMING THE BASE RADIO	18
<i>Programming the T203x and T2040.....</i>	<i>18</i>
<i>Programming the TM825x.....</i>	<i>22</i>
CONFIGURING THE REMOTE (OR VEHICLE) RADIO WHEN EITHER A GPS OR T630-400 MDT IS DIRECTLY CONNECTED TO THE RADIO	23
<i>Programming the T203x and T2040.....</i>	<i>24</i>
<i>Programming the TM825x.....</i>	<i>24</i>
SMARTTRAC BASIC MPT1327 CONFIGURATION	24
6. SMARTTRAC FEATURES.....	26
CONNECTING THE BASE RADIO TO THE PC.....	26
MAPS.....	27
STARTING SMARTTRAC AUTOMATICALLY	27
HOUSEKEEPING -ARCHIVING THE DATABASE	28
DIAGNOSTICS	29
<i>Vehicle Poll Status.....</i>	<i>29</i>
DISPLAYING THE MAP27 ANALYSER.....	29
7. RELATED DOCUMENTATION.....	31
8. ISSUING AUTHORITY.....	31

2. Architecture

A typical AVL installation consists of

- SmartTRAC PC software Version 4.54.
- Base radio connected to a personal computer via a serial lead.
- Communications system (MPT1327 Trunked or conventional).
- Vehicle(s) fitted with an AVL capable Tait radio connected to a GPS receiver.

The components differ slightly between Conventional (PMR) and MPT1327 Trunked system.

3. SmartTRAC Software Installation

To install SmartTRAC, insert the CD-ROM into your CD-Drive. The installation process will start automatically. Follow the on screen prompts until a screen labelled **Setup Type** is displayed. For most instances select '**Single User Installation**'.

When the **MapInfo** installation starts you will be asked to fill in your user details. When a prompt appears asking for a **Serial number**, enter any number to proceed, as this field is not used.

Wait until the **Setup Finished** box is displayed and then restart your PC.

4. Conventional (PMR) installation

Table 1 shows typical Hardware and Software configurations for the base radio equipment and **table 3** provides the configuration for the remote (or vehicle) radio. Only use this information as a guide as the requirements for your system may differ slightly.

Mobile Radio Type	Base Radio		Base Station
	Hardware	Firmware Version	
T2010/2015	Fitted with T2000-A75 (CCDI Modem)	Standard	The system can work without a base station (Simplex operation), however for reliable coverage, a base station such as the Tait T800, TB7100 or TB8000 range should be used.
T2020	Fitted with T2000-A77 (CCDI Modem)	Standard	
TM81xx	Optionally fitted with TMAA01-02 (TM RS232 options board) or TMAA01-05 (Options extender board)	Standard. Supported above Version 2.04	
TM825x	Optionally fitted with TMAA01-02 (TM RS232 options board) or TMAA01-05 (Options extender board)	Standard. Supported above Version 1.04 and 2.05 for dual mode.	

Table 1

Configuring the base radio

1. Install SmartTRAC as per [section 3](#).
2. If required install the required hardware as detailed in **table 1**.
3. Program the radio (TM8xxx) or the T2000-A75 (T201x) or the T2000-A77 (T2020) as detailed under '**programming the base radio**' in this section of the document.
4. Connect the radio to the power supply and antenna.
5. Connect the radio to the PC's serial port. This is via either a standard 9- way RS232 serial cable (when the radio is fitted with a T2000-A75, T2000-A77 or TMAA01-02) or a custom 9 way male to 9 way female when using the TM8105. **Table 2** below shows the connection details to the 3 possible serial connectors for the TM8xxx.

Description and pin assignment for standard RS232 (PC connection)	TM8xxx communication port			
	RJ45 (Mic Port)	TMAA01-02 (DB9)	TM8xxx AUX (DB15)	TM8105 DB9
2 TXD (TX data line)	3 (MIC_TXD)	2 (Serial_TXD)	11 (AUX_TXD)	2 (PRG_TXD)
3 RXD (RX data line)	7 (MIC_RXD)	3 (Serial_RXD)	3 (AUX_RXD)	4 PRG_RXD
5 GND	6 (AGND)	5 (Data_GND)	15 (AGND)	8 (AGND)

Table 2

Programming the base radio

Programming the T2000-A75 (T201x) and T2000-A77 (T2020)

1. After installing the T2000-A75 modem programmer onto your PC, start the application via **Start→Programs→Tait Programming Applications→A75 modem programmer** as shown in **figure 1**.

NOTE: The T2000-A75 programming application is used for programming both the T2000-A75 and the T2000-A77.



Figure 1

2. Connect a 9-way serial lead between the PC serial port to the 9-way connector on the back of the T2000. Turn the T2000 on.
3. Program the T2000-A7x with the values shown in **figure 2**. If the modem has not been programmed before, click **'Send Escape'** and wait until the application responds with an **'OK'** message before reading or programming the modem.
This will enable the programming of the modem when the **'Transparent Mode Auto Start'** option has been previously enabled (the factory default).
4. The value of **'Lead in Delay for Transparent Mode'** and the **'Data ID'** (numerical characters only where the first 4 characters are 0000 and the last 4 characters are the unique Identity) of the radio are the only parameters that may need to be changed.
If there is a long delay between the time that the base station keys up and the receive signal is heard (often due to sub-tone decode) then this value should be increased accordingly, otherwise the data message will be clipped.

The screenshot shows a software window titled 'Programming Values' with a menu bar containing 'File', 'Comport', and 'Help'. The window contains the following settings:

- Transparent mode auto start:
- Transparent mode baud rate: 1200
- Over the air Baud rate: 1200
- Command mode baud rate: 9600
- SDM Auto Acknowledge:
- SDM Ack delay time: 100 mS (100 - 12000)
- SDM Wait for ack time: 6 seconds (1 - 20)
- Lead in delay for transparent mode: 200 mS (40 - 5100)
- Power up channel: 1
- Data ID: 00008000
- Inhibit CTS:
- Inhibit RTS:

At the bottom of the window, there is an 'Options' section with three buttons: 'Read', 'Send Escape', and 'Program'. Below the options is a 'Status' text area.

Figure 2

Programming the TM81xx

The **Base** TM81xx will need to be configured so that it has a unique data identity, can send and receive SDM's and that the supported GPS SDM format is selected.

(Refer to figure 3)

1. Under **Data**→**General** select the **Powerup State** as '**Command Mode**'.
2. In this same field select '**Output SDMs Automatically**'

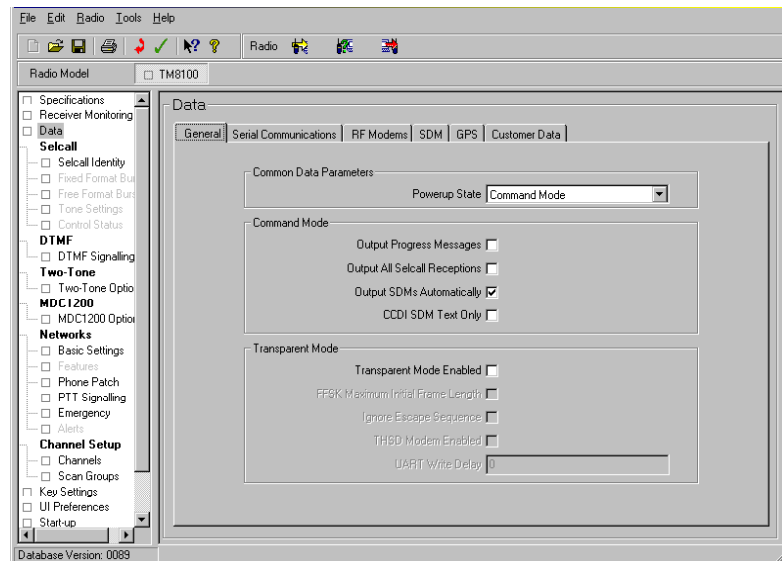


Figure 3

(Refer to figure 4)

3. Under **Data**→**Serial Communications** select the required **Baud rate**. This needs to be set to '**9600**' as this is the default setting of the serial communication rate for SmartTRAC.
4. In this same field select the **Data Port** to be used to connect the radio to your P.C.

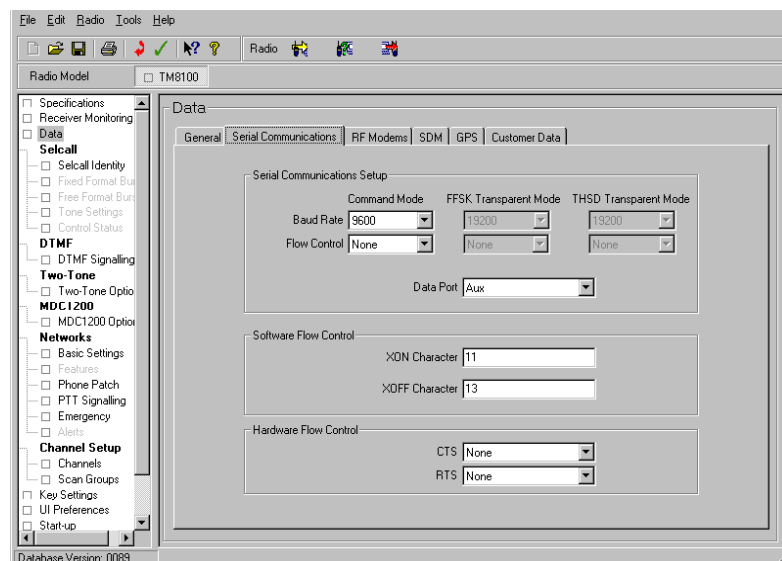


Figure 4

(Refer to figure 5)

5. Under the **Data** → **SDM** tab, select **SDM Enabled**.
6. Choose a unique 8 digit **Unit Data Identity** (numerical characters only where the first 4 characters are 0000 and the last 4 characters are the unique Identity).
7. From the dropdown box for **SDM format** select '**CCDI2 GPS**'.
8. Enter in the channel information for your system.
9. Program the radio.

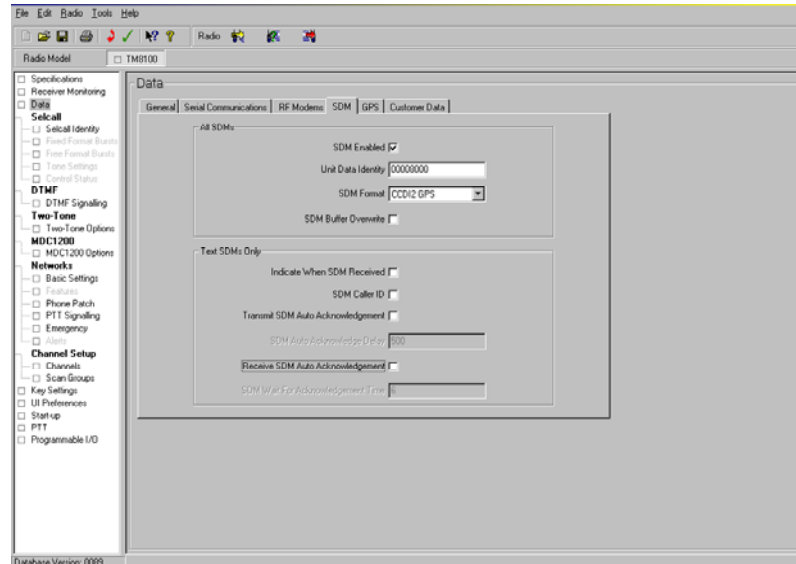


Figure 5

Programming the TM825x

The **Base** TM825x will need to be configured so that it has a unique data identity, can send and receive SDM's and that the supported GPS SDM format is selected.

(Refer to figure 6)

1. Under **Global Features**→**Data**→**General** select the power-up state as '**Command Mode**'.
2. In this same field select '**Output SDMs Automatically**'.

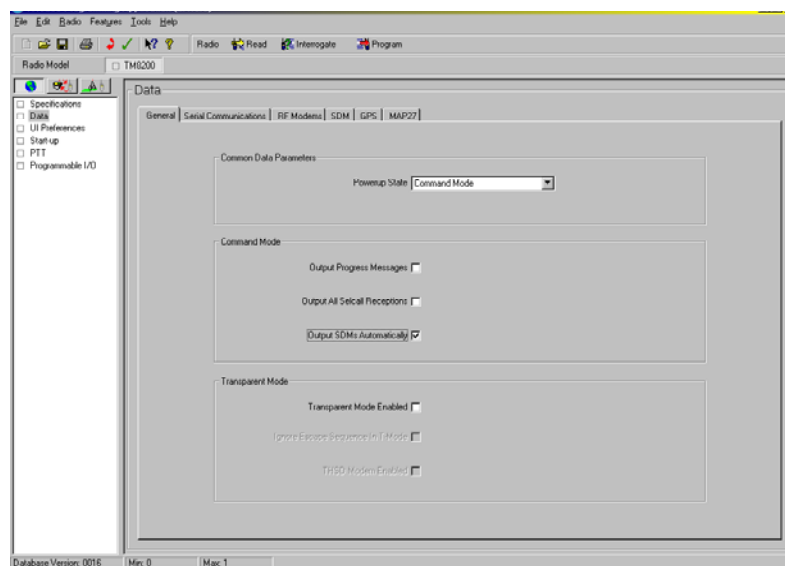


Figure 6

(Refer to figure 7)

3. Under **Data** → **Serial Communications** select the required **Command Mode Baud Rate**. This needs to be set to **'9600'** as this is the default setting of the serial communication rate for SmartTRAC.
4. In this same field select the **CCDI UART port** to be used to connect the radio to your PC and select **'CCDI Enabled'**.

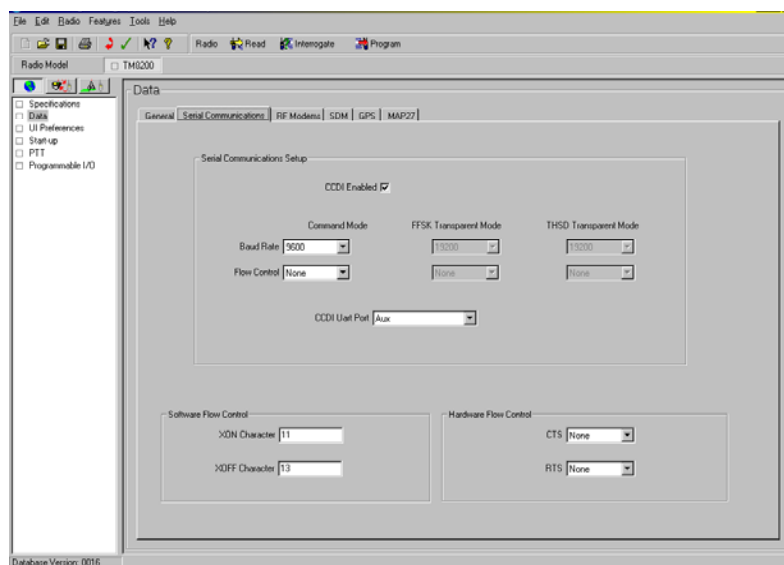


Figure 7

(Refer to figure 8)

5. Under the **Data** → **SDM** tab, select **'SDM Enabled'**.
6. Choose a unique 8 digit **Unit Data Identity** (numerical characters only where the first 4 characters are 0000 and the last 4 characters are the unique Identity).
7. From the dropdown box for **GPS SDM Format** select **CCDI2 GPS**.
8. Enter in the channel information for your system.
9. Program the radio.

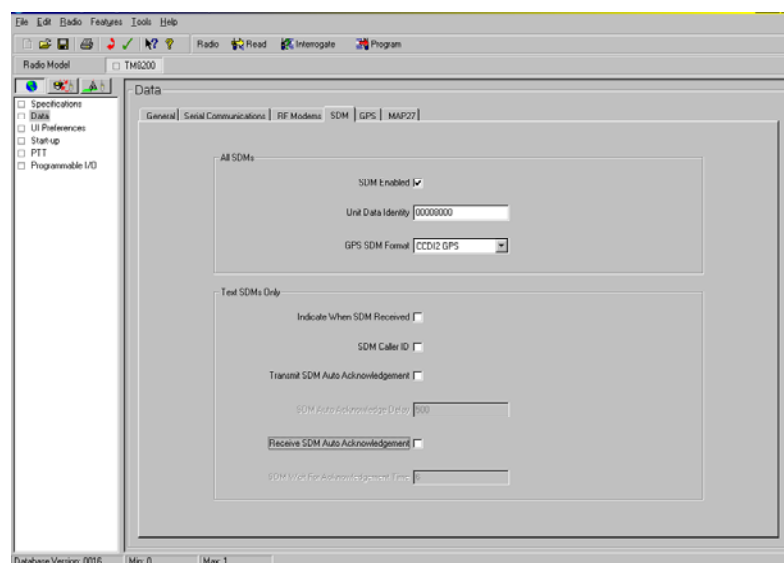


Figure 8

Configuring the remote (or vehicle) radio

1. If required, install the required hardware as detailed in **table 3**.
2. Program the radio (TM8xxx) or T2000-A7x (T2xxx) as detailed under **'programming the vehicle (or remote radio)'** later in this section of the document.
3. Connect the radio to the power supply and antenna in the vehicle.
4. Locate the GPS receiver where it has an uninterrupted view of the sky. This is either on the roof of the vehicle (for the external GPS RX's - T2005-A00 or TMAA05-01) or on the rear parcel tray in the vehicle (for internal GPS RX – T2003-A00).
5. Connect the GPS RX to the chosen radio port. Connections to the radios may vary. Refer to [table 4](#) for a detailed description of the radios hardware connection with the Tait supported GPS receivers.

Note: Take special attention to the power supply requirements of the selected GPS receiver.

Mobile Radio Type	Hardware	Tait Supported GPS Rx	Firmware Version
T2010/2015	Fitted with T2000-A76 (AVL CCDI modem)	T2003-A00 and T2005-A00	Standard
T2020	Fitted with T2000-A78 (AVL CCDI modem)	T2003-A00 and T2005-A00	Standard
TM81xx	Optionally fitted with TMAA01-02 (TM RS232 options board or TMAA01-05 Options extender board	T2003-A00 and TMAA05-01	Standard. Supported above Version 2.04
TM825x	Optionally fitted with TMAA01-02 (TM RS232 options board or TMAA01-05 Options extender board	T2003-A00 and TMAA05-01	Standard. Supported above Version 1.04 and 2.05 for dual mode

Table 3

Tait Supported GPS Receiver Connection details				Tait Radio GPS Interface Details							
				T2000 fitted with T2000-A76 or T2000-A78 (Conventional) or T2000-A66 (Trunked). All provide an RS232 connection		TM8000 15 way Aux connector (TTL Connection)		TM8000 using a TMAA01-02 (RS232 connection)		T630-400 (MDT) GPS connection (RS232 connection)	
T2003-A00	9 way Drange plug pins	GPS cable wire colour	GPS operation desc.	9 way Drange skt pins	Signal Desc.	15 way Drange skt pins	Signal Desc.	9 way Drange skt pins	Signal Desc.	9 way Drange skt pins	Signal Desc.
<i>Internally mounted 5 volt GPS RX</i>	2	White	GPS data in	2	RXD	N/A	N/A	2	RXD	2	RXD
	3	Green	GPS RX data out	3	TXD	N/A	N/A	3	TXD	3	TXD
	4	Red	+5 V Supply	4	¹ +5 Volt supply	N/A	N/A	4	² +5 Volt supply	4	³ 5Volt supply not supported as standard
	5	Black	GND	5	GND	N/A	N/A	5	GND	5	GND
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6	+13.8 Volt supply
T2005-A00	9 way Drange adaptor pins	GPS cable wire colour	GPS operation desc.	9 way Drange skt pins	Signal Desc.	9 way Drange skt pins	Signal Desc.	9 way Drange skt pins	Signal Desc.	9 way Drange skt pins	Signal Desc.
<i>Externally mounted 13.8 volt GPS RX</i> ⁴ (Connection to the radio is via the provided DB9 to RJ45 adaptor)	3	White	GPS RX data out	3	RXD	N/A	N/A	3	RXD	2	RXD
	5	Black	GND	5	GND	N/A	N/A	5	GND	3	TXD
	5	Braid	Shield	5	GND	N/A	N/A	5	GND	4	-
	5	Yellow	GPS remote On/Off	5	GND	N/A	N/A	5	GND	5	GND
	6	Red	6 – 40 V Unregulated supply	6	⁵ +13.8 Volt supply	N/A	N/A	6	⁶ +13.8 Volt supply	6	+13.8 Volt supply
TMAA05-01	15 way Drange adaptor Pins	GPS cable wire colour	GPS operation desc.	9 way Drange skt pins	Signal Desc	15 way Drange skt pins	Signal Desc	9 way Drange skt pins	Signal Desc	9 way Drange skt pins	Signal Desc
<i>Externally mounted 13.8 volt GPS RX</i> ⁴ (Connection to the radio is via the provided DB15 to RJ45 adaptor)	3	White	GPS RX data out	N/A	N/A	3	AUX_RXD	N/A	N/A	N/A	N/A
	11	Blue	GPS RX data in	N/A	N/A	11	AUX_TXD	N/A	N/A	N/A	N/A
	15	Black and Braid	GND	N/A	N/A	15	AGND	N/A	N/A	N/A	N/A
	15	Yellow	GPS remote On/Off	N/A	N/A	15	AGND	N/A	N/A	N/A	N/A
	8	Red	6 – 40 V Unregulated supply	N/A	N/A	8	+13v8_SW	N/A	N/A	N/A	N/A

Table 4

NOTE: All Tait radios can be pre-ordered ready for AVL operation with the required firmware and hardware pre-installed. For mounting options please contact your local Tait representative for details.

¹ Requires a wire to be connected internally of the radio from pin 4 on DB9 to S14 Pin2 on the logic board

² Requires fitting of R15. Refer to MMA-00012-02 (TM8000 Acc. Manual) section 3 circuit diagram for details

³ Requires a separate 5 Volt supply as not available from the MDT (T630-400)

⁴ Internal wiring details and the RJ45 socket pin numbers of the RJ45 to DB9 adaptor have been ignored

⁵ Requires a wire to be connected internally of the radio from pin 6 on DB9 to S14 Pin1 on the logic board

⁶ Requires fitting of R17. Refer to MMA-00012-02 (TM8000 Acc. Manual) section 3 circuit diagram for details

Programming the remote (or vehicle) radio

Programming the T2000-A76 (T201x) and T2000-A78 (T2020)

1. Connect a 9-way serial lead from the PC communications port into DB9 of the T2000-A76/A78 connector at the rear of the T2000.
2. Ensure that pins 4 and 6 of the 9-way lead are isolated to prevent the power feed from the radio causing possible damage to the PC serial port.
3. Power up the T2000.
4. Program the T2000-A76/A78 using the '**AVL programming**' tool (see **figure 9**). A description of each field of the programming tool follows on from figure 9.
5. Program the T2000 (using the T2000 PGM tool) for the required operating frequencies and sub tones that you wish to use. Specific programming of the T2000 for operation with the T2000-A76/A78 is not required.

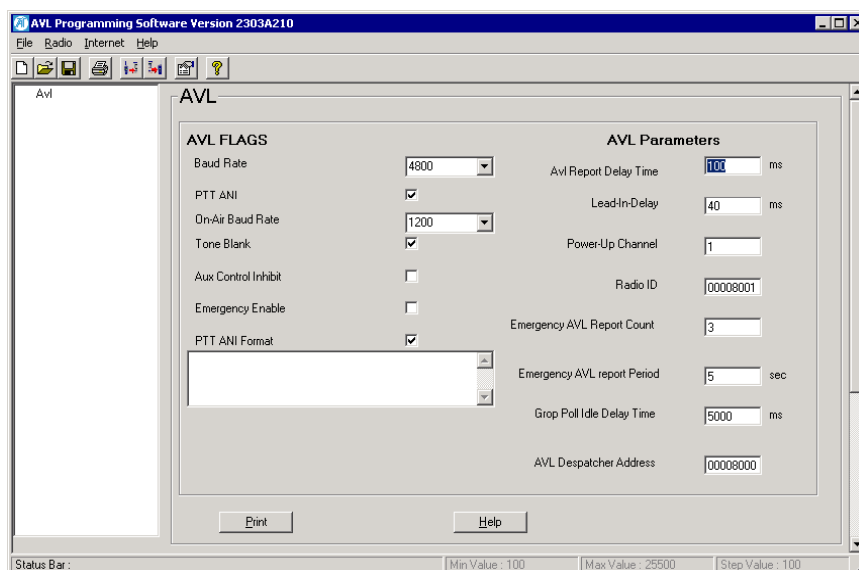


Figure 9

(Field descriptions - refer to figure 9)

1. **Baud Rate:** specifies the baud rate between the A76/A78 and the GPS receiver. Default setting is 4800 Baud.
2. **PTT ANI:** If this box is checked, an AVL string will be sent each time the PTT is pressed/released.
3. **On-Air Board Rate:** specifies the over-air data rate. This can either be 1200 or 2400 and must match the programming of the base radio.
4. **Tone Blank:** If this option is checked, the receiving audio will be muted when AVL data is active on the channel.
5. **Aux Control Inhibit:** Not used for SmartTRAC
6. **Emergency Enable:** Enables an emergency AVL poll to be sent when pin 7 of the T2000-A76/A78 9-way is grounded.
7. **PTT ANI Format:** If this option and the PTT ANI option are checked, an AVL string will be sent on PTT release. If this option is un-checked, an AVL string will be sent on PTT press only.
8. **AVL Report Delay Time:** the time between an individual poll request is received and a response is sent.
9. **Lead in Delay:** This is the length of time the radio transmits before sending data. This value should be increased if there is a significant delay through the repeater system.
10. **Power Up Channel:** if the radio has been enabled for BCD channel change, a default power up channel can be specified.
11. **Radio ID:** this should be unique for each vehicle and needs to be 8

digits long (numerical characters only where the first 4 characters are 0000 and the last 4 characters are the unique Identity). This is the number that SmartTRAC uses to poll the remote radio.

12. **Emergency AVL Report Count:** specifies how many emergency AVL reports are sent on the activation (Pull to GND) of pin 7.
13. **Emergency AVL Report Period:** specifies the time before each report is sent.
14. **Group Poll Idle Delay Time:** Not used for SmartTRAC.
15. **AVL Dispatcher Address:** should match the identity programmed into the A75/A77 base radio. This is the identity of the radio to where the AVL response will be sent.

Programming the TM81xx remote/vehicle radio

(Refer to [figure 3](#))

1. Under **Data→General** select the **Power-up State** as '**Command Mode**'.

(Refer to Figure 10)

2. Under the **Data→SDM** tab, select '**SDM Enabled**'.
3. Choose a unique 8 digit **Unit Data Identity** for this radio (numerical characters only where the first 4 characters are 0000 and the last 4 characters are the unique Identity) i.e. different to the base radio and any other radio in your fleet. (00008001 was used for this example).
4. For the **GPS SDM** format select '**CCDI2 GPS**'.

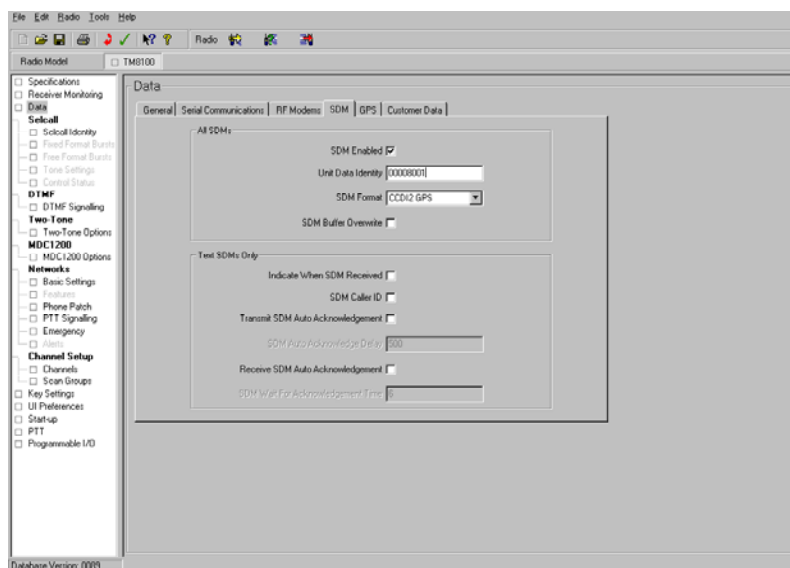


Figure 10

(Refer to figure 11)

5. Under the **Data→GPS** tab select **GPS Position Reporting Enabled**.
6. Enter in a **Connection Time Out** value. This is the time the radio allows before sending back the response '**GPS not operational**' if there is no data being received from the GPS RX.
7. Insert the data identity of the base radio in the **Dispatcher Address** field.
8. Select the serial port of the radio that will be used to connect to the GPS receiver (It must be different to the Data Port)
9. Select the required baud rate of the GPS RX (Usually 4800 for most GPS receivers).
10. Enter in a **Poll Response Delay Time** if required.
11. The **GPS Lead-In Delay** field is used to set a '**Lead in Delay**', to overcome delays encountered when operating through a repeater, before the SDM response is transmitted.
12. Select whether you want the poll response from this radio to go out on the current or another dedicated channel set in the **channel setup field→Poll Response Channel Type** field
13. The operating parameters of the **alarm** (When Activated via a GPIO on the AUX connector) are set within the **alarm field**. This field sets how many GPS Position reports are sent out and at what interval during an alarm activation.
14. Program the radio for operation on the required frequency(s).

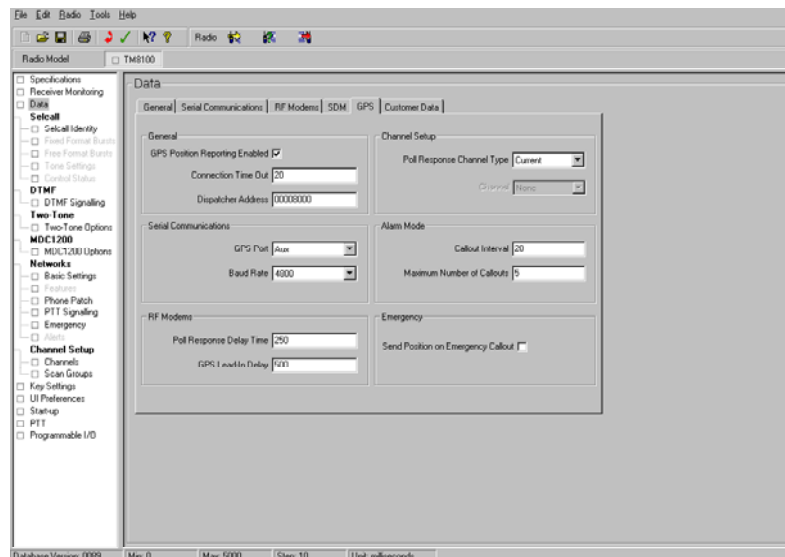


Figure 11

Programming the TM82xx remote/vehicle radio

(Refer to [figure 6](#))

1. Under **Global Features**→**Data**→**General** select the **Power-up State** as **'Command Mode'**.

(Refer to figure 12)

2. Under the **Data**→**SDM** tab, select **'SDM Enabled'**.
3. Choose a unique 8 digit **Unit Data Identity** for this radio (numerical characters only where the first 4 characters are 0000 and the last 4 characters are the unique Identity) i.e. different to the base radio and any other radio in your fleet. (00008001 was used for this example).
4. For the **GPS SDM** format select **'CCD12 GPS'**.

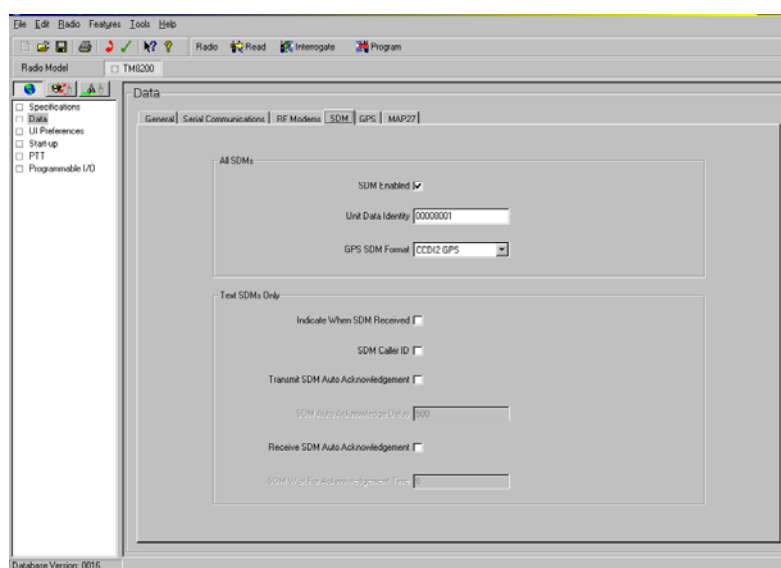


Figure 12

(Refer to Figure 13)

5. Under the **Data**→**GPS** tab select **'GPS Position Reporting Enabled'**
6. Enter in a **'Connection Time Out'** value. This is the time the radio allows before sending back the response **'GPS not operational'** if there is no data being received from the GPS RX.
7. Insert the 8 digit data identity of the base radio in the **'Dispatcher Address'** field.
8. Select the serial port of the radio that will be used to connect to the GPS receiver (It must be different to the Data Port)
9. Select the required baud rate of the GPS RX (Usually 4800 for most GPS receivers).
10. Enter in a **'Poll Response Delay Time'** if required.
11. The **GPS lead-in delay** field is used to set a **'Lead in Delay'**, to overcome delays encountered when operating through a Repeater, before the SDM response is transmitted.
12. Select whether you want the poll response from this radio to go out on the current or another dedicated channel in the **'Channel Setup'** field.
13. The operating parameters of the alarm (When Activated via a GPIO on the AUX connector) are set within the **Alarm Field**. This field sets how many GPS Position reports are sent out and at what interval during an alarm activation.
14. Program the radio for operation on the required frequency(s).

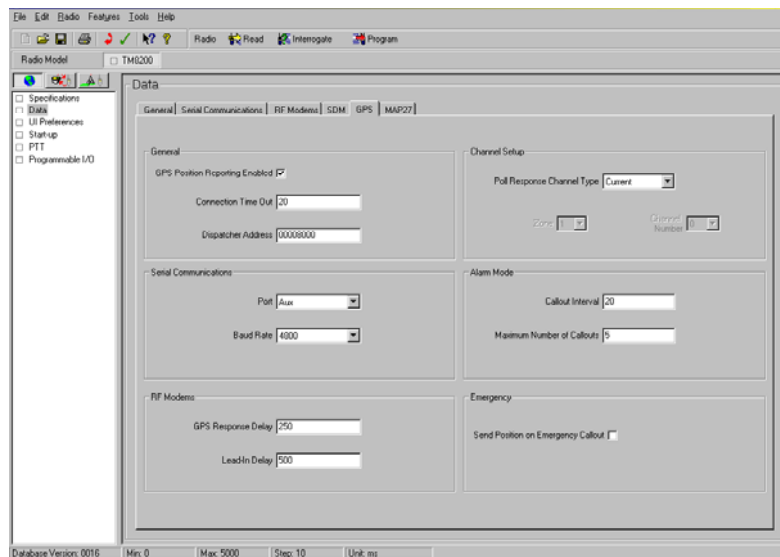


Figure 13

SmartTRAC basic conventional configuration

What follows is a brief instruction on how to add a vehicle in SmartTRAC version 4.54 that will enable you to poll conventional radios. For details on the communication setup for SmartTRAC please refer to [section 6](#) at the end of this document. For a more detailed description on SmartTRAC and it's components refer to the 'SmartTRAC workstation user reference manual'.

Adding Mobile Units to SmartTRAC

1. To enter a new vehicle, open SmartTRAC under **Start→Programs→SmartTRAC→SmartTRAC explorer**.
2. Right click in the vehicles list window and choose **'New Mobile Unit'**
3. A properties box will appear with different options as shown in **figure 14**.

Details Tab

(Refer to figure 14)

1. Click on each of the following fields and then enter the required information:
 - **Type:** car, truck, van etc. The units will be grouped according to their type in the filter window
 - **ID:** any ID that is used for the vehicle. This field is not compulsory
 - **Name:** this will be displayed next to the vehicle

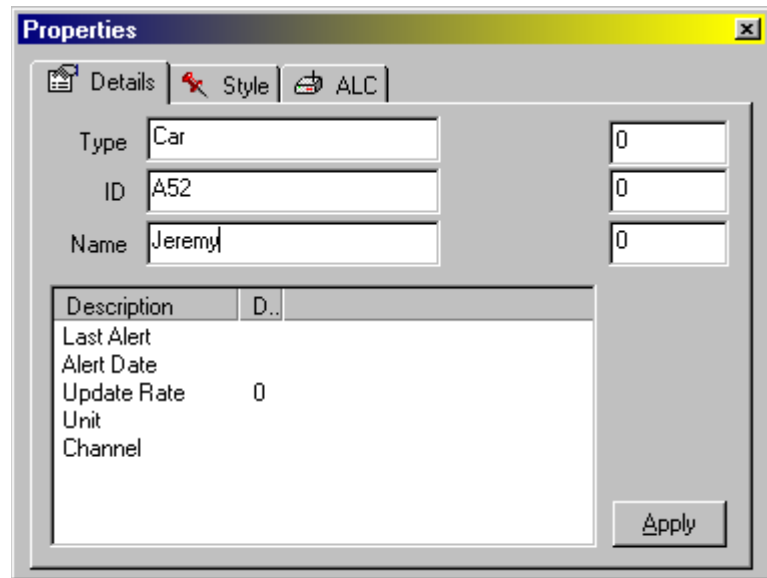


Figure 14

Style Tab

(Refer to figure 15)

1. The Icon, colour, size and track of the vehicle can all be changed according to user preference within this field

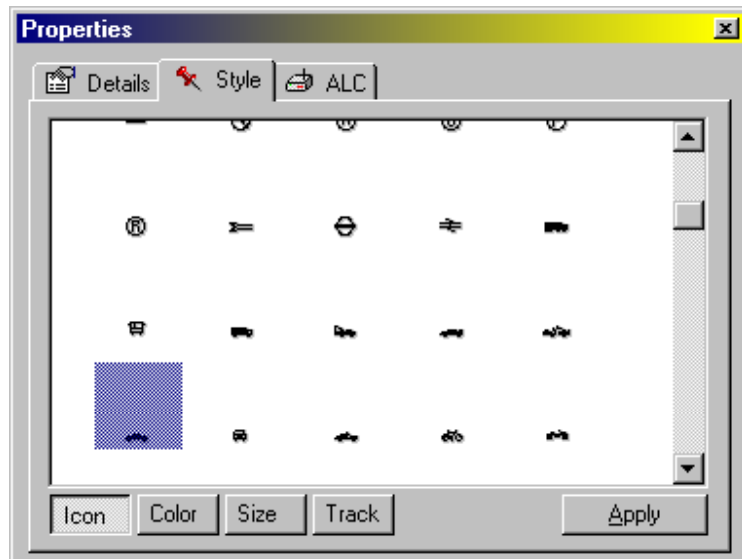


Figure 15

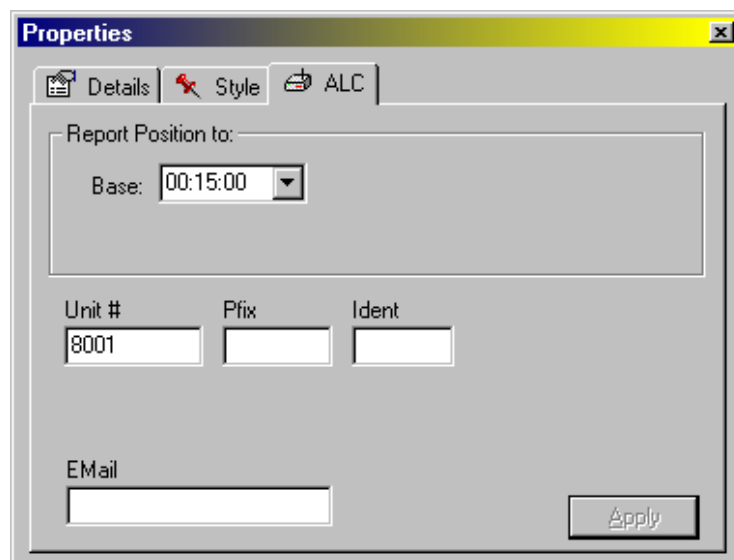
ALC Tab

(Refer to figure 16)

This tab is used to configure how often the remote/vehicle radio is polled by SmartTRAC and sets the identity. In this example there are only 2 fields that need set:

1. **Base:** determines the automatic polling rate. In this example the vehicle will be polled automatically every 15 minutes and a latitude/longitude placed in the database. Limits are often set by the network providers for the minimum value of automatic poll duration.
2. **Unit number:** this is the number that was programmed into the T2000-A76/A78 and the remote/vehicle TM8xxx. This will be unique for every Vehicle.

NOTE: Only 4 numerical numbers for the 'Unit #' are supported in SmartTRAC. The first 4 zeros of the radio units ID's are therefore dropped off for compatibility in SmartTRAC.



The screenshot shows a 'Properties' dialog box with three tabs: 'Details', 'Style', and 'ALC'. The 'ALC' tab is selected. Inside the dialog, there is a section titled 'Report Position to:' containing a 'Base:' dropdown menu set to '00:15:00'. Below this are three input fields: 'Unit #' containing '8001', 'Pfix' (empty), and 'Ident' (empty). At the bottom, there is an 'EMail' input field and an 'Apply' button.

Figure 16

5. MPT1327 Trunked installation

Table 5 shows typical Hardware and Software requirements for the base radios to operate an AVL system on a MPT1327 network. The remote (or vehicle) radio equipment is detailed in **table 6**. Only use this information as a guide as the requirements for your system may differ slightly.

Mobile Radio Type	Base Radio		Base Station
	Hardware	Firmware Version	
T203x	Fitted with T2000-A66	Standard	The system requires a MPT1327 Trunked Network to work.
T2040	Fitted with T2000-A66	Standard	
TM825x	Optionally fitted with TMAA01-02 (TM RS232 options board or TMAA01-05 Options extender board	Standard for TM8255. TM8250 requires an optional SFE key (TMAS011) if upgrading to MPT1327 operation. MAP27 operation supported above Version 2.05	

Table 5

Configuring the base radio

1. Install SmartTRAC as per [section 3](#).
2. If required install the hardware as detailed in **table 5**.
3. Install an SFE key if required for MPT1327 operation on the TM8250.
4. Program the radio as detailed under '**programming the base radio**' in this section of the document.
5. Connect the radio to the power supply and antenna.
6. Connect the GPS RX to the chosen radio port. Connections to the radios may vary. Refer to [table 4](#) for a detailed description of the radios hardware connection with the Tait supplied GPS receivers.

Note: Take special attention to the power supply requirements of the selected GPS receiver.

Programming the base radio

Programming the T203x and T2040

(Refer to figure 17)

1. Start the T2000 '**Trunked Application**' under **Program Files**→**Tait Applications**→**T2000**→**Trunked Application**. This application is used to program all T2000 MPT1327 Trunked radios.
2. Select the model type of your radio in the '**Radio Type**' toolbar near the top of the screen. This application note will use the T2040 radio as an example. However the T203x radio settings are the same.
3. Enter in the details that will enable the radio to work on your network
4. Enable '**MAP 27**' located in the **specifications** page.

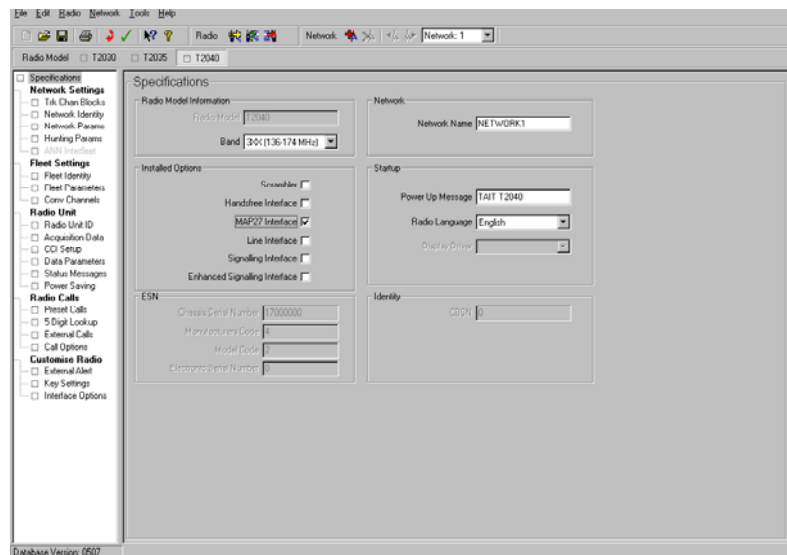


Figure 17

(Refer to figure 18)

5. The parameters of the **CCI** (Computer Controlled Interface) need to be configured located in the **CCI Setup** page. Select the type of **UIM** (UART Interface Module) that is fitted to the radio. '**Single port**' is a T2000-A66 (single port UART).
6. The setting of the Baud rate needs to be set to '**9600**'. This is the default setting of the serial communication rate for SmartTRAC.

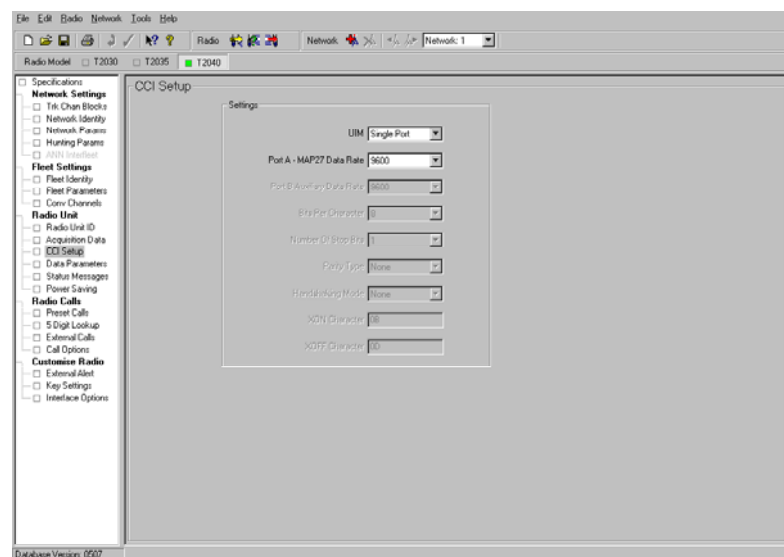


Figure 18

(Refer to figure 19)

- Under **Call Options** ensure that **'Data Calls'** is selected. This field sets whether the user may set up data calls such as short data messages (**SDMs**) over a traffic channel.

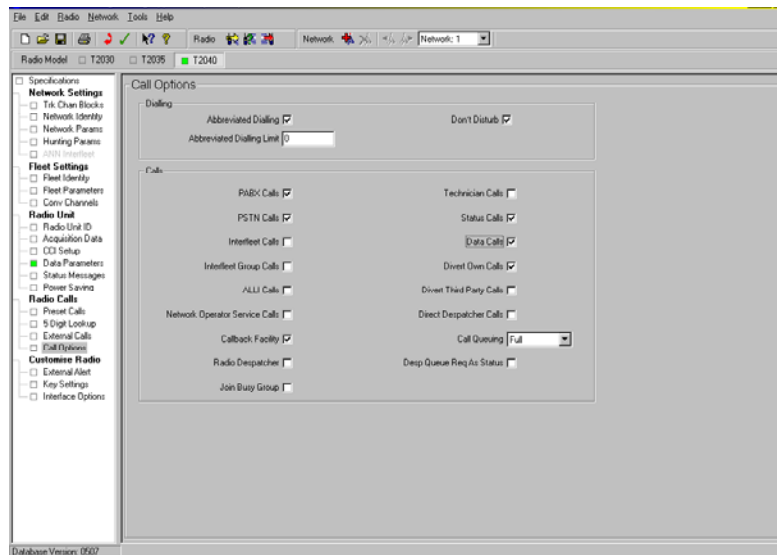


Figure 19

(Refer to figure 20)

- Ensure that **'Short Data Messages'** and **'Tait Data Protocol'** under **Data Parameters** are selected. The default values within these fields will suit most networks.

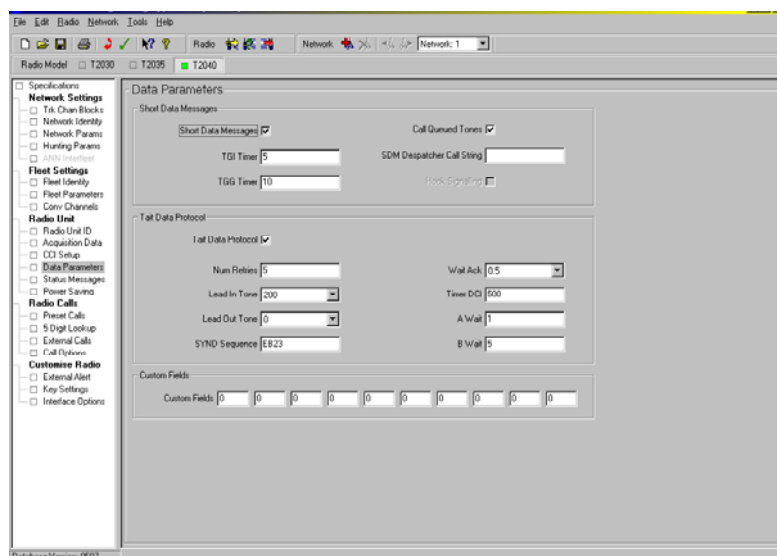


Figure 20

(Refer to figure 21)

9. Check with the customer whether or not the radio should make a sound (beep) when a GPS poll is made to the vehicle.
If this is not required then ensure that in the **Audible interface** field under **Interface options** of the radio file that **Tone On Speech Calls** is **'enabled'** and **ALL** of the other tone alert fields are disabled.

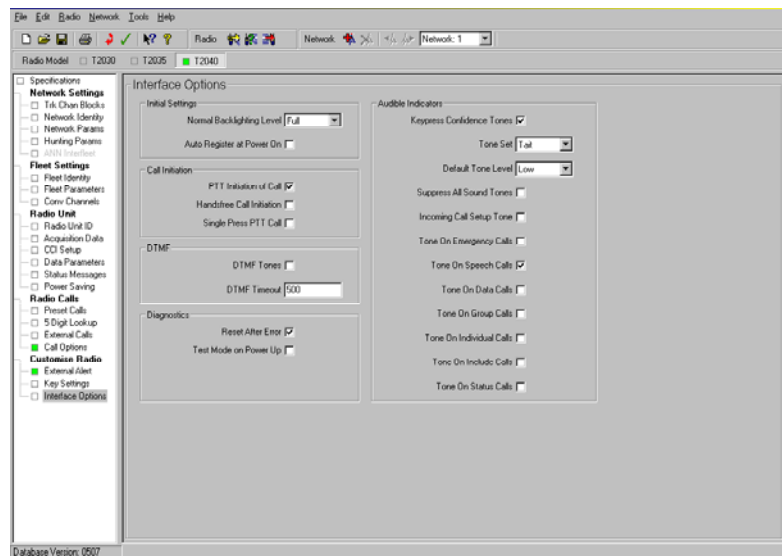


Figure 21

10. Enter the required details for your network.
11. The radio can now be programmed.
12. The T2000 MPT1327 Trunked radio is now ready for operation as the **'AVL base radio'**.

Programming the TM825x

As with the T2000 MPT1327 radio the TM825x MPT1327 radio will also communicate with the P.C running SmartTRAC using the MAP27 protocol only. In this mode CCDI control is not available.

(Refer to figure 22)

1. Under **Global Features**→**Data**→**Serial Communications** 'unselect' the **CCDI Enabled** box.

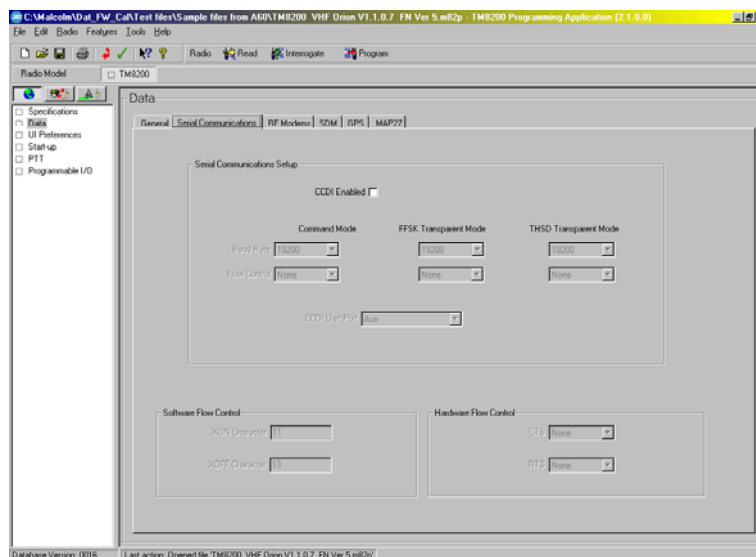


Figure 22

(Refer to Figure 23)

1. Under **Global Features**→**Data**→**GPS** 'select' the **MAP27 Enabled** box.
2. Set the **MAP27 Port** to the required communications port.
3. Set the **Baud Rate** to **9600**, which is the default setting of the serial communication rate for SmartTRAC.
4. For full **MAP27** communications set the **Link Layer Type** to 'full'.

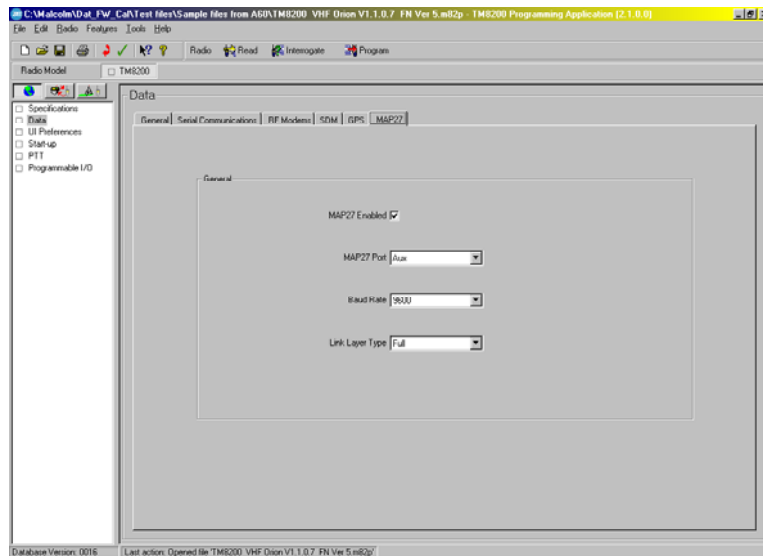


Figure 23

Configuring the remote (or vehicle) radio when either a GPS or T630-400 MDT is directly connected to the radio

1. If required install the required hardware as detailed in **table 6**
2. Program the radio as detailed under **'programming the vehicle'** (or vehicle radio) in this section of the document.
3. Connect the radio to the power supply and antenna in the vehicle.
4. Locate the GPS receiver where it has an uninterrupted view of the sky. This is either on the roof of the vehicle (for the external GPS RX's - T2005-A00 or TMAA05-01) or on the rear parcel tray in the vehicle (for internal GPS RX – T2003-A00).
5. Connect the **GPS RX** to the chosen Tait port. Connections to the radios may vary. Refer to **table 4** for a detailed description of the radios hardware connection and Tait supplied GPS receivers.

NOTE: Currently the TM825x does not support GPS operation (Direct connect) when operating in Trunked mode. This application note will be updated with the instructions on how to configure the radio once this feature has been implemented in the firmware.

Mobile Radio Type	Hardware	Tait Compatible GPS Rx	Firmware Version	
			Connecting to a GPS Receiver	Connection to a T630-400 MDT
T203x	Fitted with T2000-A66	T2003-A00 and T2005-A00	Direct connect	Standard
T2040	Fitted with T2000-A66	T2003-A00 and T2005-A00	Direct connect	Standard
TM825x	Optionally fitted with TMAA01-02 (TM RS232 options board or TMAA01-05 Options extender board	T2003-A00 and TMAA05-01	Currently does not support direct connection of a GPS RX in MPT mode. MAP27 operation supported above Version 2.05	Standard

Table 6

Programming the T203x and T2040

The programming of the remote (or vehicle) T203x and T2040 is the same as the base radio. The port settings are encoded in the Direct Connect firmware fitted to the radio.

If a T630-400 MDT (Mobile dispatcher terminal) is to be used with the remote radio then standard firmware will be fitted to the radio and the GPS receiver is fitted to the MDT. The MDT will communicate with the radio using MAP27. The programmable settings of the radio are the same as the base radio. Refer to the [Programming the base radio](#) section for details.

Programming the TM825x

As the TM825x currently does not support GPS operation (Direct connect) when operating in Trunked mode The programming of the TM825x remote radio is for operation with a T630-400 MDT. The programming for the operation with an MDT is the same as the **base radio** detailed in the '[Programming the base radio](#)' earlier in this section. This application note will be updated with the programming details for direct connect operation once this feature has been implemented in the firmware.

SmartTRAC basic MPT1327 configuration

The addition of the vehicle details to operate on a MPT1327 Trunked network is the same as that for the conventional described in section '[SmartTRAC basic conventional configuration](#)'. The only exception is the **ALC** field:

(Refer to figure 24)

1. In the **ALC** field of the properties box enter in the MPT1327 **prefix** and **ident** number for the radio unit. The radio used in this example has a MPT1343 numbering of:
 - Number prefix = 201
 - Fleet number = 2100
 - Unit number = 623

The MPT1327 equivalent is:

- Prefix = 1
- Ident = 623

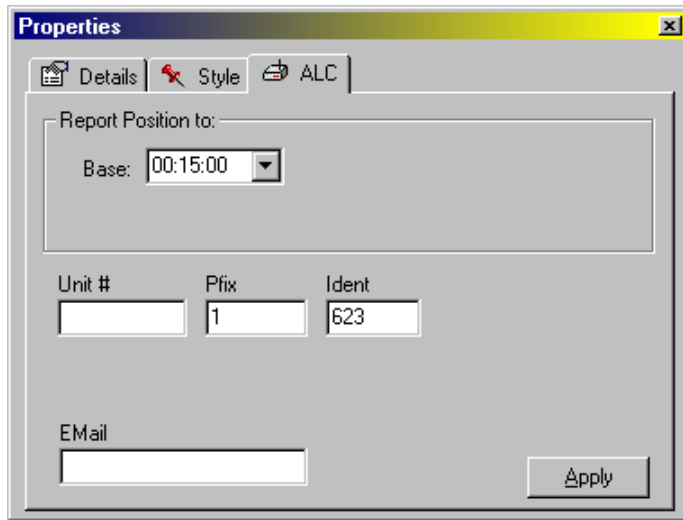


Figure 24

6. SmartTRAC features

Connecting the Base Radio to the PC

1. Connect the base radio to a spare serial COM port on the PC using the 9-way cable supplied. The supplied cable is a standard computer 9 way male to 9 way female with 1-1 wiring.
2. Once the radio is connected and switched on ensure that, for MPT 1327, the radio has network service.
3. Place a call on the radio to ensure that the received audio at the remote radio is clear.
4. To specify which COM port the base radio is connected to choose **Tools→Communications Properties** in the SmartTRAC window. A communications properties box will be displayed as shown in **figure 25**.

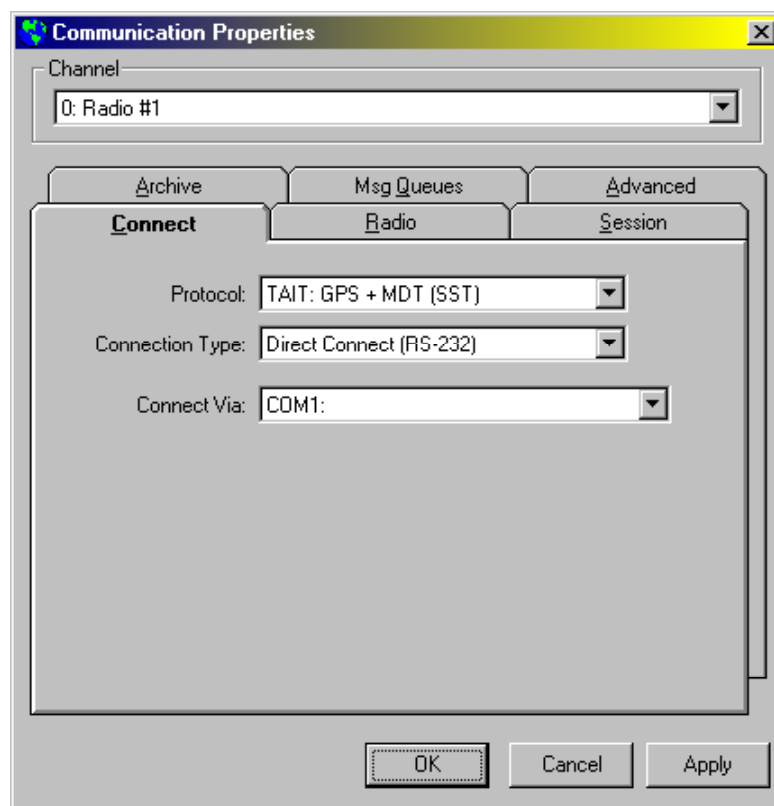
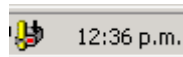


Figure 25

5. For conventional systems, the **protocol** within this window must be set to **TAIT:GPS only (conventional)**
6. For MPT1327 Trunking systems, the **protocol** can be set to either:
 - **TAIT: GPS only (SST)** for polling on the control channel
 - **TAIT: GPS only (NPD)** for polling on the traffic channel
7. When **Tools→Communications Properties** is selected the SmartTRAC server will also start running. The SmartTRAC server must **ALWAYS** be running in the background to process poll requests. An icon will appear in the toolbar if communication to the base radio fails as shown in **figure 26**.

**Figure 26**

8. Choose the COM port that the base radio is connected to and select '**Connect Now**' under **Tools** in the toolbar of the explorer window. If the operation is successful a system tray icon (bottom right hand side of the screen) will appear then disappear. You are now ready to poll vehicles.
9. If the operation was unsuccessful check that:
 - Your radio is turned on
 - The programming information and firmware versions are correct
 - The serial cable is connected between the UART fitted to the base radio and the correct COM port on the PC.

Once the COM port has been set up it will not need to be done again, however the SmartTRAC server will always need to be running each time SmartTRAC is started. This is achieved by selecting **Tools**→**Connect Now**.

Maps

SmartTRAC uses MapInfo format maps. Any MapInfo workspace with a '**.wor**' extension can be opened by either selecting **File**→**Open** and selecting the workspace from SmartTRAC or by double clicking the workspace from windows explorer. SmartTRAC will start automatically.

Starting SmartTRAC Automatically

If SmartTRAC is running on a stand alone PC, it is a good idea to add the map workspace (.wor) and **SmartTRAC server** to the windows **StartUp** menu. This will automatically open the map and run the server whenever the PC is restarted.

First find the directory where SmartTRAC was installed (usually c:\program files\SmartTRAC) and add the file **DbLink.exe** to windows **StartUp**.

Do the same for the workspace of the map you are using.

To find information on adding programs to windows **StartUp**, please consult Windows Help.

Housekeeping - Archiving the database

All position reports and unit status, type and names are stored in a Microsoft® Access database included with SmartTRAC. This database will grow as new polls are received. To keep the data secure and to keep the database to a manageable size, it is recommended to archive the database every month, or more frequently if required (depending on poll rate number vehicles etc).

To archive a Database, a copy of a compression tool such as WinZip or Power Archiver is valuable.

To archive the database and exchange with another, first locate the database. Often it will be located under **c:\program Files\SmartTRAC** and will be called **StSample.mdb**.

The next step assumes that a clean database was archived when the package was installed.

Zip '**StSample.mdb**' and copy to a safe place. This database will contain a month of position information for your vehicles. When zipping the database it is useful to give the .zip file a meaningful name such as june05.zip. This will also help prevent existing archived databases being overwritten if the same name is used.

Unzip the clean copy of the database and place back into the folder where the original database was copied. SmartTRAC now needs to know which database to use. Use the following procedure to point SmartTRAC to the correct database:

1. Run **Start→Programs →SmartTRAC →ODBC Configuration**
2. Select the '**SmartTRAC**' User Datasource and click **Configure**
3. Click the **Select** button
4. Locate the '**StSample**' database file (your database file may be named differently) on the network fileserver and click '**OK**'
5. Click '**OK**' to close the remaining dialog boxes

If an error message "ODBC Microsoft Access Driver Login Failed – Could not find the file 'c:\program files\SmartTRAC\stsample.mdb" occurs, the clean database has been installed into the wrong folder or has been renamed. Repeat the above process making sure you are using the correct database.

Diagnostics

Vehicle Poll Status

SmartTRAC will display a unit status next to each vehicle. If this cannot be seen, right click in the vehicles window and then select **View→Details**.

There are four possible states that are displayed next to each vehicle:

1. **On – Normal:** The vehicle is being polled successfully, a valid position fix is being returned.
2. **On – No GPS coverage:** The radio is responding but the GPS unit cannot obtain a valid position. The vehicle could be in a garage or in a position where the GPS receiver does not have a clear view of the sky.
3. **On - GPS Disconnected:** The radio is responding but there is no information to the radio from the GPS. The GPS receiver is either unplugged from the radio or not functioning correctly.
4. **Off / Not Home:** The radio cannot be reached. The radio is either switched off, or out of system coverage.

These states are logged into the database. If a problem occurs when vehicles are polled, the database can be zipped up and sent away for analysis. See [Housekeeping](#) for the details on how to zip and replace a database.

Displaying the Map27 analyser

SmartTRAC MPT1327 versions have a Map27 packet analyser available. This will show the Map27 commands between the radio and the PC. Map27 is the data protocol used for MPT1327 radios.

To enable the packet analyser Choose **Tools→Communications Properties**.

Click on the **radio** tab and in the field called **MAP27 trace code** type in **'log'**. Click apply and the analyser will appear. This window will remain open, even after SmartTRAC has been restarted. To stop this window from appearing remove **'log'** from this field and click apply.

To copy a view of the analyser to another application, select **<alt> and <print scrn>** to copy it to the clipboard.

7. Related Documentation

- TN-842-AN Direct connect GPS operation with the TM8100
- SmartTRAC users reference manual
- M2000-00-301 (T2000 service manual)
- MM8100-02-00-812 (TM8100 service manual)
- MMA-00012-02 (TM8000 accessories manual)

Compliance Issues

None.

CSO Instruction

Please distribute to dealers and customers that need to configure an AVL system using Tait radios and SmartTRAC tracking software.

8. Issuing Authority

Name and Position of Issuing Officer

Malcolm Brown
Senior Technical Support Engineer

Confidentiality

Confidential – This message or document contains proprietary information intended only for the person(s) or organisation(s) to whom it is addressed. All Recipients are legally obliged to not disclose Tait technological or business information to any persons or organisations without the written permission of Tait.

Distribution Level

Associate.

Document History

Original Release.	3 rd November 2005		MJB
Updated with T630-400 connection details	14 th December 2005	Version b	MJB
Updated with '8 numerical characters only' information for conventional radio I.D. fields	12 th January 2006	Version c	MJB
Updated Table 4 with more detail	1 st March 2006	Version d	MJB