

Overview

The IRC tracking and messaging programmer is used in conjunction with the Pathfinder GPS Tracking and Messaging system.

The system comprises :

1. A computer with the tracking and messaging software installed on it.
2. A base radio unit
3. A number of vehicles with the tracking and messaging radio installed.

The IRC Tracking and Messaging Programmer is used to :

1. Download new operating software into the Vehicle's tracking and messaging unit or the Base Station unit
2. Change settings on the Vehicle Tracking unit or Base Station Unit
3. Test the operation of the Vehicle unit over the air.

NOTE : The Pathfinder radio is programmed using its own programming software. This programmer does not replace it.

Installation

The software is designed to run on most Windows® operating systems including Windows 98, Windows XP and Windows 2000.

The software is supplied as two stiffie disks or on a CD. It comprises the following files

RM4TRA1.CAB
RM4TRA2.CAB
SETUP.EXE
SETUP.LST

Install the software by running the **SETUP.EXE** program.

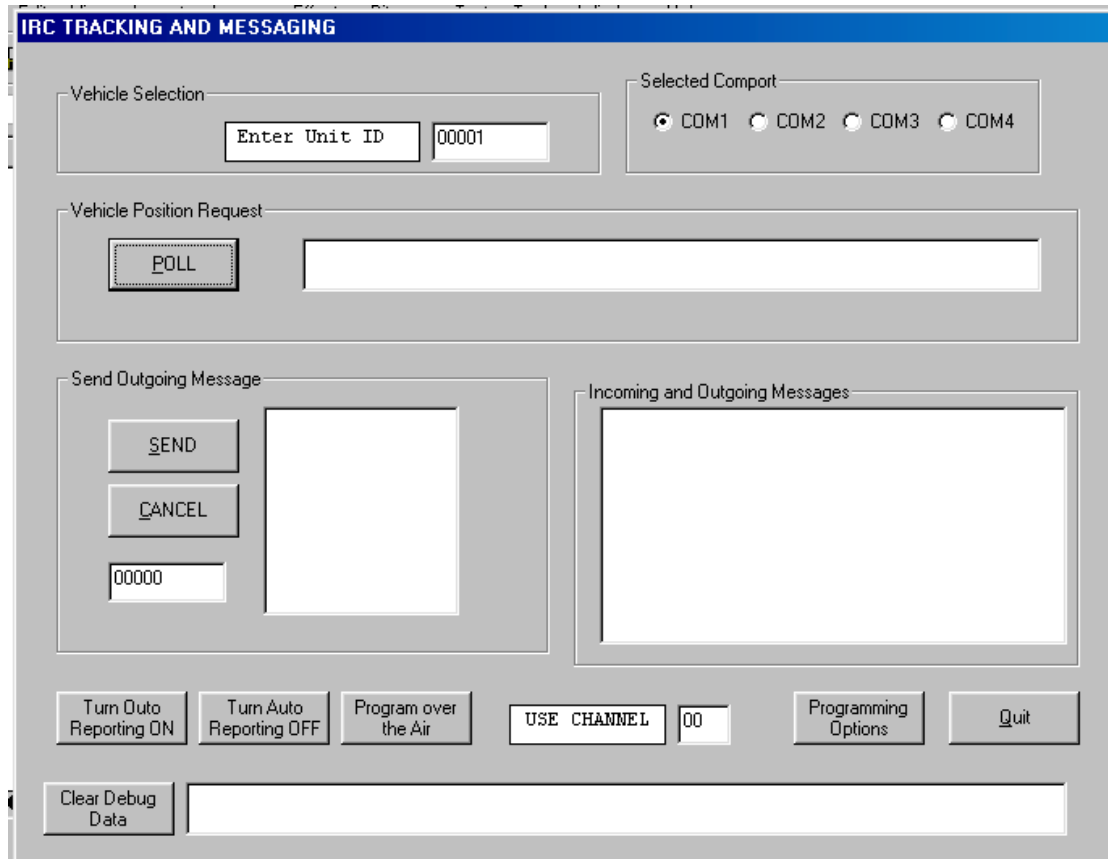
Change the install directory to C:\RM4TRACK by clicking on the CHANGE DIRECTORY button And entering the path C:\RM4TRACK

Click on the large INSTALL button and follow the instructions on the screen.

After installation, it is advisable to create a shortcut to the RM4TRACK program on your desktop. The program can alternatively be executed by START – PROGRAMS - RM4TRACK

The RM4TRACK main screen will appear when the program starts running

The main screen can be used to test the operation of the base station and vehicle units



Connect the Serial Cable from your PC's COM Port to the front of the base station unit. Select the COM Port to be used by clicking on one of the 'Selected Comport' selection boxes

Polling a Vehicle

A Vehicle can be polled for position by selecting the correct unit ID (must be 5 digits) and clicking on the POLL button

The following will happen

- The Transmit Lamp (Red) at the front of the Base Radio will light as it transmits the poll message.
- The Vehicle will 'hear' the Poll message and will reply to the Base
- The Vehicle Position Request window will show the vehicle ID and its current Latitude and Longitude

The Incoming and Outgoing Messages window will display the following

```
TIME ---- POLL -----  
TIME  REPLY  LAT xxxxxxx LONG xxxxx
```

All incoming data over the serial port will be displayed in the DEBUG DATA window. This is for diagnostic purposes only.

If no reply is received from the Vehicle radio, check the following

- a. The serial cable has been installed correctly
- b. The correct COM Port has been selected
- c. The Correct Unit ID (vehicle ID) has been selected

Receiving Messages from a Vehicle

Press the MENU key on the vehicle's radio. This will put the radio in message mode.

If there are no messages currently stored in the radio, the screen will display:

----- NO MESSAGES-----

or else the last selected message will be displayed

Press the RED F4 (Emergency) Key on the face. The radio will transmit an emergency message which will be displayed in the Incoming and Outgoing Messages window

Sending Messages to the Vehicle

Type a message in the Send Outgoing Message window.
Click on the SEND button

The message will be sent to the radio and will be displayed on its face

PROGRAMMING THE VEHICLE UNIT

Click on the **Programming Options** button on the main screen to get to the programming screen.

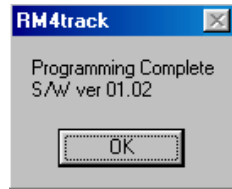
Programming Options	
Radio ID (5 Digits)	00001
Transmitter Preamble (mS)	500
Retries - Normal Messages	3
Retries - Emergency Messages	5
Automatic Report Interval (Sec)	60
Send Anyway Attempts	2
Radio Tx Channel for Messages	0
Radio Tx Channel for Replies	0
Normal Radio Channel	0
Number of Channels for Messaging	20
Busy Channel Lock-out Rules	NONE COMREP CARRIER
Save GPS Position Interval (Sec)	60
No Of Positions to Report on Query	0
Second Rx Frequency	67.0000
No Of Positions on Auto Report	0
Stagger Time	1
Auto Reporting	<input type="checkbox"/> ON
<input checked="" type="checkbox"/> MESSAGES ARE TAGGED	
<input checked="" type="checkbox"/> PAGE WHEN A MESSAGE IS RECEIVED	
<input checked="" type="checkbox"/> ALLOW OPERATOR TO USE RADIO	
<input checked="" type="checkbox"/> ALLOW MESSAGES TO BE DELETED	
<input checked="" type="checkbox"/> FIND BEST CHANNEL AUTOMATICALLY	
Download Vehicle Software	Change Vehicle Settings
Download Base Modem Software	Change base Modem Settings
Return	

The settings shown are for the vehicle units

The vehicle settings can be changed by entering them on the programming screen and then programming them into the unit via the 9 pin D-sub RS232 connector at the front of the radio.

To program the settings into the vehicle radio, connect the radio to the computer's COM Port using the serial cable supplied and click on the **Change Vehicle Settings** button.

The vehicle will settings will be updated and then the programming confirmation box will be displayed



If programming is unsuccessful, an error message will be displayed

The options for the vehicle are as follows

PARAMETER	DESCRIPTION	DEFAULT VALUE
Radio ID	The 5 digit ID number of this vehicle on the network Cannot be duplicated on the same network	
Transmitter Preamble	The time in milli-seconds that the radio transmitter is turned on for before a message is sent. This time can be short (200mS) for simplex communications and may be required to be long for repeater operation (up to 1000mS) If the radio receiving the message is scanning, the time may have to be increased so that the scan channel can be found. Legal values are from 200 to 2500mS	500mS
Retries- Normal Messages	The number of times that the vehicle will attempt to send routine messages (such as Driver Acknowledgements etc) before giving up on the message. When the base acknowledges the vehicle's message, the vehicle will stop sending	3
Retries – Emergency Messages	The number of times that the vehicle will attempt to send Panic messages before giving up on the message. When the base acknowledges the vehicle's message, the vehicle will stop sending	5
Automatic Report Interval (Sec)	If the vehicle is reporting its position to the base automatically. The vehicle will send the reports at this interval (seconds) The vehicle will only send the report if Auto Reporting has been turned on	60
Send Anyway Attempts	This is used in conjunction with the Busy Channel Lockout facility If the vehicle has failed to send a message (emergency or routine) because the channel was busy, it will send the last Send Anyway Attempts regardless of whether the channel is busy or not Must be less than the Retries (Normal or Emergency) settings	2
Radio Tx Channel for Messages	The radio channel on which messages from the vehicle will be sent. This can be any channel from 1 to 200 in the Pathfinder mobile radio	0

	<p>The frequencies for the message channel must be programmed into the radio using the Pathfinder Programming software</p> <p>If a channel number is entered into this field, the radio will switch to this channel before the message is sent over the air.</p> <p>If 0 is entered, messages will be sent on the currently selected channel</p>	
Radio Tx Channel for Replies	<p>The channel on which replies back to the base will be sent. This is applicable for Position Poll replies and acknowledgement of messages sent by the base</p> <p>If a channel number is entered into this field, the radio will switch to this channel before the reply is sent over the air.</p> <p>If 0 is entered, replies will be sent on the currently selected channel</p> <p>A dedicated reply channel is normally used in conjunction with a second receiver fitted to the radio</p>	0
Normal radio Channel	<p>The channel to which the radio will return if it has sent a message or a reply on a specific channel.</p> <p>If a channel number is entered into this field, the radio will switch to this channel after a message or a reply has been sent over the air.</p> <p>If 0 is entered, the radio will stay on the channel on which the message was sent.</p>	0
Number of Channels for Messaging	<p>Used in conjunction with the Automatic Hunting for the best channel.</p> <p>If the FIND BEST CHANNEL AUTOMATICALLY checkbox has been ticked, the radio will hunt within the first Number Of Channels For Messaging for the base station when it is sending a message</p> <p>Must be greater than 0</p>	
Busy Channel Lockout Rules	<p>NONE – Ignore a busy channel and send the message anyway</p> <p>COMREP Obey the Comrep rules for busy channel, ie. Send the message if the CTCSS tone is correct</p> <p>CARRIER Never send the message if the channel is busy</p>	NONE
Save GPS Position Interval (sec)	<p>The GPS position can be stored in the vehicle unit and retrieved later.</p> <p>If storing of the GPS interval is required, enter an interval (seconds)</p> <p>If storage is not required, set this field to 0</p>	60
No Of Positions to Report on Query	<p>0 – Report the current position when polled by the base</p> <p>1 – Report the last stored position</p> <p>2-10 Report the last N positions</p>	0
Second Rx Frequency	<p>The frequency on which the second receiver (if fitted) will receive</p>	
No of Positions on Auto Report	<p>0 – Report the current position when sending an automatic report to the base</p> <p>1 – Report the last stored position</p> <p>2-10 Report the last N positions</p>	0
Stagger Time	<p>The minimum time in seconds between the sending of message (routine and Emergency) re-attempts</p> <p>Valid times are 1 to 10 seconds</p> <p>The unit will add a random delay (based on its ID) to the time between attempts to avoid message clashing</p>	2
Auto Reporting	<p>Check this box if Automatic Reporting is to be turned on</p>	OFF

Messages are Tagged	A tag is attached to each message sent over the air for identification purposes LEAVE THIS BOX TICKED	ON
Page When A Message is Received	Page on the Radio's Speaker or Hooter output to alert the driver that a new message has been received The PAGE WITH HOOTER and PAGE WITH SPEAKER options must be programmed into the radio using the Pathfinder programming software	ON
ALLOW OPERATOR TO USE RADIO	If this box is ticked, the driver can select any of the functions in the radio (such as channel or volume) If this box is not ticked, the radio will remain in message mode and none of the radio controls can be selected	ON
ALLOW MESSAGES TO BE DELETED	If this box is ticked, the driver can delete a received message once it has been completed or cancelled If this box is not ticked, messages will remain in the radio until deleted by the base	ON
FIND BEST CHANNEL AUTOMATICALLY	If this box is ticked, the radio will search through the Number Of Channels For Messaging when it is attempting to send a message to the base station	

CHANGING THE VEHICLES SOFTWARE

In most instances, the software in the vehicle unit can be changed without opening the radio.. This is performed by clicking on the **Download Vehicle Software** button

The software for the tracking unit in the vehicle is contained in the file **RMT.BIN**.

Should you require an update to the software in the unit, the file can be obtained from IRC.
It must be placed in the TRACKDAT directory on the root directory the computer's hard disk

The directory is created when any message or position poll is sent to a vehicle from the main screen.

Copy the new RMT.BIN file into the TRACKDAT directory.
Plug the serial cable from the computer into the front of the vehicle unit RS232 port (9 pin D-sub connector).

Power down the vehicle unit.

Click on **Download Vehicle Software** and follow the instructions on the screen.

When the software download is complete, the vehicle unit will reset and will display its new software version on the face.

Every time the vehicle's settings are changed, the software version currently installed in the vehicle unit will be displayed on the screen. Refer to **Programming the Tracking Unit** section above.

PROGRAMMING THE BASE UNIT

The base unit is connected to the computer. It has some parameters which can be changed.

Click on the Change base Modem Settings button to bring up the Base Unit settings window

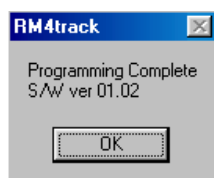
The settings shown are for the base unit

PARAMETER	DESCRIPTION	DEFAULT VALUE
Transmitter Preamble	The time in milli-seconds that the radio transmitter is turned on for before a message is sent. This time can be short (200mS) for simplex communications and may be required to be long for repeater operation (up to 1000mS) If the radio receiving the message is scanning, the time may have to be increased so that the scan channel can be found. Legal values are from 200 to 2500mS	500mS
Repeater Flag Interval	The base unit is capable of identifying all the repeaters in the network to the vehicles. It does this by keying up each repeater in turn at a regular interval Valid intervals are 20 to 999 seconds. 0 – Disable repeater flagging	0
Number of Channels to Use	Used in conjunction with the Automatic Hunting for the best channel. If the HUNT FOR VEHICLE checkbox has been ticked, the base will hunt within the first Number Of Channels to Use for the vehicle when it is sending a message Must be greater than 0	5
Message Retry Times	The number of times that a message or poll will be sent to a vehicle before giving up The base will stop sending when the vehicle replies	30
Time Allowed for Vehicle to Reply	The time in milli-seconds between sending messages to allow the vehicle to reply Valid range 1000 to 10000 milli-seconds	2000

First Vehicle in the Group	The ID of the first vehicle in the group. The vehicles should be numbered concurrently. Eg. First Vehicle 10001 Second vehicle 10002 100 th vehicle 10100 This allows the base unit to store the last channel on which a vehicle was received which is used when hunting for a vehicle.	
Number of Vehicles in the Group	The total number of vehicles in the group that this base will talk to 1 to 100	
HUNT FOR VEHICLE	Tick this box if the base is to hunt for the vehicle through the allowable channels (Number of Channels to Use)	

The base settings can be changed by entering them on the programming screen and then programming them into the unit via the 9 pin D-sub RS232 connector at the front of the radio.

Click on START PROGRAMMING when the settings are correct.
The base settings will be updated and then the programming confirmation box will be displayed



If programming is unsuccessful, an error message will be displayed

CHANGING THE BASE UNITS SOFTWARE

The software in the base unit can be changed without opening the radio.. This is performed by clicking on the **Download Base Modem Software** button

The software for the tracking unit in the vehicle is contained in the file **MODEM.BIN**.

Should you require an update to the software in the unit, the file can be obtained from IRC.
It must be placed in the TRACKDAT directory on the root directory the computer's hard disk

The directory is created when any message or position poll is sent to a vehicle from the main screen.

Copy the new MODEM.BIN file into the TRACKDAT directory.
Plug the serial cable from the computer into the front of the base unit RS232 port (9 pin D-sub connector).

Power down the base unit

Click on **Download Base Modem Software** and follow the instructions on the screen.

When the software download is complete, the vehicle unit will reset and will display its new software version on the face.

VEHICLE HUNTING

Both the base and the vehicle can be programmed to hunt through the available channels until a reply is received.

When the base wishes to poll a vehicle, or send it a message, it can switch through each channel in turn until it receives a reply from the vehicle.

The vehicle can do the same when sending a message to the base.

There are a few requirements for hunting to work

1. The radio in the base and in the vehicle must be programmed the same from channel 1 to the total number of channels to use for messaging

ie. if 20 channels are used for messaging then channels 1 to 20 in both the vehicle radio and the base radio must have the same frequencies and CTCSS tones.
2. The **Hunt for Vehicle** checkbox must be ticked in the **Base Unit Settings** window
3. The **Find Best Channel Automatically** checkbox must be ticked in the tracking unit programming screen.
4. The number of channels for messaging must be entered in both the Vehicle Unit and Base Unit options. They must be the same
5. The ID of the first vehicle in the group and the number of vehicles in the group must be entered under the Base Unit options
6. The Base Unit can be programmed to flag all the repeaters (from channel 1 to the number of channels) at a regular interval if desired.

How Hunting Works

Both base and vehicle can search for one another within the programmed number of channels when sending messages.

The base and vehicle both transmit, as part of their message, which channel they are using.

The base will store the last channel used by the vehicle (within its group) as the favorite channel for that vehicle. The next time it wishes to communicate to the vehicle, it will attempt to use this channel first. If it doesn't succeed, it will use the other channels in turn.

The vehicle will monitor any activity over the network and will store the last channel it heard as its favorite. The next time it wishes to communicate to the base, it will attempt to use this channel first. If it doesn't succeed, it will use the other channels in turn.

The base can be programmed to flag the repeaters in turn to provide activity over the network for the vehicles to hear and thus update their favorite channels.