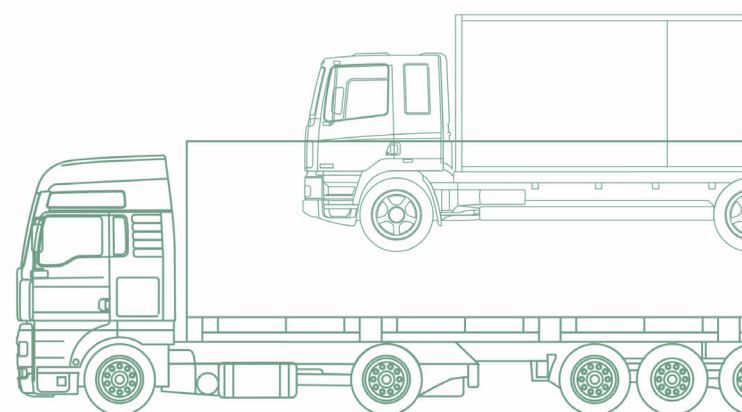




InfoTrack Vehicle Tracking Systems
Installation and commissioning manual
Data Processing Unit DPU 4500

Technical details in this document are subject to change without notice



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1 Introduction

1.1 InfoTrack Vehicle Tracking Systems

InfoTrack is a comprehensive vehicle tracking system. The system comprises of just two elements, a Data Processing Unit (DPU) with a SIM card activated for data and operating software.

The Data Processing Unit (DPU) is fitted discreetly within the vehicle and a computer operating programme is installed on the base station PC or laptop.

1.2 Functionality

Once operational, the base station can access the Data Processing Unit (DPU) via a modem and telephone connection. When connected, the software converts the data from the Data Processing Unit (DPU) and positions the vehicle on a 'moving' map. The software displays all the information needed; location, speed, direction of travel, including stops and starts, in real time as the journey takes place. InfoTrack uses mapping software to position the vehicle down to street level throughout the United Kingdom / Europe or the United States of America.

1.3 Vehicle equipment

InfoTrack supply the following equipment as standard for installations: -

- One Data Processing Unit (DPU) complete with Data enabled SIM card.
- Covert antenna
- Power cable
- Installation Manual

There is an optional external roof antenna, which may be procured if required.

1.4 Data Processing Unit DPU 4500

The DPU 4500 has been designed to operate on any digital GSM network subject to individual network roaming agreements. The DPU 4500 conforms to the GSM type approval for class 4 (900MHz) and class 2 (1800MHz) in Europe and class 2 (1900MHz) in the USA.

Table 1 Technical data

Dimensions:	59 x 27 x 111 (W x H x D)
Weight:	266 g
Power supply:	12 to 24 V DC ($\pm 10\%$)
Current: Peak current	<2A
Av. Current (moving data logging & rolling loop)	<500mA
Av. Current (ignition off & out of GSM/GPS service)	<50mA
Av. Current (ignition off & in GSM/GPS service)	<20mA
Temperature range:	Storage -20 to +70 C Operating -20 to + 60 C Charging 0 to 40 C
Interface 1:	GSM Antenna 50 ohm SMA female, 900MHZ - 1800MHz – 1900 MHz
Interface 2:	Power / AUX 15 pin D-sub male
Interface 3:	GPS Antenna 50 ohm SMC male, 1.57542 GHz $\pm$ 10 MHz
Internal SIM Interface:	small size SIM 3 or 5 Volt

The DPU 4500 compatible with two variants of software, these being:

- InfoTrack Professional - is a professional fleet system, which enables real time live tracking and allows journey data to be recorded and stored in the DPU V2.0 for remote downloading.
- InfoTrack Live Track - is a live tracking only system allowing real time tracking only.

1.5 External roof antenna GSM/GPS

The External roof antenna is used when the presence of an installation does not need to be hidden. The External roof antenna uses a rubber gasket to provide a watertight seal. With this antenna it is only necessary to drill one 18mm hole in the vehicle. The cabling for this antenna terminates with a male SMA connector for GSM and a female SMC connector for GPS.

Note: In order to comply with FCC RF exposure requirements, the

antenna(s) provided with this unit must be used. Do not use different antennas(s) or cable. Doing so may result in the installed system exceeding the RF exposure requirements. Further, the antennas must be installed such that the minim distance of 20 cm away from all nearby person is maintained.

1.6 Covert antenna GSM/GPS

The covert antenna is designed to be used when the presence of an installation needs to be hidden, and also eliminates the need to drill a hole in the vehicle bodywork. The cabling for this antenna terminates with a male SMA connector for GSM and a male SMC connector for GPS

1.7 Power cable

The power cable is designed to connect both a permanent voltage to power the DPU and to an ignition line to allow the full range of functionality of the unit to be used.

2 Installation code of practice

2.1 Installation C.O.P

The following code of practice lays down the criteria for InfoTrack dealers to adhere to when installing the InfoTrack Vehicle Tracking system.

The objective of adherence to the code of practice is to ensure a satisfied customer with a safe and efficient installation thus maintaining the high quality of a system associated with the InfoTrack name.

2.2 Approved installers

A qualified installer using InfoTrack's recommended fitting instructions must fit all DPU's. Please contact InfoTrack for the current list of approved installers.

2.3 Vehicle inspection

Prior to installation the vehicle's bodywork, upholstery and electrical fittings shall be checked. If any problems are identified these shall be pointed out to the customer before the work takes place. The InfoTrack Pre-Installation (PI1) form checklist shall be completed to provide a record of the vehicle condition before installation, which is to be signed by the customer.

2.4 Installation

- a) The health and safety at work act shall apply.
- b) Where appropriate disconnect the vehicle battery by releasing the earth terminal.
- c) When drilling holes ensure that the vehicle paint work is protected by applying insulation tape in a cross, over the area to be drilled; remove any swarf from the drilled hole; fit grommets where wiring passes through panels.
- d) Fit the product in accordance with these instructions.
- e) Wiring connections shall be of the following type:
 - i) Soldered, using non-corrosive solders and protected by adhesive lined heat shrink sleeving.
 - ii) Insulated crimp connectors using ratchet-crimping pliers.
 - iii) Or the Vehicle manufacturer's recommended method of termination.
- f) Scotchlok type connectors are NOT to be used.

2.5 Commissioning

The system shall be commissioned in accordance with the installation manual, using a laptop computer and modem with the InfoTrack testing software.

2.6 Final inspection

Ensure that the following have been carried out:

- a) All items removed have been put back correctly.
- b) All swarf and debris has been removed from the vehicle.
- c) All audio codes are reset.
- d) All system documentation is complete.
- e) Installation records are correct.
- f) Secure documentation is correctly stored.

2.7 Customer Handover

On handing over the vehicle to the customer the system should be demonstrated to be working on the customers PC. The Installation sheet should be signed and securely stored.

3 Installation

3.1 Introduction to installation

The purpose of this section of the manual is to provide sufficient information to the installation team to allow them to install the InfoTrack vehicle equipment. Once installed, section 5 of this manual is used to commission the equipment.

Cars and car-derived vans tend to have similar characteristics and hence their installation is fairly consistent. Heavy-duty commercial vehicles, particularly articulated lorries, have their own inherent problems.

3.2 Importance of a good installation

The importance of a good installation of the InfoTrack equipment cannot be over emphasised. A poor installation will reduce equipment performance and complicate the commissioning task. A good installation with sufficient thought and planning will ensure good performance from the system and assist the commissioning process.

When installing the equipment the bonding of the equipment and antenna is crucial. All earth leads must be checked for a resistance of less than 0.1 Ohm to the vehicle's main earth point. Failure to comply with this check will lead to poor equipment performance and a likelihood of intermittent problems in the future. Whenever possible, all earth leads must be kept to less than 410mm (16in). Long earth leads introduce considerable impedance at radio frequencies even though their DC resistance is low.

When cabling equipment particular care must be taken to protect all cables from chaffing. Where cables are fed through bulkheads or panels, grommets must be fitted to the hole to protect the cables. Damage to cables can cause false alarms or damage to the DPU.

3.3 Crimp connectors

The use of the correct size crimp connectors is important to the reliability of the installation. The colour of crimp connectors and appropriate wire sizes are as follows:

Red crimp	-	0.5 to 1.5mm
Blue crimp	-	1.5 to 2.5mm
Yellow crimp-		2.5 to 6.5 mm

3.4 Equipment Earthing

It is essential that the electrical resistance between the antenna earth, DPU and the vehicle's main earth is less than 0.1 ohms. This must be measured with the battery earth terminal disconnected to prevent current flow affecting the resistance readings. The following points are to be considered at all times:

- Earth leads are as short as is possible. Earth leads are to be connected to the vehicle earth point where resistance between itself and main vehicle earth point is less than 0.1 ohm. The resistance to be checked and confirmed. DPU power and antenna plugs are disconnected when making resistance checks and vehicle battery earth is lifted
- No earth lead should exceed 410mm (16in) in length as long leads introduce considerable impedance at radio frequencies even when the DC resistance is low.
- Earth leads to be connected to a clean unpainted surface, secure with bolts and star type shake proof washers.
- All earth connections are to be protected by sealant.
- All bolts and shake proof washers must be of a conductive material.
- All earth connections; including physical connections of the antenna are to be checked.

3.5 Advance requirements

Before the InfoTrack equipment is installed a full set of equipment and tools must be available. Vehicle to be available for a minimum of half a working day.

3.6 Checks before installation.

Simple checks of the vehicle can greatly reduce time spent on installation and commissioning as can ensuring that all the necessary equipment is available and to hand. The following checks should be made before the installation is undertaken:

- a) - Vehicle supply voltage and polarity.
- b) - Position for the DPU.
- c) - Position for the Antenna.
- d) - Cable runs.
- e) - Earth points.

3.7 Vehicle voltage supply and polarity.

The majority of cars, vans and small lorries on the road today use a 12-volt negative earth electrical system. Many commercial vehicles, owing to the heavy electrical load requirements, use a 24-volt earth return electrical system. For this reason, the InfoTrack vehicle equipment has been designed to operate with either 12-volt or 24-volt negative earth voltage supplies. Vehicles with voltage supplies outside this range require an addition external converter.

Where a vehicle has a 24-volt isolated return system, an isolated 24/12-volt converter is used to maintain isolation. Isolated return systems are usually found on vehicles carrying dangerous loads. Dangerous loads are petrol, explosives and chemicals; these vehicle types should not be installed without first consulting Trackcom.

If isolated return vehicles are to be met, the installer must check that the isolation between the battery and the vehicle chassis is correct both before and after the installation of the equipment. It can often be found that the integrity of the isolation earth has been broken by unauthorised equipment fitted on the vehicle.

Check the supply voltage and polarity of the vehicle to be fitted to ensure that the necessary isolated DC to DC converter is available.

3.8 Position of the DPU.

The siting of all the InfoTrack equipment is crucial to its satisfactory operation. The important factors to take into account when deciding on a position to fit the unit are as follows:

- Clean and dry environment.
- Away from radio frequency interference (RFI) sources.
- Type of mount arrangement

Clean and dry environment - the DPU should be fitted in a clean dry environment. Almost anywhere on the interior is possible except in the engine compartment. Areas to avoid are:

- Where tea, coffee, cigarette ash, etc. will be a problem.
- Where cables will be difficult to run or will get damaged by the user of the vehicle.
- Around heaters or water drainage points.

Away from RFI sources - i.e.: in the vicinity of the in/car radio - entertainment system, in/car navigation systems, CB radio or HT leads, engine management system.

Type of mounting arrangement. Determine the method of fixing the unit to the vehicle. If there is a plane surface, the unit can be bolted or screwed directly to this.

3.9 Antenna position.

The siting of the antenna is crucial to the satisfactory operation of the equipment. Most noise and interference that is fed to the DPU is picked up and amplified by the antenna. Little is picked up via the cable of the unit. The vehicle antenna must be fitted incorporating all the following points:

- Adequate ground plane around the antenna.
- Away from the vehicle's engine and other RFI sources.
- High as possible away from sources of interference and Driver / Passengers.
- Hidden or disguised.
- Access to the underside of the antenna for routing cables. Cables should not be wound or bound together.
- Where it will not get damaged in normal use.
- There should be no metal objects obstructing the antennas view for example parts of the vehicle chassis or metal lined dashboard.
- In vehicles with metallic window tinting, the GPS antenna should be mounted outside on the vehicle body, for example on the roof or inside the plastic fender.

Note: To ensure perfect function please keep a distance of at least 10cm to metal parts like window frames.

Ground plane. A ground plane is required for a good transmission and to help subdue RFI to the low frequency navigational signals. This is normally obtained from the chassis of the vehicle. In the case of a glass reinforced plastic (GRP) vehicle, a ground plane will need to be provided for the antenna. The size of the ground plane is to be 375mm by 375mm (15in by 15in) typically 24swg aluminium.

3.10 Cable runs

Ensure that cables are not routed close to RFI sources such as HT Leads. Ensure that cabling and equipment are well away from Engine Management units, ABS sensors and Airbags sensors.

Try to make the installation as neat and secure as possible. Always use grommets where cables have to go through bulkheads to avoid damage caused by chaffing of the protective covering. Cables are to be hidden from sight and are, where possible, not to be colour coded.

3.11 Earth Points

Earthing of the InfoTrack equipment is essential to its operation. The following mechanical and electrical factors must be considered for the earth points:

Mechanical

- Not subject to corrosion
- Part of the main chassis or cab of the vehicle
- Short distance from the equipment

Electrical

- Low resistance to the vehicle chassis (less than 0.1 ohm)
- Good metal to metal joint
- Correct size and type of terminals used on wire

3.12 Installing the equipment

By this stage, the installer will have decided where the vehicle equipment is going to be installed and the type of antenna that is going to be used for the installation.

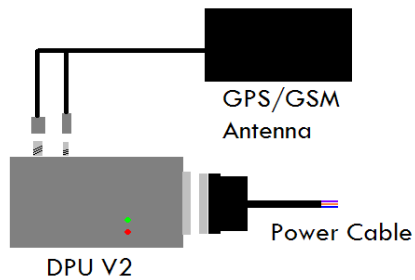
Always ensure that a full set of the correct equipment and all the necessary tools are available and to hand before attempting to install a vehicle.

An Installation sheet supplied by Trackcom must be completed in full for every complete system fitted.

Information is given in the following paragraph on how to install each part of the vehicle equipment. Information is given with reference to the schematic diagram, figure 1.1

- Installing the Data Processing Unit (DPU) V2.0
- Whip roof antenna
- Covert antenna
- Antenna plugs
- Power cable
- Basic checks after installation

Figure 1.1



3.13 Installing the Data Processing Unit (DPU) V2.0

Before starting, the information in section 2 is to have been read and followed to determine the best position to fit the DPU. Ensure that a fully operational SIM card is inserted into the unit before fitting and the SIM number and Data number has been logged on the Installation Sheet. Determine the material in which the self-tapping screws/bolts are going to go into. From the following, select the appropriate fixings:

- | | | |
|--------------------------|---|--------------------------------------|
| - Metal, no rear access | - | 4x self tapping screws, M4 |
| - Metal, access to rear | - | 4x M4 nuts and bolts, length to suit |
| - GRP, no access to rear | - | 4x self tapping screws, M4 |
| - GRP, access to rear | - | 4x M4 nuts and bolts, length to suit |

The procedure to fit the unit is as follows:

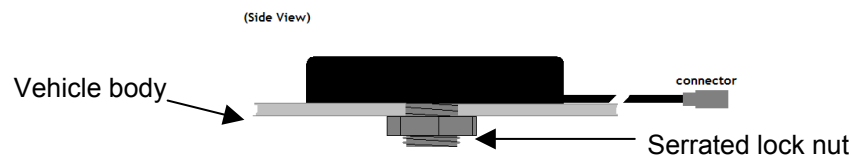
- Offer up the DPU in the required position and determine the drill holes for the self-tappers / bolts. Drill pilot holes through the plate holes into the vehicle after first ensuring that there are no cables or fuel tanks behind the fixing position.
- Open up the holes in the vehicle to accept an M4 bolt. Clean off all burrs with de-burring tool. Fit the bolts through the plate and vehicle and secure in place with a lock washer and nut. Remove the excess length from the bolt OR,
- Secure DPU in place with self-tapping screws.

3.14 External roof antenna

The External roof antenna is generally used for commercial vehicles. The

antenna is secured to the roof of the vehicle with nuts from inside the vehicle and can be fitted to almost any surface, the gasket providing a good seal.

Figure 1.2



A diagram of the antenna fitted to a metal vehicle, figure 1.2, is shown above. When fitting the antenna to a GRP or non-metallic vehicle, a ground plane must be provided for the antenna. The ground plane is essential for the correct operation of the antenna and consists of a metal plate under the antenna that is electrically connected to both the antenna and the vehicle chassis. The minimum size of the ground plane is 375mm by 375mm (15in by 15in) and is to be of aluminium plate, typically 24 swg.

The procedure to fit the antenna to the vehicle is as follows:

- a) Locate the exact site for the antenna and ensure that there is no headlining or wires under the site. Remove headlining as necessary.
- b) Put tape over the centre of the antenna site and make a small centre pop in the centre of the tape. Drill a small pilot hole through the vehicle and gradually open up, using larger size drills, to 18mm. Clean off all burrs.
- c) Abrade the underside of the hole with coarse emery cloth to remove paint. Fit antenna as shown above and secure with the serrated lock nut.
- d) Run both the antenna feeder cables to the DPU ensuring that the cable is protected with grommets where it passes through bulkheads or the frame of the vehicle.
- e) Re-fit the headlining as required.
- f) Check for good antenna earth connection by measuring between earth braid of the feeder cable and the main earth with a DVM set to its lowest ohm range. The reading should be less than 0.1 ohm.

If the vehicle is GRP

- g) Obtain a piece of 24 swg aluminium plate, measuring at least 375mm (15in)

square, with rounded corners. The rounded corners ensure that the plate does not crack the GRP. Drill a small pilot hole through the centre of the plate and open it up to 18mm. Clean off burrs.

h) Fit four lengths of cable (84/0.3, 6mm) directly to the ground plane using nuts, bolts and star washers. These are to be used as earth wires. Fit the earth plate and wires to the inner skin of the vehicle and secure in place with antenna spigots and nuts.

i) Run the four earth wires in different directions (as near to 90 degrees to each other as possible) to the nearest chassis earth point that provides a good earth. Cable lengths should be as short as possible and should not exceed 410mm (16in)

j) Clean the chassis earth points with degreaser and a wire brush. Fit the earth cables to the earth points using suitable crimps and self-tapping screws or bolts. Spray over the joint with silicone spray to prevent corrosion.

3.15 Covert antenna

The covert antenna is designed to be hidden anywhere in the interior of the vehicle, therefore does not require a ground plane and is earthed directly through the DPU.

The covert antenna can be mounted in the vehicle interior, for example on or under the dashboard or parcel shelf. The antenna must have a clear 'view' of the sky and the following points must be taken into account:

- There should be no metal objects obstructing the antennas view, for example parts of the vehicle chassis or metal lined dashboard.
- In vehicles with metallic window tinting the antenna should be mounted outside on the vehicle body, for example on the roof or inside the plastic fender.
- To ensure perfect function, keep a distance of at least 10cm away from metal parts like window frames.
- The antenna should not be attached to the heater matrix or heater ducts
- The antenna should be positioned away from radio receiver - too close proximity could generate RF interference.

The procedure to fit the antenna to the vehicle is as follows:

- a) Locate the exact site for the antenna with a suitable flat surface
- b) Secure using double sided adhesive tape and / or cable ties
- c) Run both the antenna cables to the DPU ensuring that the cable is protected

with grommets where it passes through bulkheads or the frame of the vehicle.

3.16 Power cable

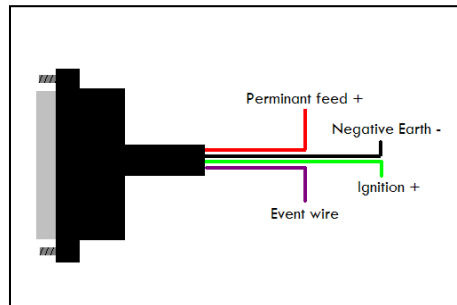
The power cable should be connected to a permanent +12-volt or +24-volt supply, earth and to an ignition line (either +12-volt or +24-volt). Please note that the permanent positive supply does need to be a permanent supply. This needs to be checked that it does not dip below 10.2V at the DPU when the vehicle ignition is cranked. If the permanent voltage supply does drop briefly below 10.2V, for instance during engine ignition, then the DPU will diagnose this as a brown out and reboot itself. This will not damage the DPU or the vehicle, but will take up to 90 seconds to recover and continue to track. During that 90 seconds the unit will not operate. After recovering the unit will return to its previous settings and all previous logs will be available. When connecting to the vehicle's power do NOT interfere in any way with the ABS wiring (yellow) or any other safety critical wiring.

The DPU is fused internally and an external fuse is not required. If however an external fuse is used, it is recommended that a 3-amp slow-blow fuse (or an equivalent) and a water resistant fuse holder be used.

The wiring connections are as follows: (See figure 1.3)

- a) Connect the RED wire from the power cable to a continuous +12 volt or +24 volt feed supply using the correct size crimp connector.
- b) Connect the BLACK wire from the power cable to the vehicle chassis using the correct size crimp connector.
- c) Connect the GREEN wire from the power cable to a switched ignition +12 volt or +24 volt feed supply
- d) When fitting the door event wire, (optional extra) connect the PURPLE wire from the power cable to the negative wire of the door switch (interior light).

Figure 1.3



Before leaving the installation to start the commissioning, the engineer must make the following checks and tests:

- Antenna earth test (Roof antenna)
- Fuse ratings check (if fitted)
- Cable check
- Isolated earth check (where applicable)
- Power on check
- Vehicle checks

a) Antenna earth test - With the SMC connector plug disconnected from the DPU check that the earth resistance between the antenna SMC earth and the chassis earth is less than 0.1 ohms.

b) Fuse ratings check - If fitted, check that the correct fuses are fitted.

c) Cable check - Check that all the cables have been correctly cleated along their length and that grommets have been fitted.

d) Isolated earth check - If the vehicle has an isolated earth, the integrity of the earth should have been tested before the installation was started. On completion, the integrity of the earth isolation must again be checked to prove that the installation is correct.

e) Power on check - When all other checks have been carried out, connect the power cable to the DPU. Check that the LED is flashing. See section 5.7.

f) Vehicle checks - Ensure that all surplus wire etc. has been removed and that the vehicle is clean and tidy. Check the operation of the vehicle's lights, engine and ancillaries to ensure that a fault has not been inadvertently been put on the vehicle.

4 Installing the InfoTrack software

4.1 Software Installation

Insert Software CD into CD-ROM Drive. InfoTrack will automatically Run.
Follow Installation Wizard to load Software.

If CD fails to Automatically Run.

Click the >Start< button on the task bar and choose >Run< and type <*>
:/SETUP.EXE > OK

You will be asked to insert an Activation Code which you can obtain by calling
Trackcom Ltd. on 01908 288288, Quoting your System ID number.

Your System ID number will displayed on the initial Unlock software Screen.

5 Commissioning

5.1 Introduction

The information in this section details most eventualities that will occur when commissioning a vehicle. When in doubt, the installer should contact Trackcom technical support on 00 (44) 1908 288288 which is manned between 0900 and 1800 weekdays (UK time).

Before the InfoTrack equipment is commissioned, the following requirements must be met:

- Equipment correctly fitted in accordance to section 3 of this manual
- Vehicle to be on a reasonable open site i.e. not garaged
- Full set of testing equipment to be available
- Tool kit available

5.2 Testing equipment

A laptop computer and modem complete with the InfoTrack programme and a digital multi-meter (DMM) must be available before attempting to commission the equipment.

5.3 Commissioning procedure

The following list shows the procedure to be followed for commissioning a vehicle. Each stage must have been passed before proceeding to the next stage.

- Basic installation checks
- Power up and basic checks
- Siting vehicle
- Initialising the vehicle
- Testing the vehicle
- Road test the vehicle
- Clean and secure

5.4 Basic installation checks

Before the commissioning can take place, the installer must ensure that the unit has been correctly installed. This can be detailed as:

- Mechanical checks
- Electrical checks

5.4.1 Mechanical checks

The following mechanical checks are to be carried out

DPU - Secured correctly with the appropriate fixing.
 Antenna - Correctly installed. Ground plane fitted correctly if required.
 Fuse and fuse holder - Correctly installed.
 Power cable - Correctly installed.
 DC to DC converter - Correctly installed.
 Cabling - Grommets are used when cables are fed through bulkheads.

5.4.2 Electrical checks

Supply rails - Check that rails are connected to the correct points. Check that fuses are the correct value. Check that crimp connectors have been correctly made and are correct sizes.

DC Input - Disconnect the DC power cable from the DPU. Check the DC input with a DMM as follows:

Pin 04	-	10 to 30-volts DC
Pin 03	-	10 to 30-volts DC with ignition ON
Pin 10	-	Negative output

If the voltages are incorrect, investigate using procedure in section 6

5.5 Siting vehicle

When all the basic function checks have been successfully completed, the next step is to move the vehicle to a suitable open space for commissioning.

The commissioning area must take into account the following:

- Buildings or structures
- Power lines
- Other sources of interference

5.5.1 Buildings and structures

The vehicle should be sited away from tall metal or brick structures. The table below is used as a guide to how far away the vehicle should be:

Number of stories	Metal Structure	Brick/stone Structure
1	40 meters	20 meters
2	50 meters	30 meters
3	60 meters	40 meters

5.5.2 Power lines

The vehicle must not be parked under or near power lines. This also applies to electrified railway lines

5.5.3 Other sources of interference

The vehicle must not be parked near other sources of interference i.e. tall trees, next to a larger vehicle, near large antennas.

5.6 Power up

When all basic installation checks have been successfully completed, the next step is to power up the DPU and check the basic function of the unit.

5.7 Power up checks

Reconnect the power cable to the DPU. Check the following indicators of the two LED's on the top of the DPU:

Initial power up - When the power cable is first connected the DPU will go into boot up mode. While booting both LEDs are not lit. Booting will take about 30

seconds. When it finishes booting both LEDs will flash together about once per second. The DPU will then attempt to register on the mobile phone network. When it succeeds the **Green** will flash twice in quick succession each second. The **Red** will flash twice in quick succession when it has a 2D GPS fix and three times for a 3D fix.

The unit will then go into **sleep mode**. (No flashes)

To ensure the DPU is working it is then necessary to turn **on** the ignition.

The LED's will flash together (**Red and Green**). The above sequences of flashes still apply, with the further combination of **3 Green** flashes for DPU 'in call' and **4 Green** flashes for 'error on call'.

5.8 Connecting to the DPU

Once all the basic checks and power up have been successfully completed, using a laptop or computer with a modem it is necessary to connect to the DPU to ascertain that the DPU is operating correctly.

The following tests must be carried out:

- Live track
- Data download

Using the InfoTrack software, set up the programme to track the DPU. Reference to setting up the system can be found in the current version of the InfoTrack User Instruction Manual.

5.8.1 Adding a vehicle

Vehicle Name - this name appears on the Main Map and Reporting

SIM Number - is the vehicle dial up number (See the Installation Record).

Unit Number - is the number of the DPU unit.

Driver - this name will appear in the Vehicle Details panel.

Note: If the telephone system requires a number pre-fix to obtain an outside line, this number must be typed before the unit number.

Fuel Details - click fuel types then enter average MPG Figure.

Time Details - set to differentiate between Business and Private mileage. Click to highlight the relevant time segment - adjust digits using [up / down] arrow box.

Click on a Vehicle Icon from the selection given.

Click >Add< to enter details. The >Settings< panel re-appears.

Click >Add New< to input additional vehicles and repeat the above process.

Click >Save< to record details - the screen will then disappear.

5.9 Live Track

The vehicle icon(s) (as previously entered in >Add New< panel) will appear in the Info panel at the top of the Main Map.

Select a vehicle for tracking by clicking on the appropriate icon.

[a] Double click to begin dial-up process OR...

[b] Right click on vehicle icon to activate mini menu – click > Live Track< option.

The vehicle should then be displayed on the map at its location.

Confirmation of real time operation is shown by the appearance of a modem icon in the lower right hand corner of the Main Navigation bar.

Note: You can only Live Track ONE vehicle at a time.

The icons of a previously tracked vehicle will remain static in their last recorded location on the map. *NB:* Connection can be made to previously tracked vehicles by placing the mouse cursor on the vehicle within the map and single clicking. A menu will appear allowing you to select Live Track. This method can also be used to Zoom to the selected vehicle.

5.10 Data Download

Testing the download feature ensures that the DPU is operating correctly and that an efficient and secure installation has been carried out.

There are 3 types of event that the DPU records, these being

- Journey data
- Ignition on/off event
- Door open/close event (optional extra)

To test for these events:

Journey data - It is necessary to have the vehicle ignition on. The default option is to log the vehicle at anytime when the ignition is on, even if the vehicle does not move. The further the journey - the more data will be recorded.

Ignition on/off event - To test this feature simply turn the ignition on and off several times

Door open/close event (optional extra) - To test this feature simply open and close the relevant door.

Downloading the data to the PC

Click *>Log Download<* on the Main Navigation bar to open the Settings panel.

Select vehicles for data downloading by clicking the appropriate boxes.

Click *>Download now<* to connect with the vehicle(s) and begin downloading the data.

The status of each download will be shown in the Information panel.

After completion of data download, the programme disconnects the telephone link and activates the *>Saving Journey to Log, Please wait<* panel.

It is now necessary to create a Journey report to show that each event has been successfully downloaded.

Click *>Report<* on the Main Navigation bar to open the Report panel.

In *>Report Type<*, select *>Journey Report<*

A list of events will then be created and shown on the screen.

Journey data - The journey that has been taken will be shown in the text format of streets and towns

Ignition on/off event - In text format, Ignition on and/or off will be shown

Door open/close event (optional extra) - In text format Door open and/or close will be shown.

If the live track or data download process fail to work, contact Trackcom Ltd. for advice on 00 (44) 1908 288288

5.11 Clean and secure

The vehicle must be left clean and secure on completion of the commissioning. The vehicle should be left in the same condition as it was before any work took place. Good customer relations are an essential part of commissioning. Once the

commissioning process is completed and the customer has been shown how to work the system a signature is required from the customer on the Installation sheet.

6 Maintenance

6.1 Introduction to maintenance

The purpose of this section is to provide sufficient information to the equipment maintainer to enable them to repair / replace the InfoTrack vehicle equipment in the event of breakdown.

InfoTrack equipment has been designed and manufactured to professional standards using high quality components and materials throughout. As such, there is no requirement for any routine tuning or maintenance to be carried out on the equipment. Before units are deployed, they are bench tuned and tested to ensure serviceability and reliability.

On site, testing and repair is carried out using the same computer and test equipment that is used during the commissioning of the equipment.

The information in this section of the manual is designed to assist an engineer to quickly locate a defective unit. The maintenance policy for the equipment is to repair by replacement of complete units. Defective units will then be returned to the equipment supplier using a Fault Report form.

This section of the manual presents information under the following headings:

- Fault finding assistance
- Typical fault reports
- Equipment testing and checks
- Unit replacement
- Routine maintenance

6.2 Fault finding assistance

Information in this section is given under the following headings:

- Confirm reported defect
- Advance requirements
- Test equipment

6.2.1 Confirm reported defect

Before any tests or checks are carried out on the equipment in the vehicle, it is always good practice to confirm the reported defect.

As the equipment is inherently reliable, a reported defect can often be localised to a simple fault such as a cable inadvertently being disconnected. Always check for simple faults before assuming that there is equipment failure.

6.2.2 Advance requirements

Before any maintenance is carried out on the InfoTrack equipment fitted in the vehicle, the following requirements must be met:

- Vehicle to be on a reasonably open site, not garaged
- Full set of spare equipment to be available
- Full set of test equipment to be available
- Tool kit available
- If possible, a copy of the installation record to be available

6.2.3 Test equipment

The following list indicates the test equipment that must be available to the engineer before attempting to test and repair the equipment:

- Laptop or computer with modem, InfoTrack software
- Digital multi-meter
- Spare Antenna
- Own vehicle fitted with InfoTrack system for comparison

6.3 Fault report and remedial action

Listed below are typical reported faults. Remedial action is dealt with under each heading:

- a) Cannot connect to the vehicle from the PC
- b) The PC will connect to the vehicle but there is not icon on the map
- c) The PC is showing a 'GPS initialising. Please wait 5 minutes...' message
- d) The PC will connect to the vehicle but will not download data.
- e) The reports do not show Ignition on/off events or Idling

6.3.1 Cannot connect to a vehicle from the PC

If the customers PC fails to connect to the vehicle it is imperative to ascertain that the PC and modem are set up correctly before revisiting the vehicle.

Confirm the fault by testing that the vehicle does not connect using a known operational PC. For assistance contact Trackcom Ltd on 00 (44) 1908 288288.

If the vehicle connects using a known operational PC, the vehicle does not have to be revisited and the fault is with the customers PC. The following action must be taken:

- Ensure that the modem is configured correctly and that it is able to get an outside line. .
- Ensure that the settings in the InfoTrack programme are configured correctly and that the Data number has been entered correctly. Please remember to use the prefix code ie.9 if connecting through a switchboard. See InfoTrack user instruction manual for reference.

If the vehicle does not connect using a known operational PC, the vehicle will need to be revisited at the customer's earliest convenience. When on site the tests carried out to ascertain the fault are similar to those carried out during the commissioning of a vehicle. The tests should be carried out in order detailed below and faults are to be rectified at each stage

- Basic checks
- DC Voltage checks
- Power up checks
- Antenna checks

6.3.2 The PC will connect to a vehicle but there is no icon on the map

If it is found that the PC will connect to a vehicle (indicated by the connection details box in the bottom right of the screen) but no icon is shown on the map, there is an incompatibility between the PC software and the DPU software. A software update is needed for the PC, which is available from Trackcom Ltd.

6.3.3 The PC is showing a 'GPS initialising. Please wait 5 minutes...' message

When the PC is showing a 'GPS initialising. Please wait 5 minutes...' message when connected to a vehicle, it indicates that the DPU has not got the GPS fix that it requires to position the vehicle.

If it is a fresh fit it is recommended that connection to the DPU be not tried until 5 minutes has expired. Note that it can take up to 30 minutes in extreme cases for the DPU to get a GPS fix.

If it is not a fresh fit or a GPS fix cannot be made then it is necessary to revisit the vehicle and test the DPU and antenna as per paragraph 6.6.2.

6.3.4 The PC will connect to the vehicle but will not download data.

If it appears that the PC will not download data from the vehicle

- There is an incompatibility between the PC software and the DPU software. Software update needed
- There is a fault within the DPU software. Remote re-initialisation of the unit can be done through Trackcom Ltd.

For assistance with this fault, contact Trackcom Ltd on 00 (44) 1908 288288.

6.3.5 The reports do not show Ignition on/off events or Idling

If, when a report is created, it does not show ignition on/off or there is no idling time shown on the performance report, it is necessary to revisit the vehicle.

- Power down the DPU by removing the power plug
- With the ignition ON test for a voltage on pin 03 of the power plug

1 Reading correct

1 No fault

2 No voltage

- 1 Check fuse. If blown - replace.
- 2 If voltage is present at the fuse, then the cable is defective - replace.
- 3 If no voltage at fuse, Check connections, feed wire and supply fuse.

6.4 Equipment checks and maintenance

The majority of the tests are similar or identical to those used during the commissioning of the vehicle. The checks are detailed under the following headings:

- Basic checks
- DC voltage input checks

6.5 Basic checks

The basic checks to be carried out on a vehicle fit can be given as a list. The checks do not involve switching on the vehicle's ignition or powering the unit up. The checks are as follows:

- All cables connected to DPU.
- Power cables correctly installed and connected.
- Fuse and fuse holder correctly installed, fuse not blown and the correct ampere rating.
- DC to DC converter correctly installed and cabled.
- Antenna and DPU earth less than 0.1 ohm.

6.6 DC voltage input checks

The DC input to the DPU should always be 10 to 30 volts, irrespective of the vehicle's supply. The procedure to check the input is as follows:

Disconnect power input to the DPU and use the DVM to measure the DC voltage on the plug as follows:

Pin 04 - 10 to 30-volts DC
 Pin 03 - 10 to 30-volts DC with ignition ON
 Pin 10 - Negative output

<u>Reading result</u>	<u>Action/Suspect circuit</u>
1 Reading correct	No fault
2 No voltage	1) Check fuse. If blown - replace. 2) If voltage is present, the cable is defective - replace. 3) If no voltage at fuse, Check connections, feed wire and supply fuse.
3 High voltage	Fault on vehicle charging system. Check and repair as necessary.
4 Fuse continually blows with power cable not connected to DPU	Fault on power cable or DC to DC converter - replace.
5 Fuses continually blows with power cable connected.	1) Fault on DPU - replace

6.6.1 Power up checks

On a properly functioning DPU the LED's will repeatedly flash **Red and Green** together, with the ignition set to the **on** position.

If this is not the case then:

Disconnect and reconnect the power cable to the DPU. Check the following indicators of the LED on the top of the DPU:

Initial power up - When the power cable is first connected the DPU will go into boot up mode. While booting both LEDs are not lit. Booting will take about 30 seconds. When it finishes booting both LEDs will flash together about once per second. The DPU will then attempt to register on the mobile phone network. When it succeeds the **Green** will flash twice in quick succession each second. The **Red** will flash twice in quick succession when it has a 2D GPS fix and three times for a 3D fix.

The unit will then go into **sleep mode**. (No flashes)

To ensure the DPU is working it is then necessary to turn **on** the ignition. The LED's will flash together (**Red and Green**)

If the LED is not on, check DC voltage inputs as per paragraph 6.6.2.

If the LED flash sequence is correct but the DPU is not responding, check that the Data number that has been supplied is correct and that it has been entered into the software correctly OR there may be a fault within the DPU software, replace the DPU and retest.

6.6.2 Antenna checks

The antenna checks are for use when the antenna fitted on the vehicle is suspected of being faulty. It is time consuming to change an antenna if the fault does not lie in the antenna. Positioning of the antenna is crucial and can be the cause of many reported faults. Check that the position of the antenna is suitable

The antenna must have a clear 'view' of the sky.

- There should be no metal objects obstructing the antennas view for example parts of the vehicle chassis or metal lined dashboard.

- In vehicles with metallic window tinting the GPS antenna should be mounted outside on the vehicle body, for example on the roof or inside the plastic fender.

Note: To ensure perfect function please keep a distance of at least 10cm to metal parts like window frames

The engineer should carry a spare antenna as part of the spares holding. If the vehicle antenna is suspect, temporarily replace the existing antenna using the

spare attaching it to the roof of the vehicle.

Note that this will not provide as good results, as a fitted antenna but will prove the operation of the existing antenna.

6.7 Unit replacement

The following paragraphs detail how to change suspected faulty units. Complete units are replaced, defective units being returned to the supplier, with a fault report, for exchange. Units must be replaced with known serviceable items and be checked after replacement using the procedure laid down in the commissioning section of this manual.

6.7.1 External roof antenna

The External roof antenna is supplied as a whole assembly kit but for repair purposes can be changed leaving the feeder cable in place

- Power down the DPU by removing the power plug
- At the antenna end, unscrew the connections to the feeder cable.
- Release the serrated lock nut and remove the antenna
- Replace antenna using the new serrated lock nut supplied.
- When fixed, spray over the base/ vehicle joint with silicone spray to prevent oxidation and seal out moisture.

6.7.2 Data Processing Unit (DPU) V2

Note it is vitally important when changing the DPU, the IMEI number of the new unit is noted as well as the data number and vehicle ID and the information passed on the Trackcom Ltd to allow the database to be updated.

When replacing the DPU

- Disconnect all cables to the DPU unit.
- Release the bolts or self-tappers and lift the unit clear
- Remove SIM card from faulty unit
- Label the DPU with the faults

- Complete the Fault Report form
- Insert SIM card into new unit
- Fit new unit in place and secure with bolts/screws previously removed
- Reconnect all cables to the unit and test for correct operation

7 Tools and equipment

7.1 Introduction

This section covers the following:

- Tools
- Test equipment

All tools, test equipment should be available before attempting to install or commission the InfoTrack equipment

7.2 Tools

Recommended equipment

The following tools and consumables are recommended as a minimum requirement:

- Suitable soldering iron
- Suitable flux corded solder
- Insulation tape
- Socket set
- Heat gun
- Selection of adhesive lined heat shrink insulation
- Electric hand drill
- Wire strippers
- Side cutters
- Selection of crimps and appropriate ratchet crimping tool
- Set of flat blade screwdrivers
- Set of Philip's screwdrivers
- Selection of Screws / Nuts and Bolts
- Torque set
- Allen keys
- Metric spanner set

- Appropriate hole cutting tool
- Trim removal tools
- Pop rivet gun
- Stanley knife
- 12 volt test lamp
- Cable feeder
- High speed drill
- Vacuum cleaner
- Deburring tool
- SMC/SMA open ended spanners

7.3 Test equipment

The InfoTrack equipment needs little in the way of test equipment, the only requirements are:

Digital Multi-Meter	Capable of measuring DC volts and resistance to within 0.1 Ohms.
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Laptop or PC with modem Running the InfoTrack programme

8 FCC Certification, Instruction to the user.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or replace the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC rules. In order to maintain compliance with FCC relations, shielding cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without approval of manufacture could void the user's authority to operate this equipment.

IMPORTANT

In order to comply with the FCC exposure requirements, the antenna provided with this unit must be used. Do not use different antenna(s) or cable. Doing so may result in the installed system exceeding the RF exposure requirements. Further, the antenna must be installed such that a minimum distance of 20 cm away from all nearby persons is maintained.

InfoTrack		Installation Record	
Date: _____			
Customer Name: _____	Reference Number: _____		
Address: _____			
Vehicle Registration			
InfoTrack Model			
IMEI Number			
Data Number			
Date Fitted			
1: Unit Position			
2: Antenna Position			
3: Other			
Options installed:			
Customer Signed: _____	Installer Number: _____	Installer Signed: _____	

Conditions of valid warranty and Data Protection Act 1988: Form must be returned to regional head office and authorised installer number must be completed.

10 Returns Form



Please call Trackcom Customer Support on 01908 288288 and obtain a Returns Number before shipping your product.

10.1.1 Trackcom Returns Number	
10.1.2 Customer Reference Number	

Returns Address: Trackcom Limited
Trackcom House, 2 Newmarket Court
Chippenham Drive
Milton Keynes, MK10 0AQ

Dealer:			
Reference:		Contact Name	
Company:		Tel No.	
Address			

Product:			
Description:		Part No: IMEI:	SIM No:
Date/ time failure occurred:		Replacement IMEI No: (if applicable)	
Fault Description: Be as specific as possible:			
Date:	Name:	Signature:	

Trackcom Limited 2 Newmarket Court Chippenham Drive
Kingston Milton Keynes MK10 0AQ
10.1.2.1.1.1 Tel 00 (44) 1908 288288 Fax 00 (44) 1908 288280