



Dual band E-GSM / GPRS Class 10 / GPS MODEM

GENLoc25



Electronic Hardware Design and Production

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CONTENTS

I - GENERAL	4
II - DESCRIPTION	4
III - USING THE MODEM	5
WE RECOMMEND THAT YOU MAKE ALL THE CONNECTIONS WITH THE UNIT UNPOWERED.....	5
III.1 - INTRODUCTION.....	5
III.2 - DTE CONNECTION.....	5
III.3 - CONNECTION TO THE SUPPLY.....	5
III.4 - NETWORK CONNECTION.....	6
III.5 - SWITCHING ON.....	6
III.6 - SWITCHING OFF THE MODEM.....	6
III.7 - USING THE RESET PIN.....	7
III.8 - USING THE GPS/DGPS FUNCTION.....	7
IV - HAYES COMMANDS	8
LINKING THE COMMANDS TOGETHER.....	8
MAIN HAYES COMMANDS.....	8
V - FUNCTIONING OF THE INPUTS/OUTPUTS	9
VI - TECHNICAL DATA.....	10
VI.1 - OPERATING CONDITIONS.....	10
VI.2 - POWER SUPPLY AND CONSUMPTION.....	10
VI.3 - RF PERFORMANCES.....	10
VI.3.1 - GSM.....	10
VI.3.2 - GPS.....	11
VI.4 - PROTECTION SYSTEMS.....	11
VII - ADDITIONAL FUNCTIONS.....	11
VII.1 - MODIFICATION OF THE SIGNALS ON V24.....	11
VII.1.1 - GSM_DSR/GPS_RxD2.....	11
VII.1.2 - GSM_DTR/GPS_TxD2.....	11
VII.2 - MODIFICATION OF THE SUPPLY VOLTAGE FOR THE ACTIVE GPS ANTENNA.....	12
VII.3 - SWITCHOVER TO LOW CONSUMPTION FOR THE RS232 (SHUTDOWN).....	12
APPENDIX I - CONNECTIONS.....	13
SIGNALS FROM THE RS 232 CONNECTOR.....	13
VIEW OF THE FRONT OF THE GEN LOC25 MODEM'S RS232 FEMALE CONNECTOR.....	13
SUBD9F-SUBD15M CONNECTION CABLE.....	14
POWER SUPPLY CONNECTOR SIGNALS.....	14
VIEW OF THE FRONT OF THE POWER SUPPLY CONNECTOR.....	14
APPENDIX II - RECOMMENDATIONS	15
PROHIBITED CONNECTION DIRECTLY TO A VEHICLE'S BATTERY.....	15
RECOMMENDED CONNECTION TO A VEHICLE'S BATTERY.....	16

CHANGES TO THIS DOCUMENT:

BASIC VERSION	MODIFICATIONS ADDED	COMPILED BY:	DATE
V01	INITIAL CREATION	F GOHIER	30/06/04
V02	MECHANICAL DRAWING OF THE CASING	P BLANCHARD	21/07/04
V03	I/O MODIFICATION BECAUSE OF CHANGE TO ED C COPPER VERSION	P BLANCHARD	16/08/04

WARNING

- TO AVOID ANY RISK OF ELECTROCUTION, DO NOT OPEN THE MODEM.
- NO INTERNAL PARTS CAN BE REPAIRED BY THE USER.
- THE MODEM MUST BE RETURNED TO THE FACTORY FOR ANY REPAIRS
- THE MODEM MUST BE SUPPLIED DIRECTLY FROM THE MAINS SUPPLY; A VOLTAGE ADAPTER MUST BE USED.

With a view to improving their products, GENER reserves the right to modify them at any time, without notice.

I - GENERAL

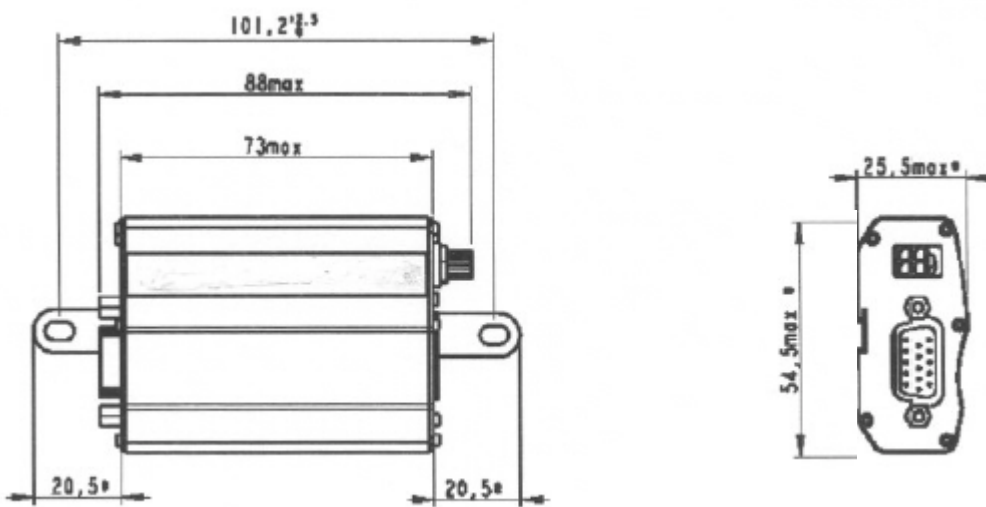
The **Gen Loc25** is:

- A **GSM modem** designed to transmit binary data asynchronously, Group 3 fax (Class 2), SMS and voice.
- A **GPS** designed for positioning.

II - DESCRIPTION

The **Gen Loc25** modem consists of an electronic card placed in an aluminium box of the following dimensions:

- Length: 73mm (excl. the connectors)
- Width: 54.5mm
- Thickness: 25.5mm



On the front of the casing:

- 4-point Micro-Fit 3.0™ female connector for the electrical supply and 2 I/Os.
- Sub-D HD 15-point female connector for the V24, telephony and GPS connections.

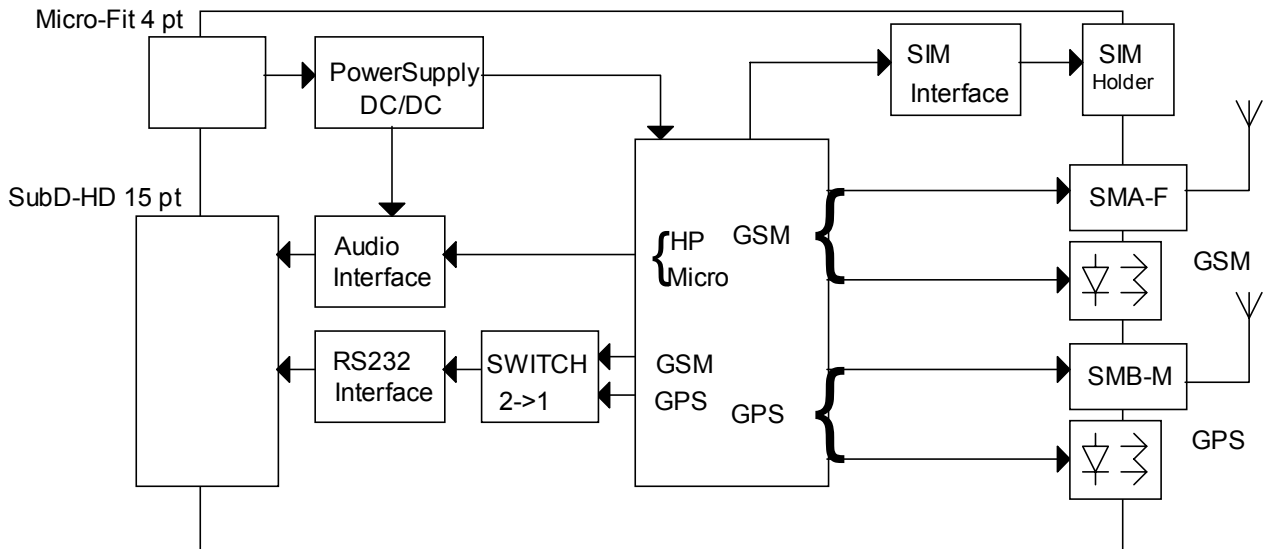
On the rear:

- SMA-F connector for attaching the GSM antenna.
- GSM modem 'Power ON' LED.
- SMB-M connector for attaching the GPS antenna.
- 'GPS positioning active' LED.
- SIM card holder

Under the casing:

- The CE label and the IMEI number

Block layout:



For details of the signals and connectors used, please refer to Appendix 1.

III - USING THE MODEM

We recommend that you make all the connections with the unit unpowered.

III.1 - Introduction

Before doing anything else, it is prudent to check that the modem is correctly configured and that all the necessary operating components are present.

The modem is delivered in its own packaging, together with:

- A set of documentation.
- A power cable
- Two fixing bridles

III.2 - DTE connection

A straight 15-point / 9-point cable is used to connect to the DTE via the V24 connection: Connect the V24 connection to the SUBD15 connector.

The DTE must be configured: 9600 bauds, 8 bits, no parity, 1 stop bit, equipment flow control.

III.3 - Connection to the supply

The **GenLoc25** must be connected to a DC supply, controlled by the power cable (please refer to the power supply ranges in the Electrical Characteristics section).

The modem is protected against excess voltage.

- Internally for surges/transitions >32V DC
- By the 2.5A fuse integrated into the power cable supplied for >32V DC; the modem is therefore disconnected from the power supply.

III.4 - Network connection

A GSM antenna must be connected to the SMA connector.

A GPS antenna must be connected to the SMB connector.

The GENLoc25 can power an active GPS antenna (see the documentation on “Specific AT Commands for GPS”).

SIM card: Press the ejector using a pointed object (pencil point) to open the SIM card holder, insert the SIM card (3V only) in the holder and re-insert the holder.

III.5 - Switching on

Switch the GENLoc25 on.

The GSM LED lights permanently and then flashes once every two seconds.

The GPS LED flashes when it is calculating the position.

If the GSM LED is functioning incorrectly:

- Check that the SIM card or the PIN code are present:
- Send via V24 the command: AT+CPIN?

The modem replies with:

+CPIN: ERROR	SIM CARD MISSING
+CPIN: READY	PIN code OK
+CPIN: SIM PIN	PIN code wrong or not yet entered
+CPIN: SIM PUK	PUK code required

-Check the antenna connection.

-Check the reception level:

- Send via V24 the command: AT+CSQ

The modem replies with: +CSQ:<rssi>,<ber>

Rssi: reception level

Ber: reception error code

Rssi must be more than 11; below 15 the signal is perfect.

The modem is now ready to receive incoming calls or to make calls. After an acquisition period (see the TECHNICAL DATA section, it can also send its position to the DTE.

If the GPS LED is unlit:

- Check the antenna connection.
- Check whether GPS is activated (see the AT command)
- Check the antenna's position (satellites not in view)

III.6 - Switching off the modem

We would strongly **advise against** switching off the power to the GENLoc25 during communication or during dialogue without disconnecting it from the operating network.

In fact, in order to to over-burden the network, **you must perform AT+CPOF when switching the modem off normally.**

If AT+CPOF is not done, the modem can remain registered on the network.

In Dialogue mode (excluding communication), before switching off the power, you must send the following sequence to the modem:

AT+CPOF or **AT+CFUN=0** (same function)

The modem replies with **OK**. The modem is no longer registered on the network and the radio unit is on standby so the power can now be switched off.

III.7 - Using the RESET PIN

This input enables you to perform a Hardware RESET on the modem. We would strongly advise against using the RESET function (SUB-D PIN 14) during communication or during dialogue without disconnecting it from the operating network.

In Dialogue mode (excluding communication), before using the RESET function, you must send the following sequence to the modem:

AT+CPOF or **AT+CFUN=0** (same function)

The modem replies with OK and then the radio unit is put on standby.

RESET is effected by setting SUB-D PIN 14 to 0V (GND).

Warning! There must never be a positive voltage placed on this RESET input (destructive effect).

III.8 - Using the GPS/DGPS function

The modem has two operating modes:

- GPS with GSM: parameters controlled by AT commands

AT+WGPSPOS which sends the last position data received

AT+WGPSNMEA=1,0,1,2,3,4,5 which, after **AT+CFUN=1**, sends the NMEA frames

- GSM and GPS separate: parameters controlled by AT commands for the GSM and by UBX protocol for the GPS units.

For more details on configuring the **GENLoc25** modem and its commands specifically for GPS, please refer to "Specific AT Commands for GPS" for the Q2501 module from WAVECOM, available on our site www.gener.fr under the heading "Technical Documents".

IV - HAYES COMMANDS

IMPORTANT:

The AT commands described below are only the main commands in current use. The complete list of all the Wavecon AT commands and their details are in the compendium of AT commands available on our site www.gener.fr under the heading "Technical Documents".

Linking the commands together

The Wavecom modem enables **AT** commands to be linked together using a semi-colon ";" as a separator

E.g.: ATE0;+IFC=0,0;&W

Main HAYES commands

ATE	ATE1 ATE0	With echo Without echo Saving by AT&W
ATQ	ATQ0 ATQ1	With reports (default with AT&F) Without reports Saving by AT&W
ATV	ATV0 ATV1	Messages in code Messages verbal (default with AT&F) Saving by AT&W
ATZ		Restores the configuration saved in EEPROM.
AT&F		Restores and saves the factory configuration. Warning! Certain commands are not restored; <u>check the appendix to the list in the compendium of Wavecom AT commands.</u>
AT&W		Saves the current configuration
AT&V		Displays the current configuration
AT&D:	AT&D0 AT&D1 AT&D2	Forced DTR signal On a descending foreground, switchover from Transfer to Dialogue mode. (Default with AT&F) hang up by DTR: switchover to low status and then high status. NB: The modem can call or answer without DTR (see the restrictions on the signals).
AT&S:	AT&S0 AT&S1	Forces the DSR signal The DSR signal follows the communication
AT&C:	AT&C0 AT&C1	Forces the DCD signal The DCD signal follows the communication

V - FUNCTIONING OF THE INPUTS/OUTPUTS

The **Gen Loc25** has 2 inputs/outputs (GPIO4 and GPIO1)

Inputs (default):

- Low Level: 0-0.8V DC
- High Level: 2-3V DC

Outputs:

- Low Level: 0-0.1V DC / -2mA
- High Level: 2.7-2.8V DC / 2mA

As an option: configurable as I2C Bus.

VI - TECHNICAL DATA.

VI.1 - Operating conditions

Temperatures

- Operating range: -35°C to + 85°C
- Storage range: - 40°C to + 85°C

Humidity without condensation:

- Operating range: RH < 70% @ +55°C

Atmospheric pressure: normal.

Weight: 95g

VI.2 - Power Supply and consumption

Power Supply

- 5-32V DC GSM / DCS / GPRS Class 2 / GPS
- 5.5-32V DC GPRS Class 10

The modem is protected against excess voltage:

- Internally for surges/transitions >32V DC
- By the 2.5A fuse integrated into the power cable supplied for >32V DC; the modem is therefore disconnected from the power supply

The GENLoc25 modem's average consumptions are:

- 8mA at rest @ 12V
- 105mA – @ 12V DC - GSM / GPRS Class 2
- 90mA @ 12V DC - DCS / GPRS Class 2
- 170mA @ 12V DC - GSM / GPRS Class 10
- 125mA @ 12V DC - DCS / GPRS Class 10
- 60mA @ 12V DC - GPS

VI.3 - RF performances

VI.3.1 - GSM

The RF performances comply with the ETSI GSM 05.05 guidelines.

The main reception parameters are:

- For E-GSM900, sensitivity is -104 dBm
- For E-GSM1800, sensitivity is -104 dBm

The main transmission parameters are:

- For E-GSM900, maximum power is 33 dBm at ambient temperature
- For E-GSM1800, maximum power is 30 dBm at ambient temperature

VI.3.2 - GPS

GPS reception sensitivity in normal mode:

- Acquisition mode: -138 dBm
- Moving mode: -146 dBm

GPS Accuracy: 5m (2m with DGPS correction)

Maximum acquisition time upon being switched on: 41 seconds.

Re-acquisition time: <1 second.

16-channel receiver (f = 1575.42 MHz)

VI.4 - Protection systems

The **Gen Loc25** modem is protected:

- By a fuse on the power supply cable: 2.5A 5x20mm
- Against voltages in excess of +32V DC
- Against +V DC polarity inversions

VII - ADDITIONAL FUNCTIONS

The additional functions are selected by inputs/outputs.

VII.1 - Modification of the signals on V24

VII.1.1 - GSM_DSR/GPS_RxD2

The GSM_DSR signal becomes the GPS_RxD2 signal (transmission of the NMEA GPS frames)
Use of input/output GPIO2

AT command:

- AT+WIOW=7,0 (by default, GSM_DSR)
- AT+WIOW=7,1 (GPS_RxD2)

VII.1.2 - GSM_DTR/GPS_TxD2

The GSM_DTR signal becomes the GPS_TxD0 signal (DGPS reception correction)
Use of input/output GPIO3

AT command:

- AT+WIOW=8,0 (by default, GSM_DTR)
- AT+WIOW=8,1 (GPS_TxD0)

VII.2 - Modification of the supply voltage for the active GPS antenna

This provides a choice of 3.3V or 5V.

Use of output GPO1

AT command:

-AT+WIOW=2,0 (by default, GPSVANT = 3.3V)

-AT+WIOW=2,1 (GPSVANT = 5V)

VII.3 - Switchover to low consumption for the RS232 (shutdown)

Use of output GPO0

AT command:

-AT+WIOW=1,0 (by default: RS232 active)

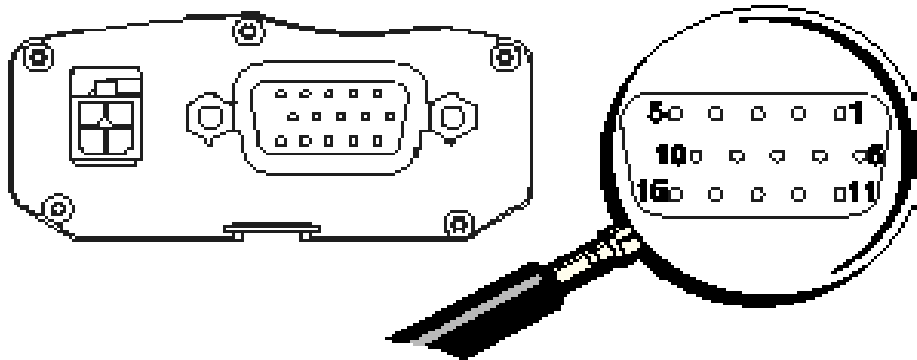
-AT+WIOW=1,1 (RS232 in low consumption, only TxD is active)

APPENDIX I - CONNECTIONS

Signals from the RS 232 connector

Pin No.	Designation	Circuit (V24 – RS232C)	GPS multi-plexing	I/O
1	Signal detection	109 - DS - DCD		OUT
2	Data reception	104 - ED - TxD		IN
3	Boot			IN
4	Microphone +			IN
5	Microphone -			IN
6	Data transmission	103 - RD - RxD		OUT
7	Data station ready	107 - PDP - DSR	NMEA frames	OUT
8	Data terminal ready	108/2 - TDP - DTR	DGPS correction	IN
9	Signal Earth (Ground)	102 - TS - Gnd		
10	Loud-speaker +			OUT
11	Ready to transmit	106 - PAE - CTS		OUT
12	Request to transmit	105 - DPE - RTS		IN
13	Call indicator	125 - IA - RI		OUT
14	Reset			IN
15	Loud-speaker -			OUT

View of the front of the Gen Loc25 modem's RS232 female connector



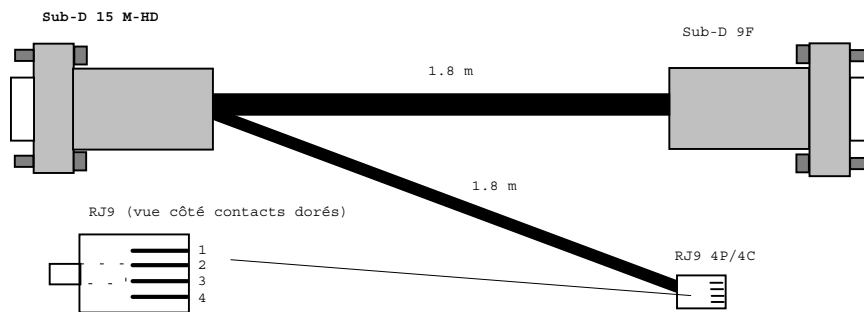
SUBD9F-SUBD15M connection cable

Complete cabling for a GENLoc25 connection to a standard PC serial RS232 port:

Cable with voice option

Designation	SUBD 9 F	SUBD 15 M-HD
DCD	1	1
RXD	2	6
TXD	3	2
DTR	4	8
GND	5	9
DSR	6	7
RTS	7	12
CTS	8	11
RI	9	13
	RJ9	
Micro +	1	4
Speaker +	2	10
Speaker -	3	15
Micro -	4	5

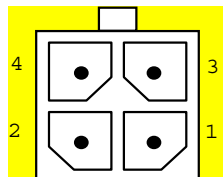
Data/audio cable (command code 4404000205)



Power supply connector signals

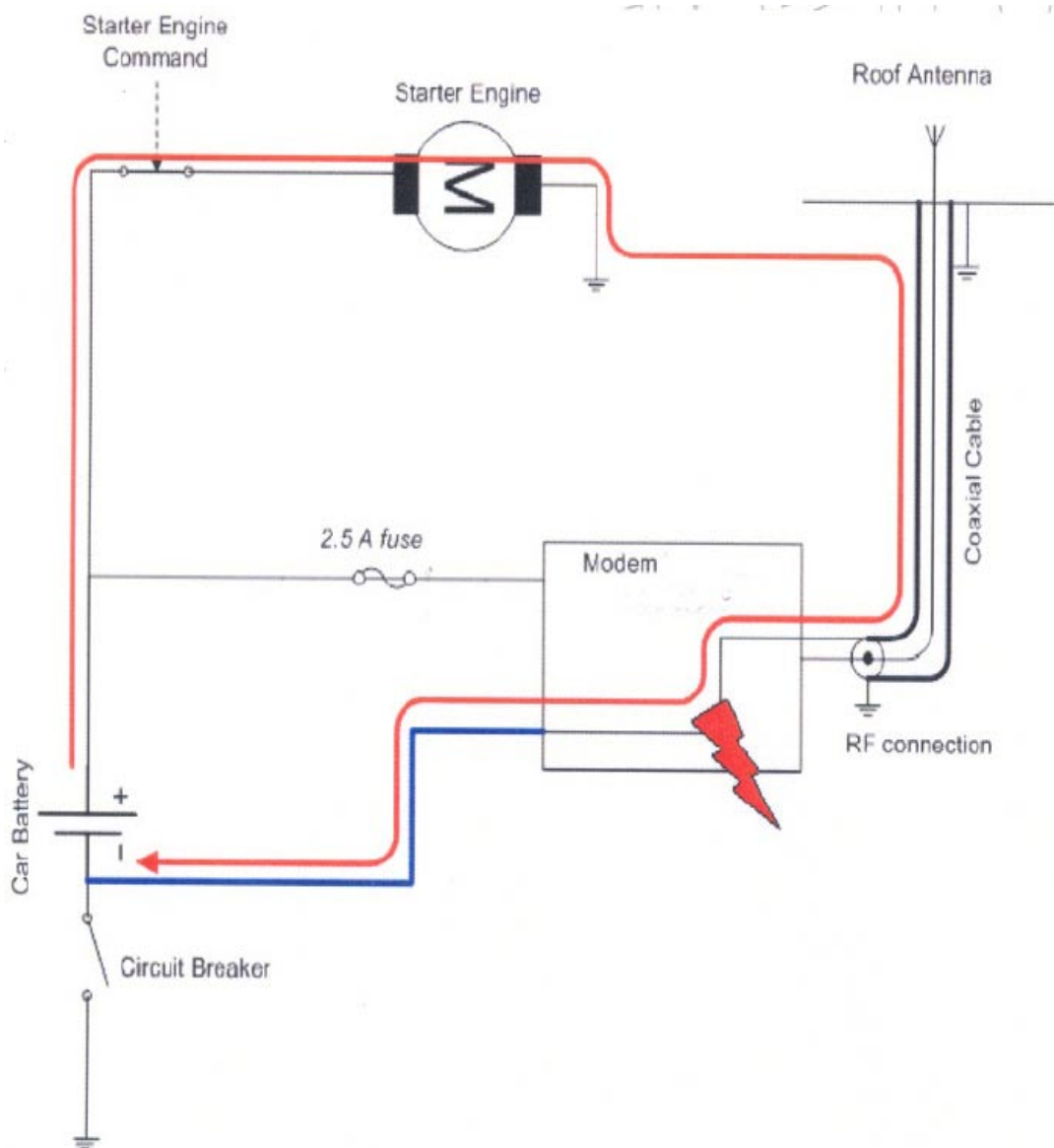
Pin No.	Signal
4	+V DC
3	Gnd (Earth)
2	GPIO_4
1	GPIO_1

View of the front of the power supply connector



APPENDIX II - RECOMMENDATIONS

Prohibited connection directly to a vehicle's battery



Recommended connection to a vehicle's battery

