Installation Guide

Radio Mobile DM3G Low-Band

Version 1.2.0

Document history

Edition	Date	Description	Parts revised
V1.0.0	11/07/2019	Document creation	all
V1.1.0	17/10/2019	Addition of FCC statements and RF exposure limitations	§1-2-7.1.1
V1.2.0	18/10/2019	Correction in technical spec	§13

Version naming convention : Vx.y.z
z is incremented for a minor change like a syntax error, adding a detail, a change in format, and are draft versions before official version
y is incremented for official released versions
x is incremented for a major change like adding a chapter, a new function

NOTE

TPL Systèmes reserves the right to modify this manual and its contents without any previous notice. Although no effort has been spared to make this manual as accurate as possible, it is not a contractual document.

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Table of Contents

1 Abbreviations and Symbols

ACC	Accessory, car ignition notch which provides electrical power to accessories
AF	Audio Frequency
ANI	Automatic Number Identification, terminal number on an analog radio network
BT	Bluetooth, wireless standard
dBm	Power unit in decibels to one milliwatt
DM3G	Name of an eDMR™ radio terminal ; DM3G Low-band refers to the 30-50MHz frequency band
e-DMR™	extended-Digital Mobile Radio, digital radio technology, developed by TPL Systèmes
EU	European Union
FCC	Federal Communications Commission, independent US government agency in charge of interstate and international communications regulations in USA territories
GPS	Global Positioning System
ID	Identity (number) of radio terminal on eDMR™ network
I / O	Inputs / Outputs
LED	Light Emitting Diod
MCE3G	Micro Clavier Evolué in French, MCE exists in new 3rd generation hardware version, DM3G micro keypad
MMI	Man Machine Interface
PC	Personal Computer
PTT	Push to Talk
RSSI	Received Signal Strength Indicator
RX	Related to radio reception
SELV	Separated or Safety Extra Low Voltage
TX	Related to radio transmission
USA	United States of America
USB	Universal Serial Bus
VSWR	Voltage Standing Wave Ratio, radio matching measurement, VSWR is ≥ 1, 1 is theoretical best value.
W	Watt, power unit

CE	Compliant to European Union health, safety, and environmental protection standards, compliant to be sold within European Economic Area
FC	Compliant to FCC rules
⚠	Caution required ! Refer to product documentation
⏻	Power-on indicator
↗	Radio TX indicator
⦚	Radio RX indicator (channel occupancy)
⇄	USB connection
ᛒ	Bluetooth logo, shows Bluetooth antenna connector.
ⓘ	Radio product working on non-harmonised frequencies
	This product must not be thrown out with household waste (see **paragraph 12**)

2 Safety instructions and Regulations

Before operating the product read this manual

! Any changes or modifications of this product not expressly approved by the party responsible for compliance could void your authority to operate this equipment.

! Users of DM3G Low-Band should ensure that the regulation of frequency allocations and applications are respected and must also check with local authority of frequency regulation in their respective country.

! Use the equipment with supplied accessories only.

! Do not use this product if it is visibly damaged.

! This product may malfunction if not installed and used in accordance with this manual. The use of radio systems near to other electrical equipment, metallic surfaces or influenced by architectural obstacles may affect the proper function respectively the radio coverage.

FCC STATEMENTS :

FCC Part 15.19 warning statement
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions : (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15.21 warning statement
Note : The **grantee** is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications coud void the user's authority to operate the equipment.

FCC Part 15.105(b) warning statement (Only required for 15.109-JBP devices)
NOTE :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 relocate 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

The DM3G installation is critical to its well-functioning. We recommend you to follow installation instructions carefully.

The DM3G **must never be installed** :

- **in a confined place** which would not enable airflow
- **near a heat source**

RF Exposure limit :
The antenna gain used with this device should be 0 dBi or less and all persons should maintain a minimum separation distance of 141.05 cm for general uncontrolled exposure and general controlled exposure.

Staff competences :
It is recommended that DM3G shall be installed by electrical accredited people.

Note : A bad setup could lead to an unusual heating of the device which could affect its function. **TPL Systèmes** denies any responsibility in case its products would not be correctly installed.

3 Overview

DM3G mobile terminal is a device designed for communications over e-DMR™ digital radio networks and analog radio networks.

For US market, only analog radio mode can be used at the date of this document.

DM3G mobile terminal is made of one part :

- A small-sized aluminum-made device in which you can find electronic board which performs radio emission and reception functions

For voice applications, DM3G works with a micro keypad (MCE) with a large display and an ergonomic keyboard which performs MMI functions, available as an accessory : in wired or Bluetooth wireless versions.

This handbook is more specifically about installation of terminal into a vehicle.

4 Packages contents and Accessories

4.1 DM3G Content

DM3G exists in 2 versions and 2 frequency bands :

- Version : with or without Bluetooth (to link to MCE)
- Frequency band :
  - DM3G Low-band : 30-50MHz

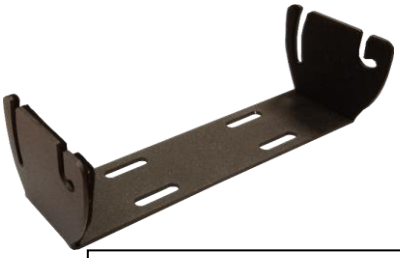
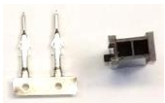
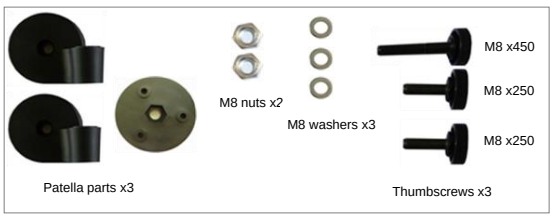
All DM3G devices are equipped with a GPS module.

TPL reference	Description	Contents
EDMR_DM3G_40	DM3G radio terminal in low-band frequencies	1a_mobile + DM3G Voice Installation kit
EDMR_DM3G_40_BT	DM3G in Bluetooth option	1b_BT mobile + DM3G Voice Installation kit

1a_DM3G mobile terminal

1b_Bluetooth DM3G mobile terminal

An **installation kit** exists for the DM3G provided with DM3G itself.

TPL reference	Description	Contents
EDMR_DM3G VOIX_KIT_INSTALL	DM3G Voice Installation Kit	Kit contains all elements listed below
EDMR_DM3G_ETRIER	Mounting bracket for mobile terminal	 Screws and washers to fix bracket on car dashboard are not provided
EDMR_DM3G_CAB_AL50	Power cable with integrated 10A fuse	
VIS_MOL_4x10_M4_AC x4 VI_ROND_EVENT_4 x4	Screw kit to fix terminal on mounting bracket	
	2 plugs and connector for external loudspeaker	
	2 plugs and connector for vehicle horn	
EDMR_DM_ROTULE made of EDMR_MCE_PIED x1 EDMR_MCE_EMBASE x2 EDMR_DM_KIT_ROT_VIS x1 (screws, nuts and washers)	Patella kit (wired MCE or BT MCE)	
	Quick installation guide paper sheet	

4.2 Accessories

Several accessories are available for the DM3G :

TPL reference	Name	Contents
EDMR_MCE3_FIL	Wired MCE (3G version, RJ45 male connector) with its support	
EDMR_MCE3_BT	Bluetooth MCE (3G version) with its charging support (RJ45 connector, 1m long cable). MCE3G BT is provided with BT antenna below.	
EDMR_DM_ANT_BT	BT antenna for DM3G + pairing notice	
EDMR_DM_ANT_GPS_F	GPS panel mount antenna with nut and washer (SMA male connector) 3-5VDC power supply	
EDMR_DM_ANT_GPSM	GPS magnetic antenna with SMA male connector 3-5VDC power supply	

TPL/HP20W	20W external loudspeaker	
C5558	5W external loudspeaker	
EDMR_DM_CAB40	Extension cable for MCE (5m long cable, with RJ45 male and female connectors)	
EDMR_DMD_KIT_PROG	USB programming cable (type A M/M) with software and manual on USB key	

5 Device description

5.1 Front panel (wired version)

1 Configuration connector

USB connector. Enables to configure and upgrade DM3G with USB cable and configuration software tool.
Refer to **DM3G Configuration Handbook** for more details.

2 LEDs

Power indicator, green LED

Radio TX indicator, red LED

Channel occupancy indicator (by RF carrier), yellow / orange LED

5.2 Front panel (Bluetooth version)

1 Configuration connector

USB connector. Enables to configure and upgrade DM3G with USB cable and configuration software tool.
Refer to **DM3G Configuration Handbook** for more details.

2 LEDs

Power indicator, green LED

Radio TX indicator, red LED

Channel occupancy indicator (by RF carrier), yellow / orange LED

3 Bluetooth antenna connector (option)

Enables to connect the Bluetooth antenna to link to a Bluetooth MCE.
SMA female connector

5.3 Rear panel

1 RF antenna connector

BNC female type

2 **Power supply connector and Inputs/outputs**

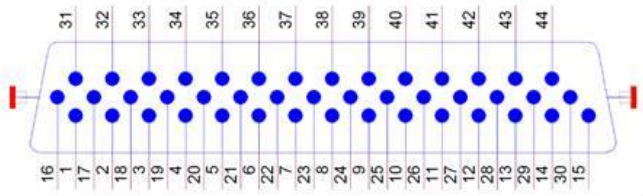
Power supply is performed by a 13.2VDC SELV through a DB44 male connector.
Also this connector provides input / output signals for special applications.
See **paragraph 5.4** for detailed pinout.

3 **GPS antenna connector**

SMA type female connector

5.4 Rear DB44 connector

Male DB44 connector, located on the rear of the device, is used for terminal power supply, and also for various I/O.

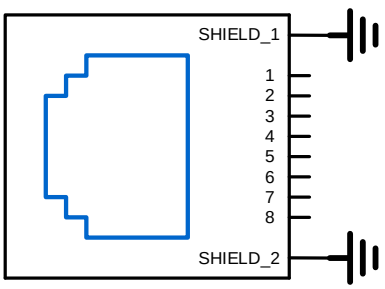


DB44 pin number	Name	Function	Specifications
1	GND	Ground for power and signals	
2	GND	Ground for power and signals	
3	V24 DTR	V24 Data Transmit Ready	
4	RS232 CTS	RS232 Clear To Send	
5	V24 DSR	V24 Data Set Ready	
6	ON / OFF	On / Off	
7	KL2	Horn 2	
8	KL1	Horn 1	
9	HP-	External loudspeaker (-)	10W / 8 Ohms @ 10% THD
10	HP+	External loudspeaker (+)	10W / 8 Ohms @ 10% THD
11	GND	Ground for power and signals	
12	MCE AUDIO_DIFF_IN+	MCE Differential audio input (+), signal from MCE	-10dBm / 600 Ohm +/- 1dB
13	MCE AUDIO_DIFF_IN-	MCE Differential audio input (-), signal from MCE	-10dBm / 600 Ohm +/- 1dB
14	GND	Ground for power and signals	
15	AUDIO_DIFF_OUT+	AF differential signal transmitted by DM3G	-10dBm / 600 Ohm +/- 1dB
16	VBAT	Power	Min = 10.8 V Nom = 13.2 V Max=15.6 V
17	VBAT	Power	Min = 10.8 V Nom = 13.2 V Max=15.6 V
18	GND	Ground for power and signals	
19	RS232 RTS	Request To Send	

20	RS232 RX	RS232 Data Receive	
21	OUTPUT1		Open collector, active at low state
22	INPUT2	Input signal (undefined)	
23	INPUT1	Transmit Enable (TE)	Active at low state (grounded)
24	/MASTER_RESET	Master Reset : hardware reset	Reset on falling edge
25	AUDIO_MIC_IN	Audio microphone input	
26	DPS_CAN_RX		
27	DSP_CAN_TX		
28	MCE_UART_RX	Wired MCE: UART interface : Rx (from MCE)	
29	MCE_UART_TX	Wired MCE : UART interface : Tx (from MCE)	
30	AUDIO_DIFF_OUT-	AF differential signal transmitted by DM3G	-10dBm / 600 Ohm +/- 1dB
31	VBAT	Power	Min = 10.8 V Nom = 13.2 V Max=15.6 V
32	VBAT	Power	Min = 10.8 V Nom = 13.2 V Max=15.6 V
33	V24 DCD	V24 Data Carrier Detect	
34	RS232 TX	RS232 Data Transmit	
35	TX_ON	Low state on TX	Open collector, active at low state
36	INPUT3	Input signal (undefined)	
37	GPS_CLK	GPS Clock	
38	VBAT	Power	
39	VBAT	Power	
40	MCE_AUDIO_DIFF_OUT-	MCE differential audio output (-), signal to MCE	-10dBm / 600 Ohm +/- 1dB
41	MCE_AUDIO_DIFF_OUT+	MCE differential audio output (+), signal to MCE	-10dBm / 600 Ohm +/- 1dB
42	GND	Ground for power and signals	
43	AUDIO_DIFF_IN -	AF differential signal received by DM3G	-10dBm RX / 600 Ohm
44	AUDIO_DIFF_IN+	AF differential signal received by DM3G	-10dBm TX / 600 Ohm

5.5 Power Cable RJ45 Connector

RJ45 connector pinout from DM3G power cable is given below :



Pin number	Name	Function
1	GND	Ground
2	MCE/DB44/DSP_UART_TX	MCE Data TX
3	MCE_WIRE/DB44/DSP-UART-RX	MCE Data RX
4	RJ45_MCE_AUDIO_DIFF_OUT+	Audio output signal, symetric, -10dBm, 600Ω
5	RJ45_MCE_AUDIO_DIFF_OUT-	Audio output signal, symetric, -10dBm, 600Ω
6	VBAT_12V	+12VDC power
7	RJ45_MCE_AUDIO_DIFF_IN+	Audio input signal, symetric, -10dBm, 600Ω
8	RJ45_MCE_AUDIO_DIFF_IN-	Audio input signal, symetric, -10dBm, 600Ω

6 MCE micro keypad

1 – Loudspeaker

2 – LEDs
- Red in TX
- Green in RX
- Blue : Bluetooth (BT) connection OK

3 – Display screen

4 – PTT key

5 – Function keys
- Performs function labeled above on the screen

6 – Power on / Call / Dial key
- Enables to power on mobile (short press)
- Enables to launch calls (digital radio mode)
- Enables to select call type (digital radio mode)

7 – Navigation arrows
Enables to browse the menu
Enables to tune audio level from main screen

8 – Hang up / Back / Power off key
- Enables to hang up the call while in communication (digital radio mode)
- In the menu enables to go back to preferred screen
- A long press enables to power off the mobile

9 – Alphanumeric keypad

10 - Microphone

7 Installation

Before setting any piece in the vehicle **TPL Systèmes** advises you to assemble all pieces together and find best place for each, in order to avoid overstretched cables.

7.1 Antennae

7.1.1 RF Antenna

For US market :
The antenna gain used with this device should be 0 dBi or less and all persons should maintain a minimum separation distance of 141.05 cm for general uncontrolled exposure and general controlled exposure.

Antenna characteristics must be :
- **50Ω impedance**
- ¼ or 5/8 wavelength

Antenna must be set on a **good ground plane**.
- Install antenna in the middle of vehicle roof, if possible
    - Or at least in the middle of a horizontal metallic wide enough surface

Use coaxial **double-braided cable** (RG223 type).

Antenna must be **cut (tuned) at TX mobile frequency**. In order to work on several channels choice will be made to cut antenna at frequency band middle.
Please refer to **antenna manufacturer chart** to get the correspondence between wire lengths and tuning frequency.

A VSWR measurement is necessary to validate installation.

VSWR must be **below 1.5** in TX band, and below 2 in RX band.

7.1.2 GPS antenna

GPS antenna must have following characteristics :
- 50Ω impedance
- 5VDC supply voltage
- SMA male connector

Antenna must be placed, in or out of the vehicle, so it can receive GPS satellites signals properly.

7.2 How to power the DM3G from vehicle

For DM3G with a wired MCE, **TPL Systèmes** recommends to connect after “ACC” notch. So the mobile starts up automatically without any action from user.

For DM3G with a BT MCE, **TPL Systèmes** recommends to power DM3G device directly from car battery (before ACC notch).
BT MCE can be powered from an ACC notch (eg, cigarette lighter).
User needs to switch on and off mobile from MCE key.

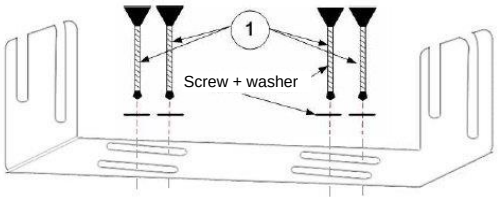
Example of connection on car radio, before ACC, on adapter connector.

7.3 DM3G radio device

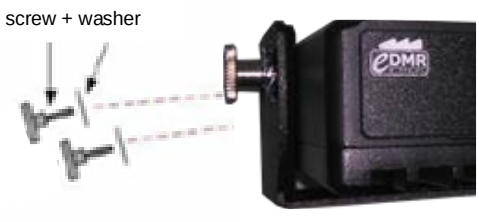
Note : To ease terminal maintaining operations the radio device and connecting cables must be easily reachable (USB and antenna)

For the mobile with **BT option**, it is important to leave BT antenna in maximum open space, to prevent a reduced BT radio range.

- Install mounting bracket with 4 screws and brake washers (not included), in the car.



- Attach DM3G device to mounting bracket with 4 screws and washers (included).

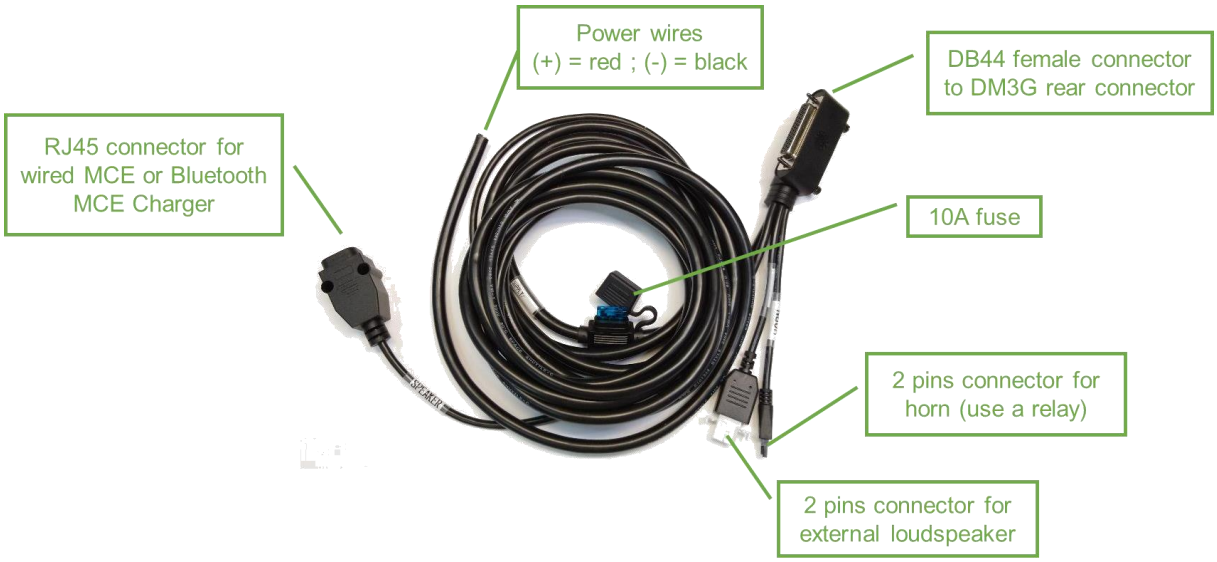


- Connect the RF antenna to the BNC connector at the rear panel. The antenna characteristics must be 50 Ω impedance.
  Please refer to manufacturer recommendations for antenna installation on vehicle.

- Connect the GPS antenna to the SMA connector at the rear of the DM3G if you wish to use GPS positioning.

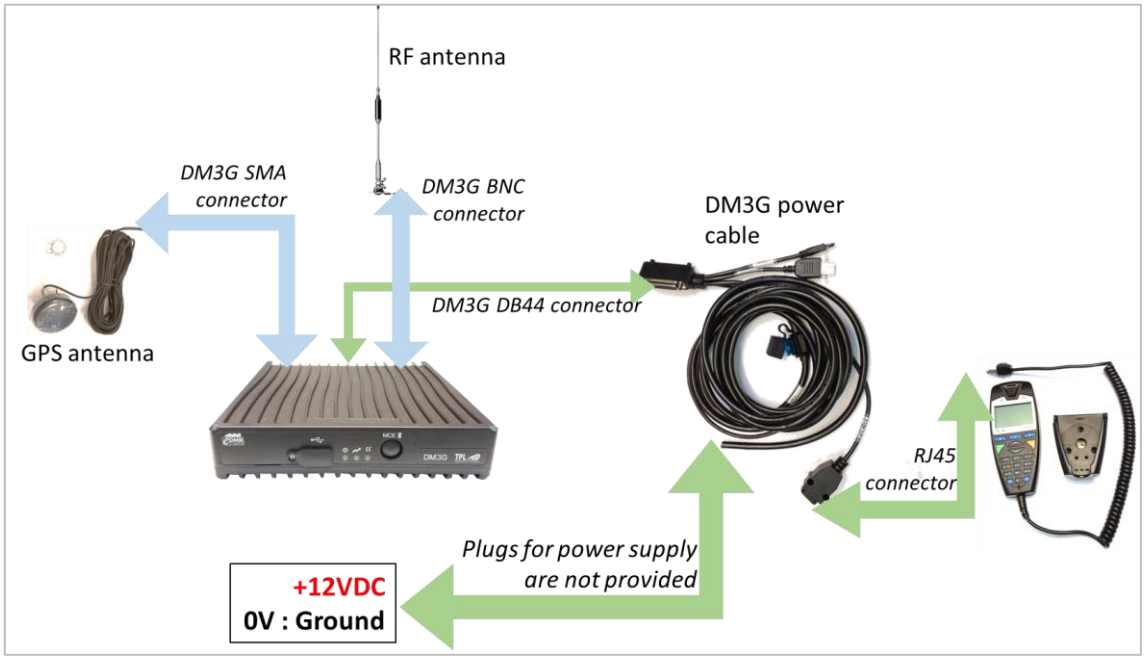
- Connect power wires from power supply cable to car battery pads or ACC notch (+12VDC), depending on your DM3G model (see **paragraph 7.2**).
  - It is important to use a stabilised power supply. If needed a power filter can be added.

Note : In case radio terminal is used on a vehicle with a 24V battery you must use a 24V / 12V converter (contact **TPL Systèmes** for suitable models).



- Connect the mobile power cable to the device rear panel (DB44 connector)

- Connect the MCE wire (or MCE BT charger) to the power cable RJ45 connector (see below).



7.4 Accessories

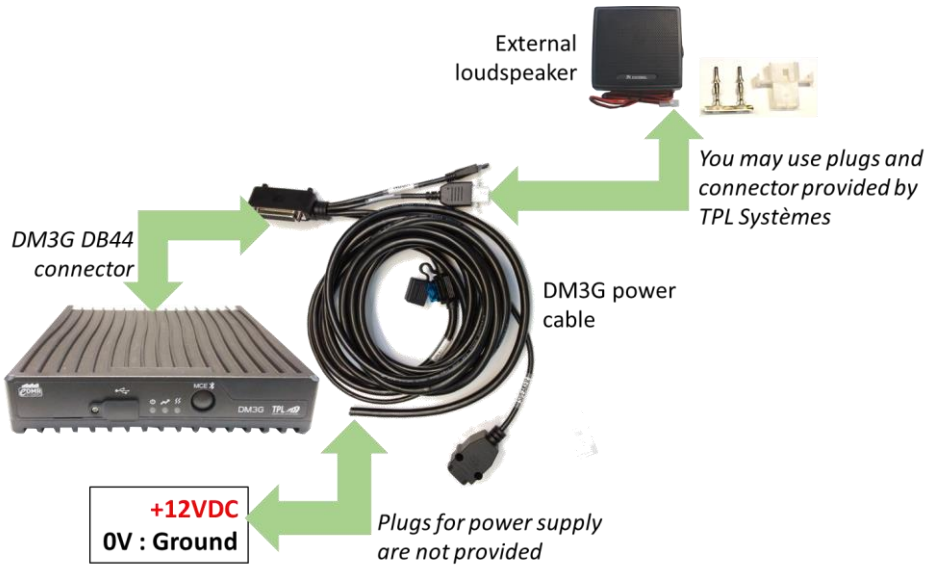
7.4.1 External loudspeaker

It is possible to connect an external loudspeaker to radio mobile (see diagram below).

External loudspeaker can be provided by **TPL Systèmes** (refer to **paragraph 4.2**), ready to connect.

User can also use an external loudspeaker of its own (8Ω input impedance) and use provided plugs and connector to connect to power cable.

There is no polarity on external loudspeaker plugging.



Do not cross loud-speaker cable with RF antenna cable.

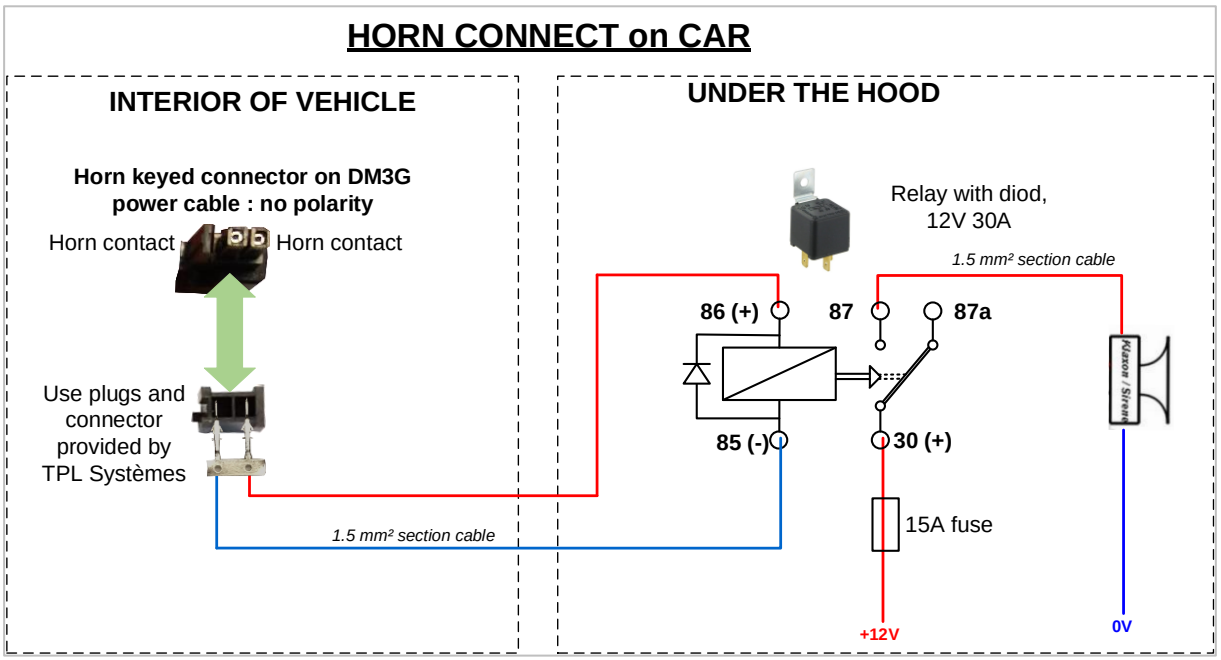
7.4.2 Horn

Vehicle horn can be connected to radio mobile DM3G. It is not active in analog radio mode.

Horn must be controlled via an external relay.

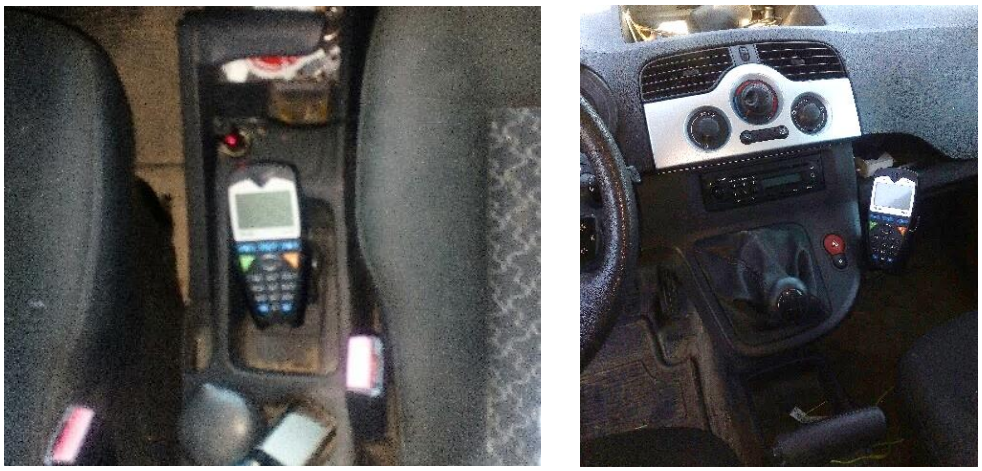
Relay is specified as such : with diod, 12V, 30A. See diagram below.

For truck vehicles, with a 24V voltage battery, use a 24V relay.



7.5 Wired or BT MCE

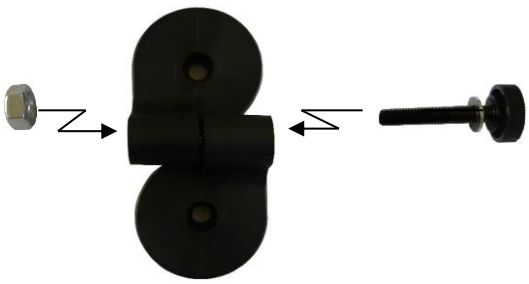
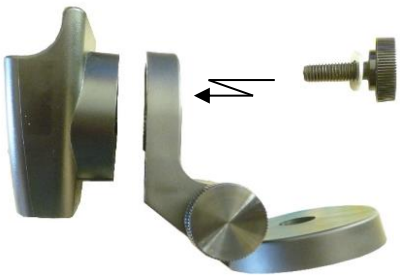
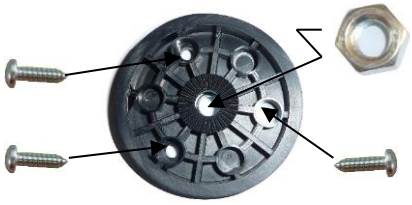
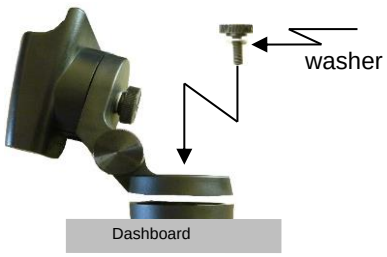
The MCE micro-keypad can be installed on its support with the patella mounting.
The setup can be made on the car dashboard, above the gear shift with the keypad turned to the driver or passenger.



Examples of MCE fastening : MCE BT is powered from cigarette lighter and placed between front seats (top view, left image) ; MCE BT is fastened on storage rack between seats (right image)

Take care not to damage airbags or electric beam when you drill.

Note : In case DM3G power cable is not long enough to reach mobile terminal an extension cable (see **paragraph 4.2**) is available as reference : EDMR_DM_CAB40.

1. Assemble two parts of patella with a nut, a washer, and the M8x450 thumbscrew. 	2. Assemble the patella and the MCE support with a washer and a thumbscrew M8x250. 
3. Attach patella pedestal on dashboard with 3 iron screws (not included) covering M8 nut. 	4. Screw the whole set on the pedestal. 

- Place MCE on its support.

- Plug the wired MCE RJ45 connector to the RJ45 connector of DM3G power cable.
  - In case of BT MCE, plug the RJ45 from MCE charging support to RJ45 connector of DM3G power cable.

- Remove protective film from micro-keypad screen.

8 Bluetooth Option

Following elements are provided with Bluetooth option :

MCE3G BT

MCE charger support

BT antenna for DM3G

Bluetooth antenna must be screwed onto DM3G device.

8.1 MCE Charging

MCE is charged through its support connected to DM3G power cable through RJ45 connector. Support is powered with +12VDC voltage through RJ45.

- Connect RJ45 connector from MCE BT support to DM3G power cable.
- Place MCE on its support and check that red LED (charge indicator) on top of MCE is lit up. LED lights off when MCE is fully charged.

8.2 Bluetooth MCE pairing

DM3G BT mobile is provided with an unpaired MCE BT.

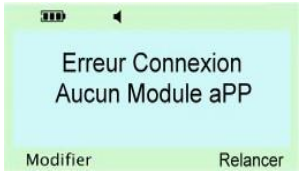
User must pair the MCE BT with the DM3G BT on first start up.
The procedure is described hereafter.

- Mobile is identified by its serial number printed on a tag at the terminal rear. Note this number before beginning
- Power on the terminal
- Power on the MCE BT by a press on MCE green key
- **TPL Systèmes** logo and search indicator are displayed as below

Bluetooth network scanning bar

During scanning, long-press # key

- **Directly dial** "**8471**" on keyboard
- Messages below are displayed



or

validate by oui / yes, then

- Select **Modifier / Modify**
- Select **Nouveau / New**
  - MCE BT searches for Bluetooth equipments and displays serial numbers (or MAC addresses) of found equipments
- When DM3G serial number appears
  - Press "Arrêter / Stop"
  - Select DM3G serial number in the displayed list with the arrows
  - Press on "Valider / Validate"
- MCE boots up and connects to DM3G after a few seconds scanning.
- Main screen is displayed

8.3 Battery charge

Status of battery charge can be seen from the display battery icon :

	Battery full
	Battery low
(blinking)	Battery discharged

When MCE battery is discharged, a beep tone is transmitted every 15 seconds for 1 minute. The « Battery low » message is displayed. When critical discharge level is exceeded, MCE automatically switches off after 30 seconds.

When MCE is placed on its support, battery is charging. When it starts charging, MCE plays an audio beep tone and battery icon animates. The red LED located at the MCE top lights up (see **paragraph 8.1**). This enables to control charge status when MCE is off.
When charging phase is over, battery icon sets to the “Battery full” position and the red LED switches off.

Bluetooth radio range from MCE to terminal depends on battery charge level.
It is therefore recommended to keep the MCE battery well charged.
Charging the battery may be longer when MCE is turned on during the charge cycle.
If battery is too low to enable the MCE to switch on, message ‘battery low” will be displayed and MCE will switch off to avoid damages to battery.

9 How to start

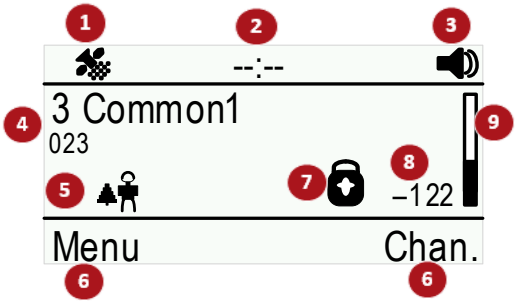
Screenshots included in this handbook are subject to change with terminal software version.

The radio device switch-on is made by pushing the  key on the MCE.

DM3G terminal is switched off by a long-press (3s) on  key on the MCE.

9.1 Main screen

When you power on the DM3G main screen (in analog mode) is displayed :



1 GPS status

	Position fixed
	Position under calculation

2 Time

Time is given in digital radio mode only, by digital radio repeater.

3 External loud-speaker status

Press one of the arrow keys to check out and/or change loud-speaker audio volume if connected.
Go to **Menu | Settings** | **Communication** to toggle loudspeaker activation.

External loud-speaker is active.

External loud-speaker is deactivated.

4 Current channel

Display of channel information. In example :

Current channel is n°3, name of channel is “Common1”, there is one DCS code active on this channel, code is “023”

5 User profiles

User profile management (*not in function yet*)

6 Function keys

Menu access key
Function then changes and is written above key.

Contextual function is linked to key.

Channel selection key
Function then changes and is written above key.

7 Keyboard locking

Keyboard lock icon. Locking time is defined in terminal configuration.

Long-press on key # to unlock.

8 RSSI level

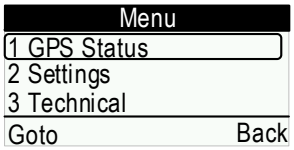
Received signal level (RSSI) on current channel is shown here. Value is in dBm.
On example : -122dBm

9 Audio volume

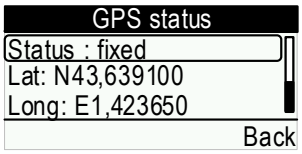
A bar-graph shows current audio volume for MCE.
Audio volume tuning can be reached with the arrow keys

9.2 GPS

Go to **Menu** | **GPS Status**
Validate with **Goto**



Screen from GPS menu displays terminal position in decimal degrees.



10 Maintenance

TPL Systèmes recommends to perform antenna and radio terminal control, at least every 5 years.

11 Warranty – Customer Support

All **TPL Systèmes** products are guaranteed one (1) year, parts and labor, return to factory, from their delivery date.

Warranty on products parts cannot not be applied in following cases :

- Abnormal use of products : breakage, vandalism, handling errors, thefts
- External causes : thunderlightning, faulty power supply, flooding, water damage, fire, industrial disaster, nuclear disaster, natural disaster
- Repairs, addings, changes performed by personel not authorised by **TPL Systèmes**

At the end of warranty length, products can be returned to **TPL Systèmes – Sarlat – France** for analysis and repair after customer agreed the quotation.

11.1 Technical support and Assistance

A customer technical support exists within **TPL Systèmes**.
This service can be contacted :

- By phone, via **TPL Systèmes**-Sarlat office : +33 5 53 31 55 00
- By mail : contact@tplsystemes.com

Office is open all working days : 8h-12h and 14h-18h, 17h on Friday

TPL Systèmes has a computerised follow-up for its technical support.

12 Recycling & Waste management

DM3G product contains electronic components which must not be thrown out with household waste.

The Directive **2012/19/EU** of the European Parliament and the Council on waste electrical and electronic equipment was implemented in order to ensure that products are recycled with best techniques of re-use, recycling and recovery of

such wastes, and so preserve, protect and improve the quality of the environment, and protect human health.
This product has been designed and manufactured with materials and components of high quality that can be reused or recycled. It is compliant with Directive **2011/65/EU** on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

13 Technical Specifications

		DM3G Low-band
PMR	Frequency bands	33-50 MHz
	Functional modes	direct / semi-duplex / duplex
	Channel spacing	12.5 - 20 - 25 KHz
	Channels number	1 000
RF transmitter	RF output power	50 W
	Analog modulation	16K0F3E
	Frequency stability	5ppm
	Noise	< -40 dB
	Spurious radiation	< 0.25 µW
	Analog data rate	1200 bds/s
	TX/RX switch time	1 ms
RF receiver	20dB SINAD sensitivity	-116 dBm typ.
	Intermodulation rejection	> 70 dB typical
	RSSI dynamic range	72 dB
	Intermediate frequencies	130.03 MHz - 30 KHz
	Selectivity	> 65 dB typical
Audio	Audio output power	10 W / 8 Ω
e-DMR	Digital modulation	TDMA - 4GFSK
	Digital data rate	9600 bds/s
	Digital sensitivity (BER 10-3)	-117dBm
Power supply	Power supply voltage	13.6V nominal +/-15% (extremes conditions)
	Power consumption (TX)	< 12A
	Power consumption (RX)	< 300 mA
Dimensions	Width	175 mm
	Depth	188 mm (with RJ45 and USB connectors)
	Thickness	37 mm
	Weight	1.4 Kg
Environment	Temperature range	-20°C to +55°C
	Dust- and Water-proofness	IP54

Handset : MCE3G	
Width	68 mm
Height	163 mm
Thickness	25 mm
Weight	233 g (with wired cable) ; 190g (BT wireless)