

User Guide

GenPro 300e



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Document History

Rev.	Modifications	Author	Date	Validation	Date
000	Creation	YST	15/02/2017	MSU	15/02/2017
001	Connector micro USB become mini USB. Contact us for voice on USB port. Add USB cable.	YST	07/03/2017	MSU	09/03/2017
002	Update Warning.	YST	15/05/2018	PBR	27/06/2018

The main modifications of this document compared to the previous version are easily identifiable on a screen by the blue color of the text.

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Presentation

Entirely dedicated to Machine à Machine (M2M) applications and embedded data services, the modem **GenPro 300e** combines the GSM/GPRS/UMTS/HSPA functions in the same robust casing.

The modem is quad-Bands (850/900/1800/1900 MHz) in GSM/GPRS Class 12.

The modem is six-Bands (I, II, IV, V, VI, VIII) in UMTS/HSPA.

The protocols of IP connectivity integrated in the GenPro 300e allow the quick installation of embedded telematics solutions with strong added-value.

This document describes the modem and provides the following information:

- General presentation,
- Functional description,
- Available basic services,
- Installation and use of the modem (first level),
- Recommended accessories for the use of the modem.

For more information about this document, ERCOGENER puts at your disposal the following elements:

- Commands List u-blox_AT_Commands_Manual_xxx
- Application Note EG_GenPro300e_1103_AN_xxx_yy
- [Certificate of Origine, Conformity ...](#)
- Client Support (Hot-Line)



These different documents are available on our website www.ercogener.com in the download area of the product concerned.

Warning



The **GenPro 325e** is dedicated to '**Machine To Machine**' (M2M) applications only. **ERCOGENER** recommends the use of SIM card subscriptions of the '**Machine To Machine**' (M2M) type.
Video, VoIP (Voice over IP) transfer requires the payment of additional royalties.

- ERCOGENER recommends to read carefully all documents linked to the product GenPro 300e (User Guide, Application Notes, Command List) that can be download on our website www.ercogener.com.
 - ERCOGENER cannot be held responsible for:
 - The problems due to an inappropriate use of the **GenPro 300e**.
 - The problems due to a wrong configuration
 - **The dysfunctions due to the absence, a bad coverage or termination of the GSM, GPRS, UMTS networks services.**
 - The dysfunctions if the product is used for the watching of physical persons where human life is engaged.
 - ERCOGENER reserves the right to modify the functions of its products "**GenPro 300e**" without previous notice.
- To avoid any risk of electrocution, do not open the casing.
- For any functioning, the casing must be closed.
- No internal part can be repaired by the user. The GenPro 300e must be returned to the factory for any repair **with RMA request (Return Material Authorization)**.
- The GenPro 300e must be placed in a normally ventilated area, out of sources of heat.
- In order to guarantee the electromagnetic compatibility, the length of the serial cable, the power supply cable and the inputs/outputs cable must not exceed 3 meters.
- The GenPro 300e must not be connected directly to the mains supply (**230 V_{AC}**); a voltage adapter must be used. **The GenLoc 354e must not be connected directly to the mains supply; a voltage adapter must be used.**



This marking on the product, accessories, packaging or literature indicates that the product and its electronic accessories (e.g. cable etc.) should not be disposed of with other household waste.

1 Copyright

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In some countries, restrictions of use of the devices may be applied. For more information, thank you to contact your nearest legally qualified local government representative.

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ERCOGENER cannot be held responsible for any loss of data or income, as well as particular damage, incidental, consecutive or indirect.

Symbols used

The following symbols are used to highlight the important information of this document.



A symbol for the essential information concerning the module integration and performance.



A warning symbol indicates the actions that could harm or damage the module

1 Security recommendations

1.1 General security

It is important to respect the specific regulations linked with the use of radio equipment, in particular with the possible risks of interference due to radio frequency (RF). Please respect carefully the following security recommendations.

Turn OFF your GSM modem:

- On an aircraft, the use of cellular telephones can endanger the plane operations; disturbing the cellular network is illegal. The non-observance of this instruction can lead to the suspension or the exclusion of the cellular phone services, or even to a trial, or both,
- At a refueling station,
- In any area with a potential explosive atmosphere that could cause an explosion or a fire,
- In hospitals and other places where medical equipment may be used.

Restrictions of use of radio equipment in:

- Fuel warehouses,
- Chemical factories,
- Places where destruction operations are in the running,
- Other places where signs indicate that the use of cellular phones is prohibited or dangerous.
- Other places where you should normally turn OFF the engine of your vehicle.

There can be a danger associated with the use of your GSM modem close to insufficiently protected medical equipment such as audio devices and pacemakers.

Consult the manufacturers of medical equipment to know if it is adequately protected.

Using your GSM modem close to other electronic equipment may also cause interferences if the equipment is insufficiently protected.

Pay attention to the warnings and the recommendations of the manufacturers.

The modem is designed to be used with "fixed" and "mobile" applications:

- "Fixed" application: The GSM modem is physically linked to a site and it is not possible to move it easily to another site.
- "Mobile" application: The GSM modem is designed to be used in various places (other than fixed) and is intended to be used in portable applications.
- The modem must be used at more than 20cm from the human body.

This equipment is powered at a Very Low Security Voltage and at non-dangerous energy level.

1.2 Security in a vehicle

Do not use your Modem whilst driving.

Respect the national regulations linked with the use of cellular telephones in vehicles. Road safety is always a priority.

An incorrect installation of the GSM modem in a vehicle could cause an incorrect functioning of the vehicle's electronics. To avoid such problems, make sure that the installation was done by a qualified person. During the installation, a verification of the electronic protection system of the vehicle must be done.

The use of warning equipment that activates the headlights or the horn of a vehicle on a public highway is not authorized.

1.3 Care and maintenance

The following suggestions will help you to preserve this product for many years.

Do not expose the modem to the extreme environments, to high temperature or high humidity.

Do not use or store the modem in dusty or dirty places, it could be damaged.

Do not try to disassemble the modem, at the risk of cancelation of the guarantee.

Do not expose the modem to water, rain or spilled beverage, it is not impermeable.

Avoid dropping, striking, or shaking the modem violently. The lack of care can damage it.

Do not place the modem next to computer disks, credit or travel cards or other magnetic supports. The information contained on disks or cards can be affected by the modem.

The use of other equipment or accessories not made or not authorized by ERCOGENER can cancel the warranty of the modem.

1.4 Your responsibility

This modem is under your responsibility. Treat it with care, it is not a toy. Keep it always in a secure place and out of the reach of children.

Try to remember your PIN and PUK codes. Familiarize yourself with the modem and use the security functions to lock it in case of non-authorized use or in case of theft.

2 Presentation

2.1 Content

The GenPro 300e is supplied with:

- a GenPro 300e cardboard packaging,
- a modem GenPro 300e,
- 2 fixing brackets,
- a power supply cable
 - 2-wires (Red/Black) stripped without fuse
 - or
 - 2-wires (Red/Black) stripped with fuse
- Cable USB 2.0 Type A / mini B
- a technical sheet (Instructions Sheet).

Figure 1 : Content



2.2 Modem packaging

The external dimensions of the modem packaging are:

- Width: 110 mm,
- Height: 55 mm,
- Length: 68 mm.
- Weight: 145 g

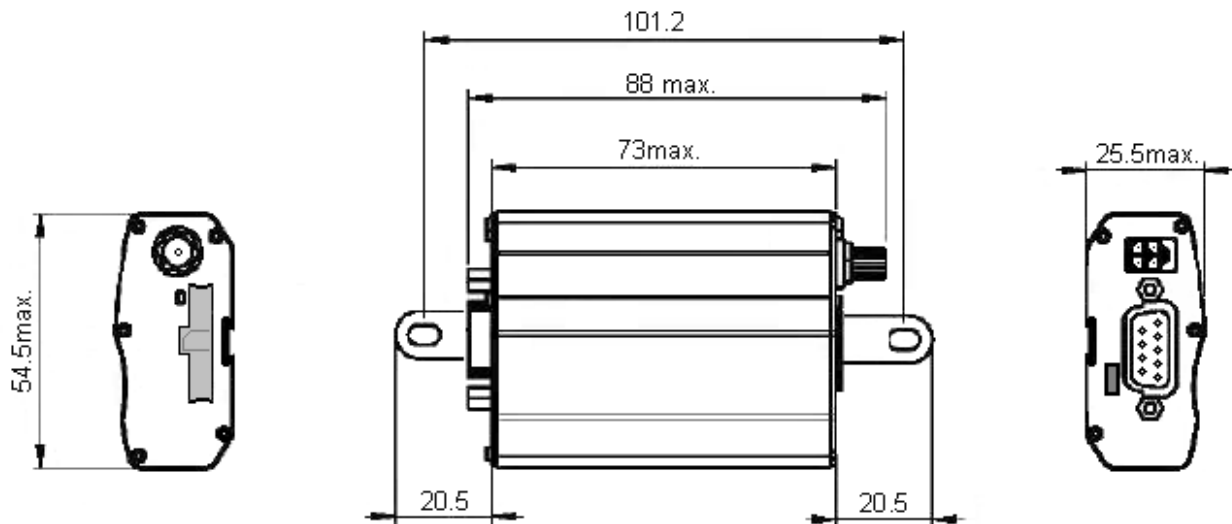
2.3 Mechanical characteristics

Table 1 : Mechanical characteristics

Dimensions	73 x 54.5 x 25.5 mm (connectors excluded)
Complete dimensions	104 x 92 x 40 mm
Weight	≈ 86 grams (modem only) < 120 grams (modem + brackets + cables)
Volume	101.5 cm ³
Casing	Aluminum profile
Waterproof level	IP31

The illustration below shows the dimensions of the modem including the clearances necessary for the installation of the modem.

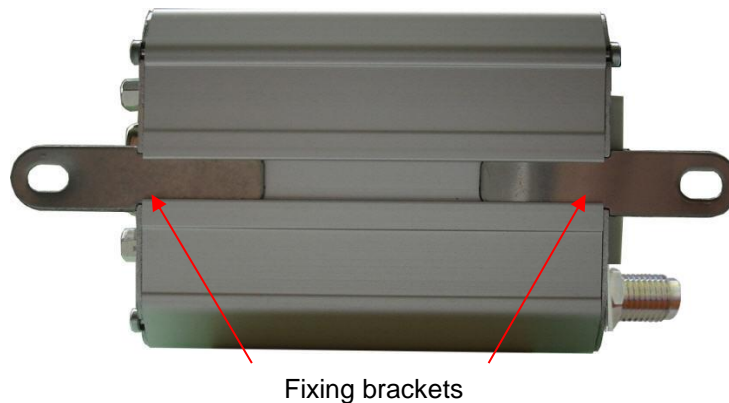
Figure 2 : Dimensions



2.3.1 Fixing brackets

2 brackets to fix the modem on a support.

Figure 3 : Back side



2.4 Characteristics and Services

2.4.1 Services

The GenPro 300e is:

- A GSM/GPRS/EDGE/UMTS modem class12 dedicated to the transmission of binary data in asynchronous and SMS.

The modem characteristics and the available services are summarized in the table below.

Table 2 : Characteristics and services

Functions 3G UMTS / HSPA - 2G GSM / GPRS / EDGE		
• UMTS/HSPA	800/850/900/1700/1900/2100 MHz 3GPP Release 7 (HSPA+)	(Bands I, II, IV, V, VI, VIII)
• GSM	4 band 850 / 900 / 1800 / 1900 MHz 3GPP Release 7 PBCCH support	(support GSM / E-GSM / DCS / PCS)
• GPRS	Class 12, CS1-CS4 - up to 86.5 kb/s	
• EDGE	Class 12, MCS1-9 - up to 236.8 kb/s	
• CS	GSM up to 9.6 kb/s UMTS up to 64 kb/s	
• SMS	MT/MO/CB	PDU/Text mode SMS over PSD or CSD
• UMTS /HSDPA/HSUPA	Power Class 3	(24 dBm)
• GSM / GPRS	Power Class 4	(33 dBm) for GSM/E-GSM bands
	Power Class 1	(30 dBm) for DCS/PCS bands
• EDGE	Power Class E2	(27 dBm) for GSM/E-GSM bands
	Power Class E2	(26 dBm) for DCS/PCS bands
• Sensibility	GSM850/E-GSM900 @ 25 °C	-110 dBm, Downlink RF level @ BER Class II < 2.4 %
	DCS1800/PCS1900 @ 25 °C	-109 dBm, Downlink RF level @ BER Class II < 2.4 %
	UMTS 800 (band VI)	-111 dBm, Downlink RF level for RMC @ BER < 0.1 %
	UMTS 850 (band V)	-112 dBm, Downlink RF level for RMC @ BER < 0.1 %
	UMTS 900 (band VIII)	-111 dBm, Downlink RF level for RMC @ BER < 0.1 %
	UMTS 1700 (band IV)	-111 dBm, Downlink RF level for RMC @ BER < 0.1 %
	UMTS 1900 (band II)	-111 dBm, Downlink RF level for RMC @ BER < 0.1 %
	UMTS 2100 (band I)	-111 dBm, Downlink RF level for RMC @ BER < 0.1 %
Packet Switched Data Rate	HSUPA category 6, up to 5.76 Mb/s HSDPA category 8, up to 7.2 Mb/s UMTS data up to 384 kb/s DL/UL	
SIM Toolkit		

Interfaces

- GSM antenna: SMA-Female connector
- Power supply : +7.2 to +32 V_{DC} (4-pin micro-FIT connector)
- 1 serial port RS232 (300 to 115200bds) Sub-D 15 pins female
- 1 USB port
- AT commands: GSM 07.05 and 07.07
- SIM reader (SIM 3V – 1,8V)

Options / additional accessories *

- DIN-rail kit K002
- Accessories K011
- Accessories: Antennas, cables, power supplies... (information available on our website)

* These options can be in addition or can replace some functions, contact us (see § 3.3 Functional architecture)

2.5 Environmental characteristics

To ensure a correct operation of the Modem, the specific limits described in the table below must be respected

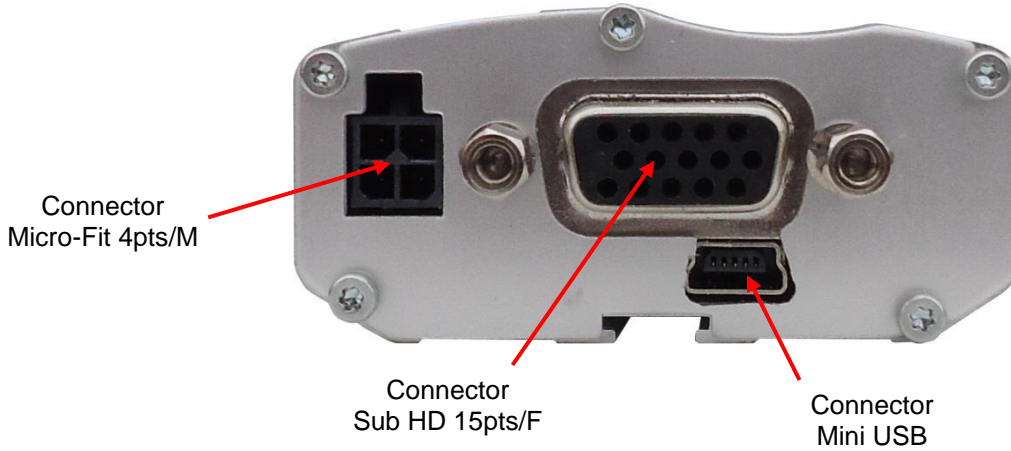
Table 3 : Environmental characteristics

Operating temperature range	-20 °C to +60 °C
Storage temperature range	-40 °C to +85 °C
Operating humidity without condensation	HR < 70% @ +55°C
Atmospheric pressure	700 hPa to 1060 hPa (-400 m to 3000 m)

3 Interfaces

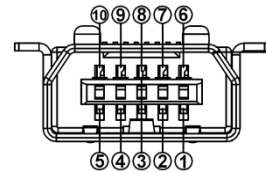
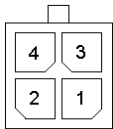
3.1 Front side

Figure 4 : Front side



See **ANNEX1 - 4 pins Micro Fit cable 2 wires with fuse**, **ANNEX 2 - 4-pin Micro- FIT cable 2 wires without fuse**.

Table 4 : Front side connection



Micro Fit 4 pins	
1	Not connected
2	Not connected
3	GND
4	+V _{DC}

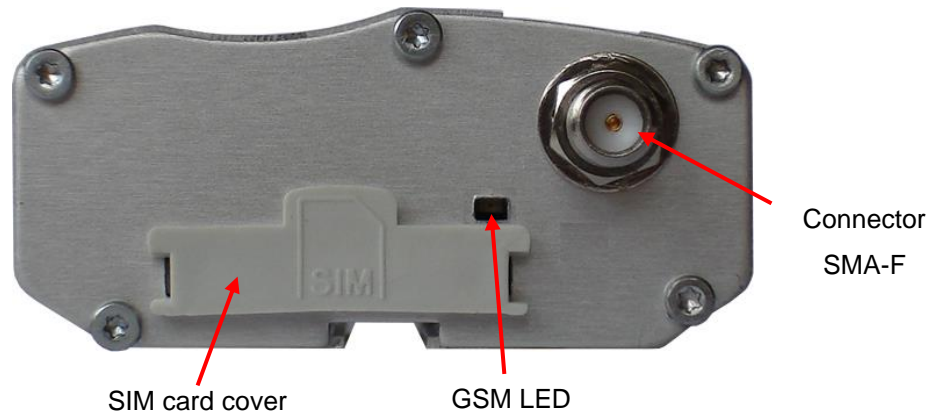
Sub-HD 15 pins	
1	Not connected
2	Data transmission
3	Not connected
4	Microphone +
5	Microphone -
6	Data reception
7	Data set ready
8	Data terminal ready
9	Signalization ground
10	Loudspeaker +
11	Ready to send
12	Request to send
13	Call indicator
14	Reset
15	Loudspeaker -

Mini USB	
1	+V _{USB}
2	Data D-
3	Data D+
4	Not connected
5	GND
6	Loudspeaker + (*)
7	Loudspeaker - (*)
8	Not connected
9	Microphone - (*)
10	Microphone + (*)

* Please consult us for audio access on the mini USB connector.

3.2 Back side

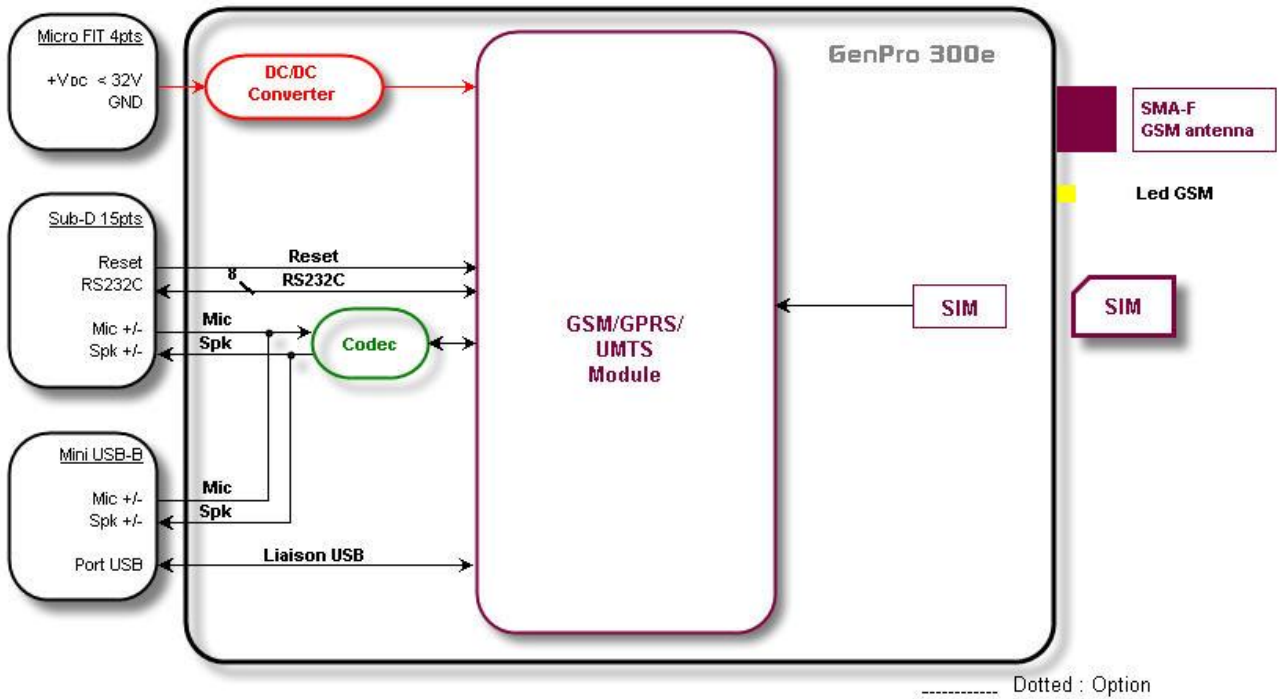
Figure 5 : Back side



3.3 Functional architecture

3.3.1 General

Figure 6 : Functional architecture

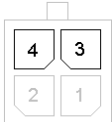


3.4 Power supply

3.4.1 Power supply cables

The modem is powered with the cable supplied with the equipment (ERCOGENER reference: 4402000100 or 4440302215). (See **ANNEX1 - 4 pins Micro Fit cable 2 wires with fuse**, **ANNEX 2 - 4-pin Micro- FIT cable 2 wires without fuse**)

Table 5 : Description of power supply pins

Signal	Connector 4 pins Pins N°	I/O	Kind of I/O	Description
+V _{DC}	4		Analog	Power supply
GND	3			
		Corresponds to wires		
		Red	for +V _{DC}	
		Black	for GND	



You must use the power cable supplied with the modem, in order to ensure a protection of the product.
The pins 1 and 2 are not used The power supply to the modem is done only via the pins 4 (+V_{DC}) and 3 (GND).

3.4.2 Power supply 7.2 – 32V_{DC}

The modem must be powered by an external DC voltage between +7.2V_{DC} and +32V_{DC}.

The internal regulation is done by a DC/DC converter and allows the supply of all necessary internal DC voltages.

The modem is also internally protected against voltage peaks of more than 32 V_{DC}.

The following table describes the consequences of an overvoltage or drop of voltage on the modem.

Table 6 : Effects of power supply defect

	Then :
▪ Voltage falls below 7.2V	▪ The functioning and the GSM communication are not guaranteed.
▪ Voltage above 32V (Punctual peaks)	▪ The modem guarantees its own protection.
▪ Voltage above 32V (Continuous overvoltage)	▪ The modem is protected by the fuse assembled on the power supply cable.

3.4.3 Consumptions of the GenPro 300e

Table 7 : Power supply range

Power supply range	7.2 V _{DC} to 32V _{DC}
---------------------------	--

Table 8 : Consumption with Shut down mode @ 25 °C

Shuts down	I _{MOY NOM.}				Unit.
V _{IN}	7.2	12	24	32	V
I _{MOY NOM.}	0.85	0.7	0.50	0.45	mA

The GenPro 300e is in '**Shuts down**' mode with the command **AT+CPWROFF** and the serial port disconnected.

Table 9 : Consumption with Power Saving mode @ 25 °C

Power Saving	I _{MOY MAX.}				Unit.
V _{IN}	7.2	12	24	32	V
GSM / GPRS @ DRX = 5	2.6	1.8	1.2	0.9	mA
UMTS @ P=23dBm	2.2	1.7	1	0.9	mA

The GenPro 300e is in **AT+UPSV=1,4000** mode + serial port disconnected + GSM attached to network PCL5

Table 10 : Consumption with data transfer mode @ 25 °C

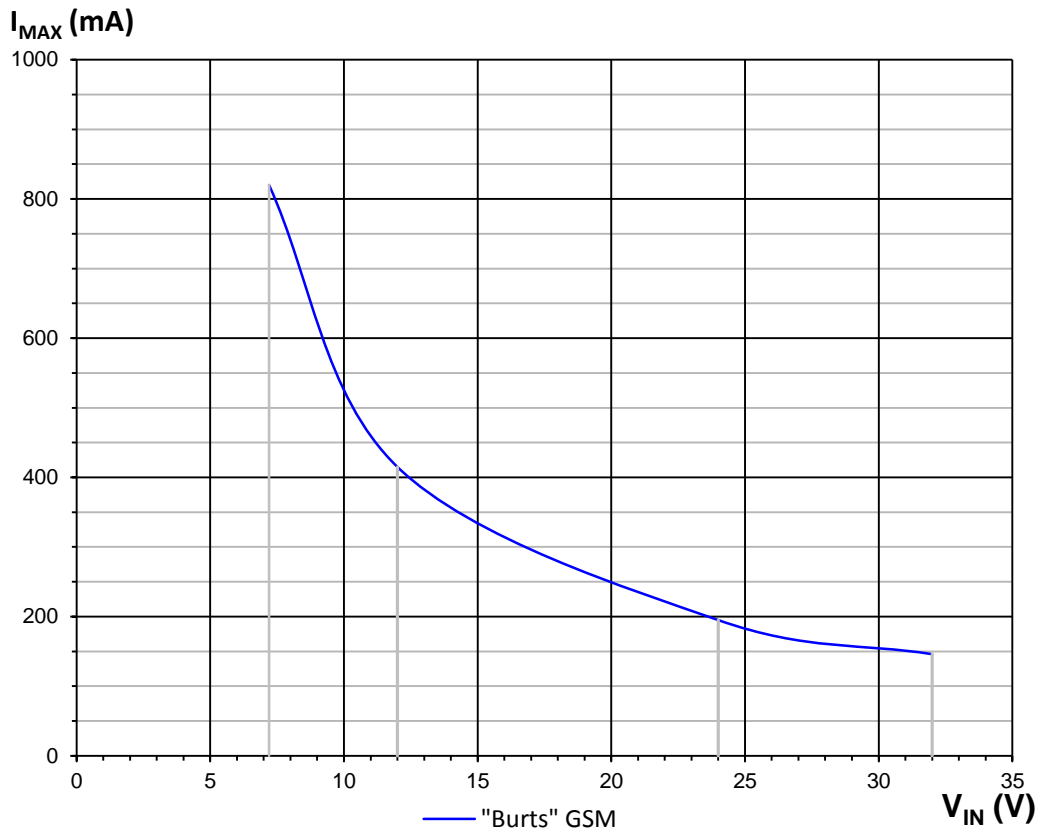
		I _{MOY MAX.}				Unit
V _{IN}		7.2	12	24	32	V
Peak current		820	415	195	146	mA
GSM	850 / 900 MHz (P = 32.2 dBm typ.)	205	105	55	40	mA
	1800 / 1900 MHz (P = 29.2 dBm typ.)	150	80	45	35	mA
GPRS	850 MHz (P = 30.5 dBm typ.)	195	110	60	45	mA
	900 MHz (P = 30.5 dBm typ.)	195	110	60	45	mA
2Tx+3Rx slots TBF	1800 MHz (P = 27.5 dBm typ.)	150	90	45	35	mA
	1900 MHz (P = 27.5 dBm typ.)	145	85	45	34	mA
UMTS	Band I (P = 23 dBm typ.)	365	210	110	85	mA
	Band II (P = 23 dBm typ.)	515	290	145	110	mA

The GenPro 300e is at its maximum power

3.4.3.1 Power supply dimensioning

The below graph shows the maximum peak current. The power supply must be able to supply this current during the GSM "*Burst*".

Figure 7 : Max consumption



This consumption is not permanent. It corresponds to the burst consumption during GSM communications.

3.5 Serial link RS232C



The 2 serial links RS232C and USB cannot work simultaneously.

Table 11 : Description of pins of serial link RS232C

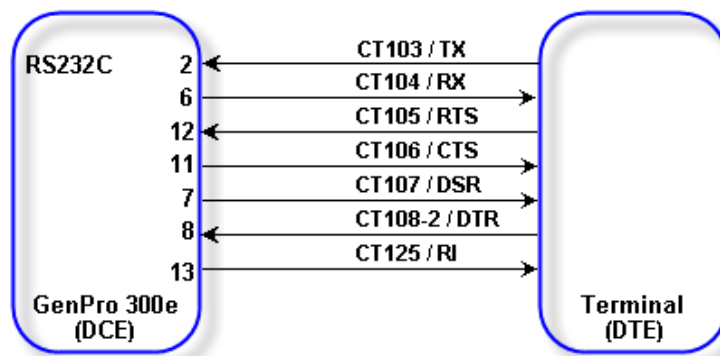
Signal	Connector Sub-HD 15 pins Pins N°	I/O	RS232 Standards	Description
CT103 / TX	2	I	TX	Data transmission
CT104 / RX	6	O	RX	Data reception
CT107 / DSR	7	O	DSR	Data set ready
CT108-2 / DTR	8	I	DTR	Data terminal ready
CT106 / CTS	11	O	CTS	Ready to send
CT105 / RTS	12	I	RTS	Request to send
CT125 / RI	13	O	RI	Call indicator
GND	9			Ground



Table 12 : Characteristics of serial link RS232C

Characteristics	Symbols	Conditions	Min.	Typ.	Max.	Unit
Input Voltage – Range	V_{INPUT}	Input Voltage – Range	-25		+25	V_{DC}
Input Voltage – Low	V_{IL}	Input Voltage – Low	0.6	1.1		V_{DC}
Input Voltage – High	V_{IH}	Input Voltage – High		1.5	24	V_{DC}
Input Hysteresis	V_{Hys}	Input Hysteresis		0.5		V_{DC}
Input Resistance	R_{in}	Input Resistance	3	5	7	$K\Omega$
Output Voltage	V_{OUT}	All transmitter outputs loaded with 3 k Ω to ground	± 5	± 5.4		V_{DC}
Transmitter Resistance	Output R_{OUT}		300	50k		Ω
RS-232 Output Short-Circuit Current	I_{CC}				± 60	mA

Figure 8 : Standards signals of serial link RS232C



Descriptions and non-contractual illustrations in this document are given as an indication only. ERCOGENER reserves the right to make any modifications.

3.6 USB serial link



The 2 serial links RS232C and USB cannot work simultaneously.

3.6.1 Standard

Table 13 : Description of pins of standard USB serial link

Signal	Connector Mini USB type B Pins N°	I/O	Description
V _{USB}	1		Not connected
D-	2	I/O	Data (D-)
D+	3	I/O	Data (D+)
ID	4		Not connected
GND	5		Ground

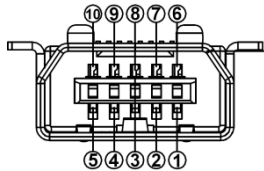
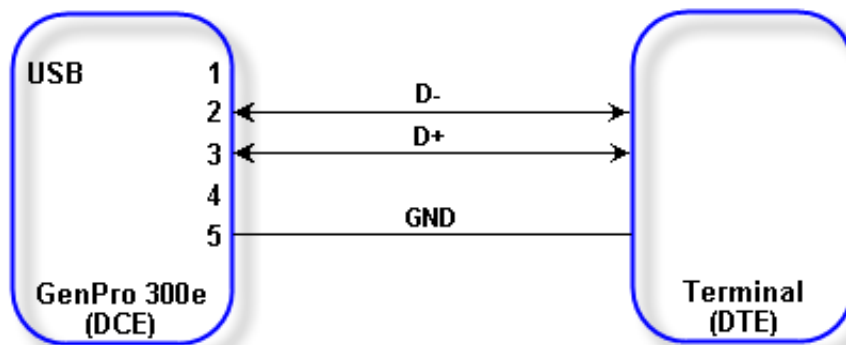


Table 14 : Characteristics of standard USB serial link

Characteristics	Min.	Typ.	Max.	Unit
Current sink at V _{USB_DET}		30		μA
High-speed squelch detection threshold (input differential signal amplitude)	100		150	mV
High speed disconnect detection threshold (input differential signal amplitude)	525		625	mV
High-speed data signaling input common mode voltage range	-50		500	mV
High-speed idle output level	-10		10	mV
High-speed data signaling output high level	360		440	mV
High-speed data signaling output low level	-10		10	mV
Chirp J level (output differential voltage)	700		1100	mV
Chirp K level (output differential voltage)	-900		-500	mV

Figure 9 : Standards signals of USB serial link



Descriptions and non-contractual illustrations in this document are given as an indication only. ERCOGENER reserves the right to make any modifications.

3.6.2 Installation of USB drivers



It is necessary to use the Drivers available on our website when using and installing the modem GenPro 300e associated to the USB Port.
It is recommended to install the driver before turning the modem ON.

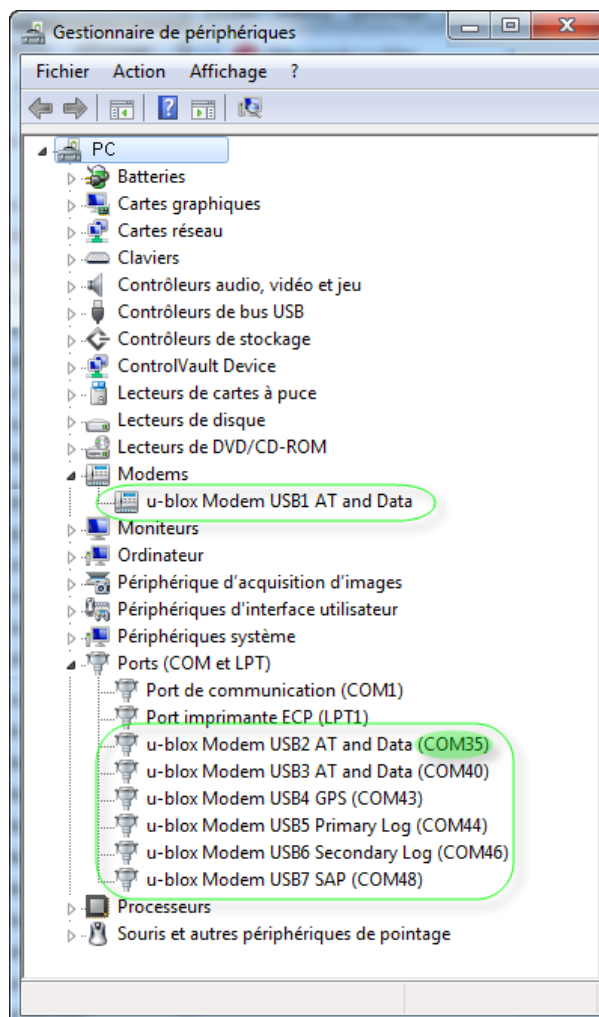
- 1- For the installation, download from our website ercogener.com the file containing the Drivers in a directory of the PC Hard Disk (example : C:\Drivers_GenPro_300e).
- 2- From this directory : C:\Drivers_GenPro_300e, execute the file u_blox_3G_USB_driver_installer_UI_xxx.exe
- 3- Follow the installation and complete the different answers.
- 4- Once the installation is done, connect the USB port and turn the modem ON.
Several windows will automatically open and close in the lower-right part of the screen.

3.6.3 Using the modem with the USB port

To know the associated port numbers, open the Device Manager.

Start / Control Panel / System / Device Manager

Figure 10 : Standards signals of USB serial link Option

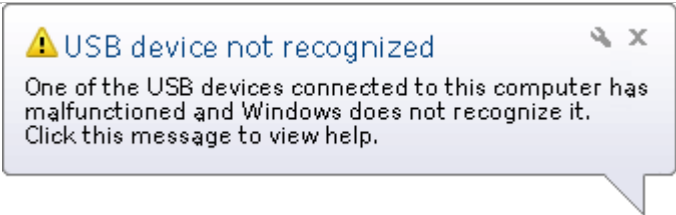


In this example, the port 35 can be used with a communication software like HyperTerminal.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER reserves the right to make any modifications.

3.6.4 Error message of USB port

The following message can appear

A screenshot of a Windows error message box. The title bar reads "USB device not recognized" with a yellow warning triangle icon and a close button. The main text says: "One of the USB devices connected to this computer has malfunctioned and Windows does not recognize it. Click this message to view help."

! USB device not recognized

One of the USB devices connected to this computer has malfunctioned and Windows does not recognize it. Click this message to view help.

In this case, turn OFF and turn ON the GenPro 300e with the USB cable connected.

3.7 Audio string

The audio interface is available on the GenPro 300e via an audio codec. To activate the codec, use the command **AT+UEXTDCONF=0,1**.

The audio interface is standard to connect an equipment like a telephone handset.

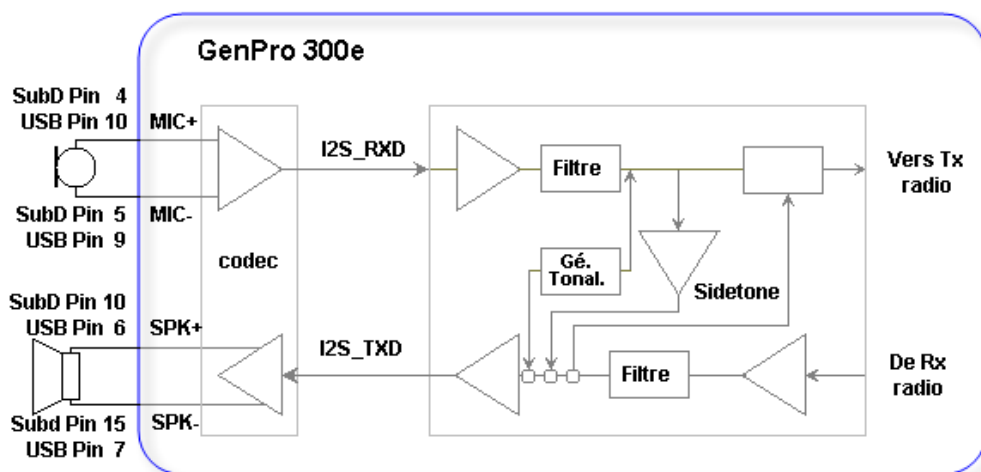
The echo cancelation (see command AT+UMGC) and particularities of sound reduction are also available to improve the audio quality in the case of a free-hand application.

The audio interface is standard to connect a telephone handset (the command AT+USPM allows the selection of the Handset, see the document "U-blox_AT_Commands_Manual").

They already include the functionality for a microphone like Electret (1 mA and 1,55 Volts). This Electret microphone can be directly connected to the inputs, allowing an easy connection to a telephone handset.

3.7.1 Synoptic of audio string

Figure 11 : Synoptic of audio string



The different parameters of the audio string can be adjusted with AT commands, mainly:

- AT+USPM
- AT+UI2S
- AT+CMER
- AT+UMCLK
- AT+UI2C

For more information, see the document "u-blox-ATCommands_Manual".

3.7.2 Input Microphone MIC+ and MIC-

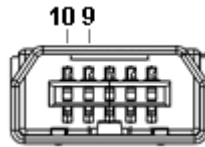
The microphone input is designed for a direct connection of the electret condenser micro. (for more details, see the command AT+USPM).



By default, the microphone input is active (pins MIC+, MIC-).

Table 15 : Description of microphone inputs

Signal	Pins N°	I/O	Type I/O	Description
MIC+	4 Sub-HD 15pts 10 USB	I	Analog	Positive input
MIC-	5 Sub-HD 15pts 9 USB	I		Negative input



* Please consult us for audio access on the mini USB connector.

Figure 12 : Microphone input

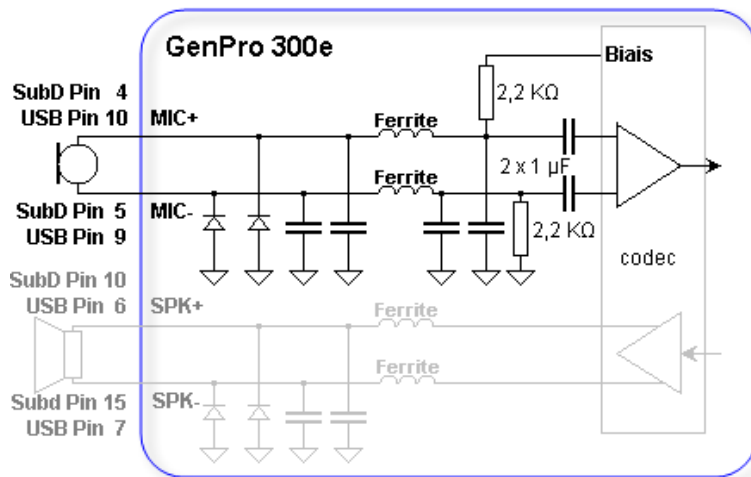


Table 16 : Characteristics of polarization for Microphone

Micro Input	Parameters/Conditions	Min	Typ	Max	Units
Microphone supply open circuit voltage output	Provided by MIC+ with MIC-.	1,5	1,55	1,6	V
Load Regulation	ILOAD = 1mA to 2mA		0,2	10	mV
MICBIAS Line Ripple Rejection	$V_{RIPPLE} = 100mV_{P-P}$ at 217Hz		82		dB
	$V_{RIPPLE} = 100mV_{P-P}$ at 10kHz		81		
MICBIAS Noise Voltage	A-weighted		9,5		μV_{RMS}



If the function is not used, the pins 4 and 5 (MIC+, MIC-) must not be connected.



The integrator has the responsibility to protect the input from electrical perturbations and to respect the functioning parameters values.

3.7.3 Loudspeaker output SPK+ and SPK-

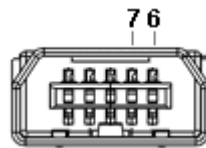
The outputs are assembled in differential to reduce the noise in common mode and the TDMA noise. These outputs can be directly connected to a loudspeaker (Earphone).



The loudspeaker output is not active by default. For more details, see the command AT+USPM. If the function is not used, the pins 10 and 15 (SPK+, SPK-) must not be connected.

Table 17 : Description of loudspeaker outputs

Signal	Pins N°	I/O	Kind of I/O	Description
SPK+	10 Sub-HD 15pts 6 USB	O	Analog	Positive output
SPK-	15 Sub-HD 15pts 7 USB	O	Analog	Negative output



* Please consult us for audio access on the mini USB connector.

Figure 13 : Loudspeaker output

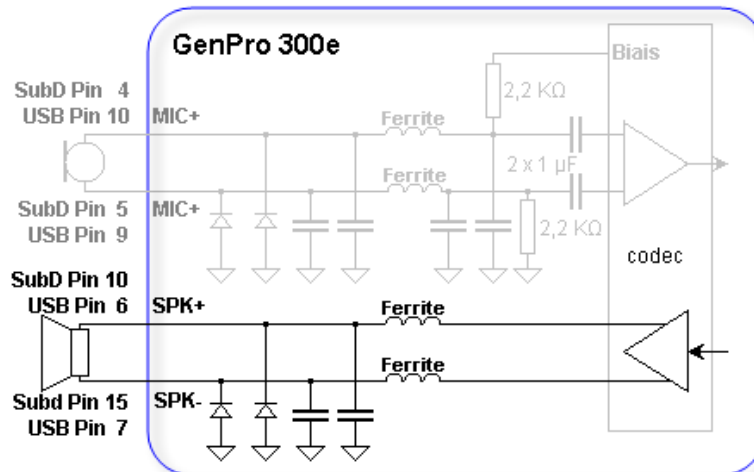


Table 18 : Characteristics of loudspeaker output @ 25°C

Speaker Output	Parameter/Conditions	Min	Typ.	Max	Units
Power	$f = 1\text{kHz}$, $RL = 16\Omega$	30	50		mW
	$T_{HD+N} \leq 1\%$, $RL = 32\Omega$		33		
Total Harmonic Distortion + Noise	$RL = 32\Omega$, $POUT = 25\text{mW}$, $f = 1\text{kHz}$		0,05		%
	$RL = 16\Omega$, $POUT = 25\text{mW}$, $f = 1\text{kHz}$		0,08		%
Dynamic Range	+0dB volume setting, DAC input at $f_s = 8\text{kHz}$ to 48kHz		90		dB
Power-Supply Rejection Ratio	$VRIPPLE = 100\text{mVP-P}$, $f = 217\text{Hz}$		86		dB
	$VRIPPLE = 100\text{mVP-P}$, $f = 20\text{kHz}$		71		
Output Offset Voltage	SPK+ - SPK-			$\pm 3,5$	mV
Capacitive Drive Capability	No sustained oscillations, $RL = 32\Omega$		500		pF
		$RL = \infty$	100		



The integrator has the responsibility to protect the outputs from electrical perturbations and to respect the functioning parameters values.

3.8 RESET



The use of the RESET function is strictly reserved for the manufacturer and distributors. This signal must be used only in case of emergency RESET. A software RESET is always preferable to a Hardware RESET. It is strongly unadvised to execute this function whilst in communication or dialog, without having previously detached it from the operator network. Using the RESET does not restore the factory parameters.

Table 19 : Description of RESET input

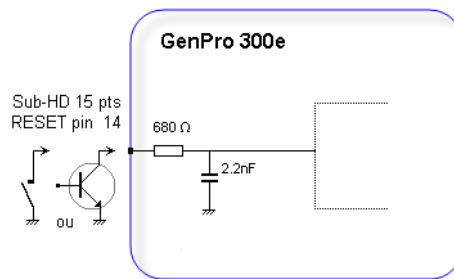
Signal	Sub-HD 15 pins Pins N°	I/O	Type I/O	Description
RESET	14	I	SCHMITT	Reset modem
GND	9			



Table 20 : Conditions of use of RESET signal

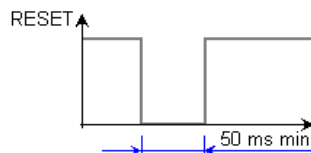
Parameters	Conditions	Min.	Typ.	Max.	Unit
V _{IL}	Input Voltage – Low	-0.3		0.8	V _{DC}
V _{IH}	Input Voltage – High	2		3.3	V _{DC}
RIPU	Internal Pull-Up Resistor		5.38K		Ω

Figure 14 : Internal electrical scheme of RESET



The use of the RESET signal must be done through a transistor assembly or via dry contact. The integrator has the responsibility to protect the input from electrical perturbations and to respect the functioning parameters values.

Figure 15 : Chronogram of RESET signal



3.9 SIM card

By default, the GenPro 300e is equipped with a standard SIM card reader accessible from the outside of the modem.

Table 21 : Characteristics of the SIM card power voltage

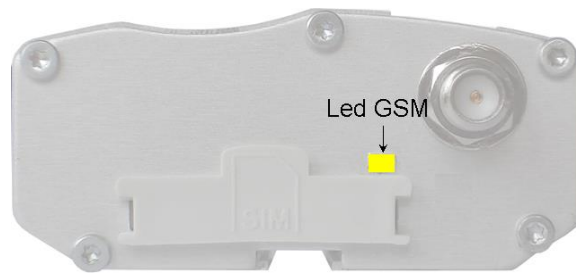
SIM card	3 V or 1.8 V
Format	Standard / mini SIM (25x15x0,76 mm)

Figure 16 : Back side with option internal SIM chip S0532C



3.10 Leds of the modem

Figure 17 : Back side Leds



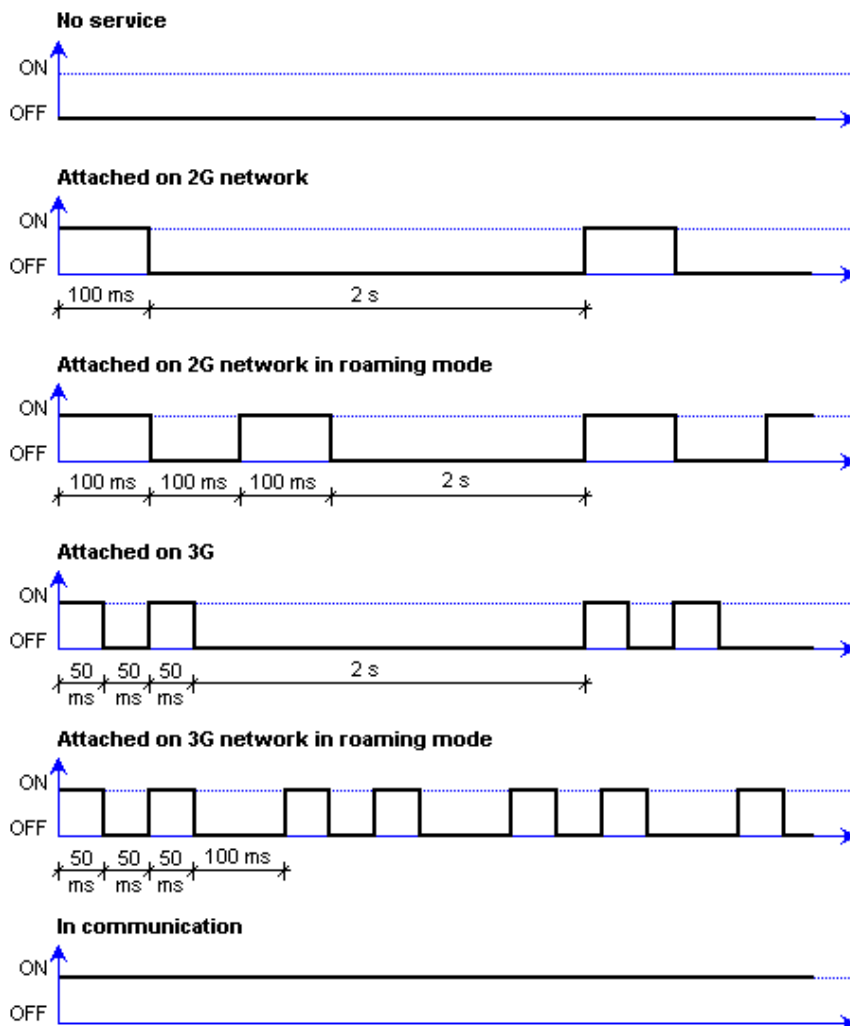
3.10.1 GSM Led

The status of the GSM module is indicated by the status of the YELLOW GSM LED situated on the back side of the modem. This is the yellow LED situated on the left.

Table 22 : Status of GSM LED

Status of GSM LED	LED activity	GSM status
OFF	LED OFF	The module is not activated or OFF.
LED flashing	See chronogram below.	
ON	LED permanent	The module is in communication.

Figure 18 : Chronogram of GSM Led



Descriptions and non-contractual illustrations in this document are given as an indication only. ERCOGENER reserves the right to make any modifications.

4 GSM external antenna

The GSM external antenna is connected to the modem via the SMA-F connector.

The external antenna must respond to the characteristics described in the table below.

Figure 19 : External GSM antenna



Table 23 : Characteristics of GSM external antenna

Frequency band	
850/900	824..960 MHz (GSM 850, GSM 900, UMTS B5, UMTS B6, UMTS B8)
1800/2100	1710..2170 MHz (GSM 1800, GSM 1900, UMTS B1, UMTS B2, UMTS B4)
Impedance	50 Ohms nominal
Input power	> 2 W peak
Gain	< 4.25 dBi for 850 MHz < 7.30 dBi for 1700 MHz < 2.74 dBi for 1900 MHz
VSWR	< 2:1 recommended < 3:1 acceptable
Return Loss	S_{11} <-10 dB recommended S_{11} <-6 dB acceptable



See § 6 Recommended accessories, for the GSM antennas recommended by ERCOGENER.

5 Use of the modem

5.1 Specific recommendations for the use of the modem in vehicles



The power supply connector of the modem GenPro 300e must NEVER be connected directly to the battery of the vehicle.

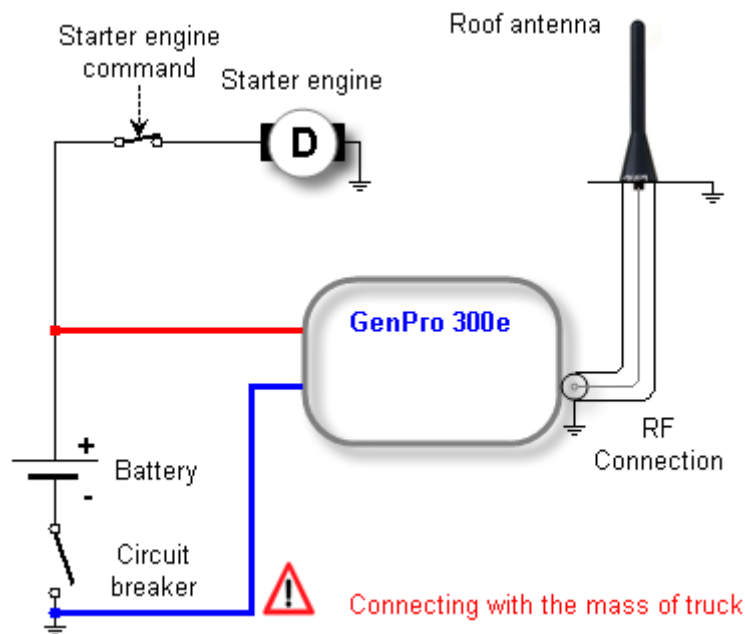
5.1.1 Recommended connection on the battery of a truck

All trucks have a circuit breaker outside the cabin. The circuit breaker is used for security reasons:

The circuit breaker is connected to the ground of the truck, usually connected to the fuse box.

Most of truck circuit breakers do not cut the + 'PLUS' of the battery, but cut its 'GROUND'.

Figure 20 : Recommended connection on the battery of a truck



The scheme above shows a recommended power connection where the connection of the modem ground is not directly connected to the battery, but connected after the circuit breaker (on the ground of the truck or in the fuse box).



If the scheme is not respected, the modem can be damaged when starting the truck if the circuit breaker is open. It cannot support important starting currents.

5.2 Turning the modem OFF

It is strongly advised to un-register from the network with the command **AT+COPS=2**

For more information about the AT commands, see the document "u-blox_AT_Commands_Manual".

5.3 Mode Power saving control (Power OFF)

It is possible to set the module in power-saving mode with the command **AT+UPSV=<mode>[<time out>],.**

With the parameter **mode**:

mode = 0 The power-saving mode is inhibited (by default).

mode = 1 The module goes to power-saving mode after expiration of the **time out**. If a character is received on the **TXD**, the module quits the power-saving mode. See § 5.3.1 CTS signal.

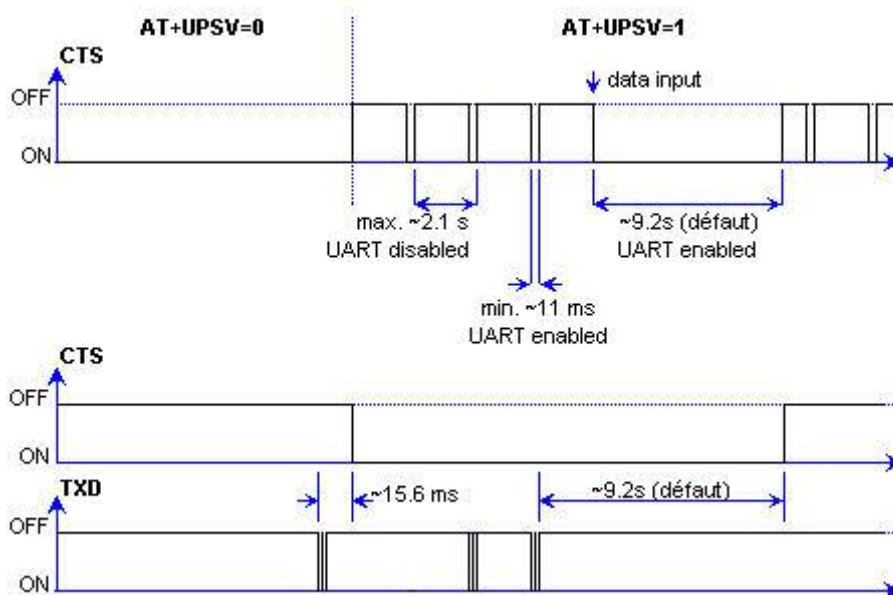
mode = 2 The module goes to power-saving mode once the **RTS** disappears. The module quits the power-saving mode once the **RTS** is back. For this mode, the flow control must be inhibited **AT&K0**.

For more information about the AT commands, see the document "u-blox_AT_Commands_Manual".

5.3.1 CTS signal

When the GSM module is in Power OFF, the CTS signal does not remain fix. (see Figure 22 : Etat signal CTS).

Figure 21 : Status of CTS signal

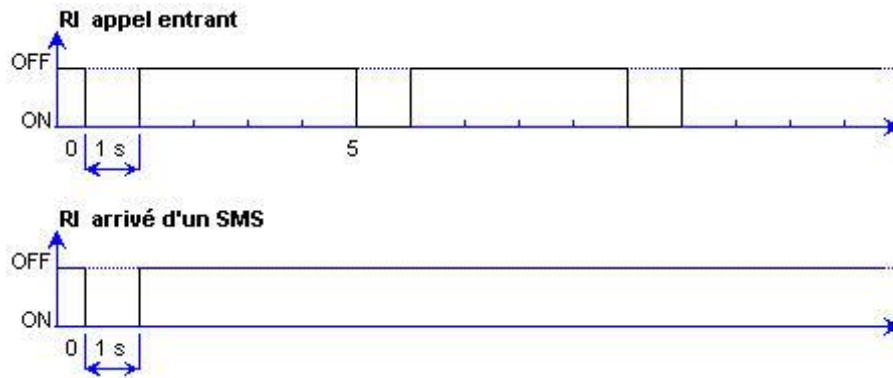


When the module is in Power OFF, receiving a character on the TDX wakes up the module (Power ON) but the character is lost. The module goes back to Power OFF more or less 9.2 s after receipt of the last character.

5.4 RI signal

The RI signal, depending on its rhythm, indicates either an incoming call or a SMS reception.

Figure 22 : Status of RI signal



5.5 Starting with the modem

5.5.1 Mounting the modem

To mount the modem on a support, use the fixing brackets as described below.

Figure 23 : Mounting the modem



- Must be fixed on a flat surface
- Max. height of the screw head: 2 mm



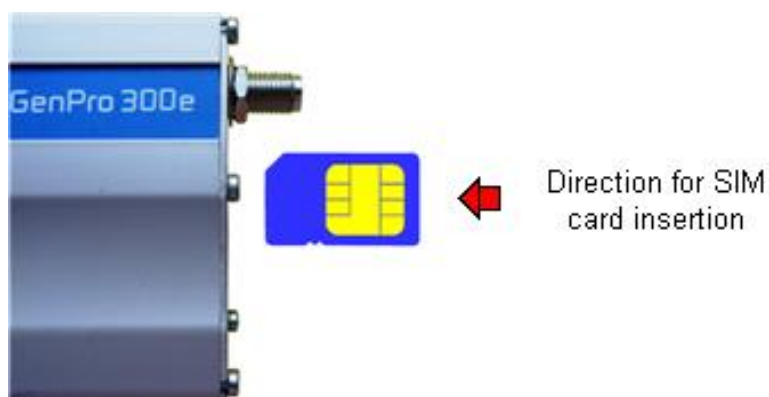
The aluminium casing of the modem is connected to the 0V (GND) of the power supply and to the 0V of the RS232 serial link. To avoid any risk of conduction of the ground plane to other equipment, the modem must be electrically insulated from its mechanical support.

5.5.2 SIM card installation

To install the SIM card, it is recommended to do the following operations with the modem turned OFF:

- Remove the SIM card cover on the back side.
- Carefully insert the SIM card into the reader.

Figure 24 : Installation of the modem



- Push the SIM card until hearing a "clac" that ensures its correct positioning.
- Put the SIM cover back.

5.6 Use of the modem

- Install the SIM card.
- Connect the GSM antenna to the SMA-Female connector.
- Connect the RS232 link between the DTE (COM port) and the modem (DCE).
- Connect the power cable to the continuous and regulated external power source (for an automobile application, see § 5.1 Specific recommendations for the use of the modem in vehicles).
- Connect the power cable to the modem.
- Use a communication software like HyperTerminal ® de Windows set as follows:
 - Bits per second: 115 200 bps,
 - Data Bits: 8,
 - Parity: none,
 - Stop Bits: 1,
 - Flow control: none.

5.6.1 Checking the communication with the modem

Send the following command to identify the module

- **ATI** The modem must return the model of module
 - Example : **LISA-U200-02S-01**

5.6.2 Using the documentation of AT command list

The AT command list documentaiton "*u-blox_AT_Commands_Manual_xxx*" is available on our website and is common to different modules.

To check if the command is available on the module look at :

<p>The begining of this document</p>	<p>Applicable products This document applies to the following products:</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Type number</th> <th>Modem version</th> </tr> </thead> <tbody> <tr> <td>LISA-U200</td> <td>LISA-U200-00S-00</td> <td>21.21</td> </tr> <tr> <td></td> <td>LISA-U200-01S-00</td> <td>22.40</td> </tr> <tr> <td></td> <td>LISA-U200-02S-01</td> <td>22.90</td> </tr> <tr> <td></td> <td>LISA-U200-03S-00</td> <td>22.11</td> </tr> </tbody> </table>	Name	Type number	Modem version	LISA-U200	LISA-U200-00S-00	21.21		LISA-U200-01S-00	22.40		LISA-U200-02S-01	22.90		LISA-U200-03S-00	22.11					
Name	Type number	Modem version																			
LISA-U200	LISA-U200-00S-00	21.21																			
	LISA-U200-01S-00	22.40																			
	LISA-U200-02S-01	22.90																			
	LISA-U200-03S-00	22.11																			
<p>On each command</p>	<p>COMMANDE</p> <table border="1"> <tr> <td>Modules</td> <td colspan="3">TOBY-L200-02S TOBY-L210-02S TOBY-L210-62S TOBY-L2 LARA-R2 TOBY-R2</td> </tr> <tr> <td></td> <td colspan="3">SARA-U2 LISA-U200-01S LISA-U200-02S LISA-U200-03S L LISA-U230 LISA-U260 LISA-U270 LISA-U120 LISA-U130</td> </tr> <tr> <td></td> <td colspan="3">SARA-G340 SARA-G350 LEON-G1</td> </tr> <tr> <td>Attributes</td> <td>Syntax</td> <td>PIN required</td> <td>Settings saved</td> </tr> <tr> <td></td> <td>full</td> <td>No</td> <td></td> </tr> </table>	Modules	TOBY-L200-02S TOBY-L210-02S TOBY-L210-62S TOBY-L2 LARA-R2 TOBY-R2				SARA-U2 LISA-U200-01S LISA-U200-02S LISA-U200-03S L LISA-U230 LISA-U260 LISA-U270 LISA-U120 LISA-U130				SARA-G340 SARA-G350 LEON-G1			Attributes	Syntax	PIN required	Settings saved		full	No	
Modules	TOBY-L200-02S TOBY-L210-02S TOBY-L210-62S TOBY-L2 LARA-R2 TOBY-R2																				
	SARA-U2 LISA-U200-01S LISA-U200-02S LISA-U200-03S L LISA-U230 LISA-U260 LISA-U270 LISA-U120 LISA-U130																				
	SARA-G340 SARA-G350 LEON-G1																				
Attributes	Syntax	PIN required	Settings saved																		
	full	No																			

5.7 Checking the quality of the GSM reception signal

The command **AT+CSQ** allows to know the reception level (*rssl*) of the signal sent by the closest GSM Base Transceiver Station (BTS), as well as the reception error code (*g*).

When the SIM card is inserted and the PIN code entered the command **AT+CSQ** allows to measure the signal from the BTS of the subscribed operator network.

This command cannot be used without the SIM card.

To check the quality of the GSM signal, do the following operations:

Use a communication software like HyperTerminal, enter the command **AT+CSQ**.

The response has the following format:

+CSQ : <rssl>, <ber> with:

<rssl> = indicates the reception level,

<ber> = receive bit error rate.

Check the returned value <rssl> with the help of the table below.

Table 24 : RSSI value

Value of <rssl>	Gain in dbm	Interpretation	Value of <ber>	Interpretation
0	-113 dbm	Insufficient	0 to 7	See Standards ETSI GSM 05.08
1 to 10	-111 to -95 dbm	Insufficient		
11 to 30	-93 to -53 dbm	Sufficient		
31 (max)	-51dbm	Perfect		
99		Unknown/not detectable	99	Unknown/not detectable

The GSM modem works normally with a minimum <rssl> between 11 and 15.

Below 10, the signal level is insufficient; the modem cannot work depending on the geographical situation or the vehicle mobility. Above 15, the signal is sufficient.

For more information about the AT commands, see the document "u-blox_AT_Commands_Manual".

5.8 Verification of the PIN code

The PIN code is necessary to make a call or to accept a response coming from the GSM network. This code is held in the SIM card and can be modified by the user.

To check that the PIN code has been entered, use communication software like HyperTerminal, and enter the command **AT+CPIN?**

The table below shows the main responses given by the modem:

Table 25 : Verification of PIN code

Command	Response	Interpretation
AT+CPIN?	+CPIN : ERROR	The SIM card is absent or not recognized
	+CPIN : READY	The PIN code is correct
	+CPIN : SIM PIN	The PIN code is wrong or not entered yet
	+CPIN : SIM PUK	The PUK code is required

For more information about the AT commands, see the document "u-blox_AT_Commands_Manual".

5.9 Verification of modem registration on GSM network

1. Make sure that a valid SIM card is inserted in the SIM reader of the modem.
2. Use a communication software like HyperTerminal, and enter the following AT commands:
 - a. **AT+CPIN="xxxx"** to enter the PIN code. The user has only 3 attempts to enter the PIN code. After the third attempt, only a second code (PUK code) supplied by the operator, will allow you to choose a new PIN code.
 - b. **AT+CREG?** To check the registration status on the network. The response will have the following format : **+CREG : <mode>, <stat>** with:
 - <Mode>** = configuration of the registration message not solicited,
 - <Stat>** = registration status.
3. Check the registration status according to the value returned in the table below.

Table 26 : Verification of modem registration on GSM network

Command	Response	Interpretation
AT+CREG?	+CREG : 0,0	The modem is not recognized by the network.
	+CREG : 0,2 or 0,3	The modem is searching for a network operator.
	+CREG : 0,1	The modem is attached in GSM to the local operator.
	+CREG : 0,5	The modem is attached in GSM to the roaming operator.

If the modem is not registered: check the connection between the modem and the antenna or the reception level of the signal (cf. § 5.7 Checking the quality of the GSM reception signal).

For more information about the AT commands, see the document "u-blox_AT_Commands_Manual".

5.10 Verification of modem registration on GPRS network

1. Make sure that a valid SIM card is inserted in the SIM reader of the modem.
2. Use a communication software like HyperTerminal, and enter the following AT commands:
 - a. **AT+CPIN="xxxx"** to enter the PIN code. The user has only 3 attempts to enter the PIN code. After the third attempt, only a second code (PUK code) supplied by the operator, will allow you to choose a new PIN code.
 - b. **AT+CGREG?** To check the registration status on the network. The response will have the following format: **+CGREG : <mode>, <stat>** with:
 - <Mode> = configuration of the registration message not solicited,
 - <Stat> = registration status.
3. Check the registration status according to the value returned in the table below.

Table 27 : Verification of modem registration on GPRS network

Command	Response	Interpretation
AT+CREG?	+CGREG : 0,0	The modem is not recognized by the network.
	+CGREG : 0,2 or 0,3	The modem is searching for a network operator.
	+CGREG : 0,1	The modem is attached in GPRS to the local operator.
	+CGREG : 0,5	The modem is attached in GPRS to the roaming operator.

If the modem is not registered: check the connection between the modem and the antenna or the reception level of the signal (cf. § 5.7 Checking the quality of the GSM reception signal).

For more information about the AT commands, see the document "u-blox_AT_Commands_Manual".

6 Recommended accessories

The accessories recommended by ERCOGENER for the modem GenPro 300e are described on our website in the section Products/Accessories. For more information, please contact our sales department.

7 Client support

ERCOGENER ensures the client support for all its modems sold. You will then have access to:

- The latest version of this document
- The datasheet of the product
- The latest versions of the OS user guides
- Certificates
- Application notes

ANNEX1 - 4 pins Micro Fit cable 2 wires with fuse

(Ref. ERCOGENER : 4402000100)

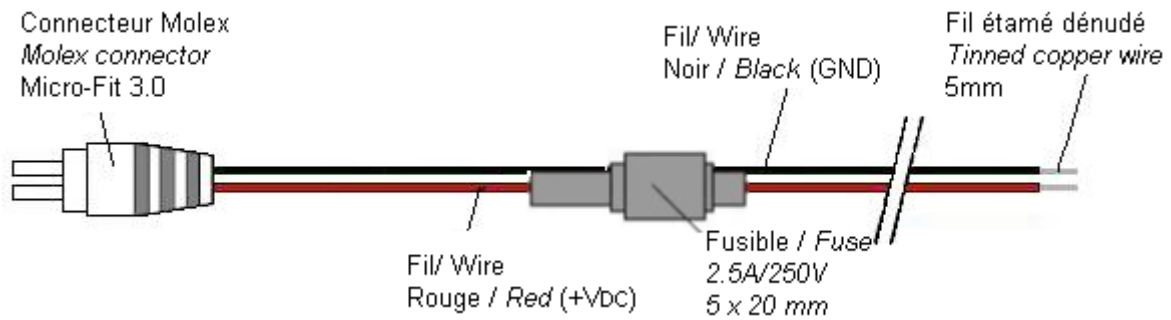


Figure 25 : 4-pin Micro-FIT cable 2 wires with fuse

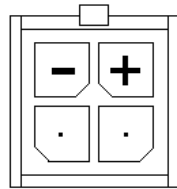


Tableau 28 : Characteristics of power cable 2 wires with fuse

Component	Characteristics
4-pin connector	
Cable	Lg ≈ 1.5m
Wire	Section : 0.75 mm ²
Fuse	5x20 F2.5A L250V
Signal	Color
+V _{DC}	Red
GND	Black

Figure 26 : Fuse 5x20 F2.5A L250V



ANNEX 2 - 4-pin Micro- FIT cable 2 wires without fuse

(Ref. ERCOGENER : 4440302215)

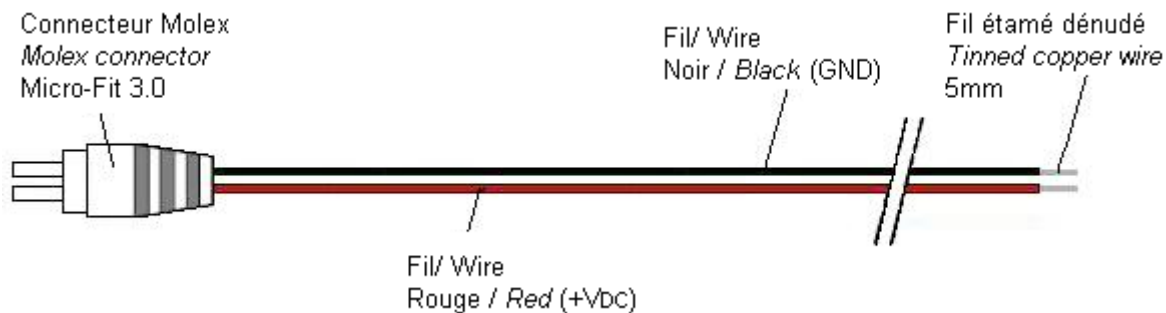


Figure 27 : 4-pin Micro-FIT cable 2 wires without fuse

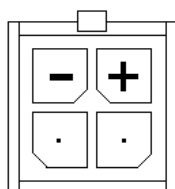


Tableau 29 : Characteristics of power cable 2 wires without fuse

Component	Characteristics
4-pin connector	
Cable	Lg ≈ 1.5m
Wire	Section : 0.75 mm ²
Fuse	
Signal	Coulor
+V _{DC}	Red
GND	Black

ANNEX 3 - USB 2,0 cable Typ A male / Typ mini B male

(Ref. ERCOGENER : 4404000401)



Figure 28 : USB 2,0 cable Typ A male / Typ mini B male



N° of Pin		Description
Type mini B	Type A	
1	1	+5VDC
2	2	Data (D-)
3	3	Data (D+)
4	NU	NU
5	4	Ground (GND)

Tableau 30 : Characteristics of USB 2,0 cable

Component	Characteristics
Connector	5 pins
Cable	Length ≈ 80 cm

ANNEX 4 – Abbreviations

3GPP	3rd Generation Partnership Project
AC	Alternative Current
ACM	Accumulated Call Meter
ADC	Analog to Digital Converter
ADN	Abbreviated Dialing Numbers
AleC	Automatically Initiated eCall
AMR	Adaptive Multi Rate
APN	Access Point Name
ASCII	American Standard Code for Information Interchange
AT	AT Command Interpreter Software Subsystem, or attention
BER	Bit Error Rate
BL	Black List
BSD	Berkley Standard Distribution
BTS	Base Transceiver Station
CB	Cell Broadcast
CBM	Cell Broadcast Message
CLI	Calling Line Identification
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CLK	Clock
CM	Connection Management
CMOS	Complementary Metal Oxide Semiconductor
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CPHS	Common PCN Handset Specification
CR	Carriage Return
CS	Coding Scheme
CSD	Circuit-Switched Data
CTS	Clear To Send
CUG	Closed User Group
DA	Destination Address
DARF	Downlink Advanced Receiver Performance
dB	Decibel
dBc	Decibel relative to the Carrier power
dB _i	Decibel relative to an Isotropic radiator
dBm	Decibel relative to one milliwatt
DC	Direct Current
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCM	Data Connection Management
DCS	Digital Cellular System
DDC	Display Data Channel (I2C compatible) Interface
DL	Down-link (Reception)
DNS	Domain Name Server
DRX	Discontinuous Reception
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi-Frequency
DTR	Data Terminal Ready
DUT	Device Under Test
EDGE	Enhanced Data rates for Global Evolution
EEPROM	Electrically Erasable Programmable Read-Only Memory
EFR	Enhanced Full Rate

EGM	Erco Gener Middleware
E-GSM	Extended GSM
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
ESD	ElectroStatic Discharges
ETSI	European Telecommunications Standards Institute
E-UTRAN	Evolved UTRAN
FDN	Fixed Dialling Number
FIT	Series of connectors (micro-FIT)
FOAT	Firmware Over AT
FOTA	Firmware Over The Air
FR	Full Rate
FS	File System
FTA	Full Type Approval
FTP	File Transfert Protocol
FW	Firmware
GCF	Global Certification Forum
GDI	Generic Digital Interfaces
GND	GrouND
GNSS	Global Navigation Satellite System
GPIO	General Purpose Input Output
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile Communications
H	High
HDLC	High Level Data Link Control
HPLMN	Home PLMN
HSDPA	High Speed Downlink Packet Access
HSPA	High Speed Packet Access
HSUPA	High Speed Uplink Packet Access
HTTP	HyperText Transfer Protocol
I	Input
I/O	Input / Output
I2C	Inter-Integrated Circuit Interface
ICCID	Integrated Circuit Card ID
ICMP	Internet Control Message Protocol
ICP	Inter Processor Communication
IEC	International Electrotechnical Commission
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Station Identity
IP	Internet Protocol
IRA	International Reference Alphabet
IRC	Intermediate Result Code
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IVS	In-Vehicle System (eCall related)
L	Low
L3	Layer 3
LCC	Leadless Chip Carrier
LCP	Link Control Protocol
LED	Light Emitting Diode
LF	Line Feed
LLC	Low Level Command
M2M	Machine-To-Machine
MAX	MAXimum
MCC	Mobile Country Code

ME	Mobile Equipment
MIC	MICrophone
Micro FIT	Family of connectors from Molex
MleC	Manually Initiated eCall
MIN	MINimum
MMI	Man Machine Interface
MN	Mobile Network Software Subsystem
MNC	Mobile Network Code
MNP	Microcom Networking Protocol
MO	Mobile Originated
MS	Mobile Station
MSD	Minimum Set of Data (eCall related)
MSIN	Mobile Subscriber Identification Number
MSISDN	Mobile Systems International Subscriber Identity Number
MSPR	Multi-Slot Power Reduction
MT	Mobile Terminated
MWI	Message Waiting Indication
N/A	Not Applicable
NITZ	Network Identity and Time Zone
NOM	NOMinal
NVM	Non-Volatile Memory
O	Output
OD	Open Drain
OLCM	On Line Commands Mode
Pa	Pascal (for speaker sound pressure measurements)
PAD	Packet Assembler/Disassembler
PBCCH	Packet Broadcast Control Channel
PC	Personal Computer
P-CID	Physical Cell Id
PCL	Power Control Level
PCN	Personal Communication Network
PCN / IN	Product Change Notification / Information Note
PD	Pull-Down
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
POS	Power-On Input (power domain)
PPP	Point-to-Point Protocol
PSAP	Public Safety Answering Point (eCall related)
PSD	Packet-Switched Data
PU	Pull-Up
PUK	Personal Unblocking Key
QoS	Quality of Service
RAM	Random Access Memory
RDI	Restricted Digital Information
RF	Radio Frequency
RFI	Radio Frequency Interference
RFU	Reserved for Future Use
RI	Ring Indicator
RMC	Reference Measurement Channel
RMS	Root Mean Square
RTC	Real Time Clock
RTP	Real-time Transport Protocol
RTS	Request To Send
Rx	Receiver

SAP	SIM Access Profile
SC	Service Centre
SI	SIM Application Part Software Subsystem
SIM	Subscriber Identity Module
SIP	Session Initiation Protocol
SMA	SubMiniature version A RF connector
SMB	SubMiniature version B RF connector
SMS	Short Message Service
SMSC	Short Message Service Center
SMTP	Simple Mail Transfer Protocol
SNR	Signal-to-Noise Ratio
SNTP	Simple Network Time Protocol
SoR	Steering of Roaming
SPI	Serial Peripheral Interface
SPK	SpeaKer
SPL	Sound Pressure Level
SRAM	Static RAM
TA	Terminal Adaptor
TCP	Transfer Control Protocol
TCP/IP	Transmission Control Protocol / Internet Protocol
TDMA	Time Division Multiple Access
TE	Terminal Equipment
TFT	Traffic Flow Template
TP	Transfer layer Protocol
TU	Typical Urban fading profile
Tx	Transmitter
TYP	TYPical
TZ	Time Zone
UART	Universal Asynchronous Receiver-Transmitter serial interface
UCS2	Universal Character Set
UDI	Unrestricted Digital Information
UDP	User Datagram Protocol
UI	Unnumbered Information
UICC	Universal Integrated Circuit Card
UIH	Unnumbered Information with header Check
UL	Up-link (Transmission)
UMTS	Universal Mobile Telecommunications System
URC	Unsolicited Result Code
USB	Universal Serial Bus (power domain)
USIM	UMTS Subscriber Identity Module
UTC	Universal Time Clock
UTRAN	Universal Terrestrial Radio Access Network
UUS1	User-to-User Signalling Supplementary Service 1
VSWR	Voltage Stationary Wave Ratio
WCDMA	Wideband Code Division Multiple Access