MODEM-G2 specifications

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Reference: WM02sp13.doc

DOCUMENT AMENDMENTS				
ISSUE	DATE	STATUS	AUTHOR	COMMENTS
1.0	20/04/98	P	CGi	Creation
1.2	21/01/99		CGi	Sticker, Packaging, Accessories
1.3	29/01/98		CGi	Form

1. Introduction

1.1. Objective of the document

This document talks about the specifications of the second generation GSM modem. Modem product is referenced like this: WMO2-GXXXX according to standards (WMO2-G900 : GSM ; WMO2-G1800 : DCS ; WMO2-G1900 : PCS). All these modem products are based on WISMO concept, it means each modem include a WISMO1B-Gxxxx module .

In this document you will find, on the one hand the description of the basic modem offer and on the other hand several accessories.

1.2. Reference documents

*** ETS 300 019 Environmental conditions and environmental tests for telecommunications equipment.**

*** Plan de qualification interne WAVE version 1.1.**

*** SAE J1113 Transients Voltage Suppression in Automotive Vehicle.**

2. Basic offer and accessories

2.1. Basic offer

2.1.1. Contained

Basic offer include the following elements:

* Modem
* Mechanical fixation (holding bridle)
* Power supply cable + fuse
* User manual

2.1.2. Packaging

The Basic offer set is presented in an unique conditioning. External dimensions close to the following values:

70mm (width) x 60mm (height) x135mm (length).

This is a carton box. It is build in small waves which are covered with a thin film of white ice-cold paper.

2.1.3. User manual

User manual is realised in a size close to the following values:

105mm (width) x 148,5 mm (height) (1/2 A5).

It contains twenty two pages except the coverage.

2.2. Accessories

2.2.1. Cordons

Two cordons could be proposed:

* serial link and audio cable (Y cordon) for a low power audio solution (for example : head set, phone receiver, ...),

* serial link and audio cable (Y cordon) for Car Kit option.

2.2.2. Headset

Headset allows an audio hand free function. This last one integrates a weak power speaker phone and a microphone.

TBD :standard products

2.2.3. Antenna

Two solutions could be proposed:

* a standard deported cellular phone antenna,

* a WAVECOM designed short antenna.

2.2.4. Power supply

An AC(220V~)/DC(12V/2A) converter allows a power network connection.

2.3. Options

2.3.1. Car Kit

Thanks to an audio power amplifier, a microphone fixed on vehicle sun visor and a loud speaker fixed on the vehicle dashboard, anybody can obtains a hand free embarked solution.

Speaker (8Ω) and directional microphone are supplied with this option.

3. Marketing

3.1. Product marketing research

Market research.

Competitor analysis.

3.2. The types of markets

Modem plug in to a PC,
Alarm,
Vehicle Localisation,
Metering.

3.5. Evolution

Dual band, Dual Mode ?

Micro controller option.

4. Product management

4.1. WAVECOM reference

WMO2-GXXXX (WMO2-G900, WMO2-G1800 , WMO2-G1900).

4.2. Markings by labels

4.2.1. Product label

This label is built with anodise aluminium. This one, has a blue silk screen treatment (marking : aluminium colour) and is located on the upper convex mechanical part. It supports the WAVECOM logo. Dimension: 96 x10 mm.

4.2.2. Production sticker

This label is located on the back of the product and contains CE marking (in order to improve the productivity on assembly line, this marking will be printed matter or silk screened in the laser). Dimension : 60 x 9.5 mm.

4.2.3. CE and IMEI sticker

This label placed in the back of the product, it contains the following information : REF PROD (WMO-GXXX), REF WISMO WM1B-GXXX, PN (WMXXXXX) in clear and IMEI number in barre code. This last one integer the product serial number. Dimensions : 60 x 9.5 mm.

4.2.4. Label packaging

This label is put on the product box. Define the contents.

5. Context specifications

5.1. Normative specifications

Product is compliant with specification ETSI Phase II.

5.2. Environment specifications

5.2.1. Climatic and mechanics environment

The following figure shows environment standard constraints:

WMO2_Gxxxx		ENVIRONNEMENTAL CLASSES		
TYPE OF TEST	STANDARDS	STORAGE Class 1.2	TRANSPORTATION Class 2.3	OPERATING (PORT USE) Class 7.3
Cold	IEC 68-2-1 Ab test	-25?C 72 h	-40?C 72 h	-20?C 16 h
Dry heat	IEC 68-2-2 Bb test	+70?C 72 h	+70?C 72 h	+55?C 16 h
Change of temperature	IEC 68-2-14 Na/Nb test		-40?/ +30?C 5 cycles t1 = 3 h	-20?/ +30?C 3 cycles t1 = 3 h
Damp heat cyclic	IEC 68-2-30 Db test	+30?C 2 cycles 90%- 100%RH variant 1	+40?C 2 cycles 90%- 100%RH variant 1	+40?C 2 cycles 90%- 100%RH variant 1
Damp heat	IEC 68-2-56 Cb test	+30?C 4 days	+40?C 4 days	+40?C 4 days
Sinusoidal vibration	IEC 68-2-6 Fc test	5 - 62 Hz : 5 mm/s 62 - 200 Hz : 2 m/s2 3 x 5 sweep cycles		
Random vibration wide band	IEC 68-3-36 Fdb test		5 - 20 Hz : 0.96 m2/s3 20 - 500 Hz : - 3 dB/oct 3 x 10 min	10 - 12 Hz : 0.96 m2/s3 12 - 150 Hz : - 3 dB/oct 3 x 30 min

5.2.2. Electric environment

The following figure sum up electrical constraints in an automotive environment:

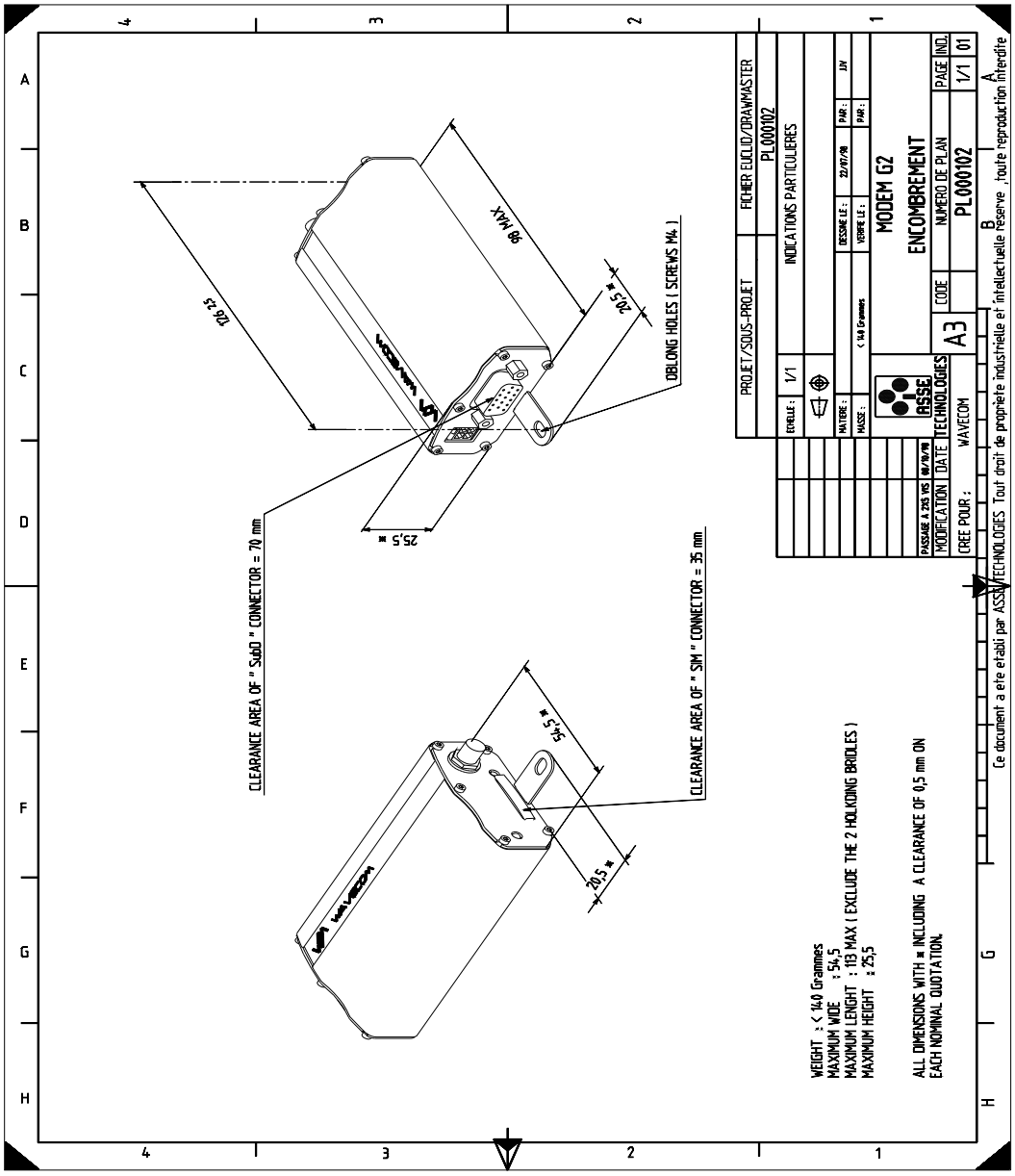
Length of transient	Cause	Energy capability Voltage Amplitude	Possible frequency of application
Steady state	Failed Voltage Regulator	oo + 18 V	Infrequent
3 - 5 minutes	Jump start with 24 V battery	oo +/- 24 V	Infrequent
200ms to 400ms	Load dump - i.e., disconnection of battery while at high charging rates	≥10 J ≤125V	Infrequent
< 0.32 s	Inductive Load Switching Transient	<1 J -300V to +80V	Often
< 0.20 s	Alternator Field Decay	<1 J -100V to -40V	Each Turn-Off
90ms	Ignition Pulse, Battery Disconnected	<0.5 J ≤75V	<500Hz Several Times in vehicle Life
1ms	Mutual Coupling in Harness (Note)	<1 J <200V	Often
15µs	Ignition Pulse, Normal	<0.001 J <3V	<500Hz Continuous
	Accessory Noise	<1.5V	50 Hz to 10 KHz
	Transceiver Feedback	20mV	R.F.

Note : These transients may be present on any wire in the vehicle.

5.3. Physical characteristics

The physical characteristics are the following ones:

Physical characteristic	Qualification	Comments
Dimension Absolute maximum dimension	98x54x25 mm 110x54x25 mm	Without the connectors quotations .
Weight	< 140 g	
Volume	13.23 cm3	
Case		Aluminium profile



5.4. Basic services

Functions of this modem are the following ones:

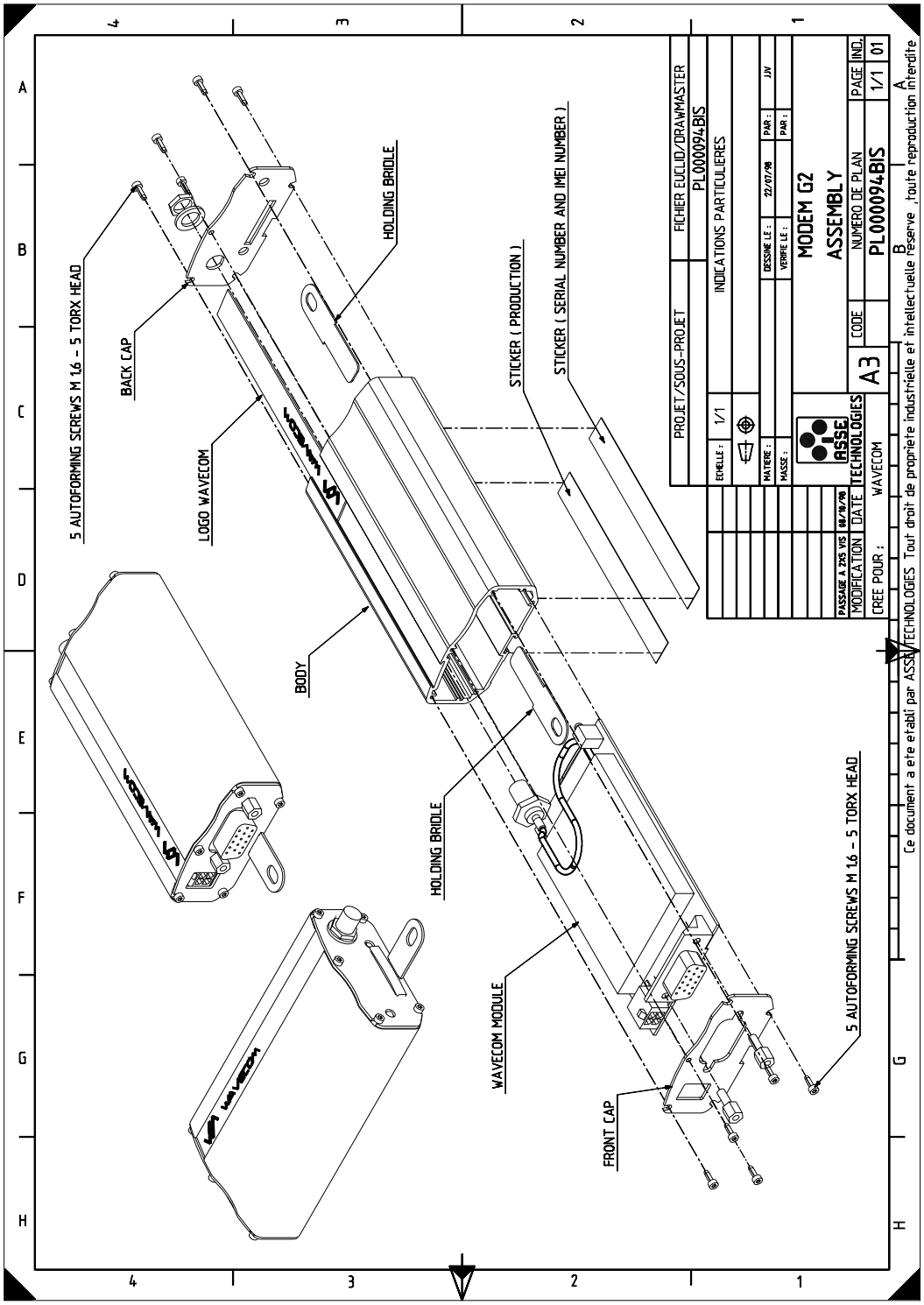
	GSM	DCS/PCS
Standard	900 MHz.	1800 MHz or 1900 MHz
	Class 4 (2W).	Class 5 (1W)
	GSM phase 2.	GSM phase 2.
Interface	Serial interface RS232 V.24/V.28	Serial interface RS232 V.24/V.28
	AT command set based on V.25ter and GSM 07.05 & 07.07.	AT command set based on V.25ter and GSM 07.05 & 07.07.
	Auto-bauding function between 2400 bits/s and 19200 bits/s	Auto-bauding function between 2400 bits/s and 19200 bits/s
	No auto-framing available	No auto-framing available
SMS	Mobile Originated (MO) and Mobile Terminated (MT). Mode Text & PDU point to point. Cell broad cast.	Mobile Originated (MO) and Mobile Terminated (MT). Mode Text & PDU point to point. Cell broad cast.
	In accordance with GSM 07.05	In accordance with GSM 07.05
Data	Asynchronous 2400, 4800, 9600 bits/s.	Asynchronous 2400, 4800, 9600 bits/s.
	Transparent and Non Transparent mode	Transparent and Non Transparent mode
	In Non Transparent Mode: 300, 1200, 1200/75 bauds.	In Non Transparent Mode: 300, 1200, 1200/75 bauds.
	Mode 3.1 KHz (PSTN) and V110 (ISDN)	Mode 3.1 KHz (PSTN) and V110 (ISDN)
Fax	2400/4800/7200/9600 bits/s, GSM teleservice 62 in Transparent Mode.	2400/4800/7200/9600 bits/s, GSM teleservice 62 in Transparent Mode.
	Class 1.	Class 1.
	Group 3 compatible.	Group 3 compatible.
Audio	FR et EFR operation	FR et EFR operation
	1 : Head Set	1 : Head Set
	2 : Car Kit (in option)	2 : Car Kit (in option)

6. General description

6.1. Presentation

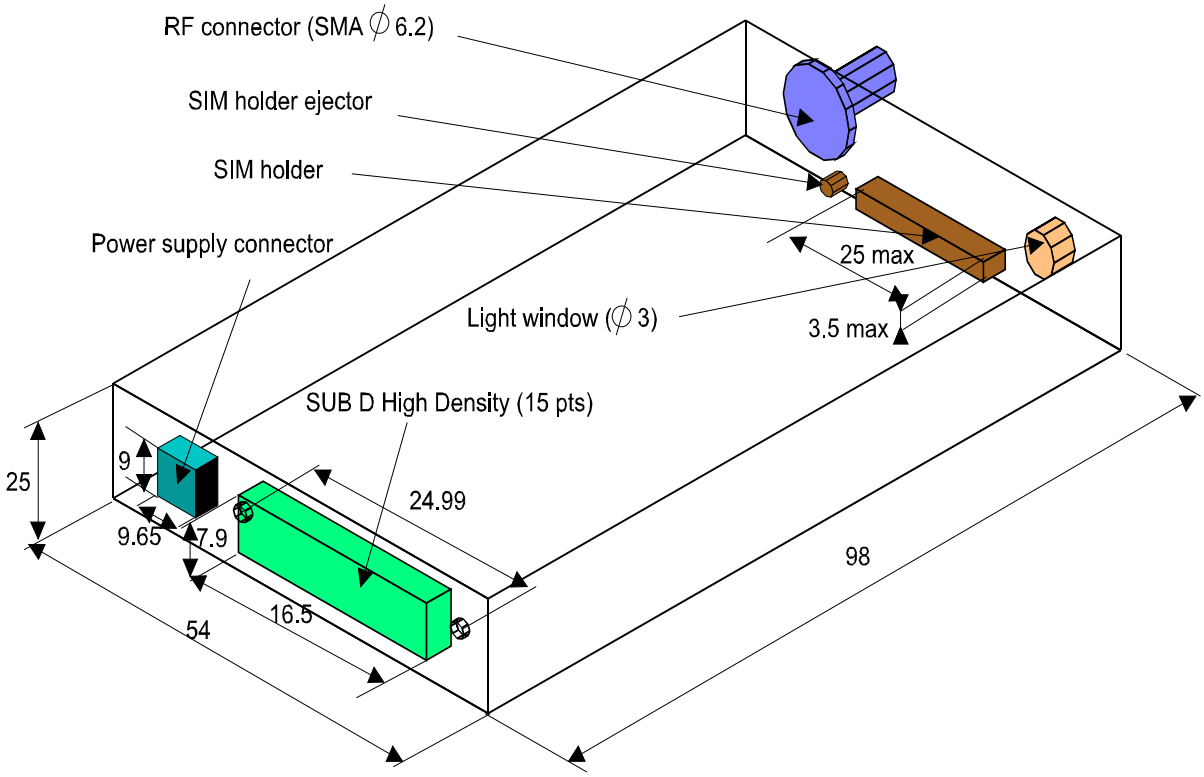
Modem mechanical case is built from an aluminium profile ended by two stoppers at these extremities. All input/output links are established by three connector placed at the two extremities of the profile. No cordon is fixed to the case. The SIM card (micro-SIM) is put on an extract drawer. A red indicator specifies the functioning mode of the product.

6.2. Mechanical philosophy retained



6.3. Connectors definition

6.3.1. Connector location



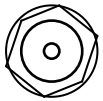
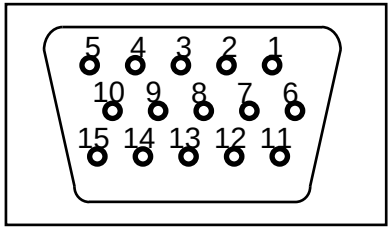
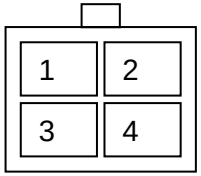
6.3.2. Connectors description

We apply the following constraints in the connector choice:

* size,
* mechanical,
* electrical performances,
* Industrialisation (surface assembly choice).

In order to extract or insert the Micro SIM card, each user has to press with a sharp element (a pen for example) the SIM holder ejector.

If this procedure is no respected, the SIM holder could be destroyed.

Function connector	Type	Pining	Drawing	Ref. supplier	opposite connector examples
RF connector	SMA			RADIALL : R284310085	RADIALL : R125073
Serial link AUDIO link BOOT RESET	SUB D High Density (15 pts)	1 DCD (CT109) 2 TX (CT103) 6 RX (CT104) 7 DSR (CT107) 8 DTR (CT108/2) 9 GND 11 CTS (CT106) 12 RTS (CT105) 13 RI (CT125) 4 MICROPHONE (+) 5 MICROPHONE (-) 10 SPEAKER (+) 15 SPEAKER (-) 3 BOOT 14 RESET		JST : KSEY-15S-3B6L18-13	ITT CANNON : ZDEA-15P-SB or JST : KEC-15P with contact JK-SP2143
Power Supply connector	Micro-Fit (4pts)	1 V+BATTERY 2 GROUND 3-4 AUXI		MOLEX : 43045-0409	MOLEX : 43025-0400
SIM holder				MOLEX : 52828-0611	MICRO SIM

6.5. Electrical characteristics

The following figure summarises electrical characteristics defined in input/output for all external connections.

Parameters	MIN	TYP	MAX	UNIT	Comments
Power supply :					
Input supply voltage	5*/6**	13,5	32	V	GSM or DCS/PCS
Input supply voltage with Car Kit option		13,5	18	V	
Input peak supply current @**5V*/6V****			2,5*/0,9**	A	GSM or DCS/PCS
Input average supply current @5V*/6V** in communication mode			450*/200**	mA	GSM or DCS/PCS
Input average supply current @**5V*/6V**** in idle mode (paging period 480ms)			35	mA	
Input average supply current @**5V*** in idle mode with auto-shutdown function***			10	mA	
Serial link :					
RS232					standard
Audio (head set) :					
microphone input current @2V/2KΩ		0,5		mA	
absolute microphone input voltage			100	mVpp	
speaker output current 150Ω //1nF		16		mA	
absolute speaker impedance			32	Ω	
SIM	3		5	V	

* only GSM

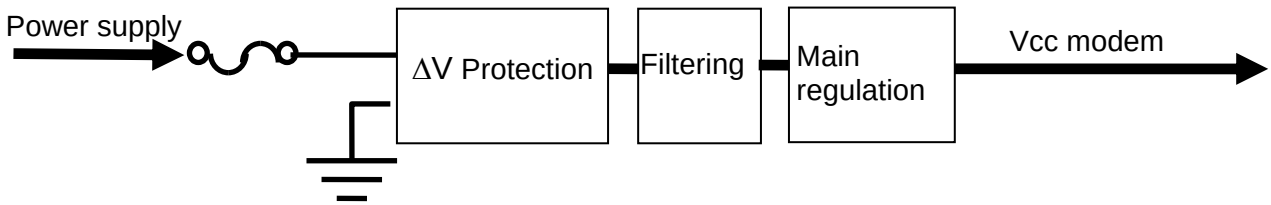
** only DCS/PCS

*** auto shutdown function could be activate if the serial link leads a non hardware flux (CTS/RTS non used). This hardware function will not be available with the first products.

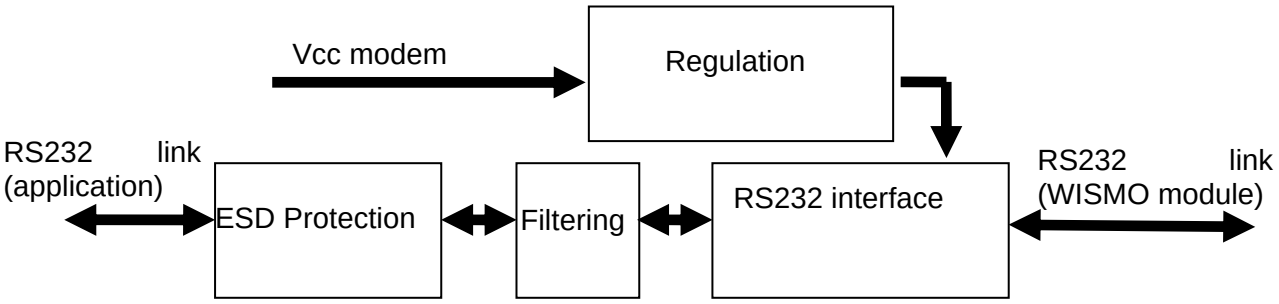
6.6.Electrical functions

6.6.1. Functional schematic

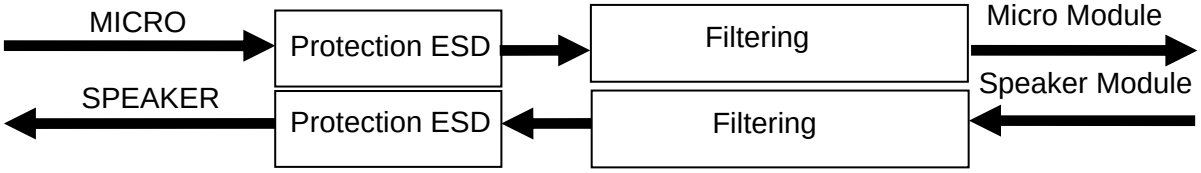
POWER SUPPLY REGULATION



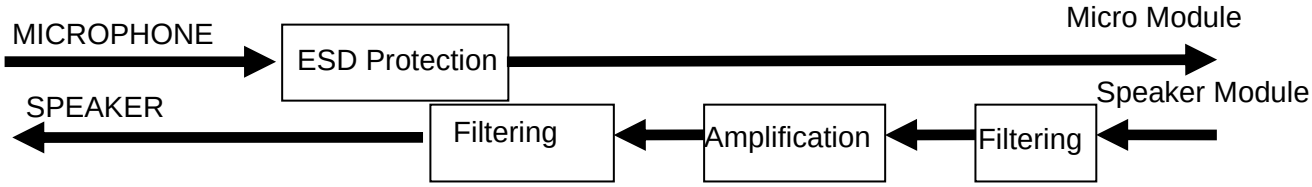
RS232 INTERFACE



AUDIO INTERFACE : Head Set



AUDIO INTERFACE : Car Kit (in option)



6.6.2. Filtering

Filtering guarantees:

* EMI/RFI protection in input and output,
* signal smoothing.

Components retained are on the one hand Low Pass Filter (LC filter architecture) and other one power inductor.

6.6.3. ESD protection

This function protects all input/output against the electrostatic surges.

Components which compose this function will be sized according to, the power of the electrostatic surges apply on the connectors and the normal functioning voltage scale. Components retained are TRANZIL diodes (TVS diode : Transient Voltage Suppression diode).

6.6.4. Voltage surge protection

This function allows a protection against, the voltage surges, the reverse polarity and electrostatics surges on the power supply line.

6.6.5. Regulation

Main regulation is made with a DC/DC converter in order to supply power at all functions (STEP-DOWN CONVERTER is the name of montage).

6.6.6. RS232 Interface

This function adapts voltage levels between the WISMO module and external world .

6.6.7. Amplification

This function is obtains with an audio power amplifier.

6.6.8. Other function

Red indicator. This function shows three operating modes:

the red indicator light up and light down fast in the transmission mode,
the red indicator light up and light down slowly in the idle mode,
the red indicator is light up continuous in the network search mode

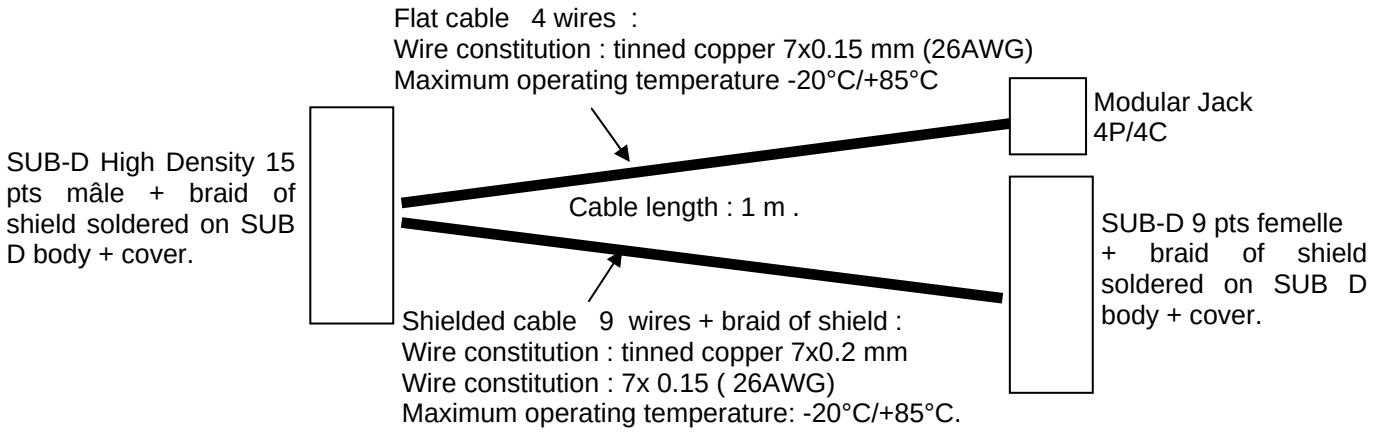
7. Accessories description

7.1. Headset

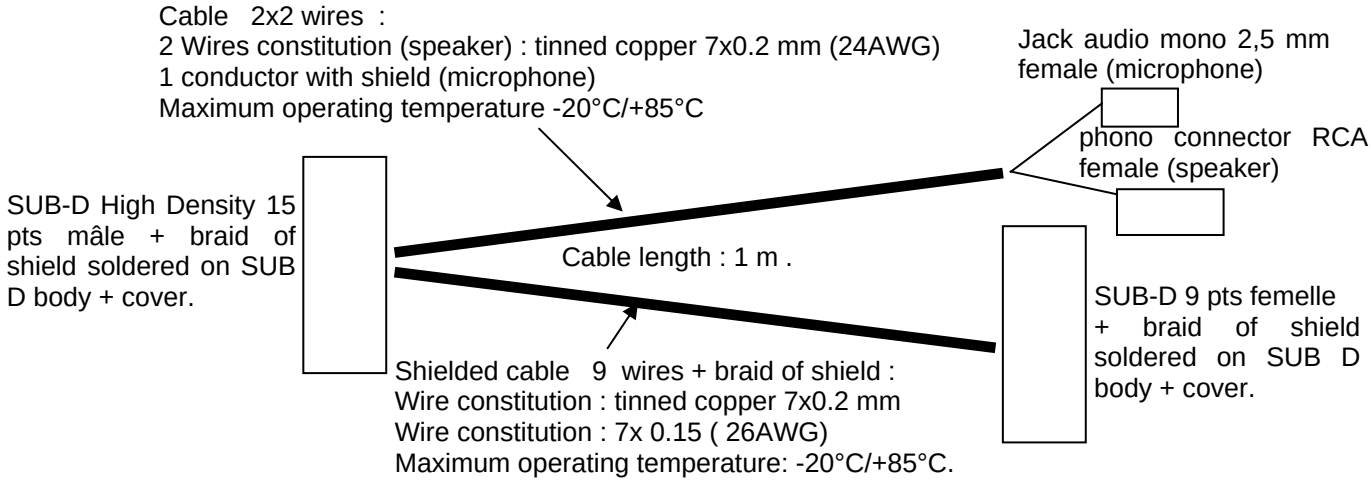
References of this kit have to be specified.

7.2. Cordon examples

7.2.1. Cordon RS232/AUDIO(head set) :



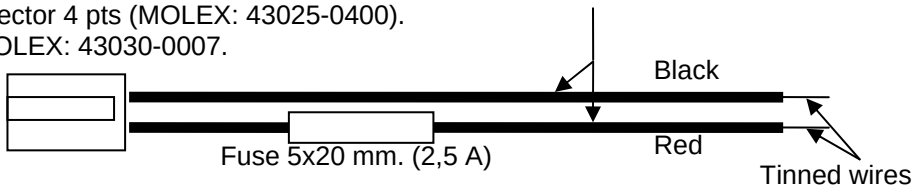
7.2.2. Cordon RS232/AUDIO(Car Kit) :

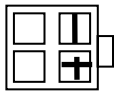


7.2.3. Power supply cordon :

Cable : 1 wire.
Ame : tinned copper 24x0.2 mm
Section : 0.75 mm²
Maximum operating temperature: -20°C/+85°C.

MICRO FIT connector 4 pts (MOLEX: 43025-0400).
Contacts (x2) (MOLEX: 43030-0007.

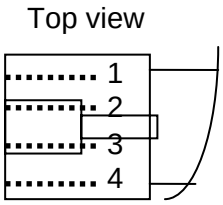




Cable length : 1 m .

7.2.4. Cordons construction (RS232/Audio head set):

Assembly example



SUB-D 9CTS	Connection	SUB D 15CTS (RS232)	Signal name
1 (White)	➲	1 (White)	DCD (CT109)
2 (Grey)	➲	6 (Grey)	RX (CT104)
3 (Violet)	➲	2 (Violet)	TX (CT103)
4 (Bleu)	➲	8 (Bleu)	DTR (CT108/2)
5 (Black)	➲	9 (Black)	GND
6 (Orange)	➲	7 (Orange)	DSR (CT107)
7 (Yellow)	➲	12 (Yellow)	RTS (CT105)
8 (Brown)	➲	11 (Brown)	CTS (CT106)
9 (Green)	➲	13 (Green)	RI (CT125)
Modular Jack 4P/4C	**Connection**	**SUB D 15CTS (AUDIO)**	
1 (Yellow/White)	➲	4 (Yellow/White)	microphone(+)
2 (Red/White)	➲	10 (Red/ White)	speaker(+)
3 (Green/White)	➲	15 (Green/White)	speaker(-)
4 (Black/White)	➲	5 (Black/White)	microphone(-)
Flying wires	**Connection**	**SUB D 15CTS (Boot/Reset/GND)**	
(Pink)	➲	3 (Pink)	BOOT
(Bleu/White)	➲	14 (Bleu/White)	RESET
(Black)	➲	9 (Black)	GND