

WISMO Pac P5100 series

WISMO Pac P5186 module Starter kit User Guide

Reference: **P5186-SK User Manual**

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Document Information

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Cautions

This starter kit integrates a modular transmitter. This device is to be used only for mobile and fixed applications.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. The antenna(s) used for this transmitter must not exceed a gain of 3 dBi for mobile operation and 7 dBi for fixed operation.

Users and OEM integrators must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance. OEM must also be provided with labelling instructions.

This device contains 900 MHz GSM functions that are not operational in U.S. territories. This filing is only applicable for GSM 850 MHz and PCS 1900 MHz operations.

Information provided herein by Wavecom is accurate and reliable. However no responsibility is assumed for its use.

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Overview

This document is a description of the WISMO Pac P5186 Starter kit based on a mother board V2 Ref. WM01048-010-20.

This Starter kit is an equipment which can be used to start software and hardware development based on WISMO Pac P5186 modules.

Refer to the documentation of the WISMO Pac P5186 module for further information.

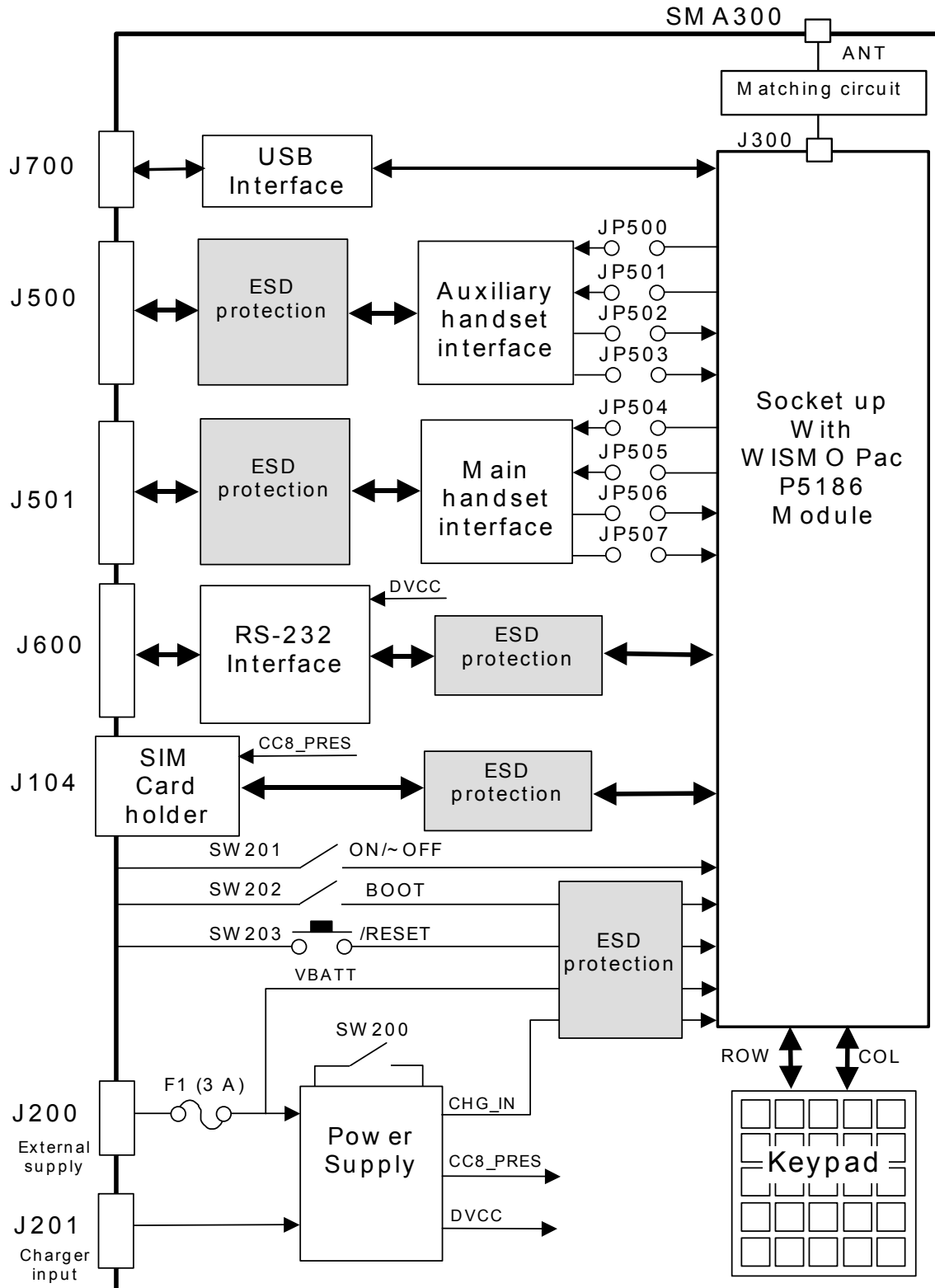
Reference documents

- [1] MOTHER BOARD Starter kit Schematics and PCB, Release 2.0
Ref.: WM01048-010-20.
- [2] WISMO Pac P5186 module Product Technical Specification
Ref.: WM_PRJ_P5100_PTS_001.
- [3] Firmware downloader User Guide
Ref.: WM_SW_GEN_UGD_001.

List of abbreviations

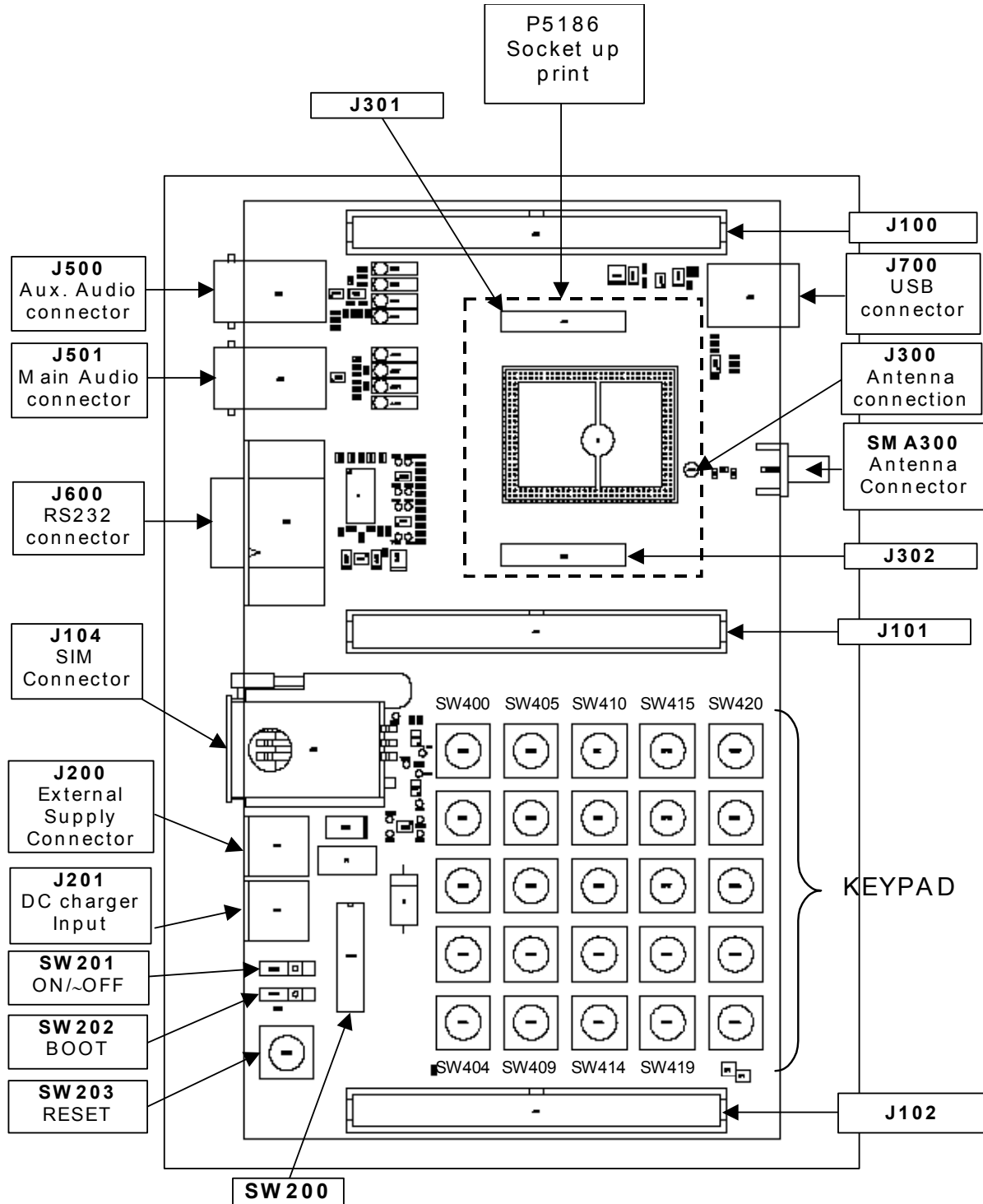
ADC	A nalog to D igital C onverter
AUX	AUX iliary
CLK	C Lock
CTS	C lear To S end
DAI	D igital A udio I nterface
DC	D irect C urrent
DCD	D ata C arrier D etect
DCE	D ata C ommunication E quipment
DSR	D ata S et R eady
DTE	D ata T erminal E quipment
DTR	D ata T erminal R eady
ESD	E lectro S tatic D ischarges
GND	G rou N D
GPI	G eneral P urpose I nterface
GPIO	G eneral P urpose I nterface O utput
GPO	G eneral P urpose O utput
I/O	I nterface / O utput
MIC	MIC rophone
PC	P ersonnal C omputer
PCM	P ulse C ode M odulation
PWM	P ulse W idth M odulation
RF	R adio F requency
RI	R ing I ndicator
RTC	R eal T ime C lock
RTS	R equest To S end
RXD	R ecieve D ata
SCI	S mart C ard I nterface
SIM	S ubscriber I nterface M odule
SPI	S erial P eripheral I nterface
SPK	S Pea K er
TXD	T ransmit D ata
USB	U niversal S erial B us

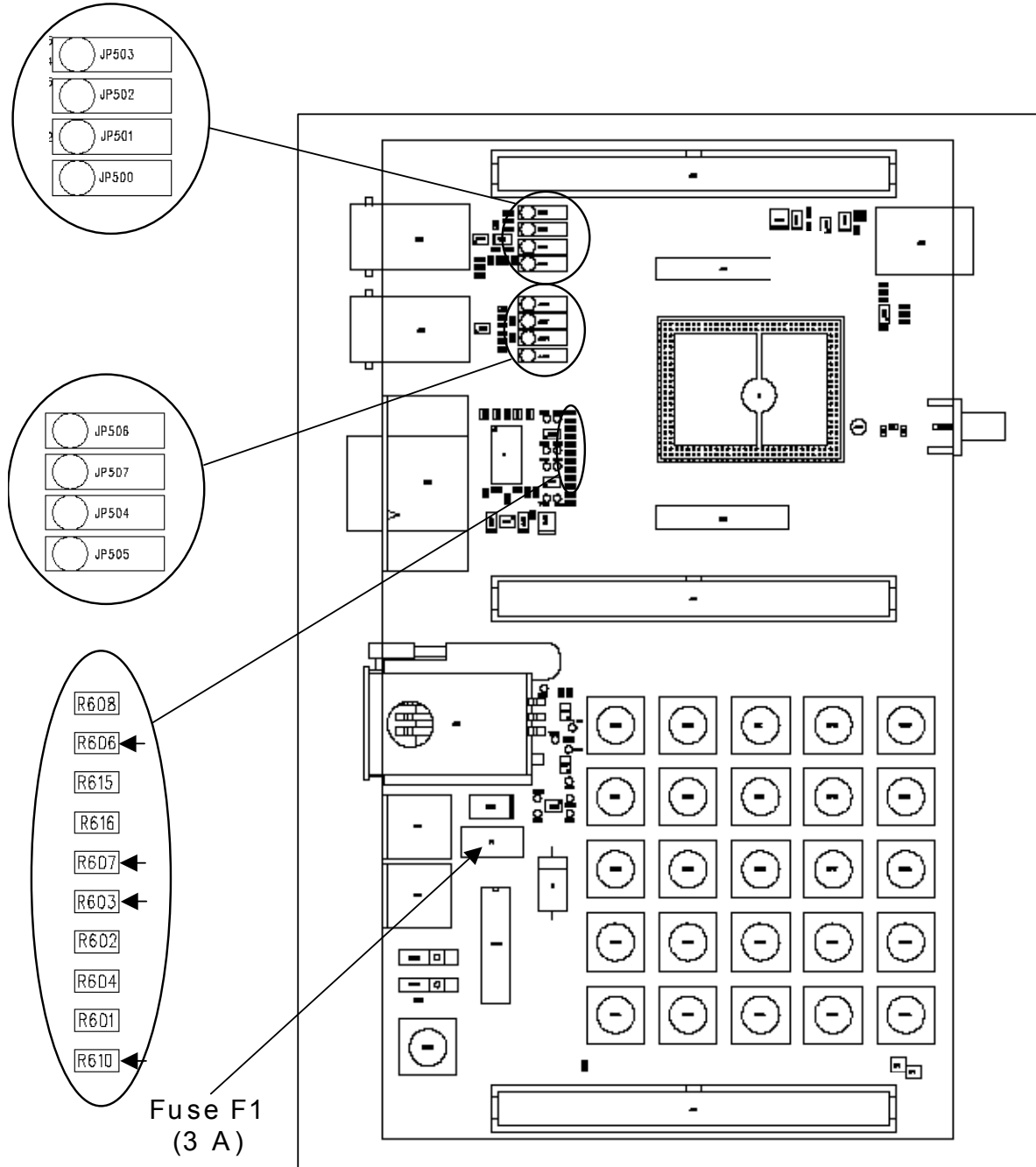
1 Mother board block diagram



2 Hardware description

2.1 Mother board





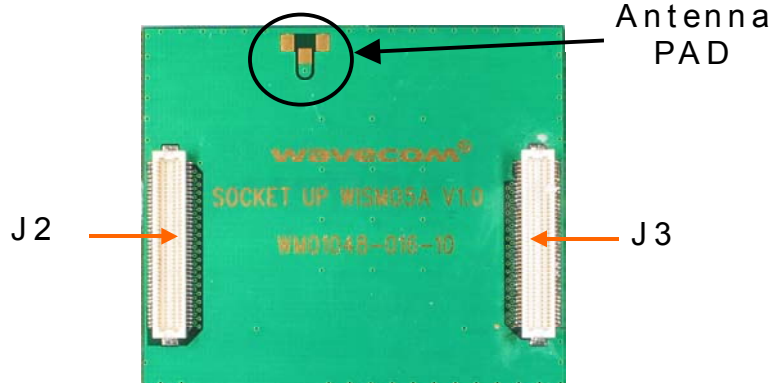
2.2 Socket up

Top view



WISM O
P5186
Module

Bottom view



Antenna
PAD

J2

J3

Connection to the mother board:

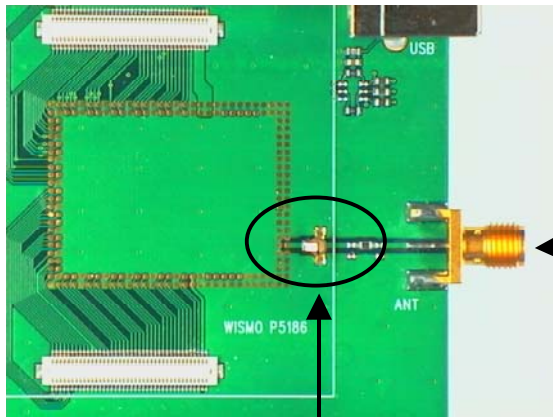
Socket up	Mother board
Antenna PAD	J300 (RF connector type IMP)
J3	J301
J2	J302

Warning:

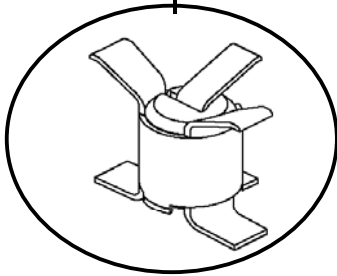
After 50 plug in and 50 plug out of the socket up on the mother board, the efficiency of the connection is no more guaranteed by the connector manufacturer:

Connector designation	80- pin header on the mother board	80- pin receptacle on the socket up
Manufacturer	HIROSE	
Part number	DF12(3.0)-80DP-0.5V(80)	DF12(3.0)-80DS-0.5V(80)

2.3 Antenna connection



SMA300
Antenna
connector



J300 (SMT connector)
Antenna connection
With the socket up

3 Connector description

3.1 WISMO Pac P5186 signals

Some of the WISMO Pac P5186 interface signals mentioned hereafter are multiplexed in order to limit the number of pins.

For further information about the WISMO Pac P5186 signals and multiplexing, refer to document [2]
WISMO Pac P5186 module Product Technical Specification
Ref.: WM_PRJ_P5100_PTS_001.

3.2 J100 connector

J100 is a HE10 50-pin male connector.

Pin number	Signal name	I/O	I/O type	Description	Comment
1, 2	GND			Ground	
3, 4	VBATT	I/O		Battery voltage	High current.
5, 6	GND			Ground	.
7	AUX_ADC	I	Analog	Auxiliary ADC input	
8	BAT_TEMP	I	Analog	ADC input for battery temperature measurement	
9, 10	GND			Ground	.
11	SPK_N	O	Analog	Main speaker negative output	
12	SPK_P	O	Analog	Main speaker positive output	
13	SPK_AUX_P	O	Analog	Auxiliary speaker positive output	
14	SPK_AUX_N	O	Analog	Auxiliary speaker negative output	
15	MIC_N	I	Analog	Main microphone negative input	
16	MIC_P	I	Analog	Main microphone positive input	
17	MIC_AUX_P	I	Analog	Auxiliary microphone positive input	
18	MIC_AUX_N	I	Analog	Auxiliary microphone negative input	
19, 20	GND			Ground	
21	VIBRATOR	O	Analog	Vibrator output	Iout = 80 mA max Vout = 2.8 V max.

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Pin number	Signal name	I/O	I/O type	Description	Comment
22	BAT_RTC	I/O	Supply	RTC back-up supply	Iout = 2 mA max Vout = 2.5 V max.
23	LED_OUT	O	Open Drain output	External LED driving and battery charging indicator	
24	VCC	O	Supply	Digital supply for external 2V8 digital devices	Iout = 10 mA max.
25, 26	GND			Ground	
27	CT108_2/DTR1	I	CMOS 2V8	Serial link (UART1) Data Terminal Ready	Multiplexed with SPI2_DATA and GPIO14
28	CT106/CTS1	O	2V8	Serial link (UART1) Clear To Send	Multiplexed with GPO2
29	CT107/DSR1	O	2V8	Serial link (UART1) Data Set Ready	Multiplexed with SPI2_CLK and GPO4
30	CT103/TXD1	I	CMOS 2V8	Serial link (UART1) Transmit serial data	Multiplexed with GPIO13
31	CT104/RXD1	O	2V8	Serial link (UART1) Receive serial data	Multiplexed with GPO3
32	CT105/RTS1	I	CMOS 2V8	Serial link (UART1) Request To Send	Multiplexed with GPIO15
33, 34	GND			Ground	
35	GPIO12	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCI_RST
36	GPIO10	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCI_CLK
37	GPIO11	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCI_DATA
38	GPIO8	I/O	CMOS/1V8	General Purpose I/O	Multiplexed with SCI_PRES and EXTINT3
39	GND			Ground	
40	GPIO9	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCI_PWR
41	GPIO4	I/O	CMOS/1V8	General Purpose I/O	Multiplexed with CLK32K
42	GND			Ground	
43	GPO0	O	1V8	General Purpose O	Multiplexed with CTS2 and PWM0
44	GPIO5	I/O	CMOS/1V8	General Purpose I/O	Multiplexed with USR0N and TXD2
45	IO_AUDIO	I/O	CMOS/2V8	External audio function control	Multiplexed with DAI_RST
46	GPO1	O	1V8	General Purpose O	Multiplexed with RXD2

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Pin number	Signal name	I/O	I/O type	Description	Comment
47	GPIO6	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCL and SPI3_DATA
48	GPIO7	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SDA and SPI3_CLK
49, 50	GND			Ground	

3.3 J101 connector

J101 is a HE10 50-pin male connector.

Pin number	Signal name	I/O	I/O type	Description	Comment
1, 2	GND			Ground	
3, 4	V-CORE	O	supply	Digital supply for external 1V8 digital devices	50 mA max.
5	ON/OFF	I	CMOS Schmitt	Power control	Power ON when high
6	BUZ	O	Open drain	Buzzer output	Iout = 100 mA max. Vout = 0.4 V max.
7, 8	GND			Ground	
9	/WR	O	1V8	Write operation	Active low
10	D15	I/O	CMOS/1V8	Data bus 15	
11	D11	I/O	CMOS/1V8	Data bus 11	
12	D14	I/O	CMOS/1V8	Data bus 14	
13	D12	I/O	CMOS/1V8	Data bus 12	
14	D13	I/O	CMOS/1V8	Data bus 13	
15	D10	I/O	CMOS/1V8	Data bus 10	
16	D09	I/O	CMOS/1V8	Data bus 9	
17	D07	I/O	CMOS/1V8	Data bus 7	
18	D04	I/O	CMOS/1V8	Data bus 4	
19	D05	I/O	CMOS/1V8	Data bus 5	
20	D03	I/O	CMOS/1V8	Data bus 3	
21	A03	O	1V8	Address bus 3	
22	D06	I/O	CMOS/1V8	Data bus 6	
23	/RD	O	1V8	Read operation	Active low
24	D08	I/O	CMOS/1V8	Data bus 8	
25	A02	O	1V8	Address bus 2	
26	D02	I/O	CMOS/1V8	Data bus 2	

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Pin number	Signal name	I/O	I/O type	Description	Comment
27	D01	I/O	CMOS/1V8	Data bus 1	
28	D00	I/O	CMOS/1V8	Data bus 0	
29	LCDEN	O	1V8	LCD Enable	Active high Multiplexed with GPIO0
30	GND			Ground	
31	BOOT	I	CMOS 1V8	Enable for flash downloading	Active low Multiplexed with GPIO2
32	/RESET	I/O	Schmitt	P5186 module reset	Active low
33, 34	GND			Ground	
35	USB-P	I/O	Differential	USB positive line	
36	USB-N	I/O	Differential	USB negative line	
37	V-USB	O	Supply	3V3 USB power in	
38	GPIO1	I/O	CMOS/1V8	General Purpose I/O	
39, 40	GND			Ground	
41, 42	CHG_IN	I	Supply	Current source input for battery charging	High current (1 A max)
43, 44	GND			Ground	
45	SIM_RST	O	1V8 or 3V	SIM card reset	
46	SIM_CLK	O	1V8 or 3V	SIM card clock	
47	GPIO3	I/O	CMOS/1V8	General purpose I/O	Multiplexed with RTS2 and SIM_PRESENCE
48	SIM_VCC	O	1V8 or 3V	SIM power supply	
49	GND			Ground	
50	SIM_IO (SIM_DATA)	I/O	CMOS/ 1V8 or 3V	SIM card data	

3.4 J102 connector

J102 is a HE10 50-pin male connector.

Pin number	Signal name	I/O	I/O type	Description	Comment
1, 2, 3, 4	GND			Ground	
5	5V	O	Supply	Power supply 5V	
6	DVCC	O	Supply	RS232 interface Power supply 3V	
7, 8	GND			Ground	
9, 10				Not Connected	
11, 12	GND			Ground	
13	ROW4	I/O	CMOS	Keyboard Row 4	
14				Not Connected	
15	COL4	I/O	CMOS	Keyboard Column 4	
16				Not Connected	
17	ROW3	I/O	CMOS	Keyboard Row 3	
18				Not Connected	
19	COL3	I/O	CMOS	Keyboard Column 3	
20				Not Connected	
21	ROW2	I/O	CMOS	Keyboard Row 2	
22				Not Connected	
23	COL2	I/O	CMOS	Keyboard Column 2	
24				Not Connected	
25	ROW1	I/O	CMOS	Keyboard Row 1	
26				Not Connected	
27	COL1	I/O	CMOS	Keyboard Column 1	
28				Not Connected	
29	ROW0	I/O	CMOS	Keyboard Row 0	
30				Not Connected	
31	COL0	I/O	CMOS	Keyboard Column 0	
32				Not Connected	
33	GND			Ground	
34				Not Connected	
35	IO_AUDIO	I/O	CMOS 2V8	External audio function control	Multiplexed with DAI_RST

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Pin number	Signal name	I/O	I/O type	Description	Comment
36				Not Connected	
37, 38, 39	GND			Ground	
40	/RESET	I/O	Schmitt	Module RESET	
41	DAI_CLK	O	2V8	DAI clock 104 kHz	Multiplexed with PCM_CLK
42	PCM_OUT	O	2V8	PCM serial data Output	Multiplexed with DAI_OUT
43	CODEC_8K	O	2V8	8 kHz PCM sample frame synchronization	
44	PCM_IN	I	CMOS 2V8	PCM serial data Input	Multiplexed with DAI_IN
45	TP1			Test Point TP1*	
46	TP2			Test Point TP2*	
47, 48, 49, 50	GND			Ground	

* refer to document [1] for further details.

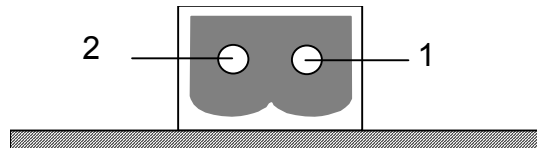
3.5 J104 connector (SIM)

J104 is a standard 1V8 or 3V SIM socket. The Table bellow gives the description of the signals of this connector.

Pin number	Signal name	I/O	I/O type	Description	Comment
1	SIM_VCC	O	1V8 or 3V	SIM card Power Supply	
2	SIM_RST	O	1V8 or 3V	SIM card Reset	
3	SIM_CLK	O	1V8 or 3V	SIM card Clock	
4	SIM_PRES	I	CMOS 1V8 max.(*)	SIM Card presence detect	Multiplexed with GPIO3 and RTS2
5	GND			Ground	
6	VPP	Not connected			
7	SIM_DATA	I/O	CMOS/1V8-3V	SIM card Data	
8	CC8		1V8 digital supply (V-CORE)	SIM_PRES signal supply	

(*) For either 1V8 or 3V SIM cards.

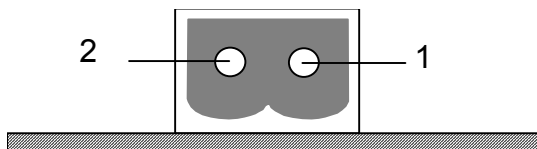
3.6 J200 connector (external power supply)



J200 is the external power supply connector. It is a 2-pin male connector. The Table bellow gives the description of its signals.

Pin number	Signal name	I/O	I/O type	Description
1	VBATT	I	Supply	External supply 4.2 VDC max.
2	GND	I	Supply	Ground

3.7 J201 connector (battery charger)



J201 is used to simulate a charger. It is a 2-pin male connector. The Table bellow gives the description of its signals.

Pin number	Signal name	I/O	I/O type	Description
1	CHG_IN	I	Current source 5V / 800 mA max.	External Charger
2	GND	I		Ground

3.8 J301 (Socket up)

Pin number	Signal name	I/O	I/O type	Description	Comment
1, 2	GND			Ground	
3, 4, 5, 6, 7, 8	VBATT	I/O	Supply	Battery voltage	
9, 10	GND			Ground	
11	AUX_ADC	I	Analog	Auxiliary ADC input	
12	GND			Ground	
13	BAT_TEMP	I	Analog	ADC input for battery temperature measurement	
14	GND			Ground	
15	SPK_N	O	Analog	Main speaker negative output	
16	GND			Ground	
17	SPK_P	O	Analog	Main speaker positive output	
18	GND			Ground	
19	SPK_AUX_P	O	Analog	Auxiliary speaker positive output	
20	GND			Ground	
21	SPK_AUX_N	O	Analog	Auxiliary speaker negative output	
22	GND			Ground	
23	MIC_N	I	Analog	Main microphone negative input	

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Pin number	Signal name	I/O	I/O type	Description	Comment
24	GND			Ground	
25	MIC_P	I	Analog	Main microphone positive input	
26	GND			Ground	
27	MIC_AUX_P	I	Analog	Auxiliary microphone positive input	
28	GND			Ground	
29	MIC_AUX_N	I	Analog	Auxiliary microphone negative input	
30	GND			Ground	
31	VIBRATOR	O	Analog	Vibrator output	Iout=80 mA max. Vout=2.8 V max.
32	GND			Ground	Iout=2 mA max. Vout=2.5 V max.
33	BAT_RTC	I/O	Supply	RTC back-up supply	
34	GND			Ground	
35	LED_OUT	O	Open drain output	External LED driving and battery charging indicator	
36	GND			Ground	
37	V-USB	O	Supply	3V3 USB power supply in	
38	GND			Ground	
39	USB-P	I/O	Differential	USB positive line	
40	GND			Ground	
41	USB-N	I/O	Differential	USB negative line	
42	GND			Ground	
43	DTR1	I	CMOS 2V8	Serial link UART1 Data Terminal Ready	Multiplexed with SPI2_DATA and GPIO14
44	GND			Ground	
45	CTS1	O	2V8	Serial link UART1 Clear To Send	Multiplexed with GPO2
46	GND			Ground	
47	DSR1	O	2V8	Serial link UART1 Data Set ready	Multiplexed with SPI2_CLK and GPO4
48	GND			Ground	
49	TXD1	I	CMOS 2V8	Serial link UART1 transmit data	Multiplexed with GPIO13

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Pin number	Signal name	I/O	I/O type	Description	Comment
50	GND			Ground	
51	RXD1	O	2V8	Serial link UART1 receive data	Multiplexed with GPO3
52	GND			Ground	
53	VCC	O	Supply	Digital supply for external 2V8 digital devices	Iout=10 mA max.
54	GND			Ground	
55	RTS1	I	CMOS 2V8	Serial link UART1 Request To Send	Multiplexed with GPIO15
56	GND			Ground	
57	GPIO12	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCI_RST
58	GND			Ground	
59	GPIO10	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCI_CLK
60	GND			Ground	
61	GPIO11	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCI_DATA
62	GND			Ground	
63	GPIO8	I/O	CMOS/1V8	General Purpose I/O	Multiplexed with SCI_PRES and EXTINT3
64	GND			Ground	
65	GPIO9	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCI_PWR
66	GND			Ground	
67	CODEC_8K	O	2V8	8 kHz PCM sample frame synchronization	
68	GND				
69	DAI_CLK	O	2V8	DAI clock 104 kHz	Multiplexed with PCM_CLK
70	GND				
71	PCM_IN	I	CMOS 2V8	PCM serial data input	Multiplexed with DAI_IN
72	GPIO4	I/O	CMOS/1V8	General Purpose I/O	Multiplexed with CLK32K
73	PCM_OUT	O	2V8	PCM serial data output	Multiplexed with DAI_OUT
74	GPIO5	I/O	CMOS/1V8	General Purpose I/O	Multiplexed with

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Pin number	Signal name	I/O	I/O type	Description	Comment
					USR0N and TXD2
75	IO_AUDIO	I/O	CMOS/2V8	External audio function control	Multiplexed with DAI_RST
76	GPO0	O	CMOS 1V8	General Purpose O	Multiplexed with CTS2 and PWM0
77	GPIO7	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SDA and SPI3_CLK
78	GPO1	O	CMOS 1V8	General Purpose O	Multiplexed with RXD2
79	GPIO6	I/O	CMOS/2V8	General Purpose I/O	Multiplexed with SCL and SPI3_DATA
80	GND			Ground	

3.9 J302 (Socket up)

Pin number	Signal name	I/O	I/O type	Description	Comment
1, 2	GND			Ground	
3, 4	V-CORE	O	Supply	Digital supply for external 1V8 digital devices	50 mA max.
5	GND			Ground	
6	ON/~OFF	I	CMOS Schmitt	Power control	Power ON when high
7	GND			Ground	
8	BUZ	O	Open drain	Buzzer output	Iout = 100 mA max. Vout = 0.4 V max.
9	GND			Ground	
10	/WR	O	1V8	Write operation	Active low
11	GND			Ground	
12	D15	I/O	CMOS/1V8	Data bus 15	
13	GND			Ground	
14	D11	I/O	CMOS/1V8	Data bus 11	
15	GND			Ground	
16	D14	I/O	CMOS/1V8	Data bus 14	
17	GND			Ground	
18	D12	I/O	CMOS/1V8	Data bus 12	
19	GND			Ground	
20	D13	I/O	CMOS/1V8	Data bus 13	

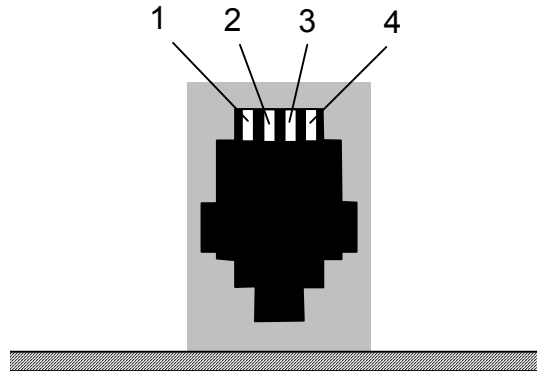
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Pin number	Signal name	I/O	I/O type	Description	Comment
21	GND			Ground	
22	D10	I/O	CMOS/1V8	Data bus 10	
23	GND			Ground	
24	D09	I/O	CMOS/1V8	Data bus 9	
25	GND			Ground	
26	D07	I/O	CMOS/1V8	Data bus 7	
27	GND			Ground	
28	D04	I/O	CMOS/1V8	Data bus 4	
29	GND			Ground	
30	D05	I/O	CMOS/1V8	Data bus 5	
31	GND			Ground	
32	D03	I/O	CMOS/1V8	Data bus 3	
33	GND			Ground	
34	A03	O	1V8	Address bus 3	
35	GND			Ground	
36	D06	I/O	CMOS/1V8	Data bus 6	
37	GND			Ground	
38	/RD	O	1V8	Read operation	Active low
39	GND			Ground	
40	D08	I/O	CMOS/1V8	Data bus 8	
41	GND			Ground	
42	A02	O	1V8	Address bus 2	
43	GND			Ground	
44	D02	I/O	CMOS/1V8	Data bus 2	
45	GND			Ground	
46	D01	I/O	CMOS/1V8	Data bus 1	
47	GND			Ground	
48	D00	I/O	CMOS/1V8	Data bus 0	
49	GND			Ground	
50	LCDEN	O	1V8	LCD Enable	Active high multiplexed with GPIO0
51	GND			Ground	
52	/RESET	I/O	Schmitt	P5186 module reset	Active low
53	GND			Ground	

Error! Reference source not found.

Pin number	Signal name	I/O	I/O type	Description	Comment
54	BOOT	I	CMOS 1V8	Enable for flash downloading	Multiplexed with GPIO2
55	GND			Ground	
56	GPIO1	I/O	CMOS/1V8	General Purpose I/O	
57	GND			Ground	
58	CHG_IN	I	Supply	Current source input for battery charging	1 A max.
59	GND			Ground	
60	CHG_IN	I	Supply	Current source input for battery charging	1 A max.
61	GND			Ground	
62	SIM_CLK	O	1V8 or 3V	SIM card clock	
63	GND			Ground	
64	SIM_RST	O	1V8 or 3V	SIM card reset	
65	GND			Ground	
66	SIM_VCC	O	1V8 or 3V	SIM card Power supply	
67	GND			Ground	
68	GPIO3	I/O	CMOS/1V8	General Purpose I/O	Multiplexed with SIM_PRES and RTS2
69	GND			Ground	
70	SIM_IO (SIM_DATA)	I/O	CMOS / 1V8 or 3V	SIM card data	
71	ROW0	I/O	CMOS	Keyboard row0	
72	COL4	I/O	CMOS	Keyboard column4	
73	ROW2	I/O	CMOS	Keyboard row2	
74	COL2	I/O	CMOS	Keyboard column2	
75	ROW3	I/O	CMOS	Keyboard row3	
76	ROW4	I/O	CMOS	Keyboard row4	
77	COL0	I/O	CMOS	Keyboard column0	
78	ROW1	I/O	CMOS	Keyboard row1	
79	COL1	I/O	CMOS	Keyboard column1	
80	COL3	I/O	CMOS	Keyboard column3	

3.10 J500 connector (Auxiliary audio)

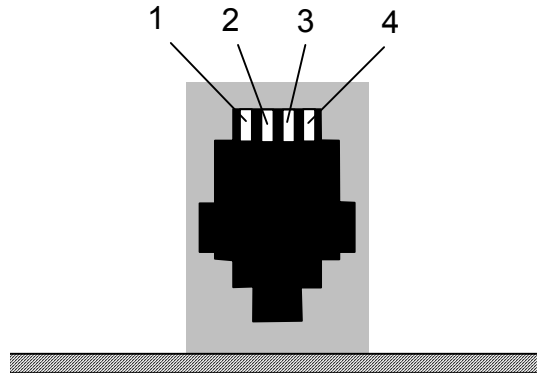


J500 is a RJ9 4-pin connector.

The Table bellow gives the description of the signals of this connector.

Pin number	Signal name	I/O	I/O type	Description
1	MIC_AUX_N	I	Analog	Auxiliary microphone negative input
2	SPK_AUX_P	O	Analog	Auxiliary speaker positive output
3	SPK_AUX_N	O	Analog	Auxiliary speaker negative output
4	MIC_AUX_P	I	Analog	Auxiliary microphone positive input

3.11 J501 connector (Main audio)

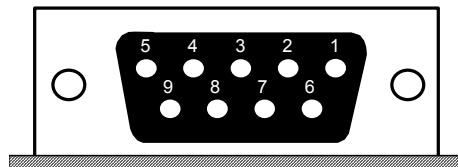


J501 is a RJ9 4-pin connector.

The Table bellow gives the description of the signals of this connector.

Pin number	Signal name	I/O	I/O type	Description
1	MIC_N	I	Analog	Main microphone negative input
2	SPK_P	O	Analog	Main speaker positive output
3	SPK_N	O	Analog	Main speaker negative output
4	MIC_P	I	Analog	Main microphone positive input

3.12 J600 connector (RS232)



J600 is a SUB-D 9-pin female connector. The Table bellow gives the description of the signals of this connector.

Pin number	Signal name	I/O	I/O type	Description
1	CT109 DCD(*)	O	RS232 (V24/V28)	Data Carrier Detect
2	CT104 RXD	O	RS232 (V24/V28)	Receive serial data
3	CT103 TXD	I	RS232 (V24/V28)	Transmit serial data
4	CT108-2 DTR	I	RS232 (V24/V28)	Data Terminal Ready
5	GND			Ground
6	CT107 DSR	O	RS232 (V24/V28)	Data Set Ready
7	CT105 RTS	I	RS232 (V24/V28)	Request To Send
8	CT106 CTS	O	RS232 (V24/V28)	Clear To Send
9	CT125 RI(*)	O	RS232 (V24/V28)	Ring Indicator

(*) optional signals

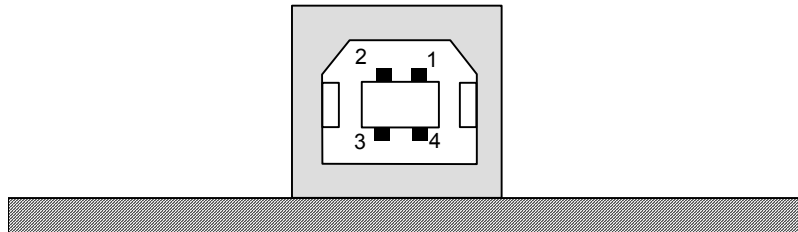
Note: the Wismo Pac P5186 module starter kit is a DCE (Data Communication Equipment). It can be connected with a DTE (Data Terminal Equipment - PC or terminal) with a “**straight cable**”.

Warning:

When RI and DCD signals are used by the application, the resistors R606 and R607 (0 Ω resistors) must be placed on the mother board. A set of 0 Ω resistors is provided with the starter kit.

3.13 J700 connector (USB)

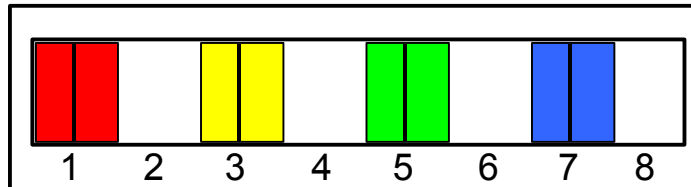
J700 is a USB Series B receptacle.



Pin number	Signal name	I/O	I/O type	Description
1	VBUS	I	Power supply	+ 5 VDC
2	DM	I/O	Digital	USB negative line
3	DP	I/O	Digital	USB positive line
4	GND		Power supply	Ground
Shell	Shielding			

4 Operating configuration

The operating configuration is made using the SW200 switch.



Jumper	Function	Position	Configuration mode	Description
Red	DVCC* power supply consumption measurement	1	Normal	DVCC supplied from J200 (VBATT)
		2	Measurement	DVCC supplied from J201 (5V current source)
Yellow	Charger input management	3	Normal	Charger input (CHG_IN) connected to J201 (5 V current source)
		4	Measurement	Charger input (CHG_IN) disconnected
Green	RS232 Serial link transceiver shutdown management	5	Normal	Shutdown inactive
		6	shutdown	Shutdown active
Blue	SIM card presence management (SIM_PRES** signal)	7	Modem	SIM card presence is managed (SIM_PRES supplied by V-core)
		8	Mobile	SIM card presence is not managed (SIM_PRES not supplied)

* DVCC is an internal digital power supply (3 V typical) mainly used as the RS232 interface power supply.

** SIM_PRES: SIM card presence is detected via the GPIO3 of the WISMO module.

The **default configuration** (called “modem configuration”) of the **SW200** switch is **1, 3, 5 and 7**:

- Red jumper on position **1**,
- Yellow jumper on position **3**,
- Green jumper on position **5**,
- Blue jumper on position **7**.

Consumption measurement configuration is given in the table below:

SW200 positions	Measurement on external supply input (J200)	Measurement on charger input (J201)
Normal mode 1 and 3	VBATT + DVCC	CHG_IN
Measurement mode 2 and 4	VBATT	DVCC

VBATT = WISMO module P5186 consumption.

VDCC = RS232 interface consumption.

CHG_IN = charging consumption.

The RS232 transceiver shutdown function (**SW200 positions 5 and 6**) is used for serial link consumption measurement (DVCC) and test of the RS232 cable.

5 Functional description

5.1 Power supply

J200 is the Power Supply connector of the WISMO module. The voltage applied to this connector is described hereafter.

	Minimum	Typical	Maximum
VBATT+	3.3 V		4.2 V

5.2 Charger function

J201 is used to simulate a charger. The voltage applied to this connector is described hereafter.

	Minimum	Typical	Maximum
CHG_IN	4.8 V		5.2 V

Note: CHG_IN current = 800 mA max.

5.3 SIM function

The SIM interface controls 3 V SIM cards.

Note: in a future version of the starter kit, the use of 1.8 V SIM cards will be available.

When the SIM_PRES signal is used by the application (detection of SIM card presence) then a jumper must be set on **position 7** of the **SW200** switch.

When the SIM_PRES signal is not used by the application, then a jumper must be set on **position 8** of the **SW200** switch.

5.4 RS232 function

5.4.1 Introduction

The Starter Kit is fitted with a MAX3238 RS232 transceiver device (U1).

The Starter Kit acts as a DCE (Data Communication Equipment) and is connected to a DTE (Data Terminal Equipment - PC or terminal) with a “straight cable”.

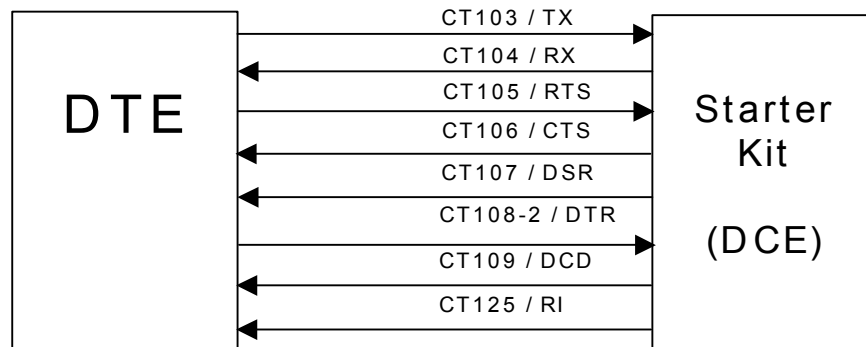


Figure 1: RS232 serial link

RS232 link default configuration is made of 6 wires: TX, RX, CTS, RTS, DTR and DSR.

Warning:

When RI and DCD signals are used by the application, the resistors R606 and R607 (0 Ω resistors) must be placed on the mother board. In the mother board default configuration, these resistors are not placed. So, a set of 0 Ω resistors is provided with the starter kit.

When the SPI2 bus of the WISMO P5186 module is used, resistors R603 and R610 must be unsoldered and removed from the motherboard, because the SPI2 bus signals (SPI2_DATA and SPI2_CLK) are multiplexed with DSR1 and DTR1. In that case, the RS232 serial link will be made up of 4 wires only: TX, RX, CTS and RTS.

The signal name relationship between the WISMO Pac P5186 serial interface (V24/CMOS) and the RS232 interface (V24/V28) is given hereafter:

Pin #	I/O	RS232 signal	P5186 signal
1	O	DCD	GPIO7
2	O	RXD	TXD1
3	I	TXD	RXD1
4	I	DTR	DSR1
6	O	DSR	DTR1
7	I	RTS	CTS
8	O	CTS	RTS
9	O	RI	GPIO6

5.4.2 Shutdown of Max3238

The Max3238 device can be shut down using the switch **SW200**:

- **Position 5**: shut down inactive,
- **Position 6**: shut down active.

When the shut down is active, the MAX3238 device transmitters and receivers are disabled and their outputs go high impedance.

The shutdown is used for measuring the serial link consumption and for testing the RS232 cable.

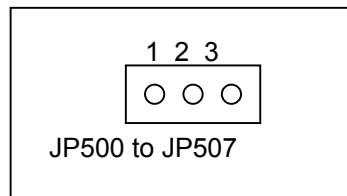
5.5 Audio functions

When **Auxiliary Audio interface** is used on the mother board, the following jumpers must be connected between pin 2 and pin 3:

- JP500 and JP501: auxiliary speaker,
- JP502 and JP503: auxiliary microphone.

When **Main Audio interface** is used on the mother board, the following jumpers must be connected between pin 2 and pin 3:

- JP504 and JP505: main speaker,
- JP506 and JP507: main microphone.



5.6 ON/~OFF and BOOT function

Mode	BOOT (SW202)	ON/~OFF (SW201)
Normal	OFF	ON
Download	ON	ON

Note: internal boot is started when both switches **SW202 (BOOT)** and **SW201 (ON/~OFF)** are **ON** during the reset of the module (**SW203**).

5.7 RESET function

When **SW203** is pressed (**RESET** button), the WISMO module is reset.

5.8 KEYPAD function

The following table shows the matrix of the keyboard:

	COL0	COL1	COL2	COL3	COL4
ROW0	SW400	SW405	SW410	SW415	SW420
ROW1	SW401	SW406	SW411	SW416	SW421
ROW2	SW402	SW407	SW412	SW417	SW422
ROW3	SW403	SW408	SW413	SW418	SW423
ROW4	SW404	SW409	SW414	SW419	SW424

Example: If you press the key SW412, an electric detection will be made on ROW2 and COL2.

5.9 Antenna function

The antenna is connected to the board via the **SMA300** connector.

The antenna cable is fitted with a FME connector and a SMA/FME adaptor is supplied to permit the connection to the board.

5.10 ESD protections

External ESD protections are added on the mother board for the following signals:

- **WISMO Pac P5186** VBATT and CHG_IN input signals.
- **WISMO Pac P5186** /RESET and BOOT input signals.
- **WISMO Pac P5186 SIM interface signals:** SIM_PRES, SIM_VCC, SIM_IO, SIM_CLK, SIM_RST,
- **WISMO Pac P5186 Serial link signals (UART1):** TXD1, RTS1, DTR1, DSR1, RXD1, CTS1, RI1 (GPIO6) and DCD1 (GPIO7).
- **Main audio interface signals.**
- **Auxiliary audio interface signals.**

6 Getting started

6.1 Procedure

- Make sure that both the “**ON/OFF**” switch (**SW201**) and “**BOOT**” switch (**SW202**) are on position “**OFF**”.
- Put the operating configuration switch (**SW200**) in default configuration position:
 - Red jumper on **position 1**,
 - Yellow jumper on **position 3**,
 - Green jumper on **position 5**,
 - Blue jumper on **position 7**.
- Make sure that the jumpers **JP500** to **JP507** are connected between **pin 2** and **pin 3** (Main audio interface and auxiliary audio interface).
- Make sure that the external DC power supply is switched off and connect it to **J200** (VBATT) using the power supply cable provided with the starter kit.
- Connect the RS232 cable, provided with the starter kit, between port **COM1** (or **COM2**) of the PC and **J600** of the board.

The COM port properties must be the following:

- Bits per second: **115.200 k**,
 - Data bits: **8**,
 - Parity: **None**,
 - Stop bits: **2**,
 - Flow control: **None**.
- Connect the antenna to the **SMA300** connector (if communications are required).
 - Connect the handset, provided with the starter kit, to the Main Audio connector **J500** (if communications are required).
 - Insert a SIM card into the SIM card holder (if communications are required).
 - Switch on the external power supply then adjust:
 - the output voltage to 4 Volts DC,
 - the current limitation to 2 A min.
 - Switch “**ON**” the “**ON/OFF**” switch (**SW201**) of the board then check there is a consumption on the external power supply amperemeter.
 - On the PC, open a terminal emulator window to communicate with the WISMO module via the COM1 (or COM2) port.
 - Press the “**RESET**” key (**SW203**) to reset the WISMO module.
 - Using the terminal emulator, send the following command on COM port to communicate with the WISMO module: **AT+J**.
 - When the communication is established between the PC and the WISMO module, the last one sends the message “**OK**” as a reply. This message is displayed in the terminal emulator window.

6.2 Trouble shooting

- If I=0 on the external power supply amperemeter, then:
 - Check that the external power supply:
 - Is “ON”.
 - is connected on J200.
 - is adjusted for an output voltage between 3.2 V and 4.2 V.
 - Check that the “ON/OFF” switch (SW201) is “ON”.
 - Check the fuse F1 (3 A) and replace it if necessary.
Note: technical characteristics of the fuse to be replaced are given in appendix.
 - Check the configuration of the jumpers on switch SW200.
- If the WISMO module does not reply to the “AT↓” command (no message “OK” is received), make sure that:
 - The WISMO module is present on the mother board (socket up mounted).
 - a software has been loaded in the module (refer to the documentation [3]).

6.3 Safety, FCC and Industry of Canada Regulatory compliance

6.3.1 RF safety

6.3.1.1 General

Your GSM terminal¹ is based on the GSM standard for cellular technology. The GSM standard is spread all over the world. It covers Europe, Asia and some parts of America and Africa. This is the most used telecommunication standard.

Your GSM terminal is actually a low power radio transmitter and receiver. It sends out and receives radio frequency energy. When you use your GSM application, the cellular system which handles your calls controls both the radio frequency and the power level of your cellular modem.

6.3.1.2 Exposure to RF energy

There has been some public concern about possible health effects of using GSM terminals. Although research on health effects from RF energy has focused on the current RF technology for many years, scientists have begun research regarding newer radio technologies, such as GSM.

After existing research had been reviewed, and after compliance to all applicable safety standards had been tested, it has been concluded that the product was fitted for use.

If you are concerned about exposure to RF energy there are things you can do to minimize exposure. Obviously, limiting the duration of your calls will reduce your exposure to RF energy. In addition, you can reduce RF exposure by operating your cellular terminal efficiently by following the below guidelines.

¹ based on WISMO2D

6.3.1.3 Efficient terminal operation

For your GSM terminal to operate at the lowest power level, consistent with satisfactory call quality:

- If your terminal has an extendible antenna, extend it fully. Some models allow you to place a call with the antenna retracted. However your GSM terminal operates more efficiently with the antenna fully extended.
- Do not hold the antenna when the terminal is « IN USE ». Holding the antenna affects call quality and may cause the modem to operate at a higher power level than needed.

6.3.2 Modular Transmitter

Modular transmitter. This device is to be used only for mobile and fixed applications. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. The antenna(s) used for this transmitter must not exceed a gain of 3 dBi for mobile operation and 7 dBi for fixed operation. Users and OEM integrators must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance. OEM must also be provided with labelling instructions. This device contains 900 MHz GSM functions that are not operational in U.S. Territories. This filing is only applicable for GSM 850 MHz and 1900 MHz PCS operations.

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.

Your mobile device is a low power radio transmitter and receiver. When it is ON, it receives and also sends out radio frequency (RF) signals. In August 1996, the Federal Communications Commission (FCC) adopted RF exposure guidelines with safety levels for mobile device. Those guidelines are consistent with safety standards previously set by both U.S. and international standards bodies: American National Standard Institute (ANSI), National Council of Radiation Protection and Measurements (NCRP), and International Commission on Non-Ionizing Radiation Protection (ICNRP). Those standards were based on comprehensive and periodic evaluations of the relevant scientific literature. The design of your Module complies with the FCC guidelines and applicable

WARNING: Unauthorized antennas, modifications, or attachments could impair call quality, damage the Module, or result in violation of FCC regulations. Do not use the Module with a damaged antenna. Please contact your local authorized dealer for antenna replacement.

Important!

Read these safety guidelines prior to using your Module. Failure to follow these rules and guidelines may be dangerous and/or illegal.

6.3.3 Road Safety Information

Do not use a hand-held Module while driving a vehicle. Talking on the Module while driving is dangerous and illegal in some locations. If using a hand-held Module, park the vehicle before conversing. Remember – road safety *always* comes first!

6.3.4 Aircraft Safety Information

Power down your Module prior to boarding an aircraft. Sending and receiving calls on your Module on an aircraft is prohibited by law and aviation regulations. Using a wireless Module in an aircraft may interfere with aircraft radio communication or navigation equipment, and disrupt the wireless Module network. When boarding an aircraft, turn your Module OFF.

6.3.5 Hospital & Medical Safety Information

Power down your Module prior to entering hospitals, health care facilities, or when near medical equipment.

Operating any radio transmitting equipment, including digital wireless Modules, may interfere with RF-sensitive medical devices. Follow all posted regulations while in hospitals and health care facilities regarding the use of your Module.

6.3.6 Blasting and Refueling Safety Information

Do not use your Module near a blasting site. Power down your Module when in any area with a potentially explosive

Atmosphere. Radio transmissions in such areas could cause an explosion or fire, resulting in bodily injury or even death. Obey all posted signs and instructions regarding the use of wireless Module usage. Observe restrictions on the use of radio equipment in fuel depots (fuel storage and distribution areas), chemical plants or where blasting operations are in progress.

6.3.7 Interference Safety Information

All mobile Modules are subject to radio frequency interference that may affect the performance of your

Module. Your digital wireless Module is a low power radio transmitter and receiver. The design of your Module complies with the FCC guidelines and applicable standards. Never rely solely on your Module for essential communications (e.g., medical emergencies). You must be in a service area with adequate signal strength to use the Module. Emergency calls may not be possible on all wireless Module networks or when certain network services and/or Module features are in use. Check with your local service provider(s).

6.3.8 Service Safety Information

Only qualified service personnel are authorized to repair your digital wireless Module and equipment. Use only approved accessories. Contact your sales representative authorized service centers.

FCC RF EXPOSURE INFORMATION

In August 1996 the Federal Communications Commission (FCC) of the United States with its action in Report and Order FCC 96-326 adopted an updated safety standard for human exposure to radio frequency electromagnetic energy emitted by FCC regulated transmitters. Those guidelines are consistent with the safety standard previously set by both U.S. and international standards bodies. The design of this phone complies with the FCC guidelines and these international standards.

For more information about RF exposure, please visit the FCC website at www.fcc.gov

6.3.9 Federal Communications Commission (FCC) Notice

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.

If not installed and used in accordance with the instructions, it may 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 distance between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from the outlet where the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for assistance

7 Appendix

NANO² FUSE Very Fast-Acting 451/453 Series



The Nano² SMF Fuse is a very small, square surface mount fuse that is also available in a surface mount holder.

ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Ampere Rating	Opening Time
100%	1/16–15	4 hours, Minimum
200%	1/16–10	5 seconds, Maximum
	12–15	20 seconds, Maximum

AGENCY APPROVALS: Recognized under the Components Program of Underwriters Laboratories and Certified by CSA. Approved by METI from 1 through 5 amperes.

AGENCY FILE NUMBERS: UL E10480, CSA LR 29862.

INTERRUPTING RATINGS:

1/16 – 8A	50 amperes at 125 VAC/VDC
	300 amperes at 32 VDC
10A	35 amperes at 125 VAC/50 amperes at 125 VDC
	300 amperes at 32 VDC
12A – 15A	50 amperes at 65 VAC/VDC
	300 amperes at 24 VDC

ENVIRONMENTAL SPECIFICATIONS:

Operating Temperature: –55°C to 125°C.

Shock: MIL-STD-202, Method 213, Test Condition I (100 G's peak for 6 milliseconds).

Vibration: MIL-STD-202, Method 201 (10–55 Hz).

Salt Spray: MIL-STD-202, Method 101, Test Condition B.

Insulation Resistance (After Opening): MIL-STD-202, Method 302, Test Condition A, (10,000 ohms minimum).

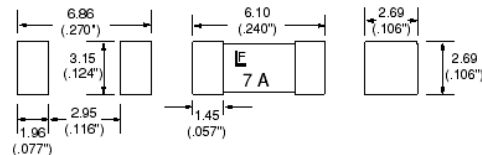
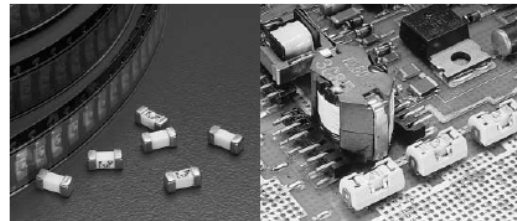
Resistance to Soldering Heat: MIL-STD-202, Method 210, Test Condition B (10 sec. at 260°C).

Thermal Shock: MIL-STD-202, Method 107, Test Condition B (–65 to 125°C).

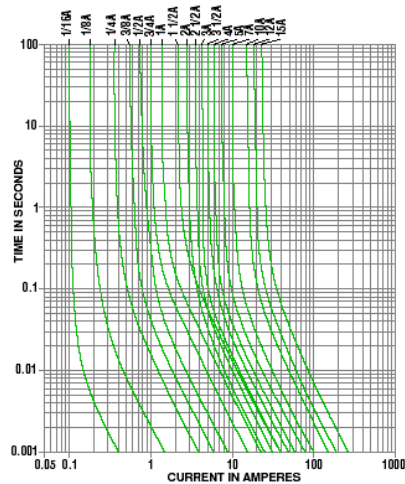
Moisture Resistance: MIL-STD-202, Method 106, High Humidity (90–98 RH), Heat (65°C).

Tin-Lead Plated Catalog #	Silver Plated Catalog #	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting Pt A° Sec.
—	R451.062	0.062	125	5.50	0.00019
—	R451.080	0.080	125	4.05	0.00033
—	R451.100	0.100	125	3.10	0.00138
—	R451.125	0.125	125	1.70	0.00286
R451.160	0453.160	0.160	125	1.80	0.00306
R451.200	0453.200	0.200	125	1.40	0.00652
R451.250	0453.250	0.250	125	1.05	0.01126
R451.315	0453.315	0.315	125	0.78	0.0231
R451.375	0453.375	0.375	125	0.610	0.0425
R451.400	0453.400	0.400	125	0.560	0.0484
R451.500	0453.500	0.500	125	0.420	0.0795
R451.630	0453.630	0.630	125	0.305	0.143
R451.750	0453.750	0.750	125	0.245	0.185
R451.800	0453.800	0.800	125	0.212	0.271
R451.001	0453.001	1.0	125	0.153	0.459
R451.1.25	0453.1.25	1.25	125	0.0780	0.664
R451.01.5	0453.01.5	1.5	125	0.0630	0.853
R451.01.6	0453.01.6	1.6	125	0.0580	1.060
R451.002	0453.002	2.0	125	0.0367	0.530
R451.02.5	0453.02.5	2.5	125	0.0286	1.029
R451.003	0453.003	3.0	125	0.0227	1.650
R451.3.15	0453.3.15	3.15	125	0.0215	1.920
R451.03.5	0453.03.5	3.5	125	0.0200	2.469
R451.004	0453.004	4	125	0.0160	3.152
R451.005	0453.005	5	125	0.0125	5.566
R451.06.3	0453.06.3	6.3	125	0.0096	9.17
R451.007	0453.007	7	125	0.0090	10.32
R451.008	0453.008	8	125	0.0077	20.23
R451.010	0453.010	10	125	0.0056	26.46
R451.012	0453.012	12	65	0.0049	47.97
R451.015	0453.015	15	65	0.0037	97.82

Refer to pag. 271 for SMF Omni-Blok® Holder, Series 154 000.



Average Time Current Curves



PHYSICAL SPECIFICATIONS:

Materials: Body: Ceramic

Terminations: Tin-Lead Alloy or Silver Plated Caps.

Soldering Parameters:

Wave Solder — 260°C, 10 seconds maximum

Reflow Solder — 260°C, 30 seconds maximum

Solderability: MIL-STD-202, Method 208.

PACKAGING SPECIFICATIONS: 12mm Tape and Reel per EIA-RS481-1 (IEC 286, part 3); 1,000 per reel, add packaging suffix, MR; 5,000 per reel, add packaging suffix NR.

PATENTED