

<p>WISMO Wireless Standard Module</p>

WM2A-G900 / WM2C-G900/G1800
COMPARATIVE DOCUMENT

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PRELIMINARY

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Preliminary

The purpose of this document is to underline the differences between Wismo2A and Wismo2C modules.

WM2A-G900	WM2C-G900/1800
<u>Dimensions :</u> 58.3 x 32.2 x 6.0 mm 22g 2 Watts radio section running under 3,6 volts . Digital section under 3 Volts . 3V/5V SIM interface. The digital interface provided by WISMO2A is an 3V interface.	<u>Dimensions :</u> 58.3 x 32.2 x 6.0 mm 20g 2 watts EGSM radio section running under 3,6 Volts . 1 Watt DCS radio section running under 3,6 Volts. Digital section under 2,8 Volts . 3V SIM interface. The digital interface provided by WISMO2C is an 2.8V interface.

1. Base-Band interface

WM2A-G900	WM2C-G900/1800
<p><u>Power supply :</u></p> <p>VDD : supplies the +3V ballast regulators of WISMO2A. The voltage has to be maintained over 3.3 volts or connected to VBATT. Minimum voltage ripple has to be maintained at this connection to avoid phase error.</p>	<p><u>Power supply :</u></p> <p>VDD : supplies the +2.8V ballast regulators of WISMO2C. The voltage has to be maintained over 3.1 volts or connected to VBATT. Minimum voltage ripple has to be maintained at this connection to avoid phase error.</p>

Power Supply Voltage

	V _{MIN} WM2A	V _{MIN} WM2C	V _{NOM}	V _{MAX} WM2A	V _{MAX} WM2C	Ripple max
VBATT	3.3 V	3.3 V	3.6 V	5.25 V	5.0 V	100 mV
VDD	3.3 V	3.1 V		5.25 V	5.0 V	100 mV

Power consumption in GSM Mode

	Conditions	I _{NOM} WM2A	I _{NOM} WM2C	I _{MAX} WM2A	I _{MAX} WM2C
VBATT	During TX bursts @ 2W	2.0 A peak	1.7 A peak	2.5 A peak	2.0 A peak
VBATT	During RX bursts	80 mA peak	75 mA peak	85 mA peak	80 mA peak
VBATT	Average @ 2W	280 mA	270 mA	350 mA	320 mA
VBATT	Average @ 0.5W	90 mA	180 mA (TBD)	110 mA	200 mA (TBD)
VDD	Average TCH/FS mode	40 mA	42 mA (TBD)	60 mA	120 mA (TBD)
VDD	Average Idle mode	3 mA	3 mA	6 mA	6 mA

2. Serial link

WM2A-G900	WM2C-G900/1800
A flexible 6 wires serial interface is available complying with V24 protocol signalling but not V28 (electrical interface) since the level interface is 3 Volts .	A flexible 6 wires serial interface is available complying with V24 protocol signalling but not V28 (electrical interface) since the level interface is 2.8 Volts .

Pin description

Signal	Pin number	I/O	I/O type WM2A	I/O type WM2C	Description
CT103 / TX	39	I	CMOS	CMOS	Transmit serial data
CT104 / RX	32	O	1X	1X	Receive serial data
CT105 / RTS	30	I	CMOS	CMOS	Ready To Send
CT106 / CTS	37	O	1X	1X	Clear To Send
CT107 / DSR	36	O	1X	1X	Data Set Ready
CT108-2 / DTR	34	I	CMOS	CMOS	Data Terminal Ready
CT109 / DCD	51	O	3X	2X	Data Carrier Detect
CT125 / RI	54	O	3X	2X	Ring Indicator

3. SIM interface

WM2A-G900	WM2C-G900/1800
<p>4 signals are present :</p> <p>SIMVCC : SIM power supply SIMRST : SIM reset SIMCLK : clock SIMDATA : I/O port GPIO0 (pin 50) can be used as SIMPRES</p> <p>The SIM interface can manage a 3V or a 5V SIM. This is made automatically in detecting, during the SIM reset cycle, which type of card is inserted in the SIM socket. This interface is fully compliant with GSM 11.11 recommendations concerning SIM functions.</p>	<p>5 signals are present :</p> <p>SIMVCC : SIM power supply SIMRST : SIM reset SIMCLK : clock SIMDATA : I/O port SIMPRES : SIM card detect</p> <p>The SIM interface controls a 3V SIM only. This interface is fully compliant with GSM 11.11 recommendations concerning SIM functions.</p>

Pin description

Signal	Pin number	I/O	I/O type	Description
SIMCLK	3	O	2X	SIM Clock
SIMRST	5	O	2X	SIM Reset
SIMDATA	7	I/O	CMOS / 3X	SIM Data
SIMVCC	9	O		SIM Power Supply
SIMPRES	50	I	CMOS	SIM Card Detect

Electrical Characteristics for Wismo2A

Parameter	Conditions	Min	Typ	Max	Unit
SIMDATA V_{IH}	$I_{IH} = \pm 20\mu A$	$0.7 \times SIMVCC$			V
SIMDATA V_{IL}	$I_{IL} = 1mA$			0.4	V
SIMDATA V_{OH}	Source current = $20\mu A$	$0.8 \times SIMVCC$			V
SIMDATA V_{OL}	Sink current = $-200\mu A$			0.4	V
SIMRST, SIMCLK V_{OH}	Source current = $20\mu A$	$0.9 \times SIMVCC$			V
SIMRST, SIMCLK V_{OL}	Sink current = $-200\mu A$			0.4	V
SIMVCC (5V) Output Voltage	$I_{SIMVCC} \leq 10mA$	4.75	5.00	5.25	V
SIMVCC (3V) Output Voltage	$I_{SIMVCC} \leq 10mA$	2.80	3.00	3.20	V
SIMCLK Rise/Fall Time	Loaded with 30pF			20	ns
SIMRST, SIMDATA Rise/Fall Time	Loaded with 30pF			1	μs
SIMCLK Frequency	Loaded with 30pF			5	MHz
SIMVCC Turn-On-Time	$I_{SIMVCC} = 0$		5		ms

Electrical Characteristics for Wismo2C

Parameter	Conditions	Min	Typ	Max	Unit
SIMDATA V_{IH}	$I_{IH} = \pm 20\mu A$	$0.7 \times SIMVCC$			V
SIMDATA V_{IL}	$I_{IL} = 1mA$			$0.3 \times SIMVCC$	V
SIMRST, SIMDATA SIMCLK V_{OH}	Source current = $20\mu A$	$SIMVCC - 0.1V$			V
SIMRST, SIMDATA SIMCLK V_{OL}	Sink current = $-200\mu A$			0.1	V
SIMVCC Output Voltage	$I_{SIMVCC} \leq 6mA$	2.70	2.80	2.85	V
SIMCLK Rise/Fall Time	Loaded with 30pF			50	ns
SIMRST, SIMDATA Rise/Fall Time	Loaded with 30pF			1	μs
SIMCLK Frequency	Loaded with 30pF			3.25	MHz

4. General purpose input / output

WISMO2A provides 5 General Purpose I/O which can be used to control any external devices.

WISMO2C provides 5 General Purpose I/O, 3 General Purpose Output and 1 General Purpose Input which can be used to control any external devices.

Pin description

Signal	Pin number WM2A	Pin number WM2C	I/O	I/O type WM2A	I/O type WM2C	Description
GPIO0	50	24	I/O	CMOS / 3X	CMOS / 2X	General Purpose I/O
GPIO1	52	52	I/O	CMOS / 3X	CMOS / 2X	General Purpose I/O
GPIO2	54	54	I/O	CMOS / 3X	CMOS / 2X	General Purpose I/O
GPIO3	51	51	I/O	CMOS / 3X	CMOS / 2X	General Purpose I/O
GPIO4	53	53	I/O	CMOS / 3X	CMOS / 2X	General Purpose I/O
GPO0	-	26	O	-	3X	General Purpose O
GPO1	-	22	O	-	3X	General Purpose O
GPO2	-	20	O	-	1X	General Purpose O
GPI	-	18	I	-	CMOS	General Purpose I

5. MISCELLANEOUS

5.1 ON/ ~OFF

Operating conditions

Parameter	I/O type	Min WM2A	Min WM2C	Max WM2A	Max WM2C	Unit
V_{IL}		0 V	0 V	1 V	0.6 V	V
V_{IH}		2.5 V	2.4 V	VDD+0.5V	VDD+0.5V	V

5.2 Reset

If an external reset is used (emergency reset), it may be driven by an open collector or by open drain.

Electrical Characteristics

Parameter	Min WM2A	Min WM2C	Max WM2A	Max WM2C
Input Impedance (R)	4.7 k Ω	4.7 k Ω		
Input Impedance (C)			50 pF	10 nF



Operating conditions for Wismo2A

Parameter	I/O type	Min	Max	Condition
V_{IL}		-0.5 V	0.9 V	
V_{OL}			0.4 V	$I_{OL} = -50 \mu A$
V_{OH}		2.2 V		$I_{OH} = 50 \mu A$

Operating conditions for Wismo 2C

Parameter	I/O type	Min	Max	Condition
V_{T-}		1.1V	1.2 V	
V_{T+}		1.7V	1.9 V	
V_{OL}			0.4 V	$I_{OL} = -50 \mu A$
V_{OH}		2.0 V		$I_{OH} = 50 \mu A$

6. External interrupt and VCC Output

<p>WISMO2A provides an external interrupt input which can be used to detect accessory in a handset for example. This input is edge sensitive and an interrupt is detected when this signal goes from low to high. If this signal is not used it can be left open.</p> <p>VCC and AVCC outputs : Theses outputs can be used to supply some external functions like LCD, to indicate that the module is ON and to switch ON an external device. VCC has to be used as a digital power supply and AVCC as an analogue power supply. This output can be used also to determine if the Wismo2A module is powered up or not.</p>	<p>WISMO2C provides an external interrupt input which can be used to detect accessory in a handset for example. This input is edge sensitive and an interrupt is detected when this signal goes from high to low (internally pull-up to VCC). If this signal is not used it can be left open.</p> <p>VCC output : This output can be used to supply some external functions like LCD, to indicate that the module is ON and to switch ON an external device. VCC has to be used as a digital power. This output can be used also to determine if the Wismo2C module is powered up or not.</p> <p>VCC_RTC output : This pin is used as a back-up power supply for the internal Real Time Clock. The RTC is supplied by the module when it is powered up but it needs a back-up power supply to save date and hour when the module is switched off. If the RTC is not used, this pin can be left open.</p>
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Pin description

Signal	Pin number	I/O	I/O type	Description
VCC	40	O		Digital External supply
AVCC (1)	56	O		Analogue External supply
VCC_RTC (2)	56	I/O		RTC Back-up supply

(1) : Only on Wismo 2A

(2) : Only on Wismo 2C

Operating conditions

Parameter	Condition	Min WM2A	Min WM2C	Max WM2A	Max WM2C	Unit
Output voltage	I = 10mA	2.7	2.74	3.1	2.86	V
Output Current				10	10	mA



7. Technical specifications

Operating conditions

Parameter	I/O type	Min WM2A	Min WM2C	Max WM2A	Max WM2C	Condition WM2A	Condition WM2C
V_{IL}	CMOS	-0.5 V	-0.5 V	0.9 V	0.8 V		
V_{IH}	CMOS	2.1 V	2.1 V	3.0 V	3.0 V		
V_{OL}	1X			0.4 V	0.2 V	$I_{OL} = -2 \text{ mA}$	$I_{OL} = -1 \text{ mA}$
	2X			0.4 V	0.2 V	$I_{OL} = -4 \text{ mA}$	$I_{OL} = -2 \text{ mA}$
	3X			0.4 V	0.2 V	$I_{OL} = -8 \text{ mA}$	$I_{OL} = -3 \text{ mA}$
V_{OH}	1X	2.4 V	2.6 V			$I_{OH} = 2 \text{ mA}$	$I_{OH} = 1 \text{ mA}$
	2X	2.4 V	2.6 V			$I_{OH} = 4 \text{ mA}$	$I_{OH} = 2 \text{ mA}$
	3X	2.4 V	2.6 V			$I_{OH} = 8 \text{ mA}$	$I_{OH} = 3 \text{ mA}$

8. RF performances

WM2A-G900	WM2C-G900/1800
<p>RF performances are compliant with REC 05.05 and REC 11.10. The main parameters are :</p> <ul style="list-style-type: none"> • Receiver : <ul style="list-style-type: none"> • Sensitivity : < -102 dBm • Selectivity @ 200 kHz : > +9 dBc • Selectivity @ 400 kHz : > +41 dBc • Selectivity @ 600 kHz : > +49 dBc • Dynamic range : 62 dB • Intermodulation : > -49 dBm • Co-channel rejection : >= 9 dBc • Transmitter : <ul style="list-style-type: none"> • Maximum output power : +33 dBm +/- 2 dB • Minimum output power : +5 dBm +/- 5 dB • H2 level : < -30 dBm • H3 level : < -30 dBm • Noise in 925 - 935 MHz : < -67 dBm • Noise in 935 - 960 MHz : < -79 dBm • Phase error at peak power : < 5 ° RMS • Frequency error : +/- 0.1 ppm max 	<p>RF performances are compliant with REC 05.05 and REC 11.10. The main parameters are :</p> <ul style="list-style-type: none"> • Receiver: <ul style="list-style-type: none"> • EGSM Sensitivity : <-104dBm • DCS Sensitivity : < -100 dBm • Selectivity @ 200 kHz : > +9 dBc • Selectivity @ 400 kHz : > +41 dBc • Dynamic range : 62 dB • Intermodulation : > -43 dBm • Co-channel rejection : >= 9 dBc • Transmitter : <ul style="list-style-type: none"> • Maximum output power (EGSM) : +33 dBm +/- 2 dB • Maximum output power (DCS) : +30 dBm +/- 2 dB • Minimum output power (EGSM) : +5 dBm +/- 5 dB • Minimum output power (DCS) : 0 dBm +/- 5 dB • H2 level : < -30 dBm • H3 level : < -30 dBm • Noise in 925 - 935 MHz : < -67 dBm • Noise in 935 - 960 MHz : < -79 dBm • Noise in 1805 - 1880 MHz : < -71 dBm • Phase error at peak power : < 5 ° RMS • Frequency error : +/- 0.1 ppm max

9. Interfaces

This board underline the differences “pin-to-pin” between the Wismo2A and Wismo2C modules.

Wismo2A						Wismo2C					
Pin #	Name	I/O	I/O type	Description	Comment	Pin #	Name	I/O	I/O type	Description	Comment
1	Reserved					1	Reserved				
2	Reserved					2	Reserved				
3	SIMCLK	O		Clock for SIM interface		3	SIMCLK	O	2 X	Clock for SIM interface	
4	Reserved					4	Reserved				
5	SIMRST	O		Reset for SIM interface		5	SIMRST	O	2 X	Reset for SIM interface	
6	ON/~OFF	I		Power ON/OFF control		6	ON/~OFF	I		Power ON/OFF control	
7	SIMDATA	I/O		I/O for SIM interface		7	SIMDATA	I/O	CMOS / 3X	I/O for SIM interface	
8	Reserved					8	Reserved				
9	SIMVCC	O		SIM card supply	10mA max (5V)	9	SIMVCC	O		SIM card supply	6mA max (3V)
10	Reserved					10	Reserved				
11	VDD	I	Supply	Low power supply	3.3V minimum or connected to VBATT	11	VDD	I	Supply	Low power supply	3.1V minimum or connected to VBATT
12	BOOT	I	CMOS	BOOT	Pull down through 1K for Flash loading operation	12	BOOT	I	CMOS	BOOT	Pull down through 1K for Flash downloading
13	Reserved					13	Reserved				
14	~RST	I/O	CMOS	Module Reset	Active low (as described in § reset)	14	~RST	I/O	SCHMITT	Module Reset	Active low

15	Reserved					15	Reserved				
16	INTR	I	CMOS	External interrupt	Active high	16	~INTR	I	CMOS	External interrupt	Active low. 100K Pull-up inside
17	Reserved					17	Reserved				
18	Reserved					18	GPI	I	CMOS	General Purpose Input	100K Pull-down inside
19	Reserved					19	Reserved				
20	Reserved					20	GPO2	O	1X	General Purpose Output	
21	Reserved					21	Reserved				
22	Reserved					22	GPO1	I/O	CMOS/3X	General Purpose Output	
23	Reserved					23	Reserved				
24	Reserved					24	GPIO0	I/O	CMOS/2X	General Purpose I/O	
25	Reserved					25	Reserved				
26	Reserved					26	Reserved				
27	Reserved					27	Reserved				
28	Reserved					28	Reserved				
29	Reserved					29	Reserved				
30	CT105/RTS	I	CMOS	RS232 interface Request To Send	Pull up to VCC with 100K Ω when not used	30	CT105/RTS	I	CMOS	RS232 interface Request To Send	Pull up to VCC with 100K Ω when not used
31	Reserved					31	Reserved				
32	CT104/RX	O	1X	RS232 interface - Receive		32	CT104/RX	O	1X	RS232 interface – Receive	
33	Reserved					33	AUXV0	I	Analog	Auxiliar ADC input 0	
34	CT108- 2/DTR	I	CMOS	RS232 interface Data Terminal Ready	Pull up to VCC with 100K Ω when not used	34	CT108-2/DTR	I	CMOS	RS232 interface Data Terminal Ready	Pull up to VCC with 100K Ω when not used
35	Reserved					35	Reserved				

36	CT107/DSR	O	1X	RS232 interface Data Set Ready		36	CT107/DSR	O	1X	RS232 interface Data Set Ready	
37	CT106/CTS	O	1X	RS232 interface Clear To Send		37	CT106/CTS	O	1X	RS232 interface Clear To Send	
38	BAT_TEMP	I	Analog	ADC input for battery temperature measurement		38	BAT_TEMP	I	Analog	ADC input for battery temperature measurement	
39	CT103/TX	I	CMOS	RS232 interface - Transmit	Pull up to VCC with 100 K Ω when not used	39	CT103/TX	I	CMOS	RS232 interface - Transmit	Pull up to VCC with 100 K Ω when not used
40	VCC	O	Supply	3V digital supply output	10mA max.	40	VCC	O	Supply	2.8V digital supply output	10mA max.
41	SPK1P	O	Analog	Speaker 1 positive output		41	SPK1P	O	Analog	Speaker 1 positive output	
42	MIC1P	I	Analog	Microphone 1 positive input		42	MIC1P	I	Analog	Microphone 1 positive input	
43	SPK1N	O	Analog	Speaker 1 negative output		43	SPK1N	O	Analog	Speaker 1 negative output	
44	MIC1N	I	Analog	Microphone 1 negative input		44	MIC1N	I	Analog	Microphone 1 negative input	
45	SPK2P	O	Analog	Speaker 2 positive output		45	SPK2P	O	Analog	Speaker 2 positive output	
46	MIC2P	I	Analog	Microphone 2 positive input		46	MIC2P	I	Analog	Microphone 2 positive input	
47	SPK2N	O	Analog	Speaker 2 negative output		47	SPK2N	O	Analog	Speaker 2 negative output	
48	MIC2N	I	Analog	Microphone 2 negative input		48	MIC2N	I	Analog	Microphone 2 negative input	
49	BUZ	O		Buzzer output	80mA max	49	BUZ	O		Buzzer output	80mA max
50	GPIO0	I/O	CMOS/3X	General Purpose I/O	Can be used as SIMPRES	50	SIMPRES	I	CMOS	SIM Card Detect	

51	GPIO3 CT109 / DCD	I/O O	CMOS/3X	General Purpose I/O RS232 - Data Carrier Detect		51	GPIO3 or CT109 / DCD	I/O O	CMOS/2X	General Purpose I/O RS232 - Data Carrier Detect	
52	GPIO1	I/O	CMOS/3X	General Purpose I/O		52	GPIO1 FLASHLED	I/O	CMOS/2X	General Purpose I/O Module State	Handset application AT command application
53	GPIO4	I/O	CMOS/3X	General Purpose I/O		53	GPIO4	I/O	CMOS/2X	General Purpose I/O	
54	GPIO2 CT125 / RI	I/O O	CMOS/3X	General Purpose I/O RS232 - Ring Indicator		54	GPIO2 or CT125 / RI	I/O O	CMOS/2X	General Purpose I/O RS232 - Ring Indicator	
55	+VBATT		Supply	Battery Input	High current	55	+VBATT		Supply	Battery Input	High current
56	AVCC	O	Supply	3V analogue supply output	10mA max.	56	VCC_RTC	I/O	Supply	RTC back-up supply	
57	+VBATT		Supply	Battery Input	High current	57	+VBATT		Supply	Battery Input	High current
58	+VBATT		Supply	Battery Input	High current	58	+VBATT		Supply	Battery Input	High current
59	+VBATT		Supply	Battery Input	High current	59	+VBATT		Supply	Battery Input	High current
60	+VBATT		Supply	Battery Input	High current	60	+VBATT		Supply	Battery Input	High current

10. Conclusion

The main differences between Wismo2A and Wismo2C **concerning their integration** in customer applications are the following :

Mecanics :

- The length of the legs as changed : 2.0 mm on the Wismo2A
3.0 mm on the Wismo2C

Hardware :

- The digital interface provided by Wismo2A is a 3V interface and a 2.8V interface on Wismo2C. Anyway, the digital signals between the two modules are fully compatible
- On Wismo2C, the interrupt is active at low level (100 k pull-up inside)
- The Pin 56, which was the AVCC output on Wismo2A, is the VCC_RTC input on Wismo2C
- The Pin 33, which was reserved on Wismo2A, is an auxiliar ADC input on Wismo2C.

Software :

The first software version to download on the Wismo2C will be available in January 2000 and will be equivalent to the last software version of the Wismo2A.