

M100 Datasheet

Version 0.1

Release Date 2017-07-05

The document only for following list module:

M100-QVCX-2G16G, M100-OVCX-1G8G, M100-OVCX-2G16G, M100-OVWX-1G8G,
M100-OVWX-2G16G, M100-OVTX-1G8G, M100-OVTX-2G16G, M100-QVCX-1G8G,
M100-QVCX-2G16G, M100-QVWX-1G8G, M100-QVWX-2G16G, M100-QVTX-1G8G,
M100-QVTX-2G16G, M100-OWNX-1G8G, M100-OWNX-2G16G, M100-QWNX-1G8G,
M100-QWNX-2G16G

Revision History

DocumentVersion	Date	Chapter	Descriptions
01	2017-07-05		Creation

1 Product Application Overview

M100 is a Android inside All wireless mode module. Now it Integrate with LTE//HSDPA/HSUPA/WCDMA/EVDO/CDMA2000/GSM, Bluetooth, WIFI, GPS on board.

This document defines the M100 module and describes its air interface and hardware interface within your application.

This document can help you to quickly understand module interface specifications, electrical and mechanical details as well as other related information of M100 module. Associated with application notes and user guide, you can use M100 module to design and set up devices applications easily.

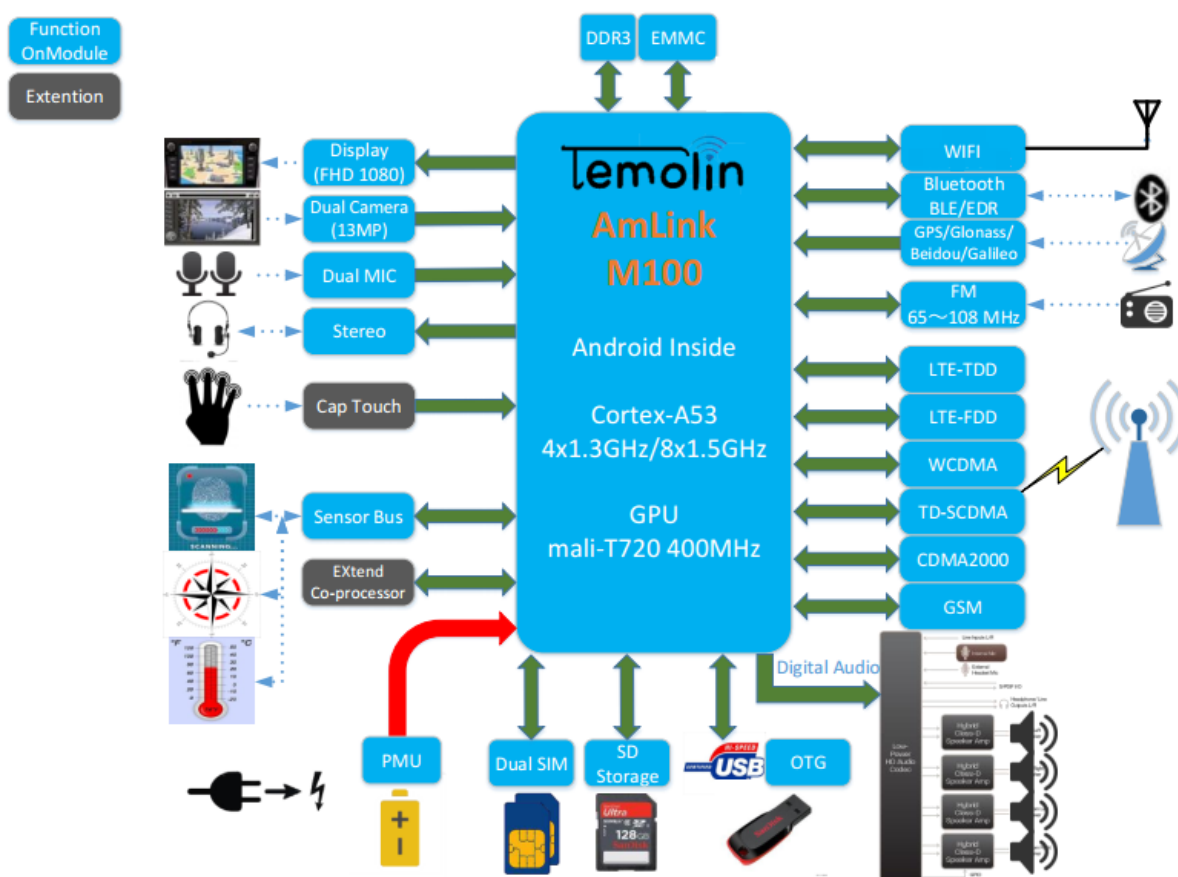


Figure: Framework of M100 Application

2 Brief description

M100 Android world mode communication module

General Info	Description
Features	
Dimension	41x52.7x3.2mm
Weight	16g
Total Pins	162
Processors	Quad-core ARM® 1.3Ghz/Octa-core ARM® 1.5Ghz Cortex-A53 32KB L1 I-cache and 32KB L1 D-cache 512KB unified L2 cache
DRAM Memory Inside	2GB LPDDR-3 Up to 667Mhz
Flash Memory Inside	8/16GB eMMC
Graphics	mali-T720 @ 450 MHz OpenGL ES 1.1/2.0/3.0 OpenCL 1.0/1.1/1.2 DirectX9
Mobile	Dual SIM Dual Standby(DSDS)
Power supply	3.3 V to 4.2V (typical: 3.8V)
Temperature range	-40°C to 85°C
Humidity	5%~ 95%
Drop Height	1.5 meters, 6 free fall
RF Support	
RF Band	LTE FDD -B1/B2/B3/B4/B5/B7/B8/B20 LTE TDD -B41 WCDMA -B1/B2/B5/B8 TD-SCDMA -B34/B39 GSM -800/900/1800/1900 CDMA -BC0/BC1

Air Symbol Rate	LTE FDD -Cat4 DL 150Mbps/UL 50Mbps LTE TDD -Cat4 DL 150Mbps/UL 50Mbps WCDMA -HSDPA,HSUPA -DL 42.2Mbps/UL 11.5Mbps TD-SCDMA -DL 2.8Mbps/UL 2.2Mbps GSM -GPRS DL 85.6kbps/UL 85.6kbps -EDGE Classs12 DL 236.8kbps/UL 236.8kbps CDMA/EVDO BC0/BC1 -DL 3.1Mbps/UL 1.8Mbps
Multimedia	Description
Resolution	Portrait panel resolution up to FHD (1,920*1,080)
Displays	MIPI DSI interface (4 data lanes) Extended support (HDMI/LVDS) by used external chip
Primary Camera	MIPI CSI interface (4 data lanes) 13MP@30fps
Secondary Camera	MIPI CSI interface (4 data lanes) 13MP@30fps
Video	Decoder: H.264 BP/MP/HP-1080p@30fps/40Mbps MPEG-4 SP/ASP -1080p@30fps/40Mbps H.263 -1080p@30fps/40Mbps DivX 4x/5x/6x -1080p@30fps/40Mbps DivX HD/XVID -1080p@30fps/40Mbps Encoder: H.264 High profile 1080p @30fps
Audio	Audio content sampling rates supported:8kHz to 192kHz Audio content sample formats supported: 8-bit/16-bit/24-bit, Support Mono/Stereo output External CODEC I2S interface supports 16-bit/24-bit, Audio encoding: AMR-NB, AMR-WB, AAC, OGG, ADPCM Audio decoding: WAV, MP3, MP2, AAC,AMR-NB, AMR-WB, IDI, Vorbis, APE,AAC-plus v1, AAC-plus v2, FLAC, WMA,ADPCM

Connectivity	Description
WLAN	802.11 /b/g/n Security: WFA WPA/WPA2 personal,WPS2.0, WAPI (hardware) Max data Rates 802.11n 40Mhz/150Mbps
Bluetooth	Bluetooth v4.0 Low Energy (LE) Compatible 2.1+EDR/3.0+HS
GPS	GPS/Glonass/Beidou/Galileo dual-band reception concurrently Supports SBAS (Satellite-Based Augmentation Systems)- WAAS/MSAS/EGNOS/GAGAN
NFC	By add on another module to support
FM	65-108MHz with 50kHz step RDS/RBDS
Other Input/Output	Description
Extensional I/O	Low speed: I2C/SPI/SPI/SD/ UART/I2S/SIM/Keypad/GPIO High speed: MIPI LCD/MIPI Camera/USB Analog: MIC/Speaker/Receiver/Headset/ADC
Other Input/Output	Description
Power down	105uA
Standby Without SIM	2.6mA
Standby with SIM	4.6mA
Mp3 play on back	98 mA
H . 264 play	253mA
LTE video play	385mA

3 Interface Overview

M100 Module show as the picture:

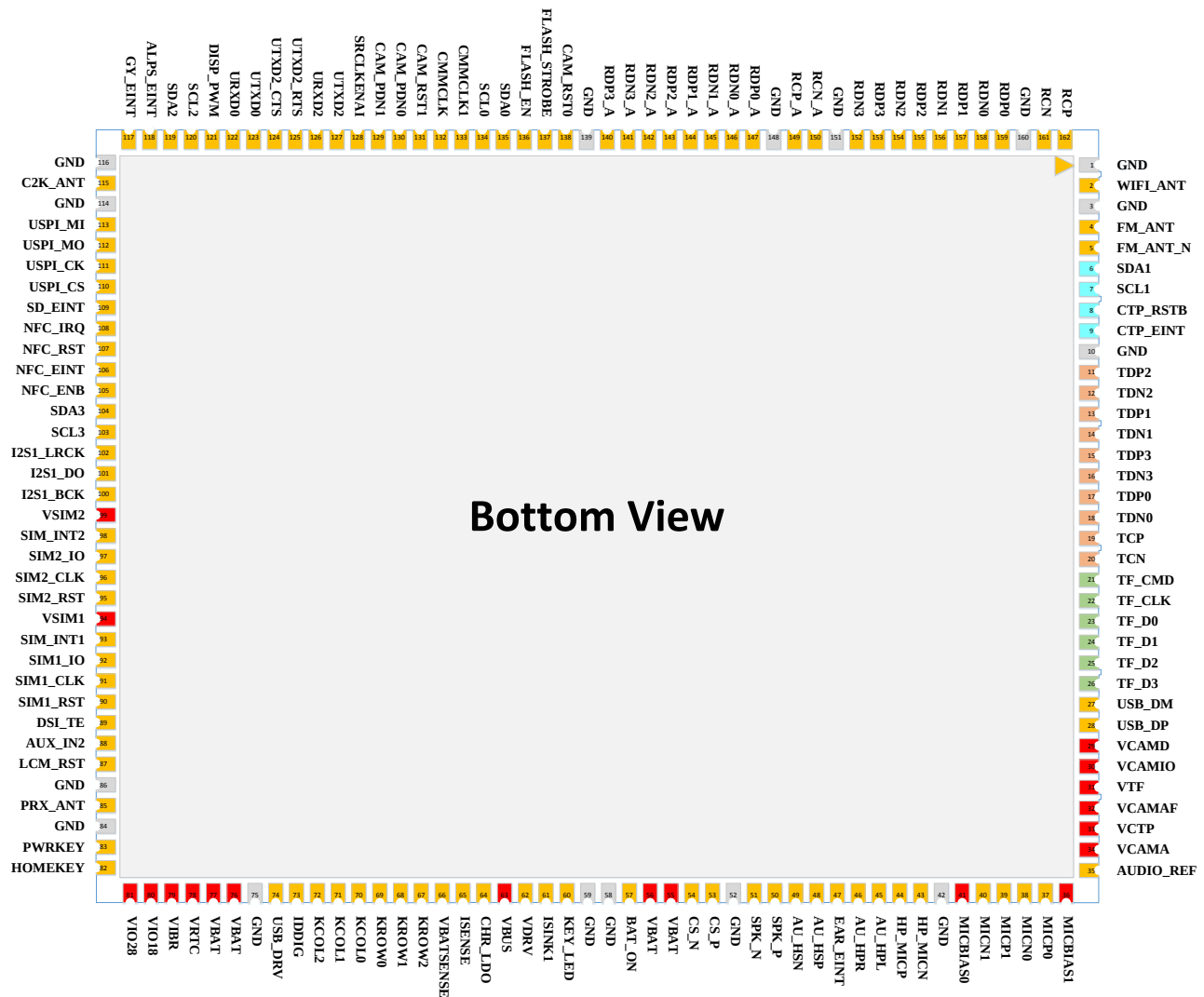


Figure: Pin Bottom view of M100 module

The following figure shows a block diagram of M100 and illustrates the major functional parts.

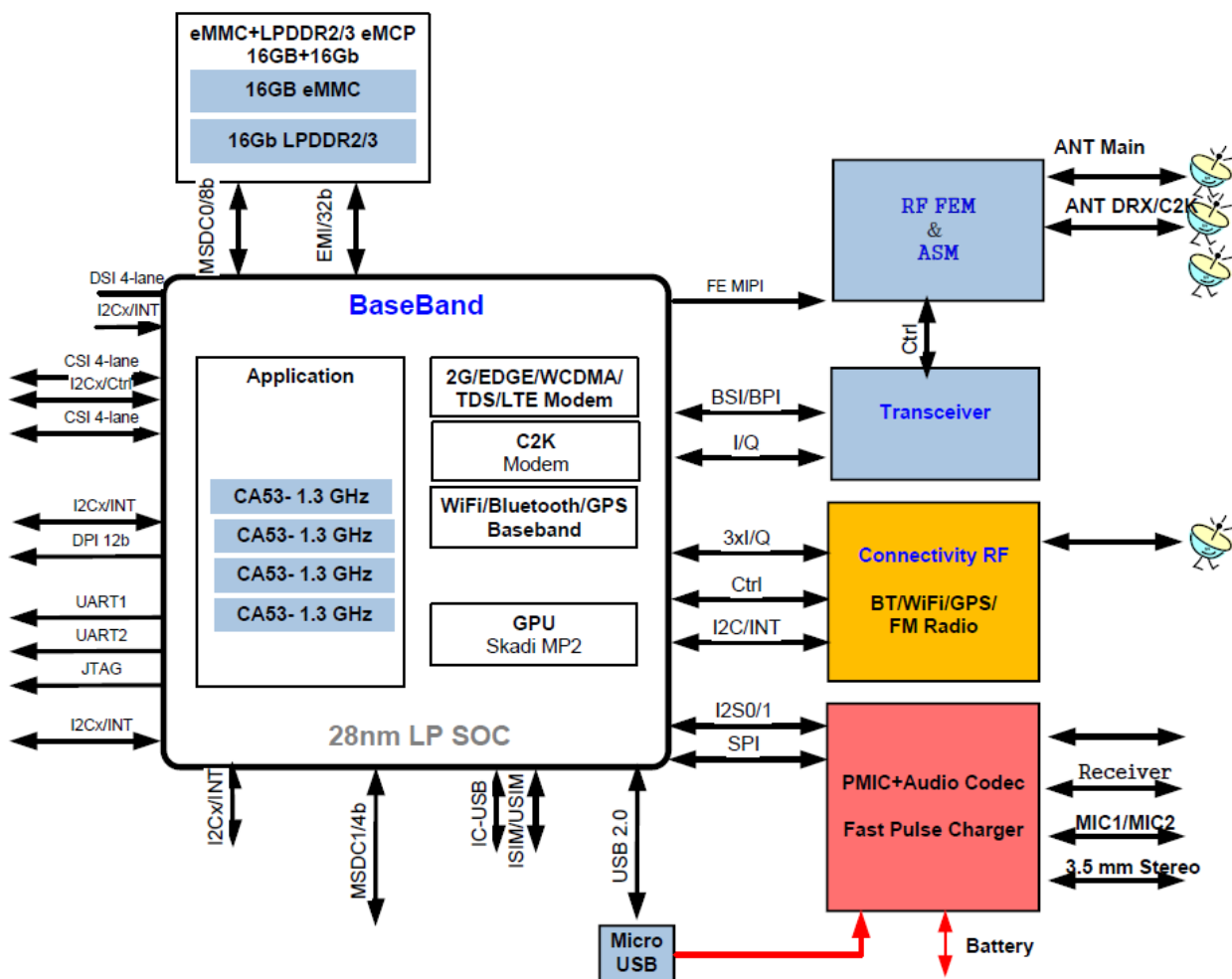


Figure: Functional Diagram

All Interface for user application detail show as following:

Table 1 : M100 hardware interface total view

◇ Storage		
1	ROM (EMMC)	16GB
2	RAM (LPDDR3)	2GB
◇ Wireless		
1	Bluetooth	BT4.0 with A2DP / BLE
2	Wi-Fi	802.11
3	GPS	Global Position System
4	NFC	Support by external NFC module
5	FM	FM onboard
◇ Interface		

1	USB with OTG	USB high speed 2.0
2	Storage Card	UHS SD3.0
3	I2C	x4
4	UART	x3
5	I2S	x1
6	SPI	x1
7	DPI(RGB LCD)	x1
8	DSI(MIPI LCD)	x1
9	CSI(CAMERA)	x2
10	GPIO	
11	SIM	x2
12	MIC	x2
13	Headset	x1
14	Receiver	x1
15	Speaker	x1
16	Keypad	3x3x2
17	LED	x2
18	ADC	x1
19	RTC	x1
20	ANT	x3
21	FM ANT	x2

4 Interface description

Table 2: M100 pin description

No.	PinName	Type	Description
1	GND	VSS	Ground
2	WIFI_ANT	Antenna	WIFI Antenna
3	GND	VSS	Ground
4	FM_ANT	Antenna	FM Antenna Positive
5	FM_ANT_N	Antenna	FM Antenna negative
6	SDA1	Open drain	I2C1 data
7	SCL1	Open drain	I2C1 clock
8	CTP_RSTB	Bi-Directional	GPIO
9	CTP_EINT	Bi-Directional	GPIO
10	GND	VSS	Ground
11	TDP2	LVDS ouput	Display LCD MIPI output DP2
12	TDN2	LVDS ouput	Display LCD MIPI output DN2
13	TDP1	LVDS ouput	Display LCD MIPI output DP1
14	TDN1	LVDS ouput	Display LCD MIPI output DN1
15	TDP3	LVDS ouput	Display LCD MIPI output DP3
16	TDN3	LVDS ouput	Display LCD MIPI output DN3
17	TDP0	LVDS ouput	Display LCD MIPI output DP0
18	TDN0	LVDS ouput	Display LCD MIPI output DN0
19	TCP	LVDS ouput	Display LCD MIPI output clock P
20	TCN	LVDS ouput	Display LCD MIPI output clock N
21	TF_CMD	CMOS input/output	Storage card command
22	TF_CLK	CMOS input/output	Storage card clock
23	TF_D0	CMOS input/output	Storage card data 0
24	TF_D1	CMOS input/output	Storage card data 1
25	TF_D2	CMOS input/output	Storage card data 2
26	TF_D3	CMOS input/output	Storage card data 3
27	USB_DM	LVDS input/ouput	USB 2.0 DM
28	USB_DP	LVDS input/ouput	USB 2.0 DP
29	VCAMD	Power output	Camera Digital Power

No.	PinName	Type	Description
30	VCAMIO	Power output	Camera IO Power
31	VTF	Power output	SD Card Power
32	VCAMAF	Power output	Camera Auto Focus Power
33	VTP	Power output	Touch IC Power
34	VCAMA	Power output	Camera Analog Power
35	AUDIO_REF	Analog input	Audio Reference Ground
36	MICBIAS1	Power output	Headset MIC bias
37	MICP0	Analog input	MIC input 1+
38	MICN0	Analog input	MIC input 1-
39	MICP1	Analog input	MIC input 2+
40	MICN1	Analog input	MIC input 2-
41	MICBIAS0	Power output	Main MIC bias
42	GND	VSS	Ground
43	HP_MICN	Analog input	Headset MIC Input -
44	HP_MICP	Analog input	Headset MIC Input +
45	AU_HPL	Analog output	Headset Audio Left Output -
46	AU_HPR	Analog output	Headset Audio Right Output -
47	EAR_EINT	CMOS input/output	Headset Insert Interrupt Input
48	AU_HSP	Analog output	Audio Receiver +
49	AU_HSN	Analog output	Audio Receiver -
50	SPK_P	Analog output	Audio Speaker +
51	SPK_N	Analog output	Audio Speaker -
52	GND	VSS	Ground
53	CS_P	Analog input	Coulomb Counter +
54	CS_N	Analog input	Coulomb Counter -
55	VBAT	Power input	Battery Input Power 3.4~4.2V
56	VBAT	Power input	Battery Input Power 3.4~4.2V
57	BAT_ON	Analog input	Battery Temperature Detection
58	GND	VSS	Ground
59	GND	VSS	Ground
60	KEY_LED	LED Sink	Keypad Backlight Sink
61	ISINK1	LED Sink	LED Sink
62	VDRV	Analog output	Charger Drive
63	VBUS	Analog input	USB VBUS
64	CHR_LDO	Analog output	Charger LDO For Detect
65	ISENSE	Analog input	Charger Current Sensor-
66	VBATSENSE	Analog input	Charger Current Sensor+

No.	PinName	Type	Description
67	KROW2	Digital input/output	Matrix Keypad Row2
68	KROW1	Digital input/output	Matrix Keypad Row1
69	KROW0	Digital input/output	Matrix Keypad Row0
70	KCOL0	Digital input/output	Matrix Keypad Col0
71	KCOL1	Digital input/output	Matrix Keypad Col1
72	KCOL2	Digital input/output	Matrix Keypad Col2
73	IDDIG	Digital input/output	OTG ID
74	USB_DRV	Analog output	Charge Drive
75	GND	VSS	
76	VBAT	Power input	Battery Input Power 3.4~4.2V
77	VBAT	Power input	Battery Input Power 3.4~4.2V
78	VRTC	Power output	Real Time Clock Power
79	VIBR	Power output	Vibrator Power
80	VIO18	Power output	1.8V I/O Power
81	VIO28	Power output	2.8V I/O Power
82	HOMEKEY	Digital input	Home Key
83	PWRKEY	Digital input	Power On/Off Key
84	GND	VSS	Ground
85	PRX_ANT	Antenna	LTE/3G/2G Main Antenna
86	GND	VSS	
87	LCM_RST	Digital input/output	LCM Reset
88	AUX_IN2	Analog input	Aux ADC Input
89	DSI_TE	Digital input/output	Display Enable
90	SIM1_RST	Digital input/output	SIM Card 1 Reset
91	SIM1_CLK	Digital input/output	SIM Card 1 Clock
92	SIM1_IO	Digital input/output	SIM Card 1 I/O
93	SIM_INT1	Digital input/output	SIM Card 1 Interrupt
94	VSIM1	Power output	SIM Card 1 Power
95	SIM2_RST	Digital input/output	SIM Card 2 Reset
96	SIM2_CLK	Digital input/output	SIM Card 2 Clock
97	SIM2_IO	Digital input/output	SIM Card 2 I/O
98	SIM_INT2	Digital input/output	SIM Card 2 Interrupt
99	VSIM2	Power output	SIM Card 2 Power
100	I2S1_BCK	Digital input/output	I2S1 BCK
101	I2S1_DO	Digital input/output	I2S1 DO
102	I2S1_LRCK	Digital input/output	I2S1 LRCK
103	SCL3	Open drain	I2C3

No.	PinName	Type	Description
104	SDA3	Open drain	I2C3
105	NFC_ENB	Digital input/output	General GPIO
106	NFC_EINT	Digital input/output	General GPIO
107	NFC_RST	Digital input/output	General GPIO
108	NFC_IRQ	Digital input/output	General GPIO
109	SD_EINT	Digital input/output	General GPIO
110	USPI_CS	Digital input/output	General GPIO
111	USPI_CK	Digital input/output	General GPIO
112	USPI_MO	Digital input/output	General GPIO
113	USPI_MI	Digital input/output	General GPIO
114	GND	VSS	Ground
115	C2K_ANT	Antenna	LTE/3G Aux Antenna, CDMA Main Antenna
116	GND	VSS	Ground
117	GY_EINT	Digital input/output	General GPIO
118	ALPS_EINT	Digital input/output	General GPIO
119	SDA2	Open drain	I2C2
120	SCL2	Open drain	I2C2
121	DISP_PWM	Digital input/output	General GPIO
122	URXD0	Digital input/output	UART 0 RXD
123	UTXD0	Digital input/output	UART 0 TXD
124	UTXD2_CTS	Digital input/output	UART 2 CTS
125	UTXD2_RTS	Digital input/output	UART 2 RTS
126	URXD2	Digital input/output	UART 2 RXD
127	UTXD2	Digital input/output	UART 2 TXD
128	SRCLKENAI	Digital input	NFC Clock Request
129	CAM_PDN1	Digital input/output	Camera Power Down 0/GPIO
130	CAM_PDN0	Digital input/output	Camera Power Down 1/GPIO
131	CAM_RST1	Digital input/output	Camera Power Reset 1/GPIO
132	CMMCLK	Digital clock output	Camera 0 Main Clock Output
133	CMMCLK1	Digital clock output	Camera 1 Main Clock Output
134	SCL0	Open drain	I2C0
135	SDA0	Open drain	I2C0
136	FLASH_EN	Digital input/output	Camera 0 Main Flash LED Enable
137	FLASH_STROBE	Digital input/output	Camera 0 Main Flash Strobe Enable
138	CAM_RST0	Digital input/output	Camera Power Reset 0/GPIO

No.	PinName	Type	Description
139	GND	VSS	Ground
140	RDP3_A	LVDS input	Camera1 MIPI IN3+
141	RDN3_A	LVDS input	Camera1 MIPI IN3-
142	RDN2_A	LVDS input	Camera1 MIPI IN2+
143	RDP2_A	LVDS input	Camera1 MIPI IN2-
144	RDP1_A	LVDS input	Camera1 MIPI IN1+
145	RDN1_A	LVDS input	Camera1 MIPI IN1-
146	RDN0_A	LVDS input	Camera1 MIPI IN0+
147	RDP0_A	LVDS input	Camera1 MIPI IN0-
148	GND	VSS	Ground
149	RCP_A	LVDS ouput	Camera2 MIPI Clock+
150	RCN_A	LVDS ouput	Camera2 MIPI Clock-
151	GND	VSS	Ground
152	RDN3	LVDS input	Camera0 MIPI IN3+
153	RDP3	LVDS input	Camera0 MIPI IN3-
154	RDN2	LVDS input	Camera0 MIPI IN2+
155	RDP2	LVDS input	Camera0 MIPI IN2-
156	RDN1	LVDS input	Camera0 MIPI IN1+
157	RDP1	LVDS input	Camera0 MIPI IN1-
158	RDN0	LVDS input	Camera0 MIPI IN0+
159	RDP0	LVDS input	Camera0 MIPI IN0-
160	GND	VSS	Ground
161	RCN	LVDS ouput	Camera0 MIPI Clock+
162	RCP	LVDS ouput	Camera0 MIPI Clock-

5 Mechanical Dimensions

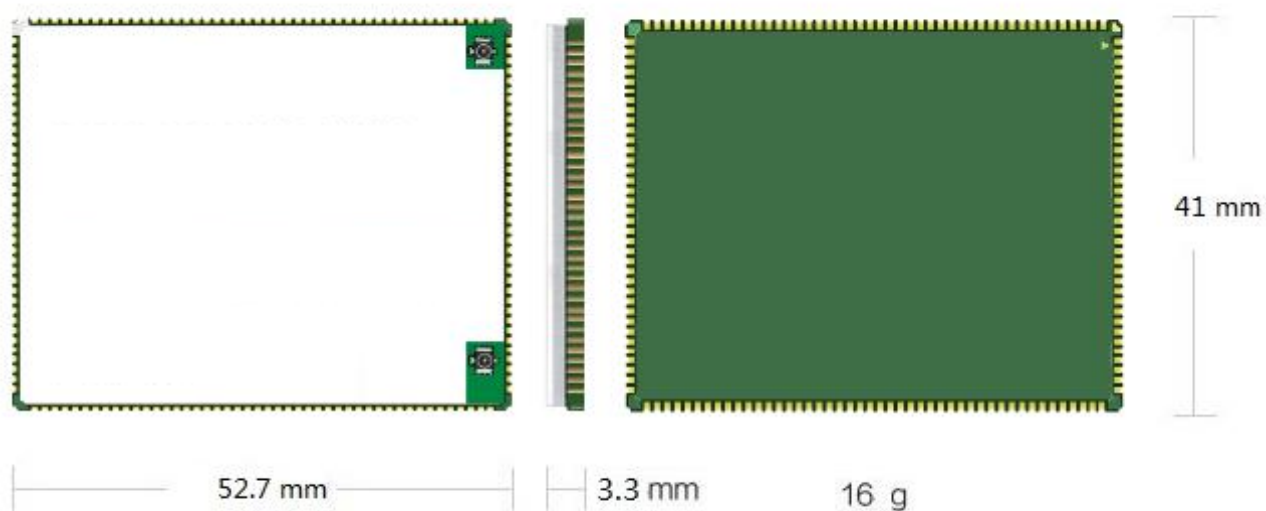


Figure :Module Top and Side Dimensions

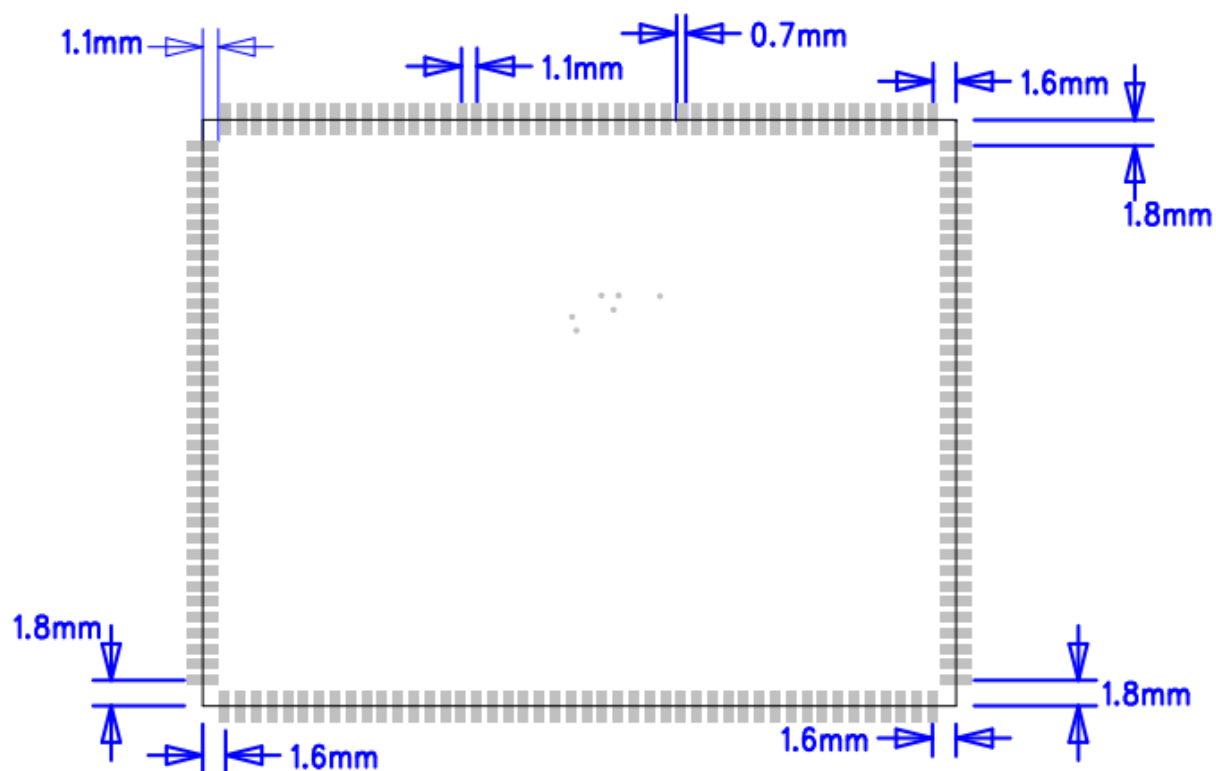


Figure : Layout PCB footprint example

5 Device Installation and User Manual

The M100 module is a proprietary product designed and manufactured by Temolin Technologies Co., Ltd.. For integration into telematics control units manufactured by Temolin Technologies Co., Ltd, Inc. for automotive OEMs.

The module is limited to installation ONLY in an integrated device design review by Temolin Technologies Co., Ltd.

During design process of the integrated device, the module is soldered onto the pcb of the integrated device.

The integrated device must provide RF connectors to external antennas or RF traces to connect the M100 modules to antennas inside the integrated device.

The typical reference design for the trace layout, including PCB stack-up and trace length is as described and shown in a Figure 3 below:

Typical RF trace layout between the M100 module and RF Connector for WIFI/BT/GPS antenna:

- Recommended RF Coconnector Type: Fakra
- Recommended RF trace length is less than 50 mm and width less than 2mm.
- WIFI/BT/GPS antenna connector is J1004.

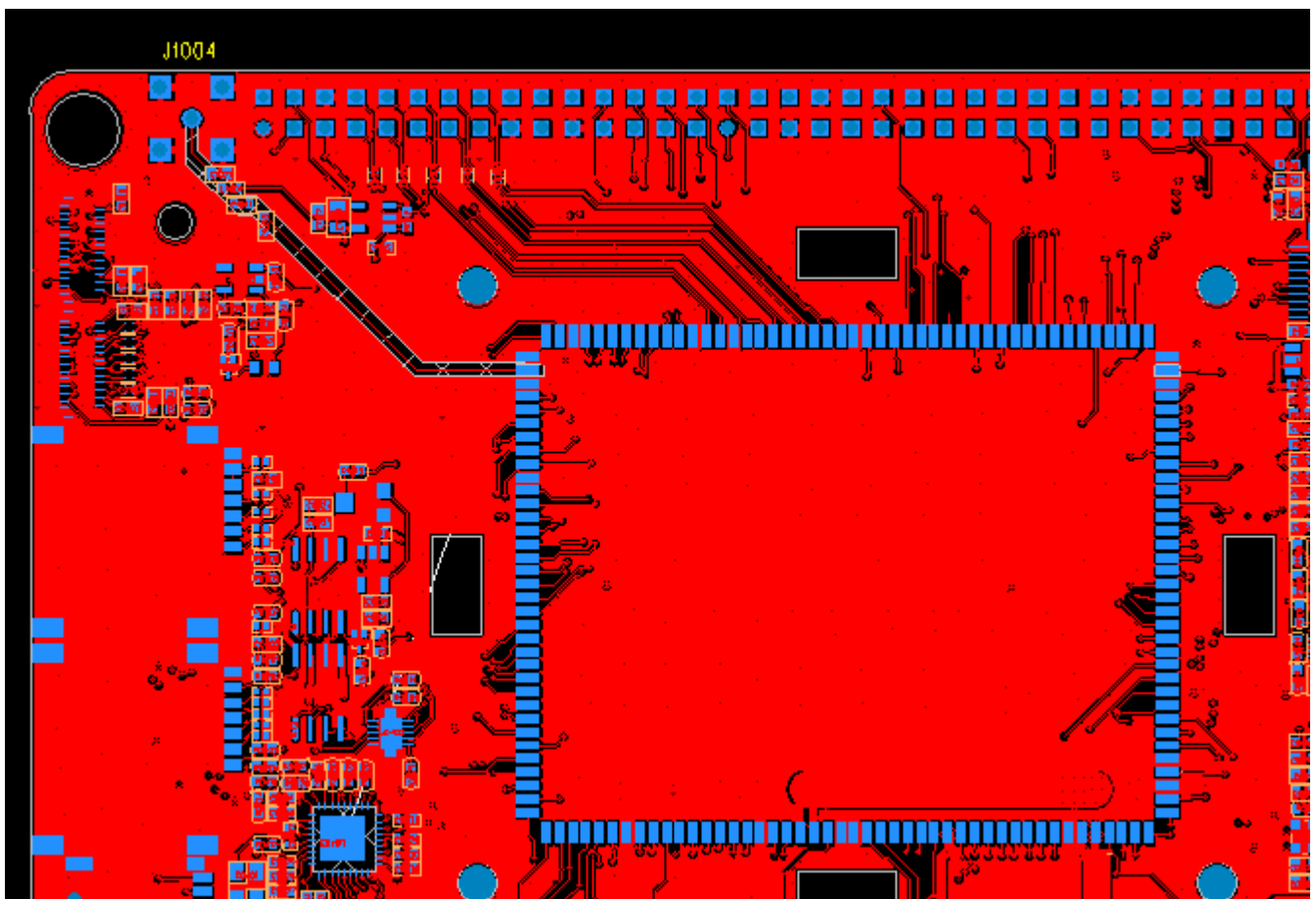


Fig. 3. Typical trace routing recommended for use with the M100 module

- PCB Material: FR 4
- PCB design information:
 - Microstrip on layer 1 with ground on layer 2 / 50 ohm Single Ended Line

LAYER STACK-UP

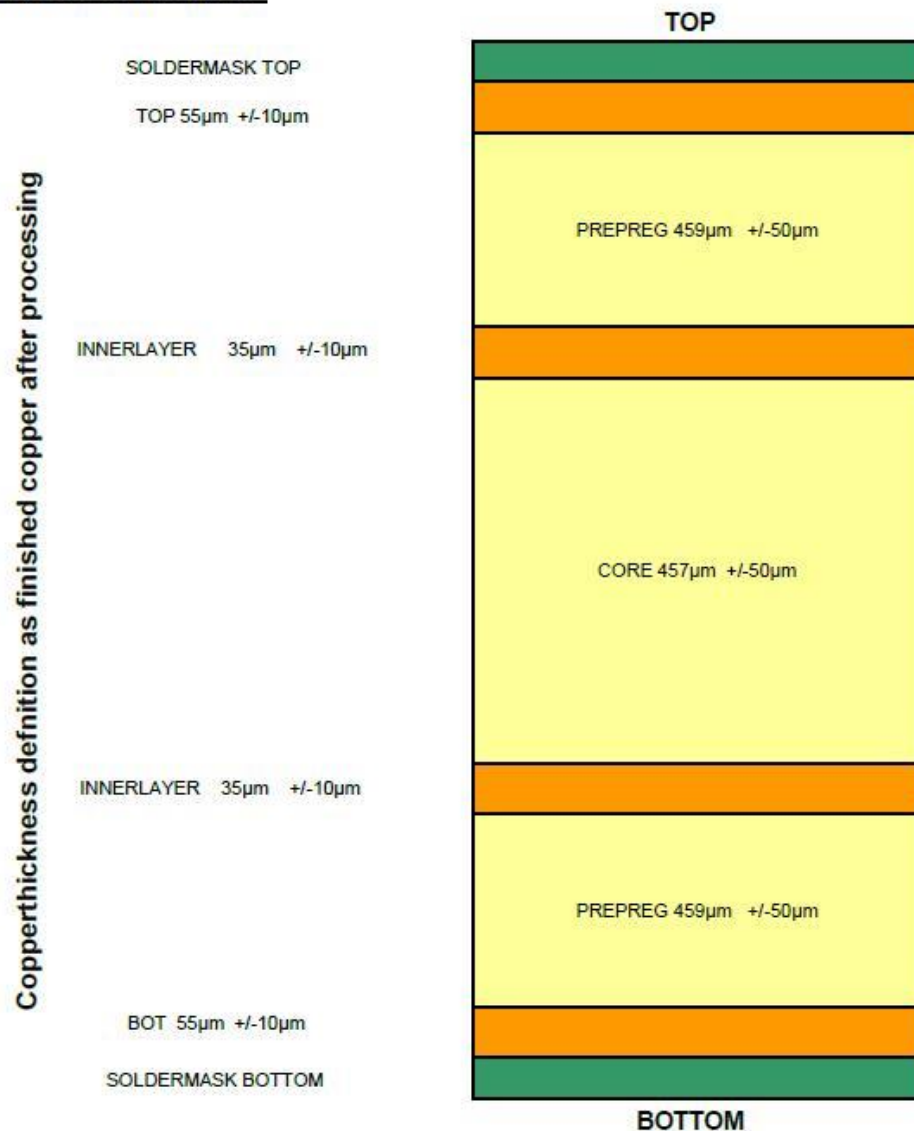


Fig. 4. Recommended PCB stack-up information for use while integrating M100 module.

Antenna information (only below approved antennas can be used with modular) :

Type	Model	manufacture
GAM/WCDMA/CDMA/LTE antenna	SG1106Z-1R23B-100-A	Shenzhen SWARD Communication Technology Co., Ltd
LTE Diversity antenna	SG1106Z-1R23B-100-A	Shenzhen SWARD Communication Technology Co., Ltd
WIFI/BT/GPS antenna	SS901S-6D10G-130-A	Shenzhen SWARD Communication Technology Co., Ltd

FCC Statement

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

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device must operate with a minimum distance of 20 cm between the radiator and user body.

Attention: Limited Single Modular Approval - this RF Module may not be sold to the generic public and requires professional installation. Due to the fact that this RF Module is equipped with an own shielding, the end-product incl. this RF Module has to show compliance to the FCC rules (15C / radiated emissions).

(OEM) Integrator has to assure compliance of the entire end-product incl. the integrated RF Module. Additional measurements (15C) and/or equipment authorizations

(e.g either a complete new certification or a Class II Permissive Change) may need to be addressed depending on co-location or simultaneous transmission issues if applicable.

Integrator is reminded to assure that these installation instructions will not be made available to the end-user of the final host device.

The Integrator will be responsible to satisfy SAR/ RF Exposure requirements, when the module integrated into any (portable, mobile, fixed) host device.

The final host device, into which this RF Module is integrated" has to be labeled with an auxiliary label stating the FCC ID of the RF Module, such as "Contains FCC ID: 2AM5I-TML-M100".