UG95&M95 R2.0

Compatible Design

2G/3G Module Series

Rev. UG95&M95 R2.0_Compatible_Design_V1.1

Date: 2015-03-25

Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

Quectel Wireless Solutions Co., Ltd.
Office 501, Building 13, No.99, Tianzhou Road, Shanghai, China, 200233
Tel: +86 21 5108 6236
Mail: info@quectel.com

Or our local office, for more information, please visit:
http://www.quectel.com/support/salesupport.aspx

For technical support, to report documentation errors, please visit:
http://www.quectel.com/support/techsupport.aspx
Or Email: Support@quectel.com

GENERAL NOTES

QUECTEL OFFERS THIS INFORMATION AS A SERVICE TO ITS CUSTOMERS. THE INFORMATION PROVIDED IS BASED UPON CUSTOMERS' REQUIREMENTS. QUECTEL MAKES EVERY EFFORT TO ENSURE THE QUALITY OF THE INFORMATION IT MAKES AVAILABLE. QUECTEL DOES NOT MAKE ANY WARRANTY AS TO THE INFORMATION CONTAINED HEREIN, AND DOES NOT ACCEPT ANY LIABILITY FOR ANY INJURY, LOSS OR DAMAGE OF ANY KIND INCURRED BY USE OF OR RELIANCE UPON THE INFORMATION. ALL INFORMATION SUPPLIED HEREIN IS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

COPYRIGHT

About the Document

History

Revision	Date	Author	Description
1.0	2014-11-07	Yeoman CHEN	Initial
1.1	2015-03-25	Yeoman CHEN	Opened PIN25 CLK_OUT of UG95.

Contents

About the Document **2**
Contents **3**
Table Index **4**
Figure Index **5**

1 Introduction **6**

2 General Descriptions **7**
2.1. Product Description 7
2.2. Feature Overview 8
2.3. Pin Assignment 9

3 Pin Description **11**

4 Hardware Reference Design **17**
4.1. Power Supply 17
4.1.1. Reference Design for Power Supply 17
4.1.2. Reduce Voltage Drop 18
4.2. Power-on Circuit 18
4.3. Power-off Circuit 20
4.3.1. Power Down Module via AT Command 20
4.3.2. Emergency Shutdown 20
4.3.3. Power Down M95 Using the PWRKEY Pin 21
4.4. Network Status Indication 22
4.5. Operating Status Indication 23
4.6. USIM&SIM Interface 23
4.7. Serial Interfaces 24
4.7.1. UART Application 24
4.7.2. USB Application 25
4.8. Audio Interfaces 26
4.9. RF Interface 27

5 Recommended Footprint **28**

6 Manufacturing **33**
6.1. Soldering 34
6.2. Packaging 35

7 Appendix A **37**

Table Index

TABLE 1: MODULE GENERAL INFORMATION 7
TABLE 2: FEATURE OVERVIEW 8
TABLE 3: PARAMETERS 11
TABLE 4: COMPARISON OF PINS 11
TABLE 5: MANUFACTURING 33
TABLE 6: REEL PACKING 36
TABLE 7: RELATED DOCUMENTS 37

Figure Index

FIGURE 1: UG95&M95 R2.0 PIN ASSIGNMENT 9
FIGURE 2: COMBINED PIN ASSIGNMENT OF UG95&M95 R2.0 10
FIGURE 3: REFERENCE CIRCUIT OF POWER SUPPLY 17
FIGURE 4: REFERENCE CIRCUIT OF STAR STRUCTURE 18
FIGURE 5: DRIVING CIRCUIT OF THE PWRKEY 19
FIGURE 6: TIMING OF TURNING ON SCENARIOS 19
FIGURE 7: TIMING OF TURNING OFF THROUGH AT COMMAND 20
FIGURE 8: DRIVING CIRCUIT OF EMERGENCY SHUTDOWN CIRCUIT 21
FIGURE 9: TIMING OF EMERGENCY SHUTDOWN 21
FIGURE 10: TIMING OF TURNING OFF M95 R2.0 MODULE FROM PWRKEY 22
FIGURE 11: REFERENCE CIRCUIT OF THE NETLIGHT 22
FIGURE 12: REFERENCE CIRCUIT OF THE STATUS 23
FIGURE 13: REFERENCE CIRCUIT OF THE 6-PIN USIM&SIM CARD 23
FIGURE 14: REFERENCE DESIGN OF THE 8-PIN USIM&SIM CARD 24
FIGURE 15: REFERENCE DESIGN OF UART INTERFACE 25
FIGURE 16: REFERENCE DESIGN OF UART&USB INTERFACES 26
FIGURE 17: REFERENCE DESIGN OF AUDIO INTERFACE 27
FIGURE 18: REFERENCE CIRCUIT OF RF INTERFACE 27
FIGURE 19: BOTTOM VIEW OF UG95 AND M95 R2.0 28
FIGURE 20: RECOMMENDED COMPATIBLE FOOTPRINT (UNIT: MM) 29
FIGURE 21: RECOMMENDED STENCIL OF UG95 (UNIT: MM) 30
FIGURE 22: RECOMMENDED STENCIL OF M95 R2.0 (UNIT: MM) 31
FIGURE 23: RENDERINGS OF INSTALLATION 32
FIGURE 24: REFLOW SOLDERING PROFILE 34
FIGURE 25: TAPE AND REEL SPECIFICATION 35
FIGURE 26: DIMENSIONS OF REEL 36

1 Introduction

Quectel UMTS/HSPA UG95 module is compatible with Quectel GSM/GPRS M95 R2.0 module. This document briefly describes the compatible design of UG95 and M95 R2.0.

2 General Descriptions

2.1. Product Description

The M95 R2.0 is a Quad-band GSM/GPRS module which works at frequencies of GSM850, EGSM900, DCS1800 and PCS1900. The UG95 is an UMTS/HSPA module that includes two variants, UG95-A and UG95-E. UG95 and M95 R2.0 are designed as compatible products. You can choose the right module for your applications. The compatible design guideline ensures a smooth migration from M95 R2.0 to UG95 for your products.

Table 1: Module General Information

Module	Appearance	Packaging	Dimensions	Description
UG95		102-pin LGA	19.9 × 23.6 × 2.2mm	UMTS/HSPA module (UG95-A and UG95-E)
M95 R2.0		42-pin LCC	19.9 × 23.6 × 2.65mm	GSM/GPRS module

2.2. Feature Overview

The following table compares general properties and features of M95 R2.0 and UG95.

Table 2: Feature Overview

Feature	M95 R2.0	UG95
Power supply	3.3~4.6V	3.3~4.3V
Peak current	VBAT: max 2A	VBAT_BB&RF: max 2A
Sleep current	2G@DRX=5: 1.3mA	2G@DRX=5: 1.12mA 3G@DRX=6: 1.98mA
Frequency bands	Quad band: GSM850/900/1800/1900	UG95-A: Dual band UMTS850/1900 UG95-E: Dual band GSM900/1800 Dual band UMTS900/2100
UMTS/HSPA	Not supported	Supports UMTS/HSPA
EDGE	Not supported	Downlink only
GPRS	Multislot class 12	Multislot class 12
GPRS data transfer typical current (1DL/4UL PCL=5)	GSM850: 457mA EGSM900: 484mA DCS1800: 461mA PCS1900: 439mA	EGSM900: 490mA DCS1800: 335mA
WCDMA data transfer current (max power)	/	UMTS850: 520mA UMTS900: 512mA UMTS1900: 563mA UMTS2100: 536mA
Operating temperature (board temperature)	Normal operation: -35°C to +80°C Restricted operation: -40°C to +85°C Storage: -40°C to +90°C	Normal operation: -35°C to +80°C Restricted operation: -40°C to +85°C Storage: -40°C to +90°C
Serial interface	Baudrate: 300 to 115,200bps Autobauding: 4,800 to 115,200bps Flow control: RTS/CTS Signal level: 2.8V	Baudrate: 300 to 921,600bps Autobauding: 4,800 to 115,200bps Flow control: RTS/CTS Signal level: 1.8V
USB interface	Not supported	USB 2.0 High Speed device interface
Analog audio	Two analog input channels and two analog output channels	Not supported

Digital audio	Not supported	One Pulse Code Modulation (PCM) digital interface
RTC backup	$V_O$max=3V V_I=1.5V~3.3V	$V_O$max=1.9V V_I=1V~1.9V
I2C interface	Not supported	Supported

2.3. Pin Assignment

The following figure shows the pin assignment of UG95 and M95 R2.0.

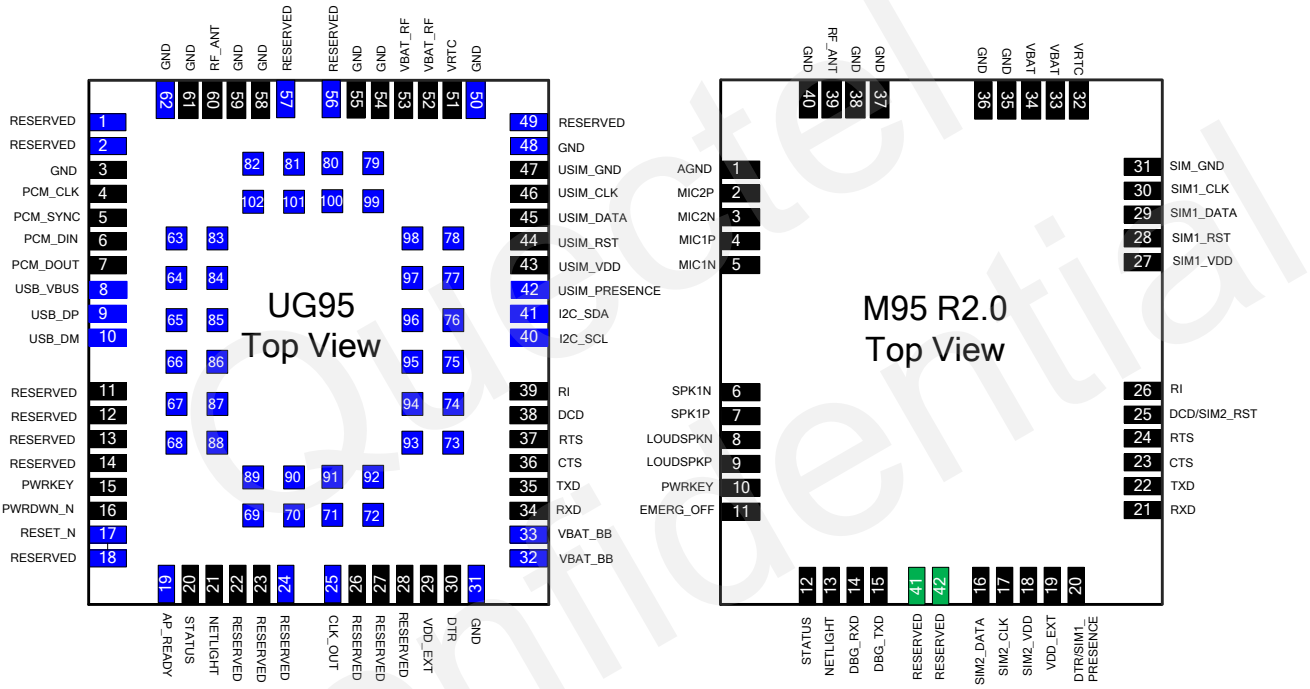


Figure 1: UG95&M95 R2.0 Pin Assignment

NOTES

1. The blue pins of UG95 are the additional pins compared with M95 R2.0.
2. The green pins are reserved pins of M95 R2.0.

Figure 2 shows the combination of pin assignment for UG95 and M95 R2.0.

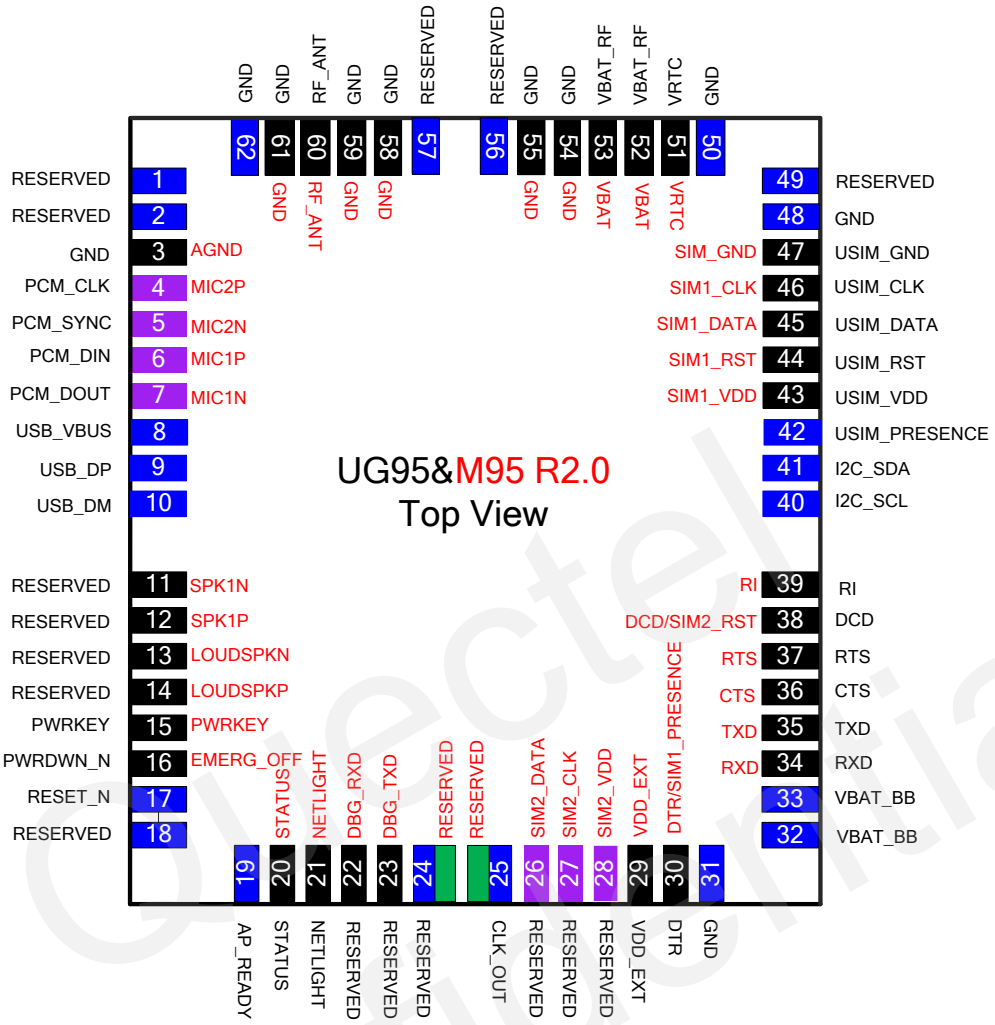


Figure 2: Combined Pin Assignment of UG95&M95 R2.0

NOTES

1. The blue pins of UG95 are the additional pins compared with M95 R2.0.
2. The pin names marked in red in the inside area are M95 R2.0's.
3. UG95 and M95 R2.0 are identical in size. The black pins of UG95 and M95 R2.0 are compatible pins in main functions.
4. The green pins are reserved pins of M95 R2.0.
5. The purple pins are different pins in main functions.

3 Pin Description

This chapter describes the pin definition and assignment of UG95 and M95 R2.0.

Table 3: Parameters

Symbol	Description
IO	Bidirectional Input/Output
DI	Digital Input
DO	Digital Output
PI	Power Input
PO	Power Output
AI	Analog Input
AO	Analog Output

The following table shows the comparison of pins between UG95 and M95 R2.0.

Table 4: Comparison of Pins

UG95				M95 R2.0			
Pin No.	Pin Name	IO	Description	Pin No.	Pin Name	IO	Description
1	RESERVED	/	/	/	/	/	/
2	RESERVED	/	/	/	/	/	/
3	GND	/	Ground	1	AGND	/	Ground
4	PCM_CLK	IO	PCM data bit clock. 1.8V	2	MIC2P	AI	Channel 2 Microphone positive input.

5	PCM_SYNC	IO	PCM data frame sync signal. 1.8V	3	MIC2N	AI	Channel 2 Microphone negative input.
6	PCM_DIN	DI	PCM data input. 1.8V	4	MIC1P	AI	Channel 1 Microphone positive input.
7	PCM_DOUT	DO	PCM data output. 1.8V	5	MIC1N	AI	Channel 1 Microphone negative input.
8	USB_VBUS	PI	USB insert Detection. 2.5~5.25V	/	/	/	/
9	USB_DP	IO	USB differential data bus (positive).	/	/	/	/
10	USB_DM	IO	USB differential data bus (minus).	/	/	/	/
11	RESERVED	/	/	6	SPK1N	AO	Channel 1 Audio negative output.
12	RESERVED	/	/	7	SPK1P	AO	Channel 1 Audio positive output.
13	RESERVED	/	/	8	LOUDSPKN	AO	Channel 2 Audio negative output.
14	RESERVED	/	/	9	LOUDSPKP	AO	Channel 2 Audio positive output.
15	PWRKEY	DI	Turn on the module. Pull-up to 1.8V by 200kΩ internally.	10	PWRKEY	DI	Turn on/off the module. Pulled up to VBAT.
16	PWRDWN_N	DI	Turn off the module. Use it only when shutdown via AT command cannot be achieved. Pull-up to 1.8V by 4.7kΩ internally.	11	EMERG_OFF	DI	Emergency off. Pulled down for at least 40ms, which will turn off the module in case of emergency. Use it only when shutdown via PWRKEY or AT command cannot be implemented.
17	RESET_N	DI	Reset the module. Pull-up to 1.8V by 200kΩ internally.	/	/	/	/
18	RESERVED	/	/	/	/	/	/

19	AP_READY	DI	Application processor wakeup state input. 1.8V	/	/	/	/
20	STATUS	DO	Indicate the module's operating status. 1.8V	12	STATUS	DO	Indicate the module's operating status. 2.8V
21	NETLIGHT	DO	Indicate the module's network status. 1.8V	13	NETLIGHT	DO	Indicate the module's network status. 2.8V
22	RESERVED	/	/	14	DBG_RXD	DI	RXD of debug UART port. 2.8V
23	RESERVED	/	/	15	DBG_TXD	DO	TXD of debug UART port. 2.8V
24	RESERVED	/	/	/	/	/	/
/	/	/	/	41	RESERVED	/	/
/	/	/	/	42	RESERVED	/	/
25	CLK_OUT	DO	Provide a digital clock output for an external audio codec.	/	/	/	/
26	RESERVED	/	/	16	SIM2_DATA	IO	SIM2 data. 1.8V/3.0V
27	RESERVED	/	/	17	SIM2_CLK	DO	SIM2 clock. 1.8V/3.0V
28	RESERVED	/	/	18	SIM2_VDD	PO	Power supply for SIM2 Card.1.8V/3.0V.
29	VDD_EXT	PO	1.8V	19	VDD_EXT	PO	2.8V
30	DTR	DI	Data terminal ready. 1.8V	20	[1)]DTR/ SIM1_PRESENCE	DI	The alternate function can be configured through AT command. 2.8V

31	GND	/	Ground	/	/	/	/
32	VBAT_BB	PI	Power supply for module baseband part. 3.3~4.3V	/	/	/	/
33	VBAT_BB	PI	Power supply for module baseband part. 3.3~4.3V	/	/	/	/
34	RXD	DI	Receive data. 1.8V	21	RXD	DI	Receive data. 2.8V
35	TXD	DO	Transmit data. 1.8V	22	TXD	DO	Transmit data. 2.8V
36	CTS	DO	Clear to send. 1.8V	23	CTS	DO	Clear to send. 2.8V
37	RTS	DI	Request to send. 1.8V	24	RTS	DI	Request to send. 2.8V
38	DCD	DO	Data carrier detection. 1.8V	25	[2)]DCD/ SIM2_RST	DO	Data carrier detection. Alternate Function: Reset signal of SIM2 card. 2.8V
39	RI	DO	Ring indicator. 1.8V	26	RI	DO	Ring indicator. 2.8V
40	I2C_SCL	DO	I2C serial clock. 1.8V	/	/	/	/
41	I2C_SDA	IO	I2C serial data. 1.8V	/	/	/	/
42	USIM_PRESENCE	DI	USIM card input detection. 1.8V	/	/	/	/
43	USIM_VDD	PO	Power supply for USIM card. 1.8/3.0V	27	SIM1_VDD	PO	Power supply for SIM1 card. 1.8/3.0V
44	USIM_ RST	DO	Reset signal of USIM card. 1.8/3.0V	28	SIM1_RST	DO	Reset signal of SIM1 card. 1.8/3.0V

45	USIM_DATA	IO	Data signal of USIM card. 1.8/3.0V	29	SIM1_DATA	IO	Data signal of SIM1 card. 1.8/3.0V
46	USIM_CLK	DO	Clock signal of USIM card. 1.8/3.0V	30	SIM1_CLK	DO	Clock signal of SIM1 card. 1.8/3.0V
47	USIM_GND	/	Ground	31	SIM1_GND	/	Ground
48	GND	/	Ground	/	/	/	/
49	RESERVED	/	/	/	/	/	/
50	GND	/	Ground	/	/	/	/
51	VRTC	PI/PO	VO=1.8V. VI=1V~1.9V. IIN max=2uA when VBAT is not applied.	32	VRTC	PI/PO	VOmax=3V. VOmin=2V. VOnorm=2.8V. VI=1.5~3.3V. Iin≈10uA.
52	VBAT_RF	PI	Power supply for module RF part. 3.3~4.3V	33	VBAT	PI	Main power supply of module. 3.3~4.6V
53	VBAT_RF	PI	Power supply for module RF part. 3.3~4.3V	34	VBAT	PI	Main power supply of module. 3.3~4.6V
54	GND	/	Ground	35	GND	/	Ground
55	GND	/	Ground	36	GND	/	Ground
56	RESERVED	/	/	/	/	/	/
57	RESERVED	/	/	/	/	/	/
58	GND	/	Ground	37	GND	/	Ground
59	GND	/	Ground	38	GND	/	Ground
60	RF_ANT	IO	RF antenna.	39	RF_ANT	IO	RF antenna.
61	GND	/	Ground	40	GND	/	Ground
62	GND	/	Ground	/	/	/	/

63~66, 75~78, 83~88, 92~99	RESERVED	/	/	/	/	/	/
67~74, 79~82, 89~91, 100~102	GND	/	Ground	/	/	/	/

NOTES

1. The blue pins of UG95 are the additional pins compared with M95 R2.0.
2. The pins marked in red are compatible pins, but their functions are different.
3. The green pins are reserved pins of M95 R2.0.
4. The black pins are compatible pins in main functions.
5. Keep all reserved and unused pins unconnected.
6. All GND pins should be connected to ground.
7. The AGND pin of M95 R2.0 should be routed as single-ended to main ground when analog audio is used in single-ended application. Otherwise, it can be connected to GND directly.
8. AP_READY is under development.
9. [1)] DTR pin can be used as SIM1_PRESENCE pin via AT command. For more details, please refer to the ***document [2]***.
10. [2)] When using the SIM2 interface, DCD pin can be used as SIM2_RST pin. For more details, please refer to the ***document [4]***.

4 Hardware Reference Design

The following chapters describe compatible design of UG95 and M95 R2.0 on main functionalities.

4.1. Power Supply

4.1.1. Reference Design for Power Supply

The power design for the module is very important, since the performance of power supply for the module largely depends on the power source. The power supply is capable of providing the sufficient current up to 2A. If the voltage drop between the input and output is not too high, it is suggested that a LDO should be used to supply power for the module. If there is a big voltage difference between the input source and the desired output (VBAT), a buck converter is preferred to be used as a power supply.

The following figure shows a reference design for +5V input power source. The designed output for the power supply is about 3.8V and the maximum load current is 3A.

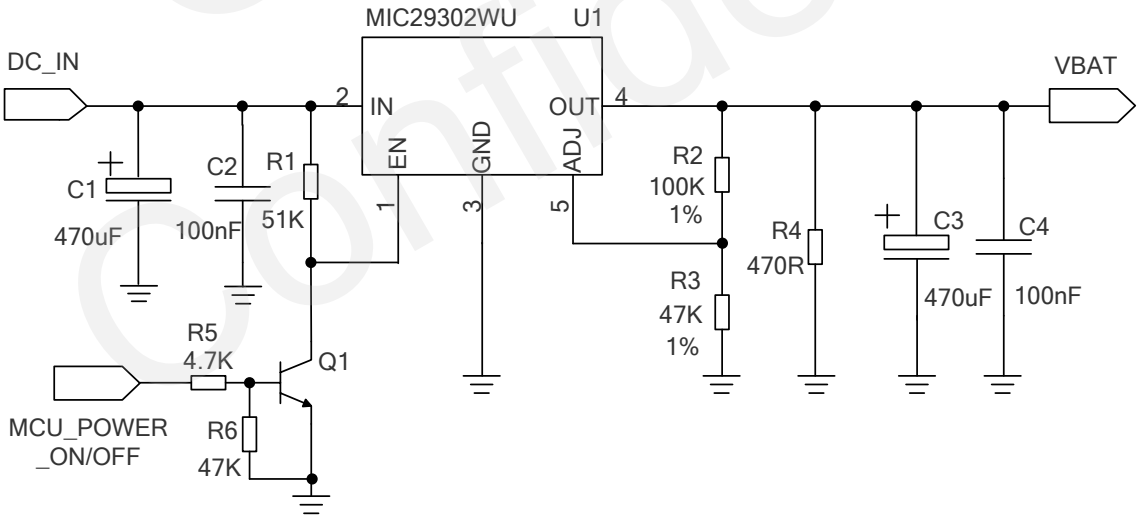


Figure 3: Reference Circuit of Power Supply

4.1.2. Reduce Voltage Drop

The power supply range of the M95 R2.0 module is 3.3V to 4.6V and the power supply range of the UG95 is 3.3V to 4.3V. Attention should be paid in the range of the power source to make sure that the input voltage will never drop below 3.3V and never exceed 4.3V, and the typical power supply is 3.8V. The VBAT to UG95 VBAT_BB and VBAT_RF pins should be divided into two separated paths in star structure. In addition, in order to get a stable output voltage, it is suggested that you should use a zener diode whose reverse zener voltage is 5.1V and dissipation power is more than 0.5 watt.

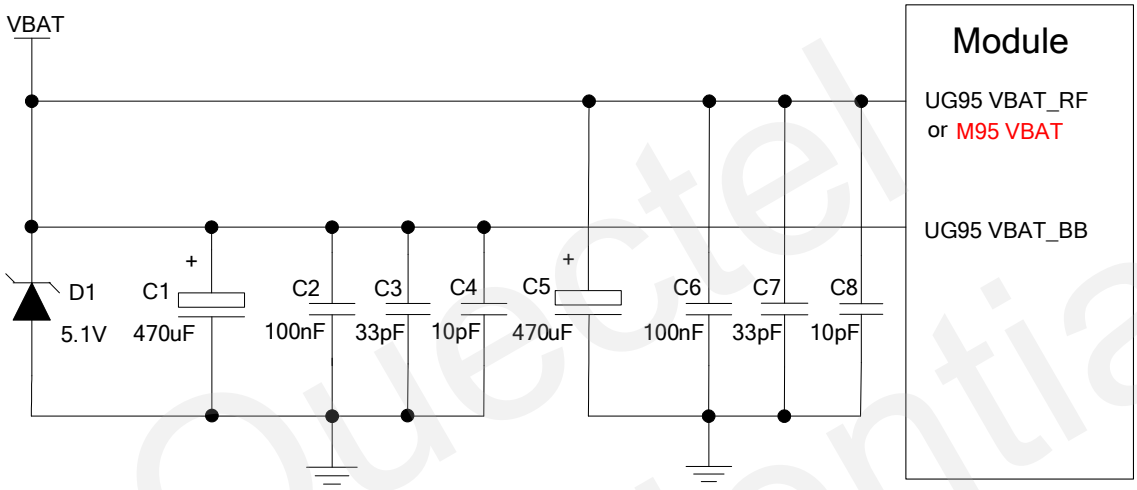


Figure 4: Reference Circuit of Star Structure

For M95 R2.0, it only has two pads for VBAT input, which is different from UG95, therefore, it is not recommended to mount C1~C4. VBAT_RF pins of UG95 are compatible with VBAT pins of M95 R2.0.

4.2. Power-on Circuit

The following circuit is a reference design for UG95 power-on circuit. M95 R2.0 can be powered on or off via this circuit, though the different power domain of PWRKEY with UG95.

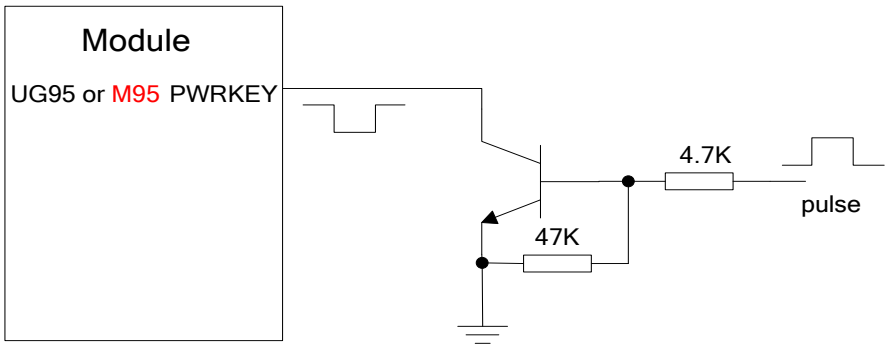


Figure 5: Driving Circuit of the PWRKEY

The turning on scenarios of UG95 and M95 R2.0 is illustrated as the following figure.

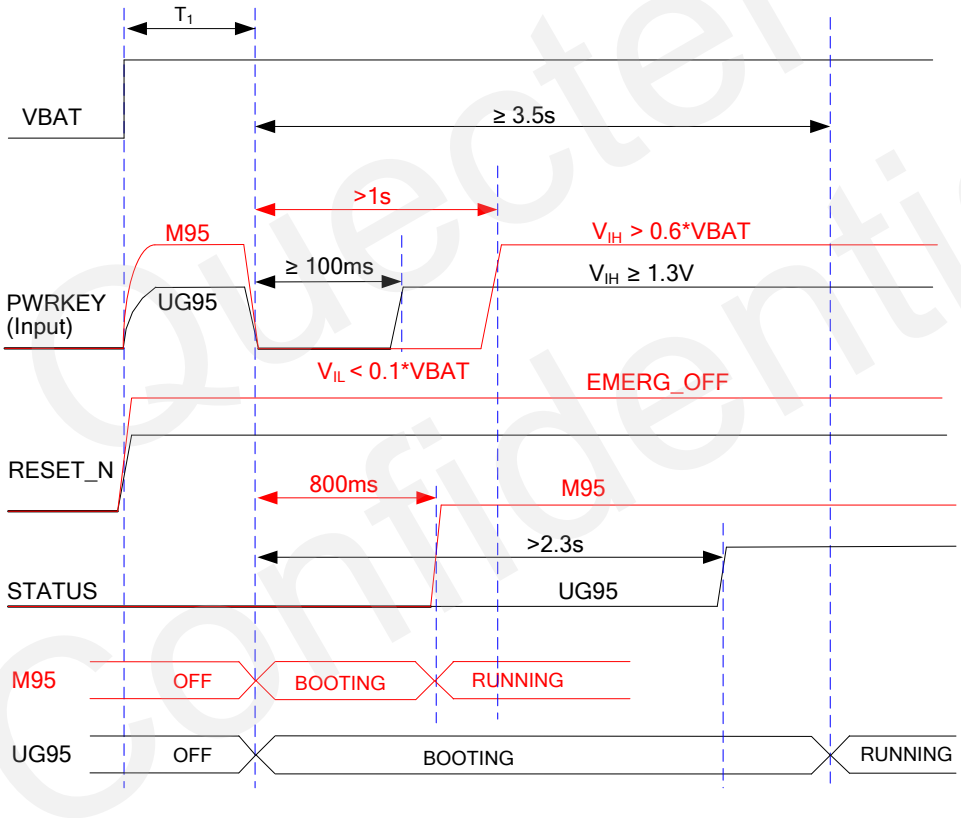


Figure 6: Timing of Turning on Scenarios

NOTES

1. Make sure that VBAT is stable before pulling down PWRKEY pin. The time of T_1 is recommended as 100ms. It is not suggested that PWRKEY pin is always pulled down.
2. The time of pulling down PWRKEY of UG95 and M95 R2.0 is not the same.
3. The part in Figure 6 marked in red is for M95 R2.0.

4.3. Power-off Circuit

4.3.1. Power Down Module via AT Command

There are several different ways to turn off the module. It is recommended to turn off the module through AT command **AT+QPOWD**. It is a safe way to turn off the module. This command will let the module log off from the network and allow the firmware to save important data before completely disconnecting the power supply.

The power-down scenario is illustrated as the following figure.

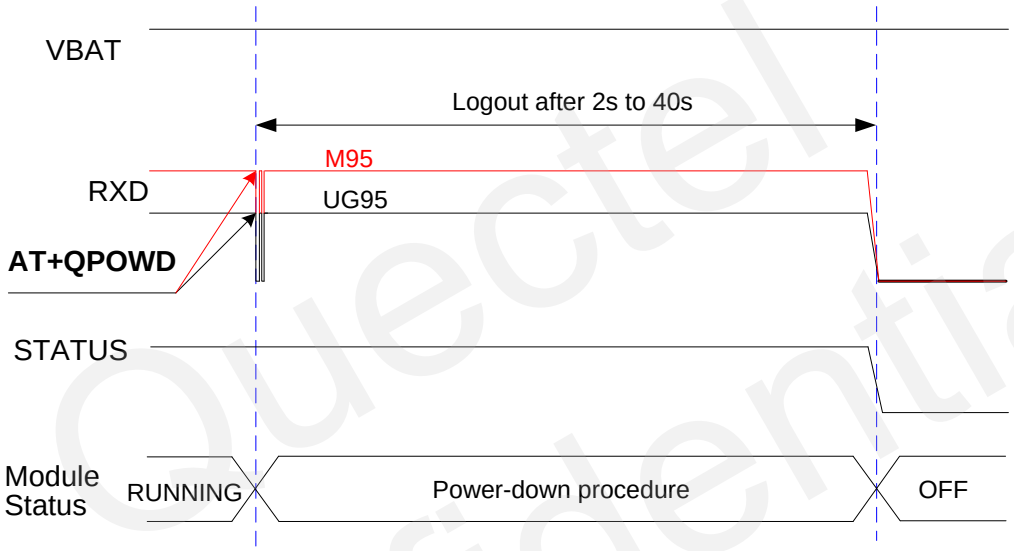


Figure 7: Timing of Turning off through AT Command

NOTE

The time of detaching network depends on the local network signal.

4.3.2. Emergency Shutdown

The module can be shut down by the pin PWRDWN_N or EMERG_OFF. It should only be used under emergent situation. Although turning off the module by PWRDWN_N or EMERG_OFF is fully tested and nothing wrong detected, this operation is still a big risk as it could reduce the service life of SIM card or module.

The following circuit is a reference design for UG95 or M95 R2.0 emergency shutdown.

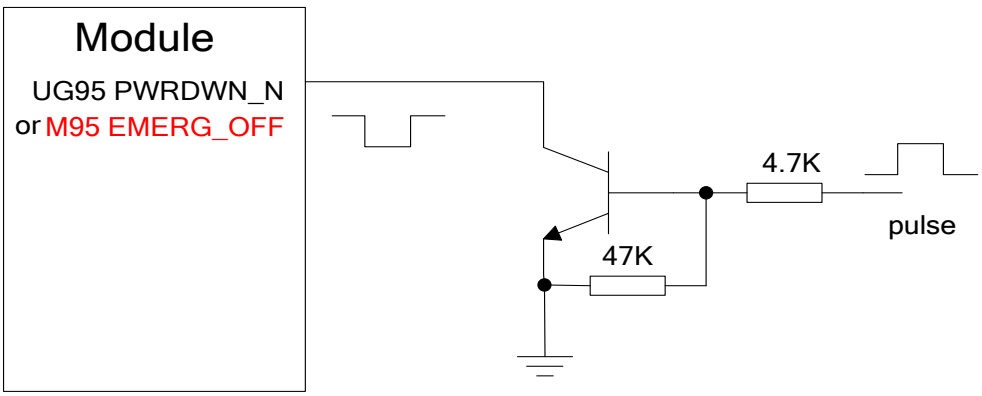


Figure 8: Driving Circuit of Emergency Shutdown Circuit

The emergency shutdown scenario is illustrated as the following figure.

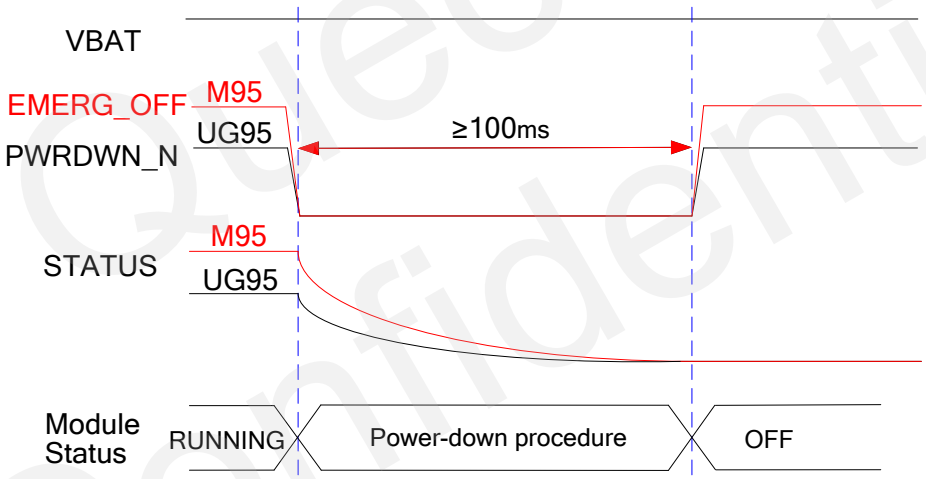


Figure 9: Timing of Emergency Shutdown

4.3.3. Power Down M95 Using the PWRKEY Pin

It is a safe way to turn off M95 R2.0 module by driving the PWRKEY to a low level voltage for a certain time, while UG95 could not be turned off by the PWRKEY pin.

The power-down scenario is illustrated as the following figure.

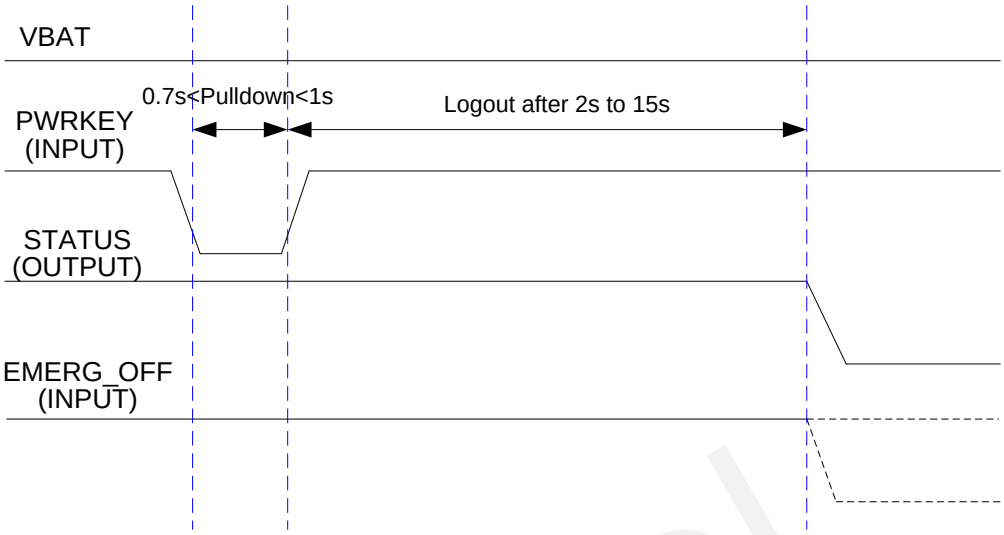


Figure 10: Timing of Turning off M95 R2.0 Module from PWRKEY

NOTE

The time of detaching network depends on the local network signal.

4.4. Network Status Indication

The NETLIGHT pin can be used to drive a network status indicator LED. The following circuit is the reference design of NETLIGHT.

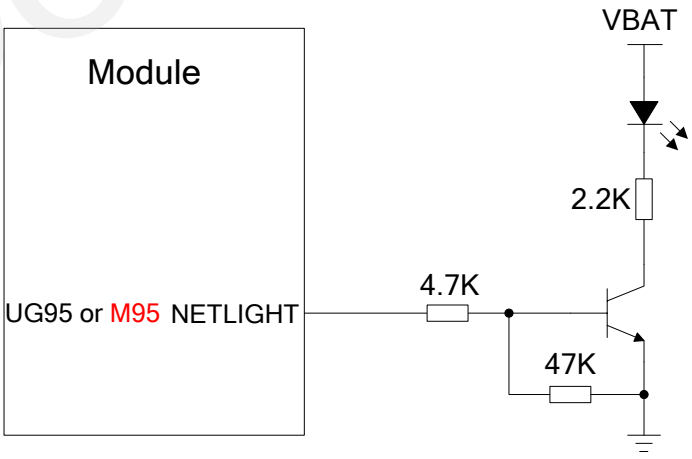


Figure 11: Reference Circuit of the NETLIGHT

4.5. Operating Status Indication

The STATUS pin is set as the module status indicator. It will output high level when module is powered on. The following figure shows the reference circuit of driving LED for STATUS.

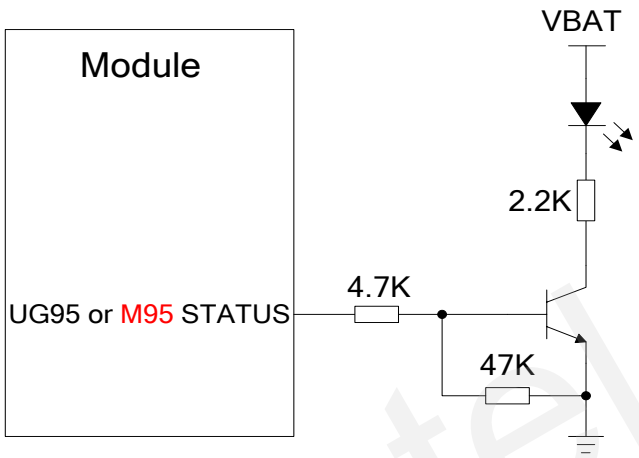


Figure 12: Reference Circuit of the STATUS

4.6. USIM&SIM Interface

USIM interface of UG95 and SIM interface M95 R2.0 supports 1.8V or 3.0V USIM/SIM cards by default. The pin assignment of UG95's USIM interface is compatible with M95 R2.0's SIM1 interface, except USIM&SIM1 PRESENCE pin.

The reference circuit for a 6-pin USIM&SIM card socket is illustrated as the following figure.

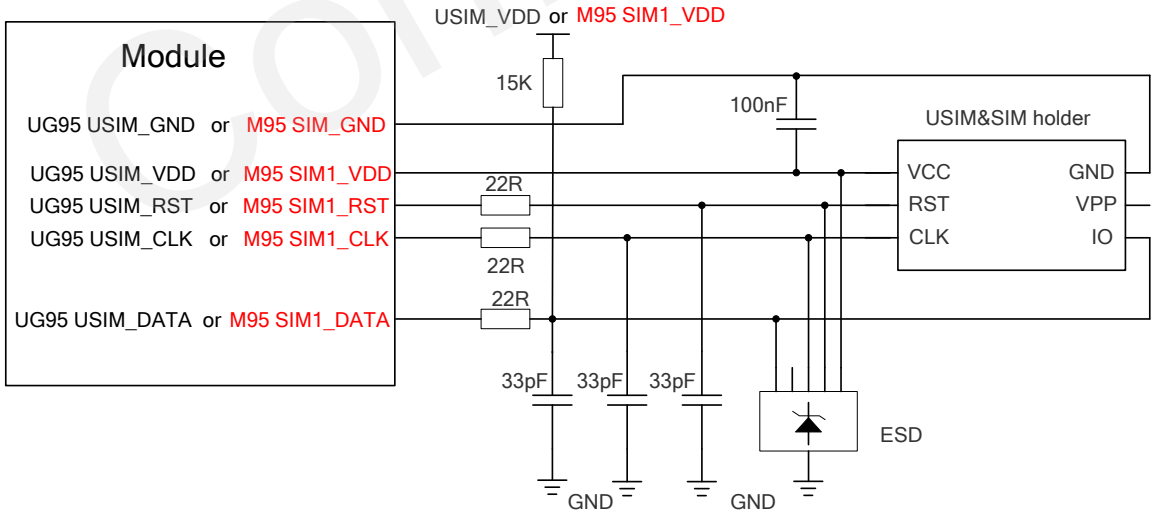


Figure 13: Reference Circuit of the 6-Pin USIM&SIM Card

If SIM card detection function is used, keep SIM1_PRESENCE or USIM_PRESENCE pin connected. The following figure shows the USIM&SIM1 reference design with USIM&SIM card detection function.

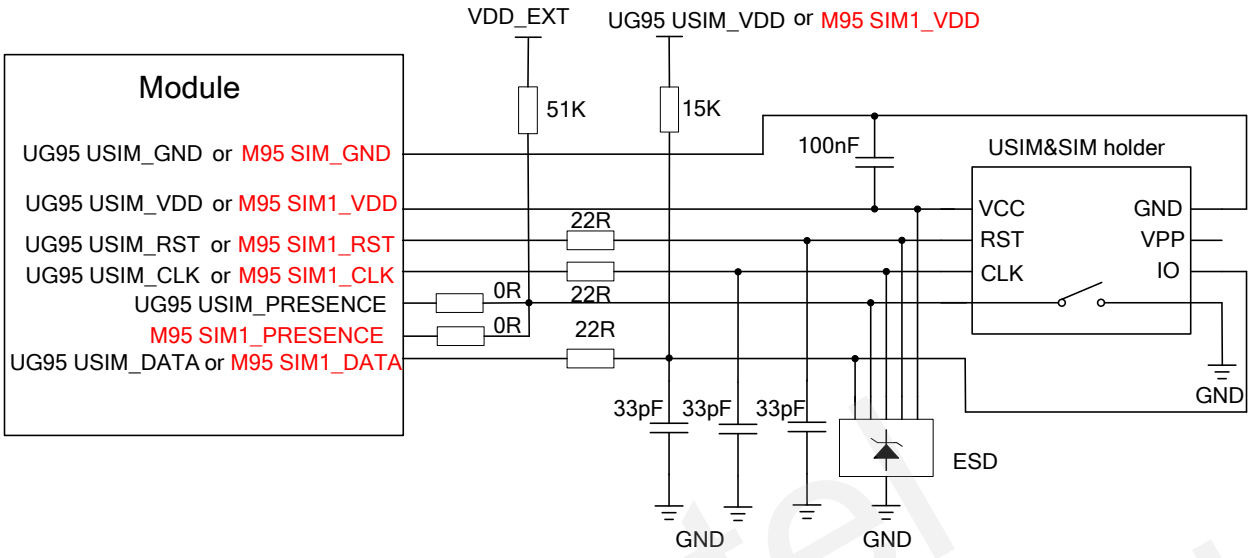


Figure 14: Reference Design of the 8-Pin USIM&SIM Card

4.7. Serial Interfaces

UG95 can communicate with application processor via USB interface or UART interface, while M95 R2.0 only has UART interface. It is recommended to choose the right communication mode for your design.

4.7.1. UART Application

If application processor communicates with module via UART interface, the following circuit shows reference design of UART interface level match. It is recommended to add level match circuit between M95 R2.0 or UG95 module and MCU, because of the different power domain of the UART interface. For details, please refer to ***document [1]***.

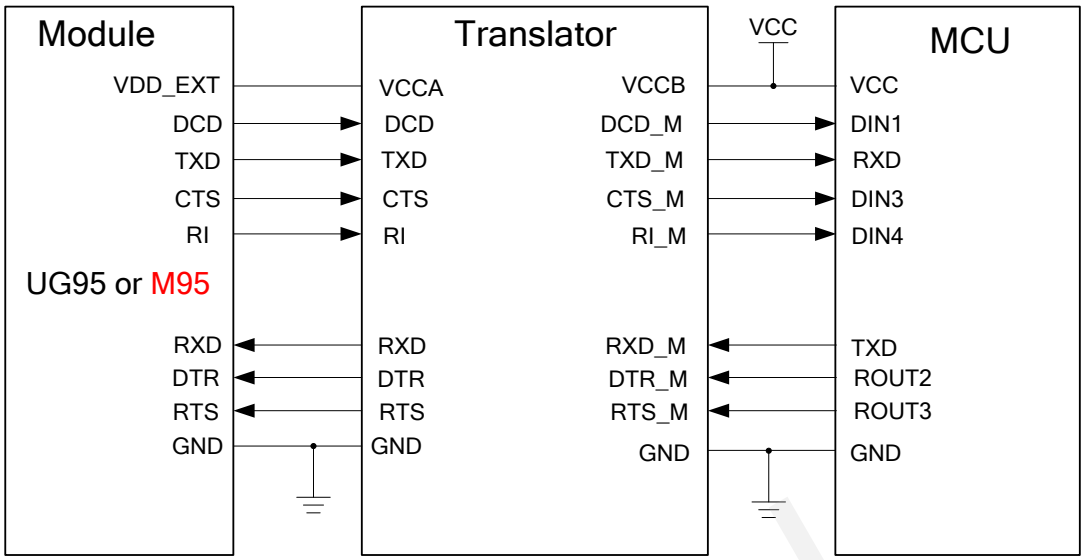


Figure 15: Reference Design of UART Interface

NOTES

1. M95 R2.0's UART pins belong to 2.8V power domain.
2. UG95's UART pins belong to 1.8V power domain.
3. It is suggested that you should set USB_DP, USB_DM and USB_VBUS pins as test points and then place these test points on the DTE for debug.

4.7.2. USB Application

UG95 contains one integrated Universal Serial Bus (USB) transceiver which complies with the USB 2.0 specification and supports high speed (480 Mbps) and full speed (12 Mbps), and supports USB device only.

If application processor communicates with UG95 module via USB interface, and communicates with M95 R2.0 module via UART interface, the following circuit shows reference design of main UART and USB interface.

Please pay attention to the voltage level match between the module and processor. For details, please refer to ***document [3]***.

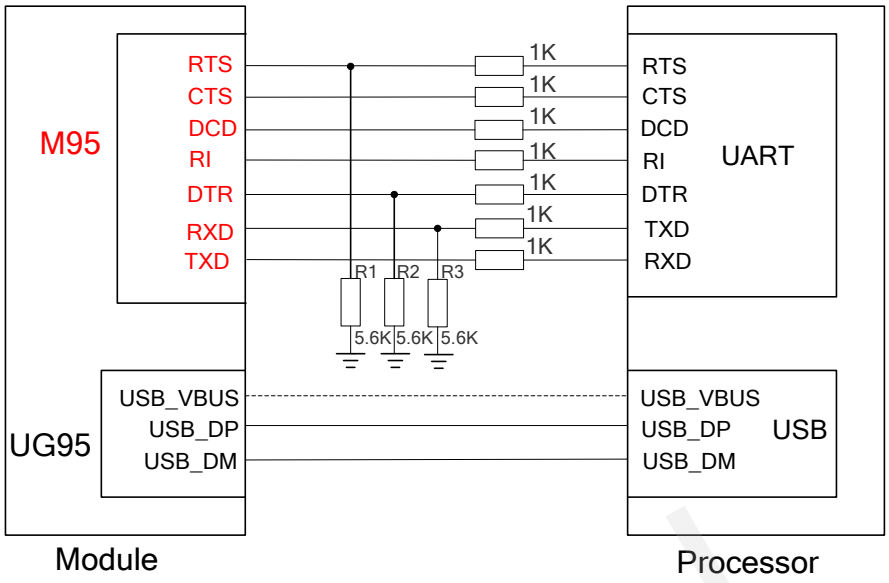


Figure 16: Reference Design of UART&USB Interfaces

NOTE

The resistance 5.6K is used on 3.3V IO level system. While the resistance of R1~R3 should change to 15K ohm on 3V IO level system, and make sure the max input level voltage to module is 2.8V.

4.8. Audio Interfaces

M95 R2.0 module provides two analog input channels and two analog output channels, while UG95 module only provides PCM audio interface.

The following figure shows the compatible reference design with UG95 and M95 R2.0. For more details, please refer to ***document [1]*** and ***document [2]***.

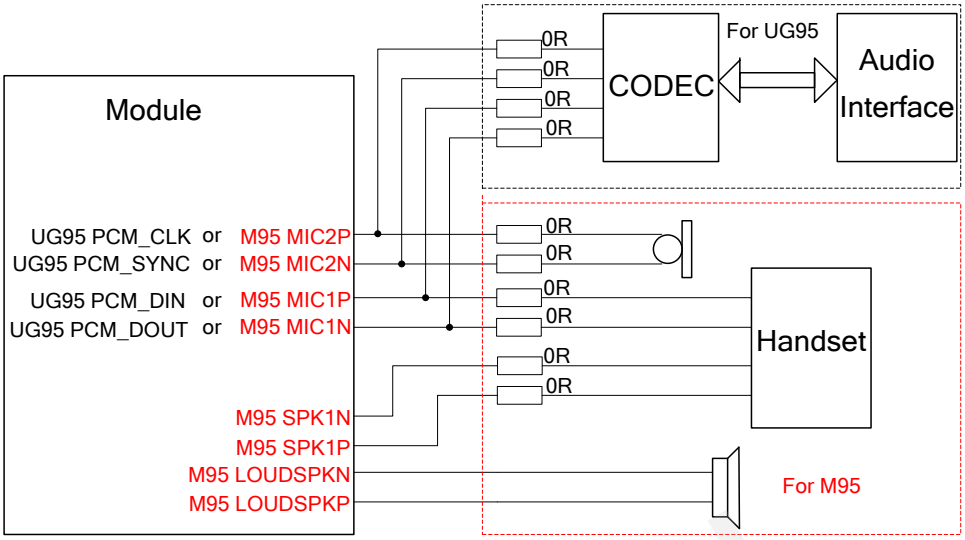


Figure 17: Reference Design of Audio Interface

4.9. RF Interface

RF_ANT pin of UG95 and M95 R2.0 is compatible pin. The RF interface has an impedance of 50Ω. A reference circuit is shown in the following figure. In order to adjust RF performance, it should reserve a π-type matching circuit. By default, the resistance of R1 is 0Ω and capacitors C1 and C2 are not mounted.

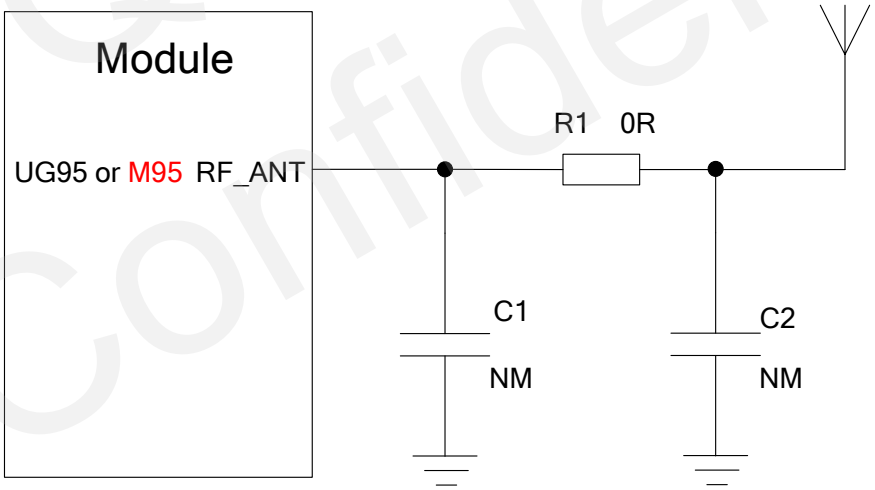
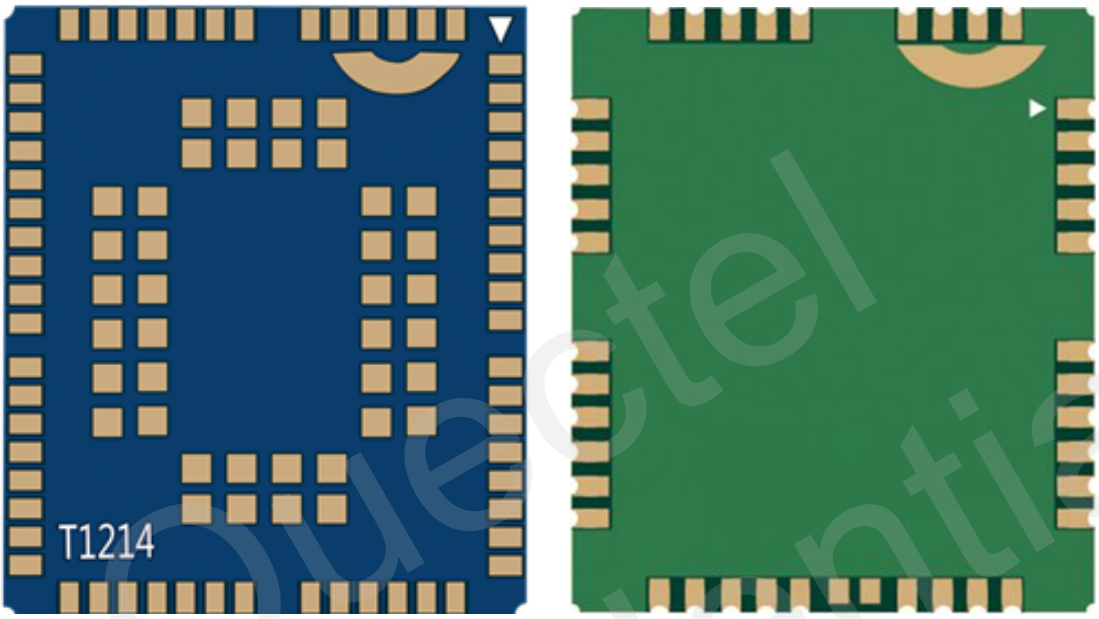


Figure 18: Reference Circuit of RF Interface

5 Recommended Footprint

The following figure shows the bottom view of UG95 and M95 R2.0.



UG95 M95 R2.0

Figure 19: Bottom View of UG95 and M95 R2.0

The following figure shows the recommended compatible footprint of UG95 and M95 R2.0.

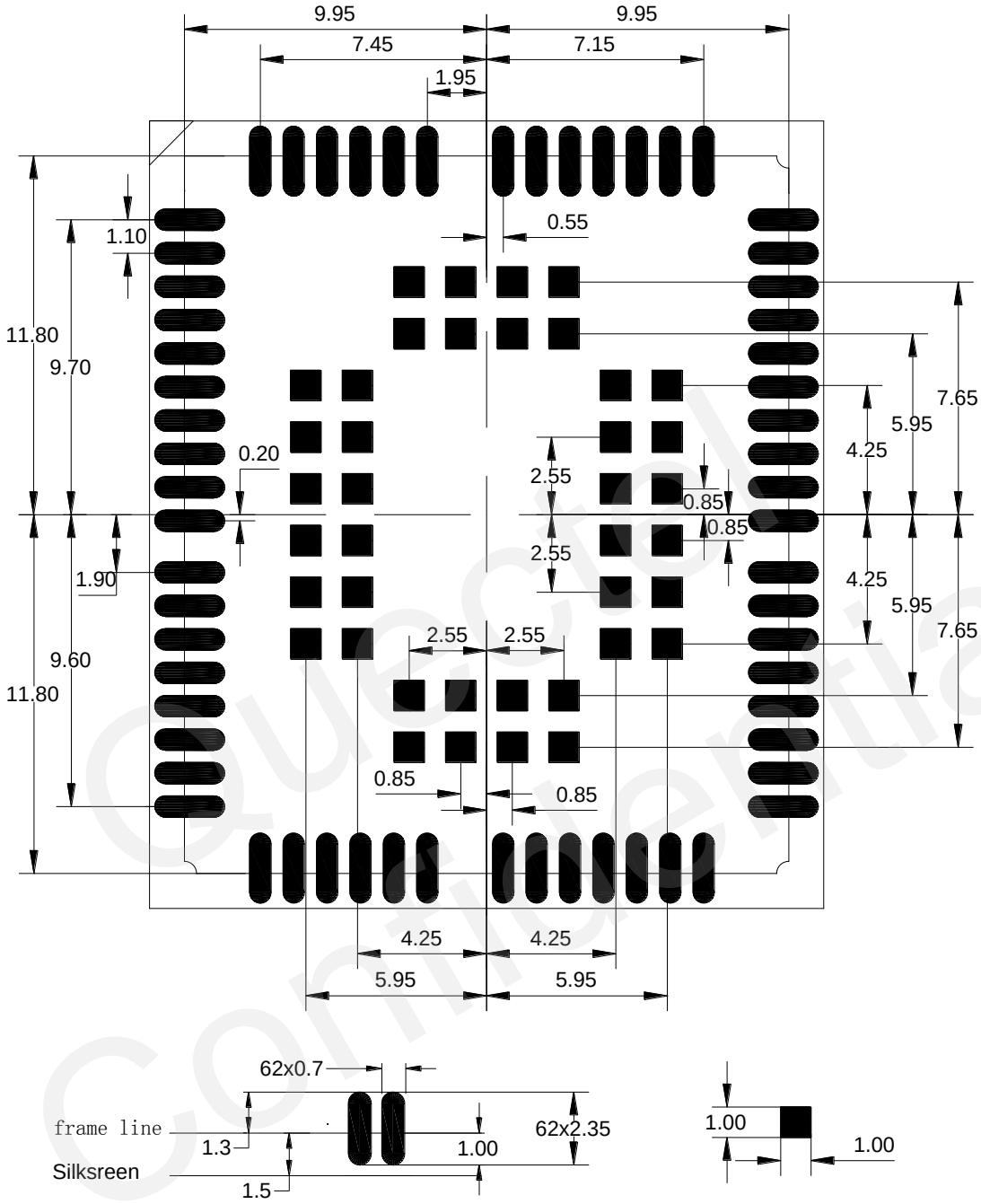


Figure 20: Recommended Compatible Footprint (Unit: mm)

Because of the different thickness of PCB, to ensure the module soldering quality, the thickness of stencil at the hole of the UG95 module pads should be 0.13mm. For M95 R2.0, the thickness should be 0.2 mm.

The recommended stencil of UG95 is shown as below.

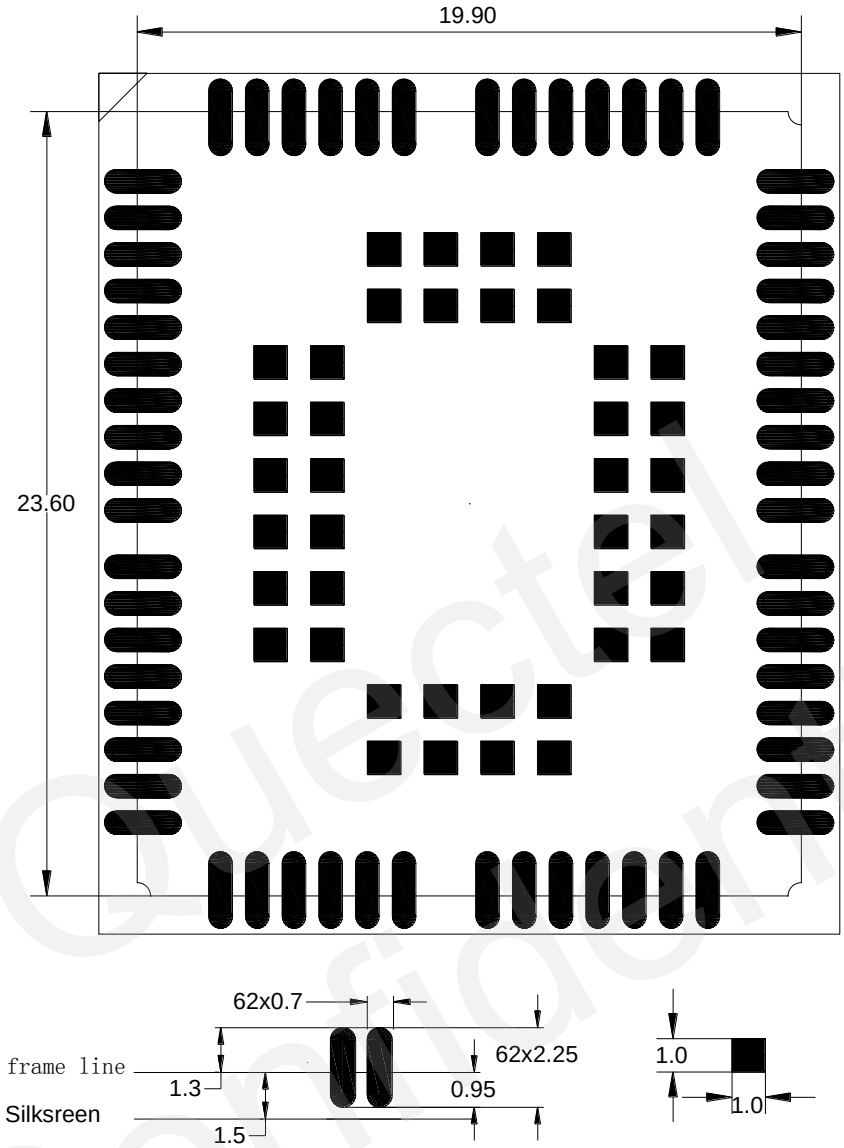


Figure 21: Recommended Stencil of UG95 (Unit: mm)

The recommended stencil of M95 R2.0 is shown as below.

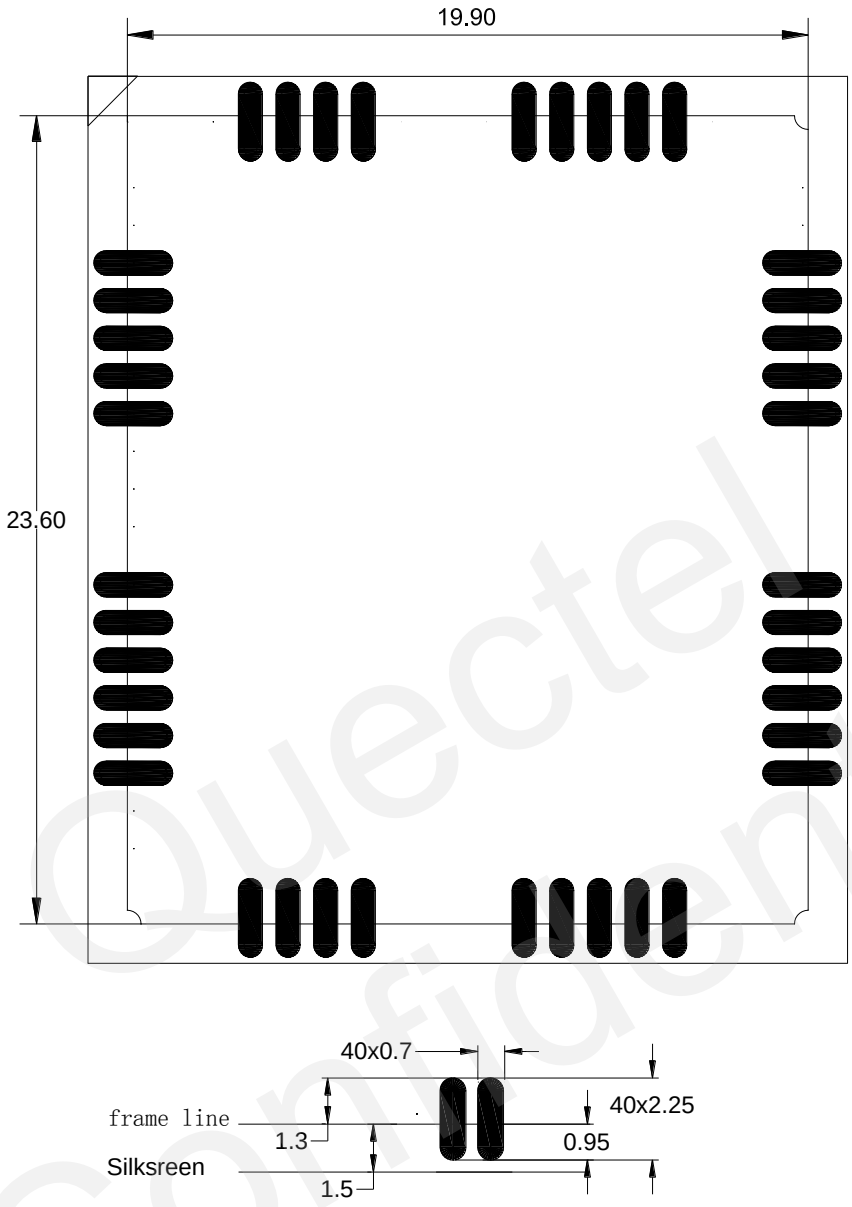


Figure 22: Recommended Stencil of M95 R2.0 (Unit: mm)

The following figure shows the sketch map of installation between UG95 and M95 R2.0.

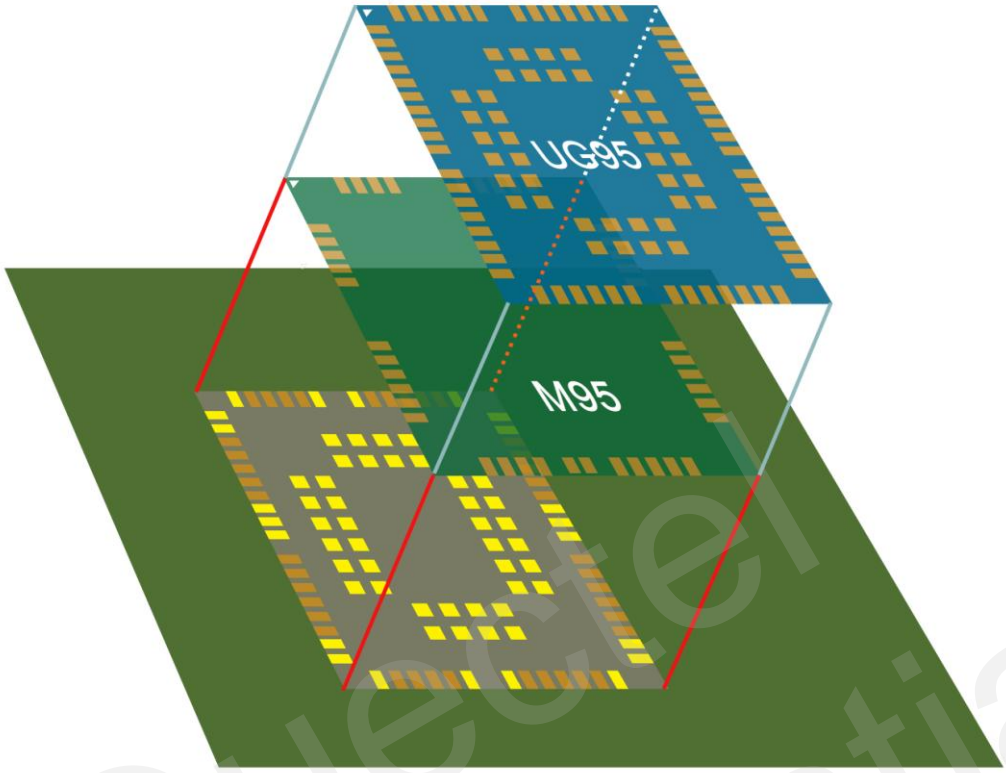


Figure 23: Renderings of Installation

6 Manufacturing

The following table shows manufacturing of UG95 and M95 R2.0.

Table 5: Manufacturing

Feature	UG95&M95 R2.0
Reflow Profile	Compatible
Reel	Compatible

6.1. Soldering

The squeegee should push the paste on the surface of the stencil that makes the paste fill the stencil openings and penetrate to the PCB. The force on the squeegee should be adjusted so as to produce a clean stencil surface on a single pass.

It is suggested that peak reflow temperature is from 235ºC to 245ºC (for SnAg3.0Cu0.5 alloy). Absolute max reflow temperature is 260ºC. To avoid damage to the module when it was repeatedly heated, it is suggested that the module should be mounted after the first panel has been reflowed. The following picture is the actual diagram which we have operated.

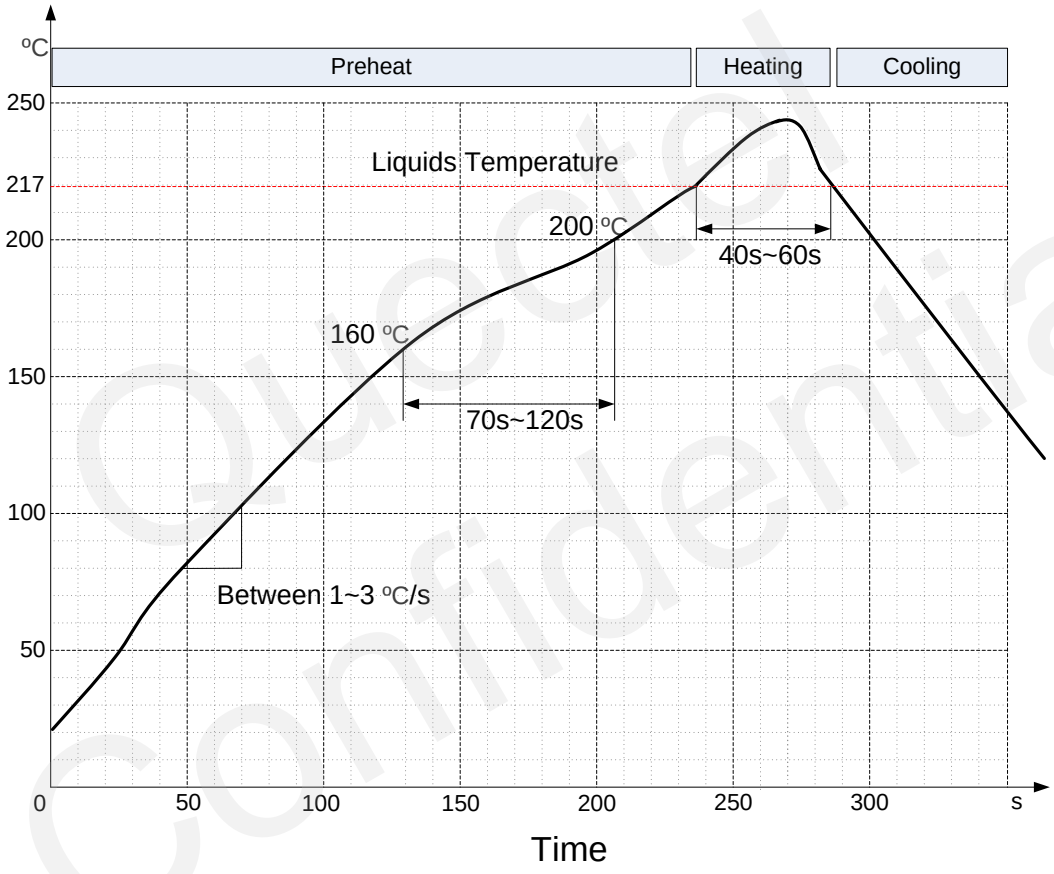


Figure 24: Reflow Soldering Profile

6.2. Packaging

The modules are stored inside a vacuum-sealed bag which is ESD protected. It should not be opened until the devices are ready to be soldered onto the application.

The reel is 330mm in diameter and each reel contains 250 modules.

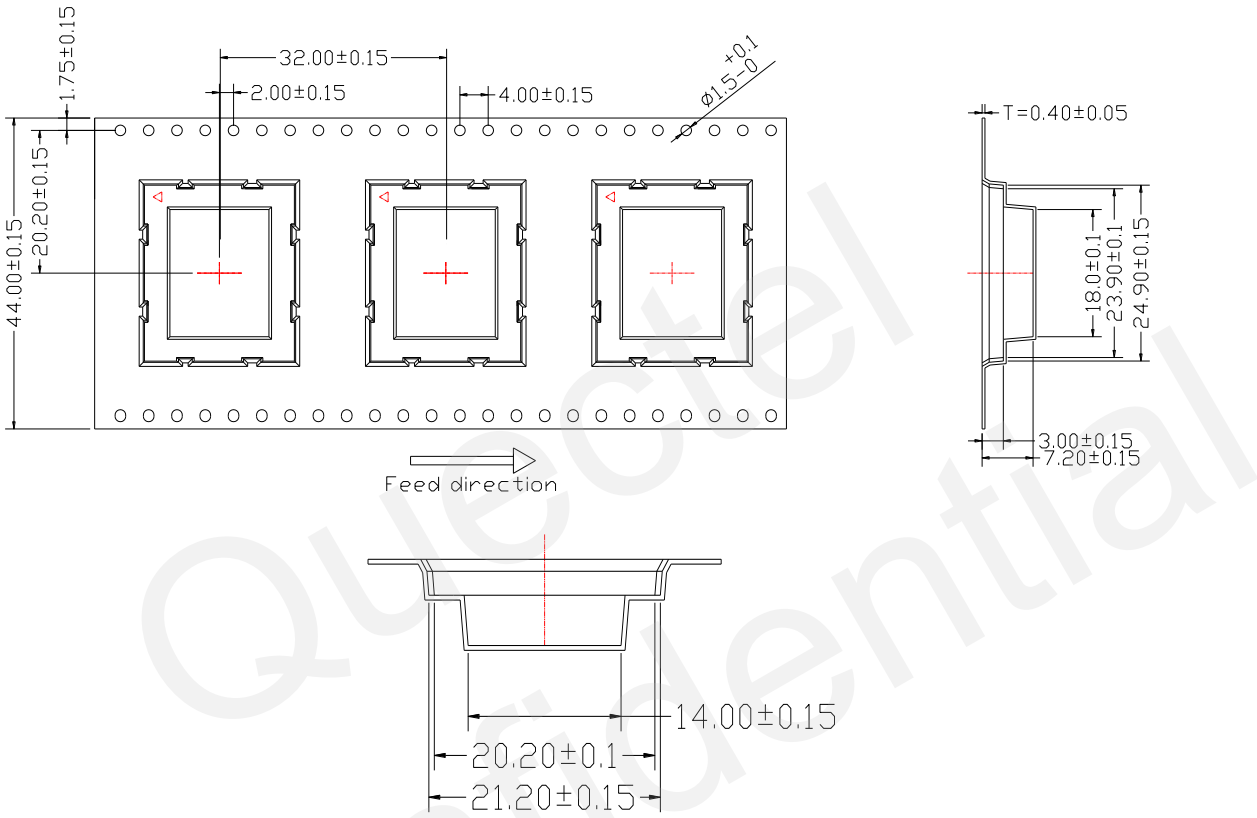


Figure 25: Tape and Reel Specification

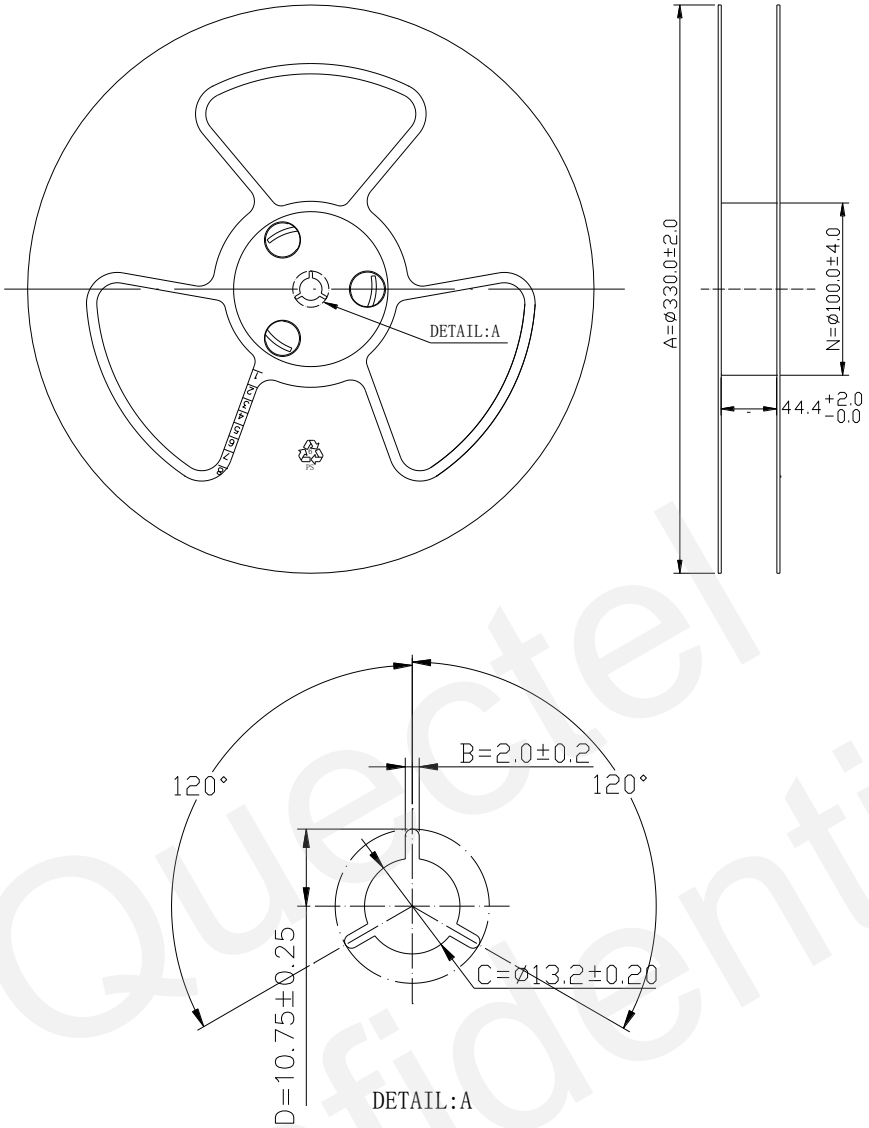


Figure 26: Dimensions of Reel

Table 6: Reel Packing

Model Name	MOQ for MP	Minimum Package: 250pcs	Minimum Package×4=1000pcs
UG95/ M95 R2.0	250pcs	Size: 370 × 350 × 56mm^3 N.W: 0.63kg G.W: 1.41kg	Size: 380 × 250 × 365mm^3 N.W: 2.5kg G.W: 6.25kg

7 Appendix A

Table 7: Related Documents

SN	Document Name	Remark
[1]	Quectel_UG95_Hardware_Design	UG95 Hardware Design
[2]	Quectel_M95_Hardware_Design	M95 Hardware Design
[3]	Quectel_UG95&M95 R2.0_Reference_Design	UG95 and M95 R2.0 Compatible Reference Design
[4]	Quectel_M95_Dual_SIM_Application_Notes	M95 Dual SIM Application Notes