

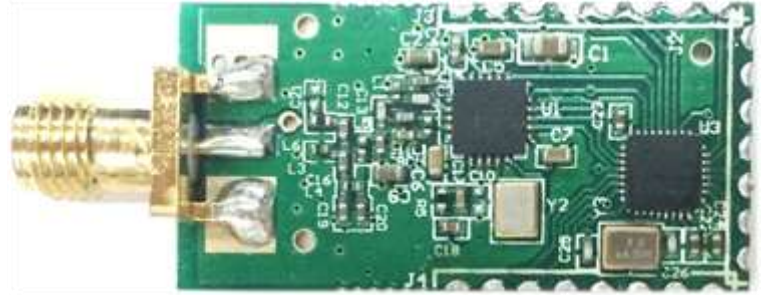
ACI908M iModule 18dBm 433.92MHz RF module specification
With 32KBytes 32-Bit Cortex-M0 Micro-Controller
 Version :V2.6

Revision History

Date	Revision Content	Revised By	Version
2015/12/26	Initial released	David Liao	V1.0
2016/3/8	Revise pin define	David Liao	V2.5
2016/08/01	Revise AP & UART command description	David Liao	V2.6
2016/08/17	Revise PIN 9 PIN 10 RX TX LED	David Liao	V2.7
2016/08/17	Addition iModule with SMA photo and order information	David Liao	V2.8

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ACI908M-iModule+SMA

Order & Shipping Packing Information

Item	Module Part No.	dimension	N.W	MOQ	Remark
2	ACI908M-iModule+SMA	16 x 31.8 mm	mg	1000PCS	Integrated SMA Connector
3	ACI-433D-409621-21001-01		mg	1000PCS	433Mhz Dipole Antenna (Sheng Group)

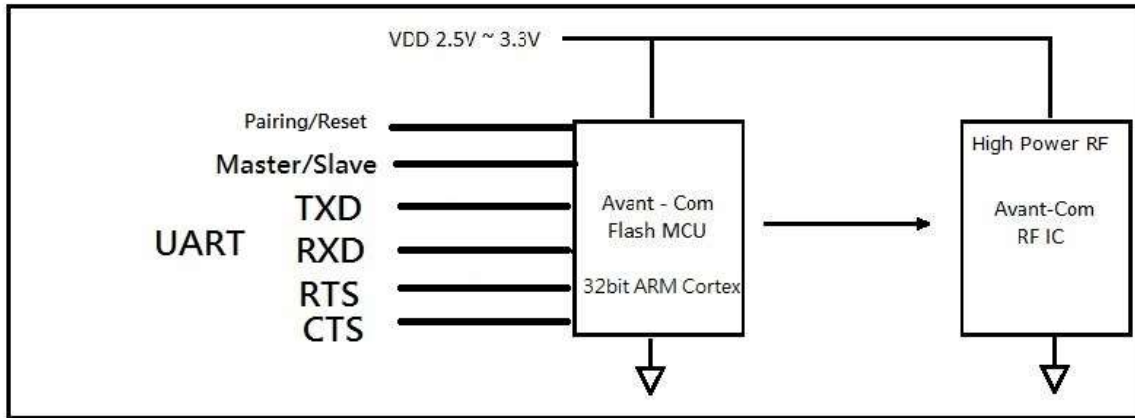
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1. ACI908M_iModule Supports Application:

- ◆ Remote control
- ◆ Lighting
- ◆ Wireless Toy
- ◆ Industry control
- ◆ Electrical appliances
- ◆ Monitor application
- ◆ Security control
- ◆ IOT application

System Diagram:



2. Features :

- ◆ 32bit ARM Cortex M0 CPU inside
 - ◆ Intergrade proprietary RF protocol
 - ◆ Programming-free
 - ◆ Support UART Interface(Half-duplex Transmission)
 - ◆ Support Two-wire(TXD / RXD)and Four-wire(TXD / RXD / CTS / RTS switching)
 - ◆ Frequency bands: 430 MHz~435MHz@FSK modulation
 - ◆ TX power: up to 17 dBm @ 430MHz~435MHz
 - ◆ Support text and File data RF Transmitter
 - ◆ Support Two way date RF Transmitter
 - ◆ Low consumption: TX:30mA, RX:14mA@10dBm
 - ◆ RF Data Rate :2Kbps/10Kbps/50Kbps/100Kbps/250Kbps.(Optional)
 - ◆ Distance:300-500m
 - ◆ Build-In Re-transmit &ACK protocol with Anti-interference
 - ◆ Receiver Sensitivity: -103dBm@250K bps
 - ◆ Support software setting for Baud rate option
 - ◆ Support multi device mode.
 - ◆ External 433MHz Dipole Antenna through SMA connector.
 - ◆ Support DTE/DCE switching, without extra connector more.
 - ◆ Support one-key to reset.

Support AP software & AT-command to setting:

- ◆ UART Baud Rate:1200/2400/4800/9600/19200/38400/57600/115200/250000/256000 bps.(Total of 10 option)
- ◆ UART Data bit :8/7/6 bit.
- ◆ UART Parity check: None/Odd/Even.
- ◆ UART stop-bit :1/2 bit.
- ◆ UART waiting time-out setting.
- ◆ RF data rate setting(2Kbps/10Kbps/50Kbps/100Kbps/250Kbps)
- ◆ RF TX power adjust(4 step);
- ◆ RF TX RX Frequency adjust(16Chanel);
- ◆ RF packet Data Length adjust(13bytes~63bytes)
- ◆ 1 Master/ 1 Slave mode and 1 Master/Multi Salve mode switch
- ◆ Master /Slave ID setting
- ◆ RF Receive Time out setting
- ◆ Read Current setting value
- ◆ ISP program support for fast Software upgrade.

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3.Pin Description

NC Pin 請空接

Pin Number	TYPE	Description
1	P	Power Supply input, GND
2	D I	RTS(DB9 RTS PIN) P1.3 / CT32B1_PWM2 / I2SWS
3	D I	CTS(DB9 CTS PIN) P1.4 / CT32B1_PWM3 / DPDWAKEUP
4	D O	UART Interface UTX(DB9 RXD PIN) P1.7 / UTXD0 / CT32B0_PWM1
5	D I	UART Interface URX(DB9 TXD PIN) P1.6 / URXD0 / CT32B0_PWM0
6	NC	NC
7	NC	NC
8	NC	NC
9	D O	RX Status(LED)(Output Low trigger), P0.3/CT32B0_PWM2/SDA1
10	D O	TX Status(LED)(Output Low trigger) P0.4/SCL0
11	NC	NC P0.5/SDA0
12	NC	NC P0.6/SCK0
13	D I/O	NC P0.11 / SWDIO / CT32B0_PWM3
14	D I	NC P0.10 / SWCLK / CT16B0_PWM2
15	D O	NC P0.7/SEL0
16	NC	NC P0.8/MISO0/CT16B0_PWM0
17	D I	Pairing /Mode switch/RESET (Low trigger) P0.2/CT16B0_CAP0/SCL1
18	D I	NC P2.0/AIN0
19	D I	NC P2.1/AIN1
20	Master/Slave	Master/Slave select,(0=Master; 1=Slave) P.S After change to Master or Slave, The module must power off and power on to restart Into change to Master device or Slave device P2.2/AIN2
21	DI	NC P2.4 / AIN4
22	P	Power Supply input,VDD
23	P	Power Supply input,GND

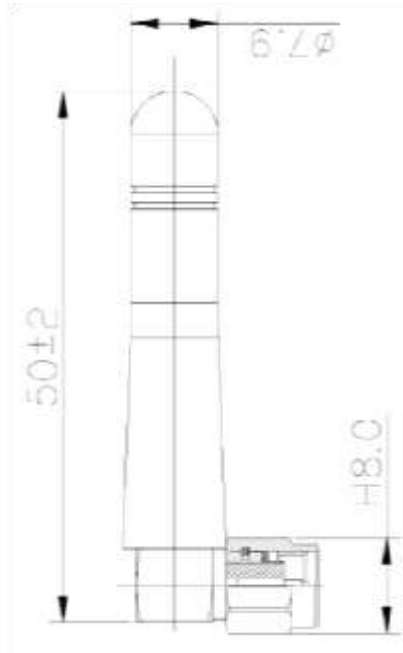
Pin17 Pairing /Mode switch/RESET

	Function	Description
RESET Restore	Restore RF Module to factory default setting Baudrate:9600bps, Data bit: 8; Parity bit: None; Stop Bit:1 RF data rate: 10kbps, Timeout :300ms, Mode: 1 Master 1 Slave	Hold Pairing/Reset Key 6 second(low trigger) and release Success : TX,RX LED will flash 5 times alternation (P9,P10 output low 5 time alternation)
Mode Switch	1 Master 1 Slave mode ==>1 Master Multi Slave mode	Hold Pairing/Reset Key 3 second (low trigger) and release ; Success : TX,RX LED will flash 3 times(P9,P10 output low 3 time)
	1 Master Multi Slave mode ==>1 Master 1 Slave mode	Hold Pairing/Reset Key 3 second (low trigger) and release ; Success : TX,RX LED will flash 1 times(P9,P10 output low 1 time)
Pairing	Master module release RFID to Slave module; Under the Condition in advance: 1.Set Each module to same mode(1 Salve mode or Multi Slave mode) 2. Set Each module P20 to Master or Slave device	Push Pairing/Reset Key(low trigger) and release Pairing in progress : TX,RX LED will continue light 10sec (P9,P10 continue output low 10sec) Pairing Success : TX,RX LED will flash 5 times(P9,P10 output low 5 time)

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Antenna size:



ACI-433D-409621-21001-01

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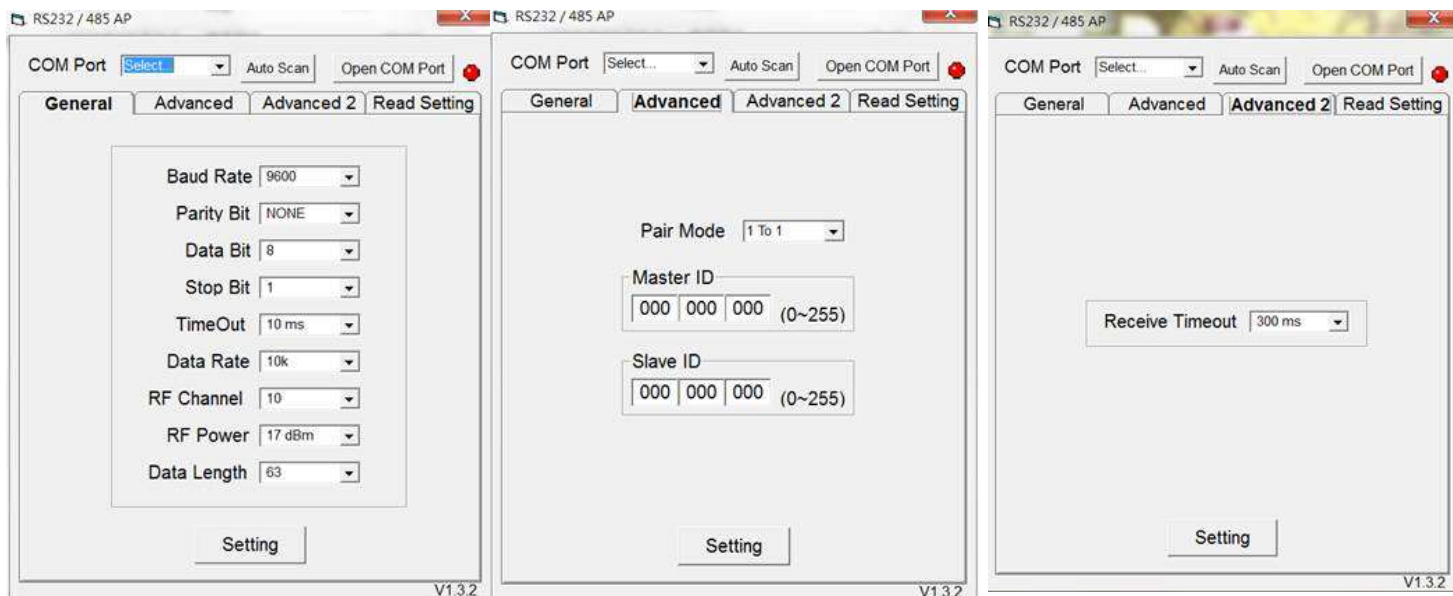
5.ACI908_iModule Electrical Specification

Parameter	SYM.	DESCRIPTION		MIN.	TYP.	MAX	UNIT
Operating voltage	Vdd			2.5		3.3	V
Input low voltage	ViL			Vss		0.3*Vdd	V
Input high voltage	ViH			0.7*Vdd		Vdd	V
Output low voltage	VoL			Vss		Vss+0.5	V
Output high voltage	VoH			Vdd-0.5		Vdd	V
Supply Current	Idd1	SLEEP	Vdd=3.0V		9		uA
	Idd2	RX	Vdd=3.0V				mA
	Idd3	TX(STBY)	Vdd=3.0V				mA

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6. Set & Read Module setting value AP

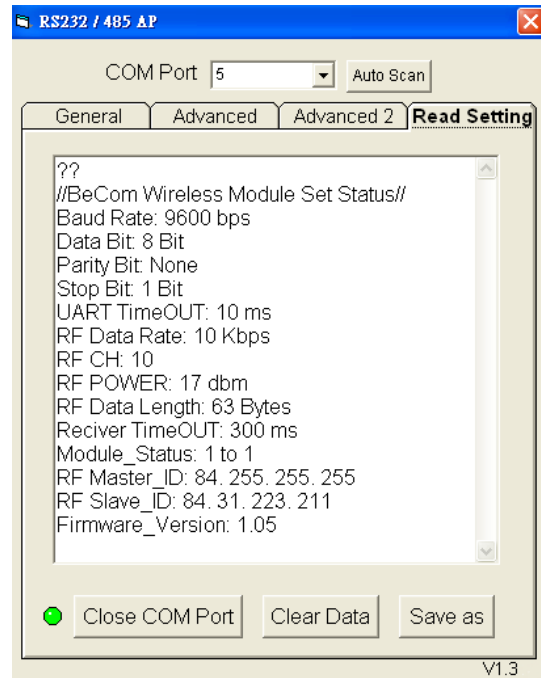
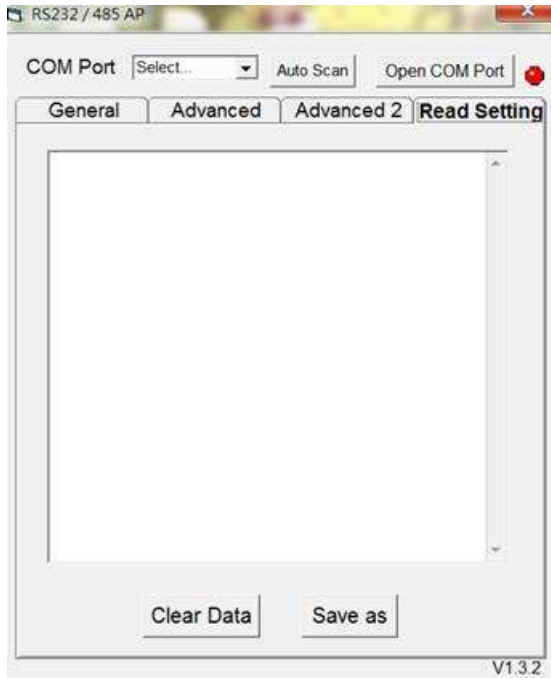


1. Execute the R232/ 485/ USB AP.exe, it shows a window above.
2. Use the RS232(DB9) to USB cable connecting between the RS232 dongle and NB/ PC's USB port.
3. Please check RS232 dongle and NB/ PC connecting or not and then AP window will show "Auto Scan" to select the Com Port.
4. **AP Only support UART baudrate:9600bps,Data bit: 8;Parity bit: None; Stop Bit:1**
5. Baud Rate: Baud rate value.
6. Parity Bit: None / Odd / Even.
7. Data Bit: 6/ 7/ 8 (bit).
8. Stop Bit: 1/ 2 (bit).
9. Time Out: (UART none data input waiting for the time out value), selecting 2ms ~ 1000ms.
10. Data Rate: 2k bps ~ 250k bps.
11. RF Channel: Ch0 to Ch15 (16 channel).
- ※ **If RS232 dongle on 1 to 1 or 1 to multi mode, it must select the same channel.**
12. RF Power: Min -8dBm to Max +17dBm (4 levels is selected).
13. Data Length: RF Packet payload data length 13 bytes to 63 bytes (11 levels selected).
14. 1 Master/ 1 Slave mode and 1 Master/Multi Salve mode switch
15. Master /Slave ID setting
16. RF Receive Time out setting
17. Read Current setting value
18. Press the "Setting" button, if the RS232 dongle was succeed, it Tx/ Rx LED light will be flashing 3 times

	Function	Description
RESET Restore	Restore RF Module to factory default setting Baudrate:9600bps, Data bit: 8; Parity bit: None; Stop Bit:1 RF data rate: 10kbps, Timeout :300ms, Mode: 1 Master 1 Slave	Hold Pairing/Reset Key 6 second and release (P17 low trigger over 6 sec) Success : TX,RX LED will flash 5 times alternation (P9,P10 output low 5 time alternation)
UART Baud rate Setting AP	1. Connect Dongle/Module UTX URX pin to PC COM/USB port 2. Open UART Baud rate Setting API Select baud rate, Parity bit, Data Bit, Stop bit..... Click "Setting" button then finish change setting ※Before setting UART, Must reset(restore) RF Module to factory default setting**	Success : TX,RX LED will flash 3 times (P9,P10 output low 3 time) ※Notice: Only can be setting one time, Due to Baud rate setting changed, It must restore to factory default setting

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※Before read ACI908M setting ,Do not Reset/Restore to factory default setting※

1.P20 Master/Slave input

- i. High >100ms then Low>100ms,switch to High >100ms
- ii. Low >100ms then High>100ms,switch to Low >100ms

2. ACI908M will generate current setting value and send by UART port(base on 9600bps,8,N,1, ASCII format)

3. AP SW read current Module F/W version and setting value through UART port(base on 9600bps,8,N,1, ASCII format)

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UART setting command section A (12bytes)

Bytes	1	2	3	4	5	6	7	8	9	10	11	12		
Value(HEX)	98	95	93	04	00	2C	01	03	1E	0A	00	3F	Default Value	

Bytes1/2/3:	Preamble	command	98,95,93
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(UART none data input waiting for the time out value),

Bytes6/7	Time Out	High byte	Low byte
	02ms	00	02
	03ms	00	03
	04ms	00	04

	1000ms	03	E8

Bytes4:	UART Baud rate	Value(HEX)
	9600bps	00
	1200bps	01
	2400bps	02
	4800bps	03
	9600bps	04
	19200bps	05
	38400bps	06
	57600bps	07
	115200bps	08
	250000bps	09
	256000bps	0A

Bytes8	RF Data Rate	Value(HEX)
	250Kbps	00
	100Kbps	01
	50Kbps	02
	10Kbps	03..
	2Kbps	04

Bytes5	Parity bit	Data bit	Stop bit	Value(HEX)
	None	8	1	00
	None	7	1	01
	None	6	1	02
	Odd	8	1	04
	Odd	7	1	05
	Odd	6	1	06
	Even	8	1	08
	Even	7	1	09
	Even	6	1	0A
	None	8	2	10
	None	7	2	11
	None	6	2	12
	Odd	8	2	14
	Odd	7	2	15
	Odd	6	2	16
	Even	8	2	18
	Even	7	2	19
	Even	6	2	1A

Bytes9	Fix code (1E)	Value(HEX)
		1E

Success: ACI908M ACK 2bytes "0x55,0xAA"

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Bytes10:	RF Chanel	Value(HEX)
	CH0	00
	CH1	01
	CH2	02
	CH3	03
	CH4	04
	CH5	05
	CH6	06
	CH7	07
	CH8	08
	CH9	09
	CH10	0A
	CH11	0B
	CH12	0C
	CH13	0D
	CH14	0E
	CH15	0F

Byte 11	RF Power	Value(HEX)
	17dbm	00
	10dbm	01
	0dbm	02
	-8dbm	03

RF Packet payload data length		
Byte 12	RF Data Length	Value(HEX)
	13 bytes	0D
	14 bytes	0E
	15 bytes	0F

	63 bytes	3F

Success: ACI908M ACK 2bytes "0x55,0xAA"

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UART setting command section B (12bytes)

Bytes	1	2	3	4	5	6	7	8	9	10	11	12		
Value(HEX)	98	95	94	00	54	FF	FF	FF	54	FF	FF	FF	Default Value	

Bytes1/2/3:	Preamble	command	98,95,94
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Byte 4	1 to 1/1 to Multi	Value(HEX)
	1 to 1	00
	1 to Multi	01

Bytes5	Fix code	Value(HEX)
		54

	Master ID	Value(HEX)
Byte 6		00 ~ FF
Byte 7		01 ~ FF
Byte 8		02 ~ FF

Bytes9	Fix code	Value(HEX)
		54

	Slave ID	Value(HEX)
Byte 10		00 ~ FF
Byte 11		01 ~ FF
Byte 12		02 ~ FF

Master Device (Set Master ID only)= Slave 1 Device(Set Slave ID Only)
= Slave 2 Device(Set Slave ID Only)

UART setting command section C (12bytes)

Bytes	1	2	3	4	5	6	7	8	9	10	11	12		
Value(HEX)	98	95	95	2C	01	00	00	00	00	00	00	00	Default Value	

Bytes1/2/3:	Preamble	command	98,95,95
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Bytes4/5	Reciver Time Out	High byte	Low byte
	02ms	00	02
	03ms	00	03
	04ms	00	04

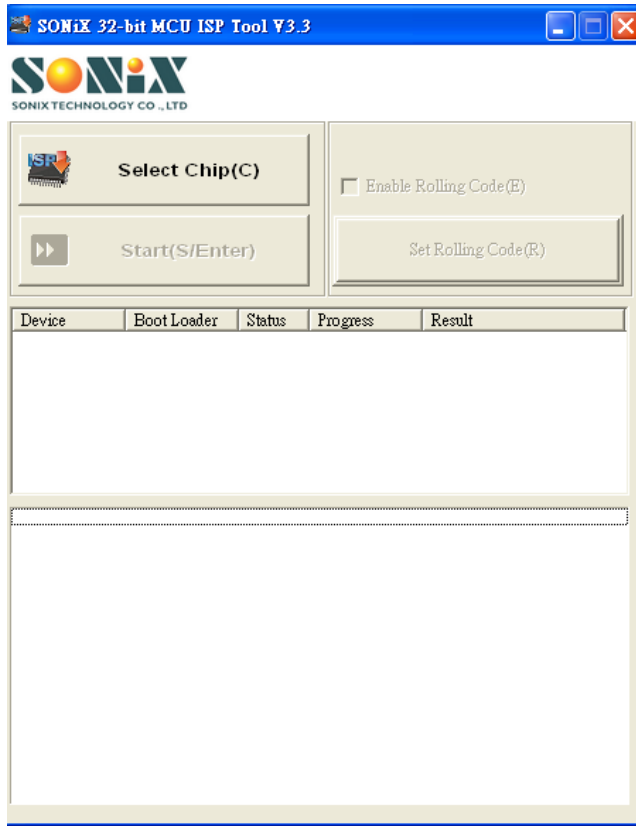
default	300ms	01	2C

	1000ms	03	E8

Success: ACI908M ACK 2bytes "0x55,0xAA"

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7.Support ISP for Fast Software upgrade:



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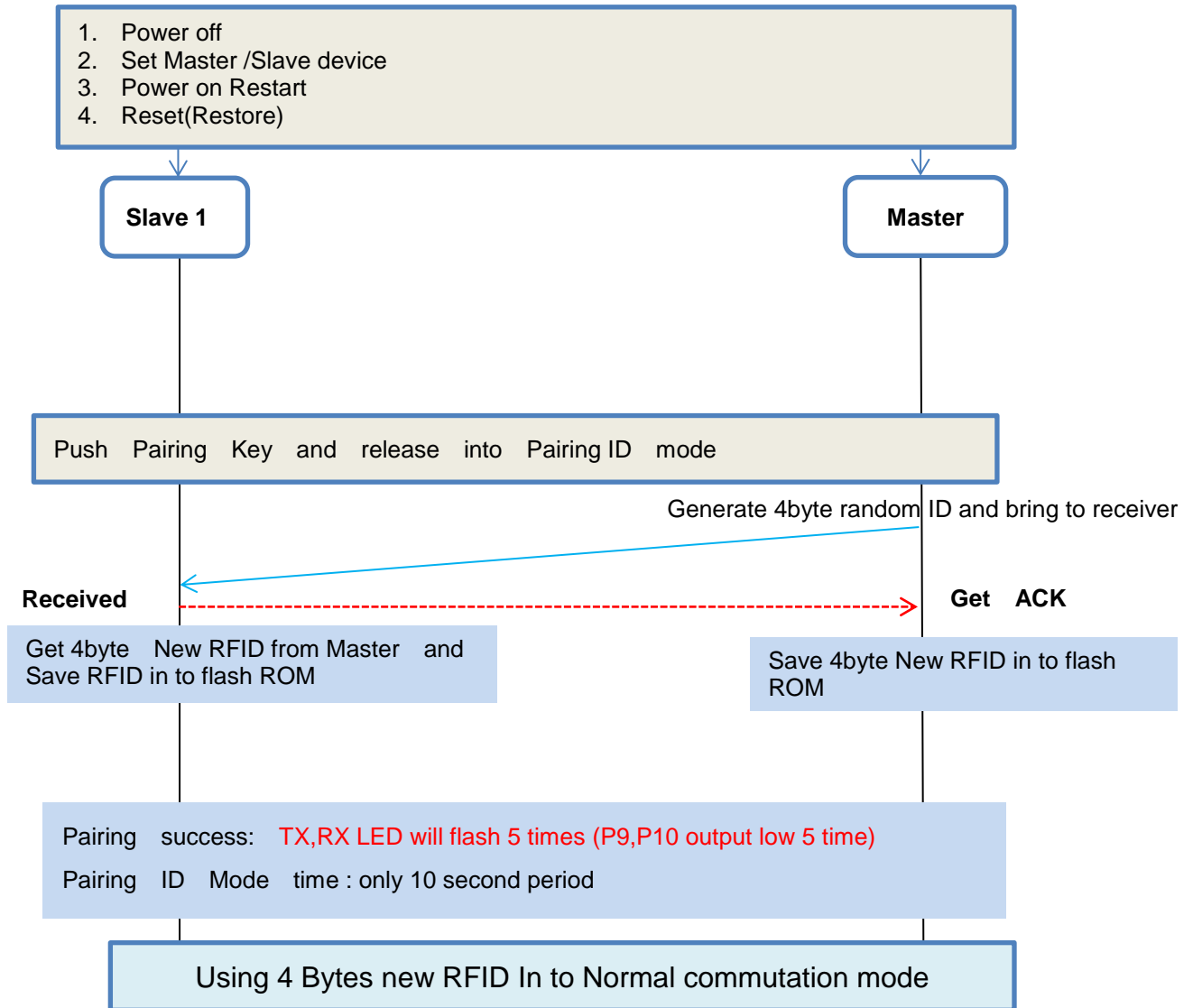
8. Pairing Protocol Specification

Use the following RFID to pairing Master and Slave

- Pairing RFID: 0x54, 0x75, 0xC5, 0x8C
- Pairing Frequency: 433Mhz

Pairing Flow Chart:

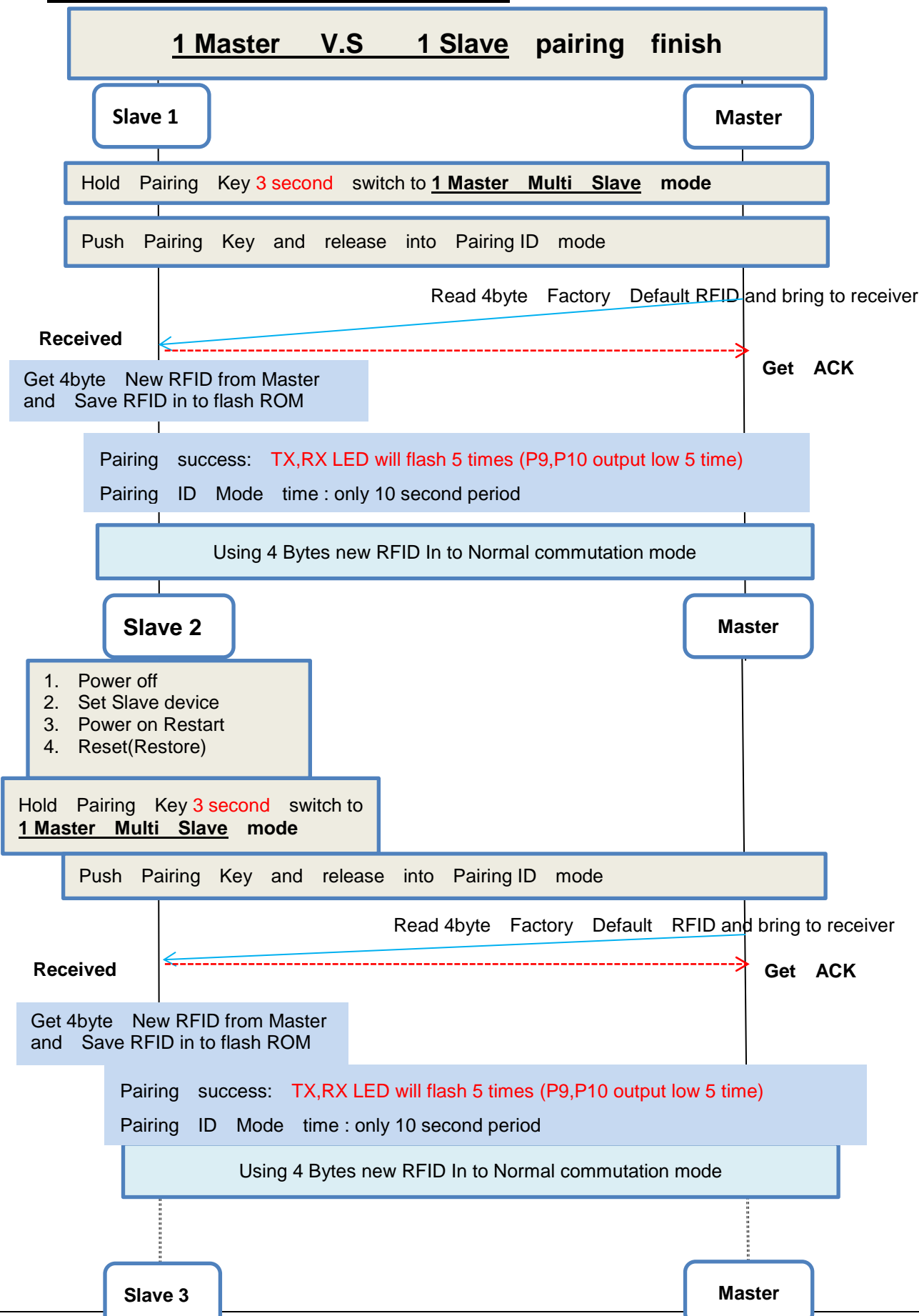
1 Master V.S 1 Slave



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1 Master V.S multi Slave



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Pairing flow chart: 1 對 1

1. 斷電，選擇好 Master/Slave
2. 重新上電
3. 按住 Pairing key 不放，大於 6 秒後放開，
TX/RX LED 會交互閃爍 5 秒，完成恢復出廠值設定。(未確定狀態建議執行本步驟)

Master 端:

5. 按一下 Pairing key 進 Pairing Mode。
6. Pairing Pass TX/RX LED 會同時閃爍 5 秒。

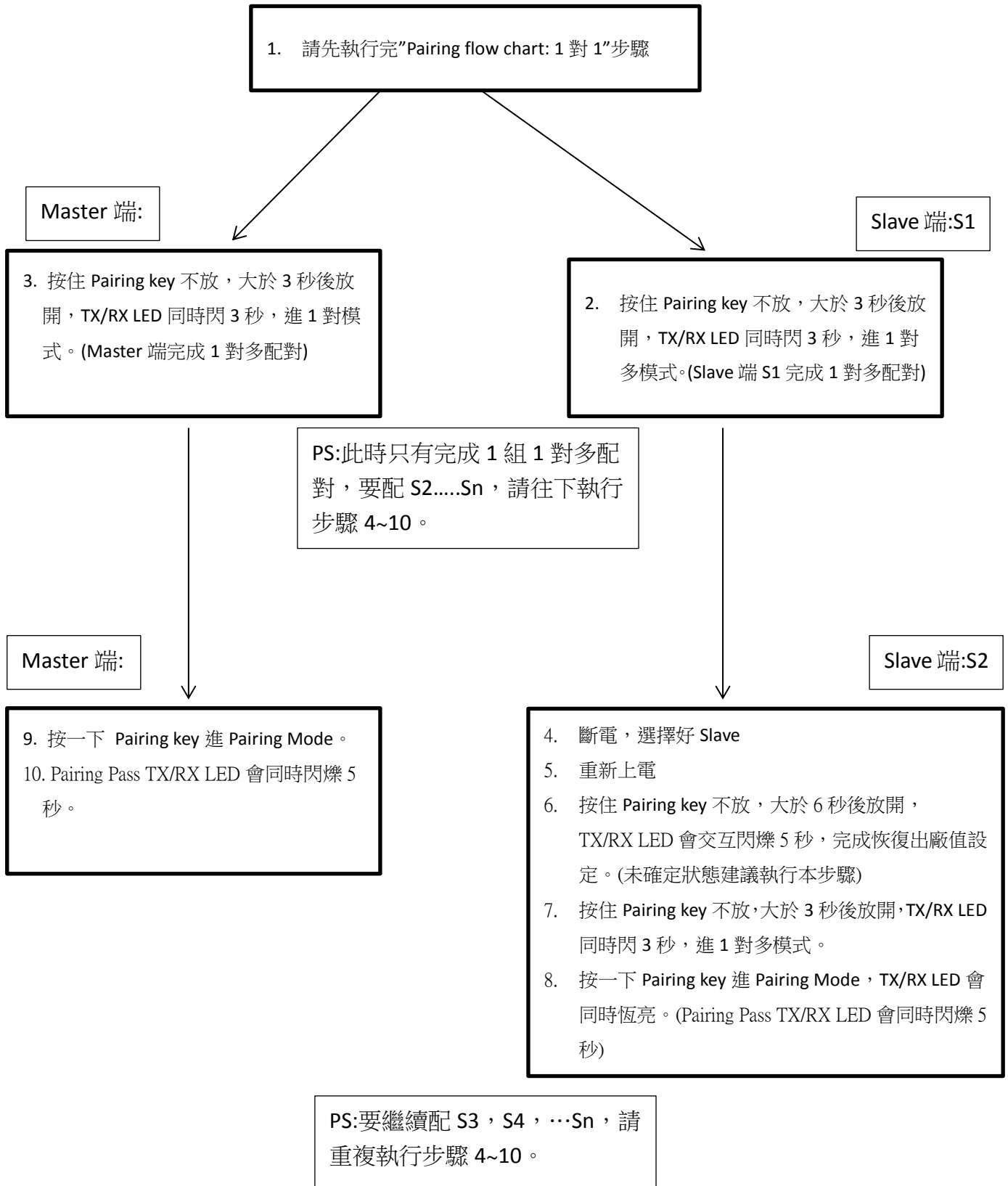
Slave 端:

4. 按一下 Pairing key 進 Pairing Mode，
TX/RX LED 會同時恆亮。
(Pairing Pass TX/RX LED 會同時閃爍 5 秒)

PS: 進 Pairing Mode 後，10 秒內沒有配對完成會自動退出 Pairing Mode，要重新進 Pairing Mode 只要按一下 Pairing key 即可。

PS: 以上步驟中 TX/RX LED & Master/Slave & Pairing key 腳位，請參考 **Module Pin Description**

Pairing flow chart: 1 對 多

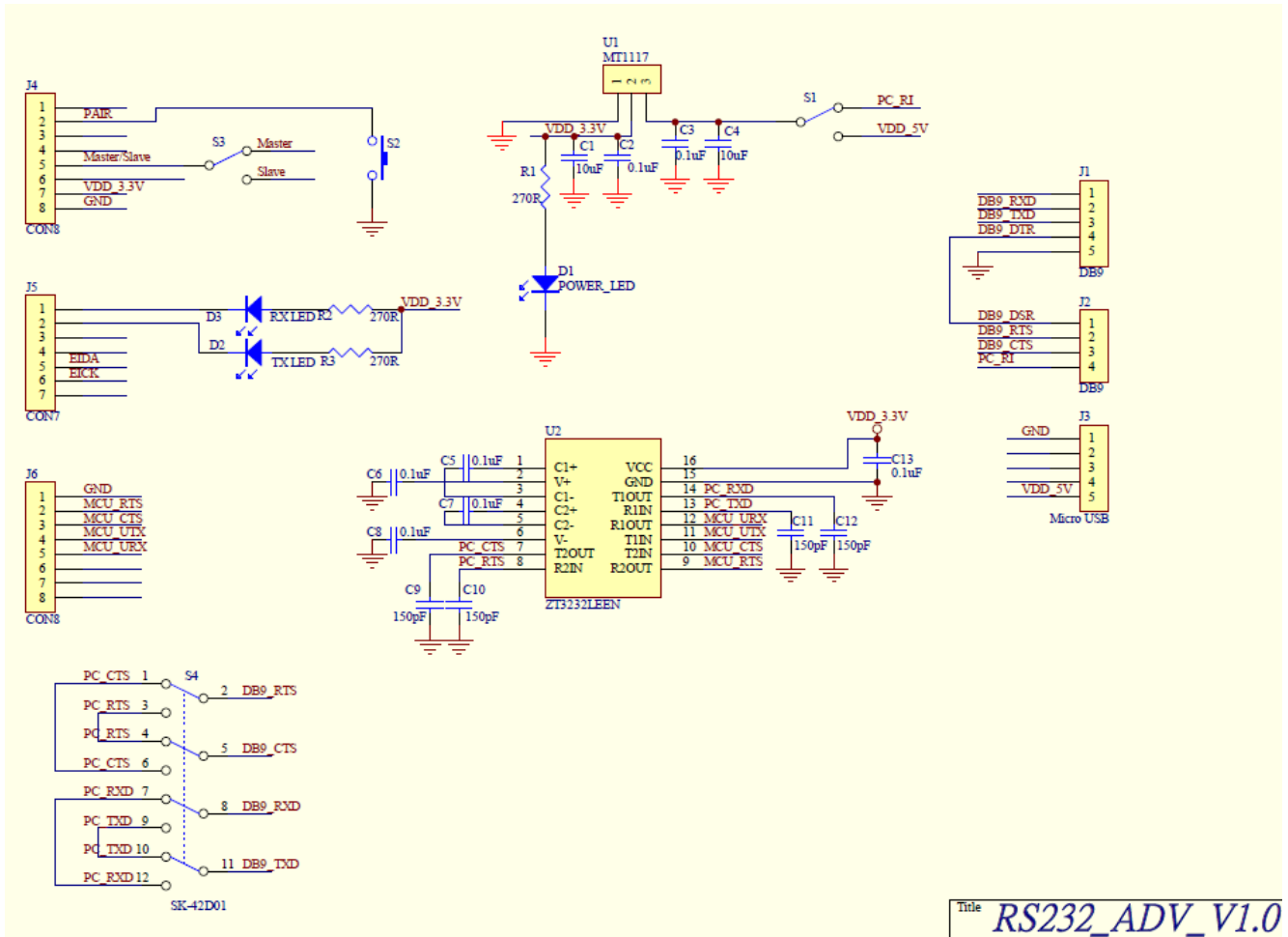


PS: 以上步驟中 TX/RX LED & Master/Slave & Pairing key 腳位，請參考
Module Pin Description

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10.Application Circuit



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