SHENZHEN HI-LINK ELECTRONIC CO.,LTD

HLK-RM08S USER MANUAL

Version：V1.0 Issuing date：2017-2-17

CONTENTS

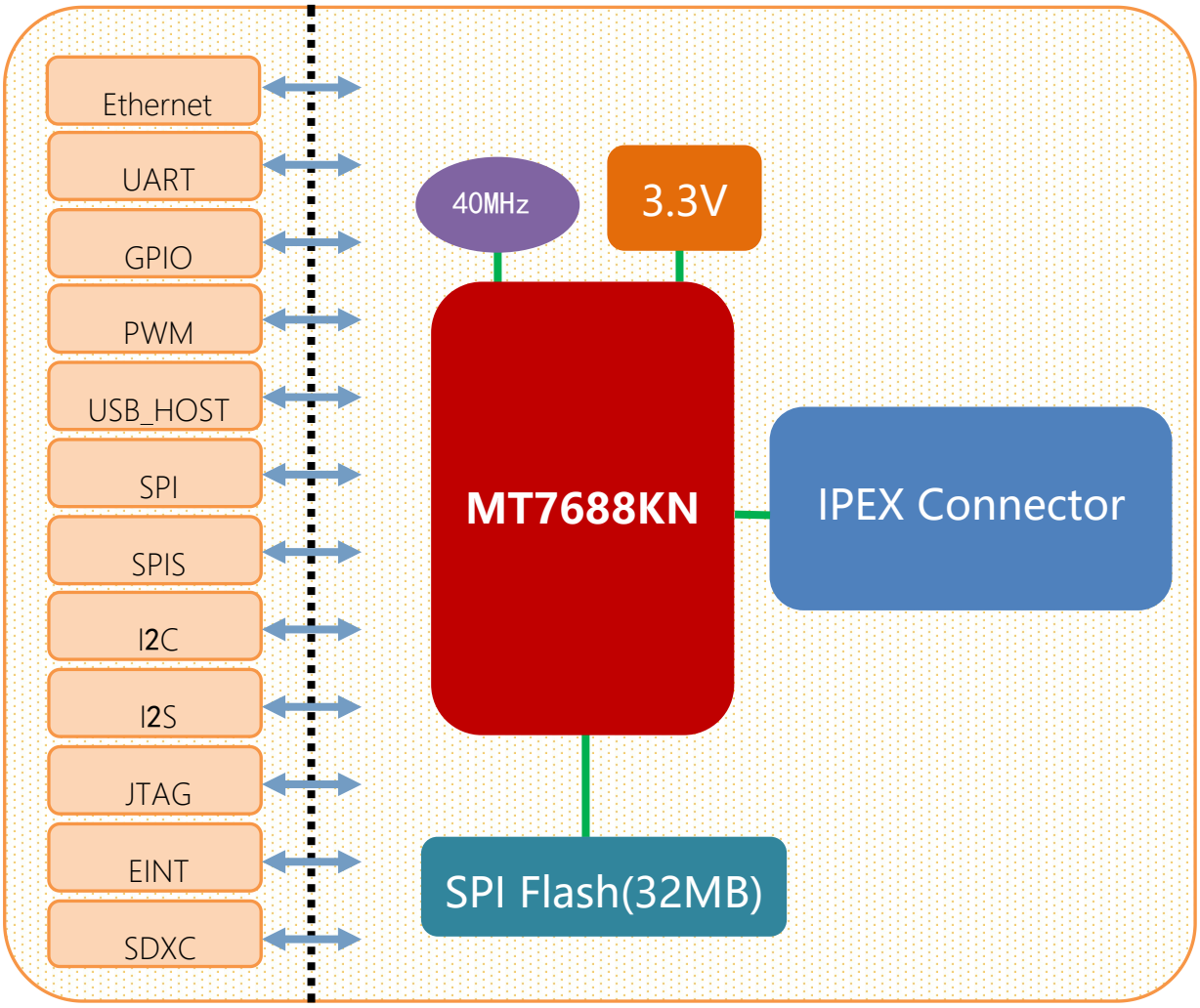
1. Brief Introduction

HLK-RM08S based on MT7688KN is a low cost and low power consumption IOT module developed by Hi-Link.The module has rich interfaces and powerful processor and could be widely used in smart devices and cloud service applications.

1.1. Basic parameters

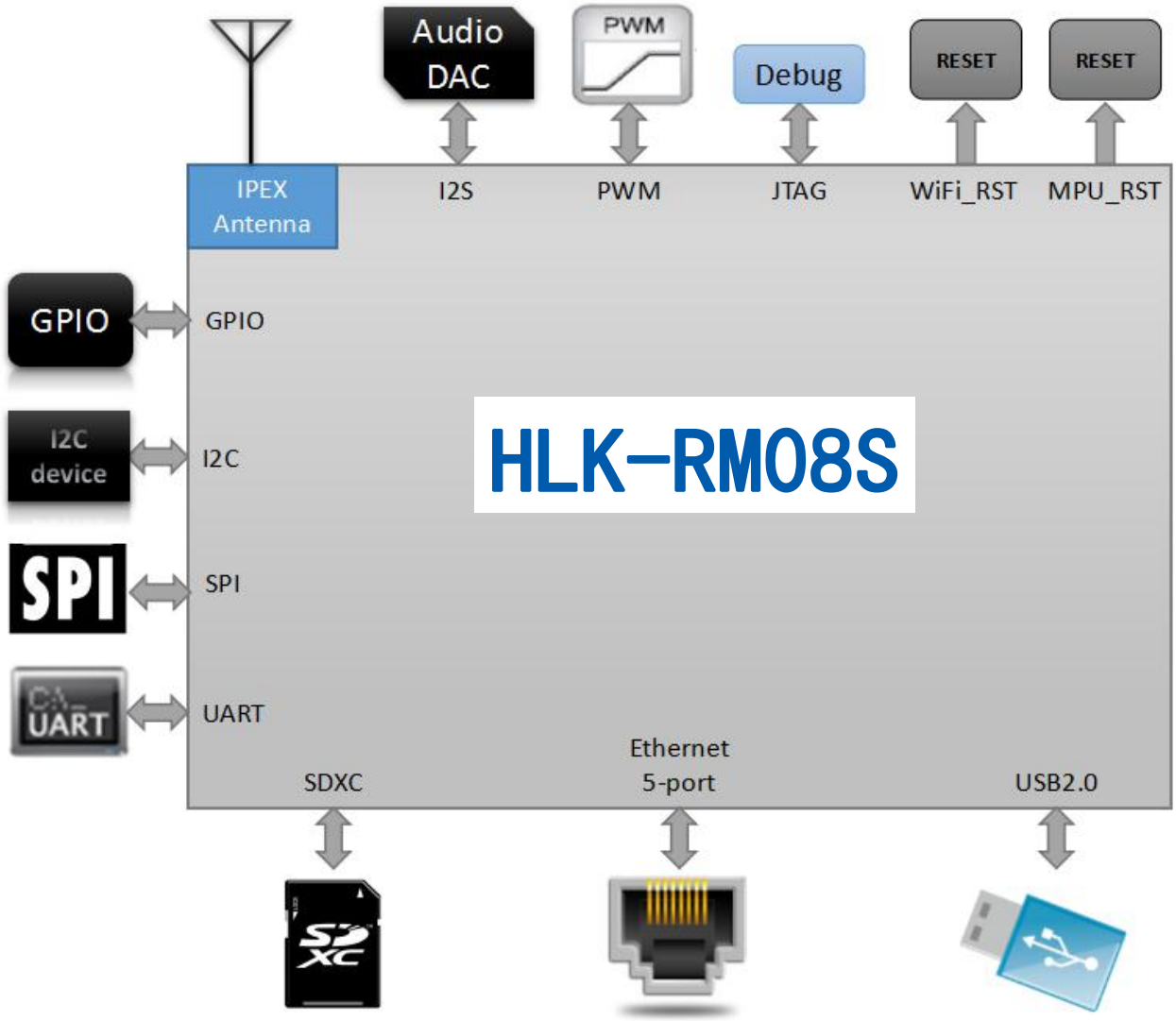
- High data processing ability，MCU frequency 580MHz
- 150M Mbps
- Support 802.11b/g/n mode
- 20/40 channel bandwidth
- Support 802.11v
- Support AP,STA and AP,STA mixed
- Fifth 10/100M adaptive com port
- One USB2.0 host interface
- Multiple interfaces SPI/SD-XC/eMMC
- Rich peripheral interfaces，SPI,I2C,I2S,PCM,UART,JTAG,GPIO
- Widely used in IOT
- Inbuilt powerful PMU
- Support 16 Multiple BSSID
- Support multiple encryption WEP64/128, TKIP, AES, WPA, WPA2, WAPI
- Support QoS，WMM，WMM-PS

2. Block diagram



HLK-RM08S Block Diagram

2.1. Typical application



HLK-RM08S typical peripheral interfaces diagram

2.2. Specification

Item	Parameter
Model	HLK-RM08S
Main Chip	MT7688KN
I-Cache，D-Cache	64KB,32KB
Kernel	MIPS24KEc
Main frequency	580MHz
RAM	64Mb
Flash	32Mb
RF	1T1R 802.11n 2.4GHz
USB2.0	1
UART	2
Temperature	Environmental temperature：-40℃~85℃
Humidity	working：10~95%（noncondensing） Storage：5~95%（noncondensing）
Size	17.4mm×25.8mm×2.8mm

3. Electrical characteristics

3.1. Input voltage

Name	Function	Min voltage (V)	Typical voltage (V)	Max Voltage (V)
VBAT	Supply voltage	3.2	3.3	3.4
I/O	I/O Voltage	3.2	3.3	3.4

3.2. RF Characteristics

3.2.1. 802.11b 11M

802.11b Transmit (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Tx Power Level	DQPSK	18	20	22	dBm
Frequency Tolerance		-15	0	15	ppm
Spectral Mask	11MHz→22MHz		40		dBr
	＞22MHz		53		dBr
Modulation Accuracy	All Data Rate		15		%
802.11b Receiver (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Min. Input	11Mbps PER<8%	-91.5	-89.5	-87.5	dBm

3.2.2. 802.11g 54M

802.11g Transmit (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Tx Power Level	OFDM	15	17	19	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate		-31	-28	%
802.11g Receiver (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Min. Input	54Mbps PER<10%	-78.0	-76.0	-74.0	dBm

3.2.3. 802.11n MCS7(HT20)

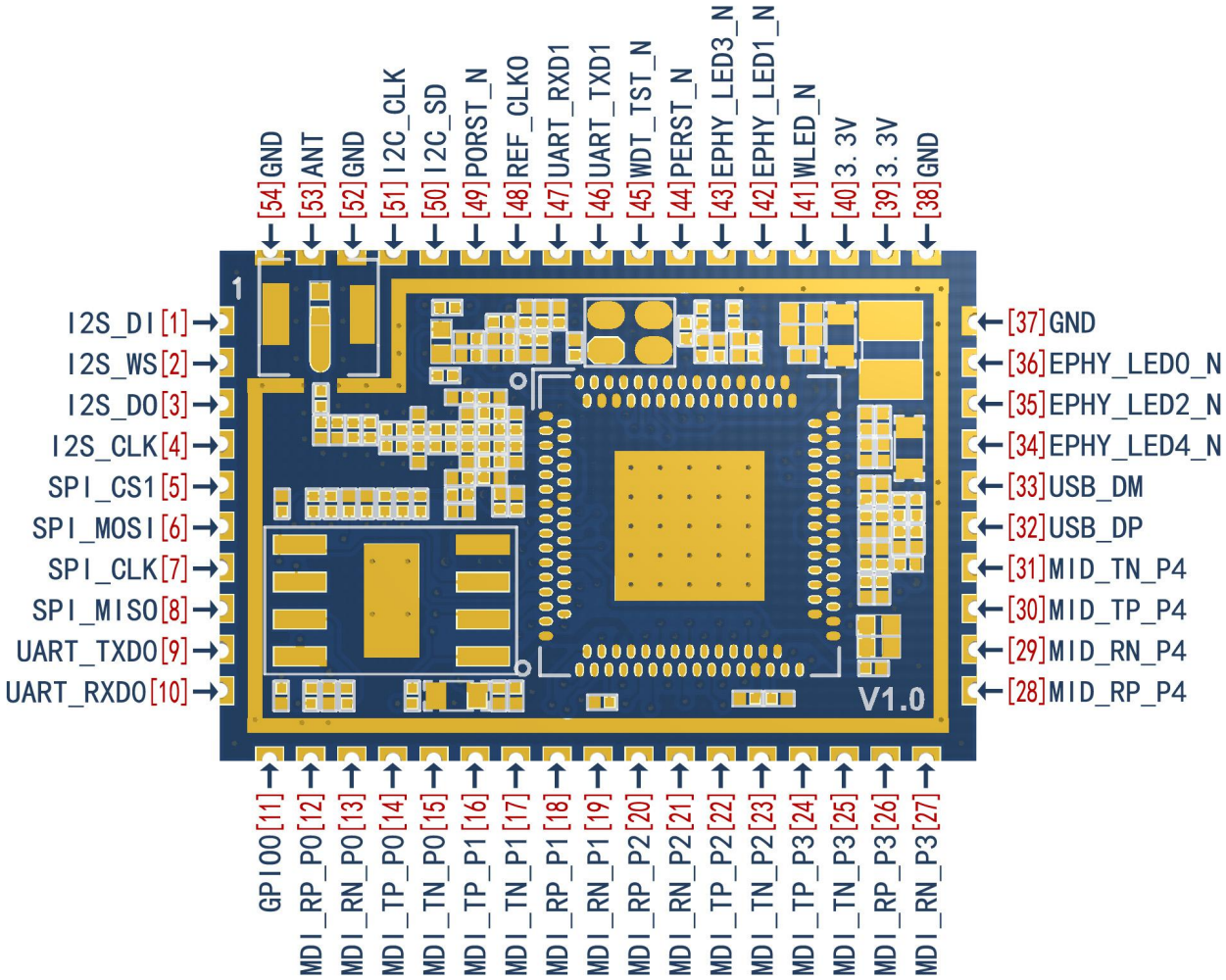
802.11n_HT20 Transmit (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Tx Power Level	OFDM	15	17	19	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate		-31	-28	dB
802.11n_HT20 Receiver (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Min. Input	MCS7 PER<10%	-76.5	-74.5	-72.5	dBm

3.2.4. 802.11n_MCS7(HT40)

802.11n_HT40 Transmit (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Tx Power Level	OFDM	15.0	17.0	19.0	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate		-31	-28	dB
802.11n_HT40 Receiver (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Min. Input	MCS7 PER<10%	-76.5	-74.5	-72.5	DBM

4. PINS DEFINTION

4.1. Pins definition diagram



HLK-RM08S Default pins definition diagram

4.2. Default pins definition

Pin	Name（Function 1）	Function 2	Function 3	Function 4	GPIO	Note
1	I2S_DI	PCMDRX			GPIO0	
2	I2S_WS	PCMCLK			GPIO2	
3	I2S_DO	PCMDTX			GPIO1	
4	I2S_CLK	PCMFS			GPIO3	
5	SPI_CS1			REF_CLKO	GPIO6	
6	SPI_MOSI				GPIO8	
7	SPI_CLK				GPIO7	
8	SPI_MISO				GPIO9	
9	UART_TXD0				GPIO12	Default is serial port TR
10	UART_RXD0				GPIO13	Default is serial port TR
11	GPIO0		REF_CLKO	PERST_N	GPIO11	
12	MDI_RP_P0				GPIO24	
13	MDI_RN_P0				GPIO23	
14	MDI_TP_P0				GPIO22	
15	MDI_TN_P0				GPIO21	
16	MDI_TP_P1	SPIS_CS		PWM_CH0	GPIO14	
17	MDI_TN_P1	SPIS_CLK		PWM_CH1	GPIO15	
18	MDI_RP_P1	SPIS_MISO		UART_TXD2	GPIO16	
19	MDI_RN_P1	SPI_MOSI		UART_RXD2	GPIO17	
20	MDI_RP_P2		eMMC_D7	PWM_CH0	GPIO18	
21	MDI_RN_P2		eMMC_D6	PWM_CH1	GPIO19	
22	MDI_TP_P2	UART_TXD2	eMMC_D5	PWM_CH2	GPIO20	
23	MDI_TN_P2	UART_RXD2	eMMC_D4	PWM_CH3	GPIO21	
24	MDI_TP_P3	SD_WP	eMMC_WP		GPIO22	
25	MDI_TN_P3	SD_CD	eMMC_CD		GPIO23	
26	MDI_RP_P3	SD_D1	eMMC_D1		GPIO24	

27	MDI_RN_P3	SD_D0	eMMC_D0		GPIO25	
28	MDI_RP_P4	SD_CLK	eMMC_CLK		GPIO26	
29	MDI_RN_P4	SD_CMD	eMMC_CMD		GPIO28	
30	MDI_TP_P4	SD_D3	eMMC_D3		GPIO29	
31	MDI_TN_P4	SD_D2	eMMC_D2		GPIO27	
32	USB_DP					Default not available
33	USB_DM					Default not available
34	EPHY_LED4_N	JTAG_RST_N			GPIO30	Com 4 status led
35	EPHY_LED2	JTAG_TMS			GPIO32	Com 2 status led
36	EPHY_LED0	JTAG_TDO			GPIO34	Com 0 status led
37	GND					
38	GND					
39	3.3V					Suggested external power supply current≥ 500mA
40	3.3V					
41	WLED_N				GPIO35	WiFi status LED
42	EPHY_LED1	JTAG_TDI			GPIO33	Com 1status LED
43	EPHY_LED3	JTAG_CLK			GPIO31	Com 3status LED
44	PORST_N					WIFI reset
45	WDT_RST_N				GPIO37	Watchdog timeout reset
46	UART_TXD1			PWM_CH0	GPIO45	Default is serial port TR
47	UART_RXD1			PWM_CH1	GPIO46	Default is serial port TR
48	REF_CLK0				GPIO38	Reference clock output
49	PERST_N				GPIO36	PCIe device reset
50	I2C_SD				GPIO5	
51	I2C_CLK				GPIO4	
52	GND					
53	ANT					Default not connected
54	GND					

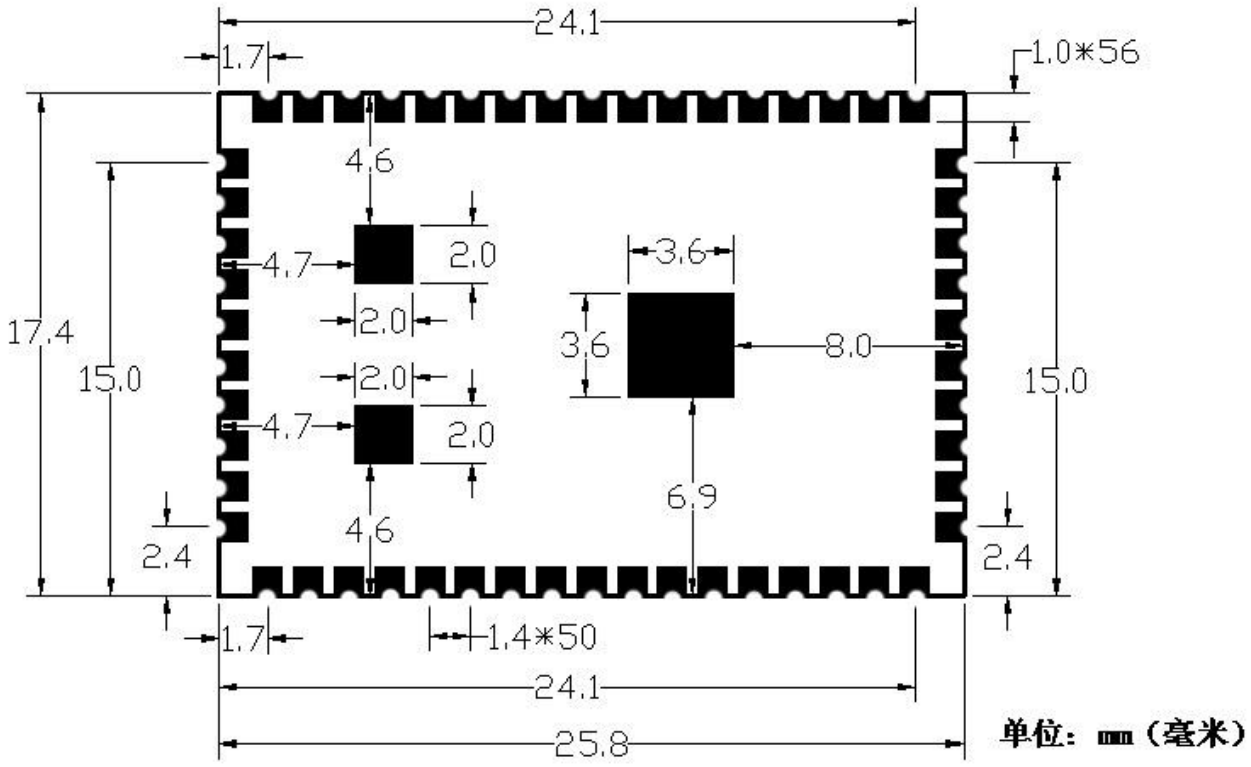
Notes：

1，All pins default 1

2，IO drive current is 4mA

3，All TTL is 3.3V

5. Dimensions



HLK-RM08S Drawing

Introductions：

1，The size of the module is length 1mm,width 1mm,space 1.4mm , depth 1.8mm.

2，The thickness of the module is 1.8mm.

3, The noted numbers in the picture is the actual size of module,do recommended pad extension around 1mm, internal heat shrink 0.2mm pad, internal thermal pad grounding once do encapsulation.

Do when the package recommended pad extension around the 1mm, 3 internal heat shrink 0.2mm pad, internal thermal pad grounding.