HLK-7688A user manual

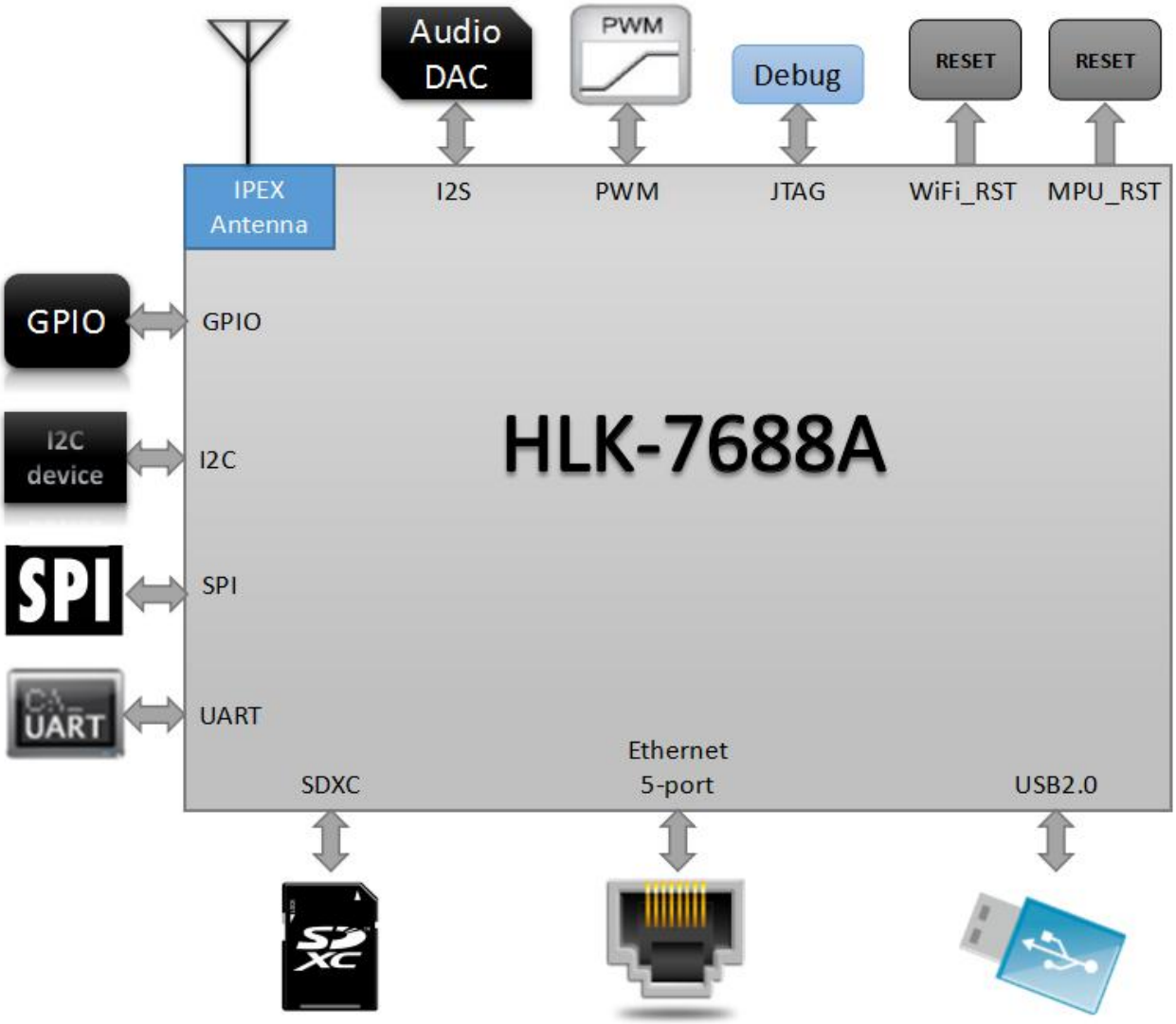
1.INTRODUCTION

HLK-MT7688A based on MT7688AN is a low cost and low power consumption IOT module developed by Hi-Link.The module supports Linux, OpenWRT operating system and custom development. It could be widely applied to smart devices or cloud services application with its rich interface and powerful processors.

1.1. BASIC PARAMETERS

- High data processing ability，MCU frequency 580MHz
- 150M Mbps
- Support 802.11b/g/n
- 20/40 Channel bandwidth
- Support 802.11v
- Support AP,STA and AP,STA mixed
- Five 10/100M ETH PORT
- 1 USB2.0 Host interface port
- Interface 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 security methods WEP64/128, TKIP, AES, WPA, WPA2, WAPI
- Support QoS，WMM，WMM-PS
- The following power is for Japan.
  802.11b (2412-2472MHz): 6.0mW/MHz
  802.11b (2484MHz): 6.0 mW/MHz
  802.11g (2412-2472MHZ):3.0mW/MHz
  802.11n HT20 (2412-2472MHZ): 1.5mW/MHz
  802.11n HT40 (2422-2472MHZ): 1.0mW/MHz

2.1. Typical application



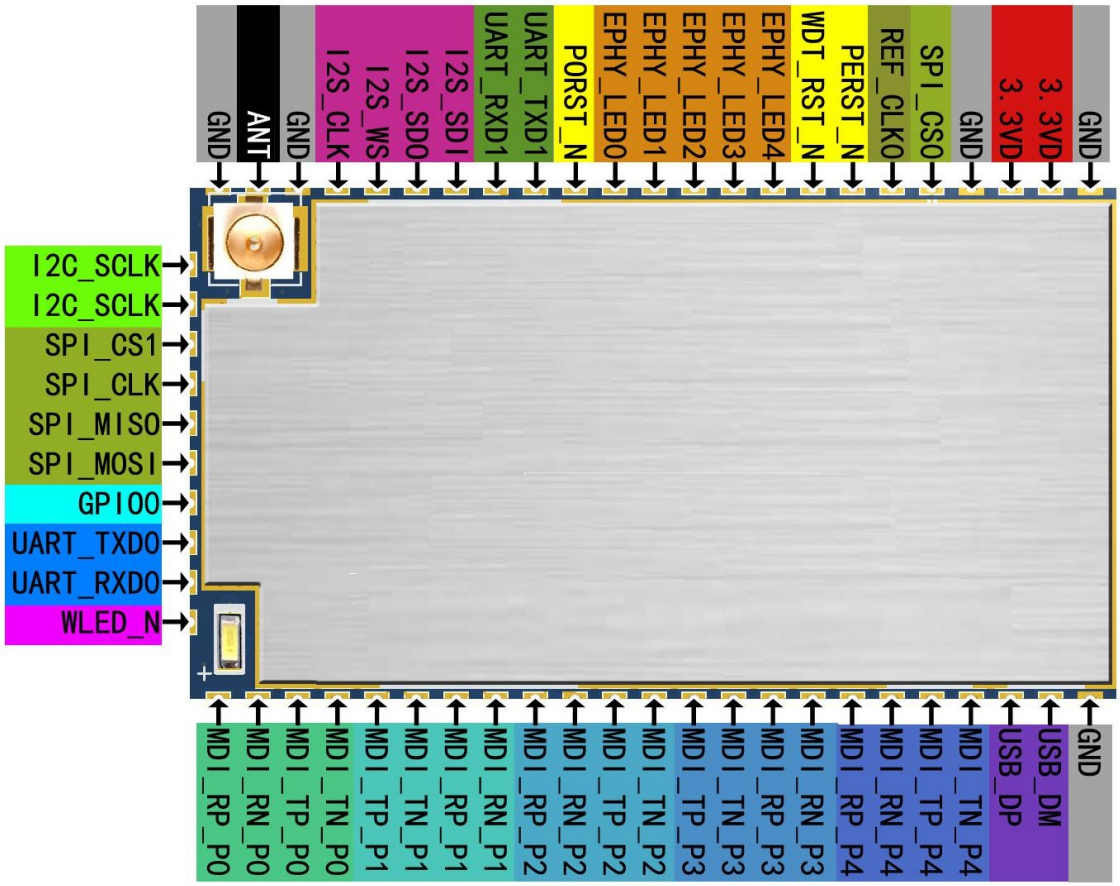
HLK-7688A typical peripheral interfaces

2.2. Specification

Item	Parameter
Model	HLK-7688A
Chipset	MT7688AN
Kernel	MIPS24KEc
Basic frequency	580MHz
RAM	DDR2 128MB
Flash	32MB
Temperature	Environmental temperature：-20℃~55℃
Humidity	working：0~85%（noncondensing ） Storage： 0~85%（noncondensing）
Size	18mm×32.8mm×2.8mm

3. MODULE PINS DEFINITION

3.1. DEFAULT PINS DEFINITION



HLK-7688A default definition

3.2. DEGAULT PINS DEFINITION

PIN	Name function 1	Function 2	Function 3	Function 4	GPIO	Note
1	GND					
2	3.3VD					
3	3.3VD					
4	GND					
5	SPI_CS0					
6	REF_CLK0				GPIO38	3333333333333333333333333333333333333333Time output
7	PERST_N				GPIO36	PCIe device reset
8	WDT_RST_N				GPIO37	
9	EPHY_LED4	JTAG_RST_N			GPIO39	
10	EPHY_LED3	JTAG_CLK			GPIO40	
11	EPHY_LED2	JTAG_TMS			GPIO41	
12	EPHY_LED1	JTAG_TDI			GPIO42	
13	EPHY_LED0	JTAG_TDO			GPIO43	
14	PORST_N					Reset
15	UART_TXD1			PWM_CH0	GPIO45	
16	UART_RXD1			PWM_CH1	GPIO46	
17	I2S_SDI	PCMDRX			GPIO0	
18	I2S_SDO	PCMDTX			GPIO1	
19	I2S_WS	PCMCLK			GPIO2	
20	I2S_CLK	PCMFS			GPIO3	
21	GND					
22	ANT					
23	GND					
24	I2C_SCLK				GPIO4	
25	I2C_SD				GPIO5	
26	SPI_CS1				GPIO6	
27	SPI_CLK				GPIO7	

28	SPI_MISO				GPIO9	
29	SPI_MOSI				GPIO8	
30	GPIO0				GPIO11	
31	UART_TXD0				GPIO12	
32	UART_RXD0				GPIO13	
33	WLED_N				GPIO44	WiFi LED
34	MDI_RP_P0				GPIO24	
35	MDI_RN_P0				GPIO23	
36	MDI_TP_P0				GPIO22	
37	MDI_TN_P0				GPIO21	
38	MDI_TP_P1	SPIS_CS		PWM_CH0	GPIO14	
39	MDI_TN_P1	SPIS_CLK		PWM_CH1	GPIO15	
40	MDI_RP_P1	SPIS_MISO		UART_TXD2	GPIO16	
41	MDI_RN_P1	SPI_MOSI		UART_RXD2	GPIO17	
42	MDI_RP_P2		eMMC_D7	PWM_CH0	GPIO18	
43	MDI_RN_P2		eMMC_D6	PWM_CH1	GPIO19	
44	MDI_TP_P2	UART_TXD2	eMMC_D5	PWM_CH2	GPIO20	
45	MDI_TN_P2	UART_RXD2	eMMC_D4	PWM_CH3	GPIO21	
46	MDI_TP_P3	SD_WP	eMMC_WP		GPIO22	
47	MDI_TN_P3	SD_CD	eMMC_CD		GPIO23	
48	MDI_RP_P3	SD_D1	eMMC_D1		GPIO24	
49	MDI_RN_P3	SD_D0	eMMC_D0		GPIO25	
50	MDI_RP_P4	SD_CLK	eMMC_CLK		GPIO26	
51	MDI_RN_P4	SD_CMD	eMMC_CMD		GPIO28	
52	MDI_TP_P4	SD_D3	eMMC_D3		GPIO29	
53	MDI_TN_P4	SD_D2	eMMC_D2		GPIO27	
54	USB_DP					
55	USB_DM					
56	GND					

Note ：

1，All pins are Default function 1.

FCC Caution:
Any C hanges or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
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.

FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.
When the module used in devices requiring additional RF exposure compliance information (e.g., MPE evaluation or SAR testing).

OEM antegrators Installation Manual
List of applicable FCC rules This module has been tested and found to comply with part 15.247 requirements for Modular Approval.
The input voltage to the module should be nominally 3.3V DC, typical value 3.3V DC and the ambient temperature of the module should not exceed 55℃
Limited module procedures N/A
Trace antenna designs N/A

Antenna
The module of HLK-7688A has one antenna port and the antenna gain as below:
2.4G Wi-Fi: 2.89dBi, Antenna cable loss: 0.5dB
The external antenna is Dipole Antenna.

Label and compliance information When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily reamoved. If not, a second label must be placed on the outside of the final device that contains the following text: Contains Transmitter Module FCC ID: 2BBXW-7688, the FCC ID can be used only when all FCC ID compliance requirements are met.

Information on test modes and additional testing requirements

a)The modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re‐test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).
b)The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand‐alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.
c)If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference has been corrected.

Additional testing, Part 15 Subpart B disclaimer

The final host / module combination need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part15 digital device. The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation and should refer to guidance in KDB 996369. For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through

(a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation. When testing the host product, all the transmitters must be operating. The transmitters can be enabled by using publicly available drivers and turned on, so the transmitters are active. In certain conditions it might be appropriate to use a technology-specific call box (test set) where accessory devices or drivers are not available. When testing for emissions from the unintentional radiator, the transmitter shall be placed in the receive mode or idle mode, if possible. If receive mode only is not possible then, the radio shall be passive (preferred) and/or active scanning. In these cases, this would need to enable activity on the communication BUS (i.e., PCIe, SDIO, USB) to ensure the unintentional radiator circuitry is enabled. Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4, ANSI C63.10 and ANSI C63.26 for further general testing details.