HK NATER TECH LIMITED

WL-AM01F-7688 Specification

Customer: _____

Description: WL-AM01F-7688-V1.0

Customer P/N:_____

Date: _____

Customer		
Approve	Auditing	Admit

Provider		
Approve	Auditing	Admit

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SPECIFICATION

WLAN 11b/g/n 1T1R 2.4G AP module

WL-AM01F-7688/7628

Version: V1.0

1.Overview

MT7688 family integrates a 1T1R 802.11n Wi-Fi radio, a 580MHz MIPS® 24KEc™ CPU, 1-port fast Ethernet PHY, USB2.0 host, PCIe, SD-XC, I2S/PCM and multiple slow IOs. MT7688 provides two operation modes – IoT gateway mode and IoT device mode. In IoT gateway mode, the PCI Express interface can connect to 802.11ac chipset for 11ac dual-band concurrent gateway. The high performance USB 2.0 allows MT7688 to add 3G/LTE modem support or add a H.264 ISP for wireless IP camera. For the IoT device mode, MT7688 supports eMMC, SD-XC and USB 2.0. MT7688 can support the WiFi high quality audio via 192Kbps/24bits I2S interface and VoIP application through PCM. In IoT device mode, it further supports PWM, SPI slave, 3rd UART and more GPIOs. For IoT gateway, it can connect to touch panel and BLE, Zigbee/Z-Wave and sub-1G RF for smart home control.

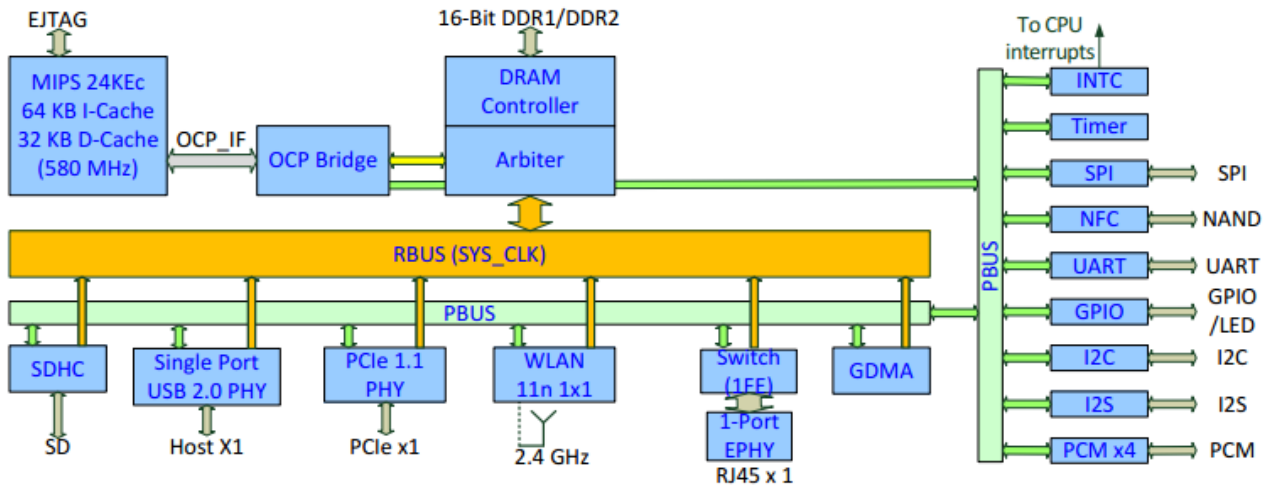
2.Features

- Embedded MIPS24KEc (580 MHz) with 64 KB I-Cache and 32 KB D-Cache
- 1T1R 2.4 GHz with 150 Mbps PHY data rate
- Legacy 802.11b/g and HT 802.11n modes
- 20/40 MHz channel bandwidth
- 802.11v
- Space Time Block Coding (STBC)
- 16-bit DDR1/2 up to 128/256 Mbytes
- x1 USB 2.0 Host, x1 PCIe Root Complex
- 1-port 10/100 FE PHY
- SD-XC, eMMC, I2C, PCM, I2S(192K/24bits), PWM, SPI master/slave, UART lite, JTAG, GPIO
- Internet Of Thing
- Embedded PMU
- Green AP/STA
  ---Intelligent Clock Scaling (exclusive)
  ---DDRII: ODT off, Self-refresh mode
- QoS: WMM, WMM-PS
- 16 Multiple BSSID
- iPA/iLNA and ePA/eLNA
- 24 STA-Proxy
- AES128/256-CBC
- WEP64/128, TKIP, AES, WPA, WPA2, WAPI
- WPS: PBC, PIN
- AP/STA Firmware: Linux 2.6.36 SDK, OpenWrt 3.10 SDK, eCOS with IPv6

3.General Specification

Model	WL-AM01F-7688/7628-V1.0
Product Name	WLAN 11b/g/n AP module
Major Chipset	MT7688/7628
Standard	802.11b/g/n, 802.3, 802.3u
Data Transfer Rate	1,2,5.5,6,11,12,18,22,24,30,36,48,54,60,90,120 and maximum of 150Mbps
Frequency Band	2.4~2.4835 GHz ISM Band
Spread Spectrum	IEEE 802.11b: DSSS (Direct Sequence Spread Spectrum) IEEE 802.11g/n:OFDM (Orthogonal Frequency Division Multiplexing)
Operation Mode	IoT gateway mode and IoT device mode
Operation Range	Up to 180 meters in open space
Operating Channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan
Security	WEP64/128, TKIP, AES, WPA, WPA2, WAPI
Interface	USB/GPIO/I2C/I2S/SDIO

4.Functional Block Diagram



5.Temperature Limit Ratings

The Temperature of Module（WL-AM01F-7688/7628-V1.0）	
Ambient Operating Temperature	0 ~ +55°C ambient temperature
Storage Temperature	-20 ~ 70°C ambient temperature
Junction Temperature	0 ~ +125°C ambient temperature
The Temperature of Chip（MT7688/MT7628）	
Module test for 10 minutes in 60 degrees Celsius, the main chip surface temperature	

6.Power Supply Characteristics.

Parameter	Symbol	Minimum	Typical	Maximum	Units
3.3 V supply voltage (IO)	Vddc33	2.97	3.3	3.63	V
2.5V supply voltage (DDR1)	Vddc25	2.375	2.5	2.625	V
1.8 V supply voltage (DDR2)	Vddc18	1.71	1.8	1.89	V
1.2 V supply voltage	Vddc12	1.08	1.2	1.32	V
3.3 V current consumption	Icc33				mA
1.5 V current consumption	Icc15				mA
1.2 V current consumption	Icc12				mA

2）DC Characteristics

Module	Voltage	Current Consumption (linking)
WL-AM01F-7688/7628-V1.0	3.3V	(上网或者看电影时的功耗)

7. Electrical Specifications

1) RF Characteristics for IEEE802.11b (11Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11b			
Mode	CCK 11 Mbps			
Channel frequency	2412 ~ 2484 MHz			
Freq.Error(±13ppm)	±13 ppm			
RX (PER≤-85 dBm@8%)	-85 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (17±2 dBm)		17		dBm
EVM (≤-18)		-18		dB

2) RF Characteristics for IEEE802.11g (54Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM 54 Mbps			
Channel frequency	2412 ~ 2484 MHz			
Freq.Error(±13ppm)	±13 ppm			
RX (PER≤-70dBm@10%)	-70 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (14±2 dBm)		14		dBm
EVM (≤-27)		-27		dB

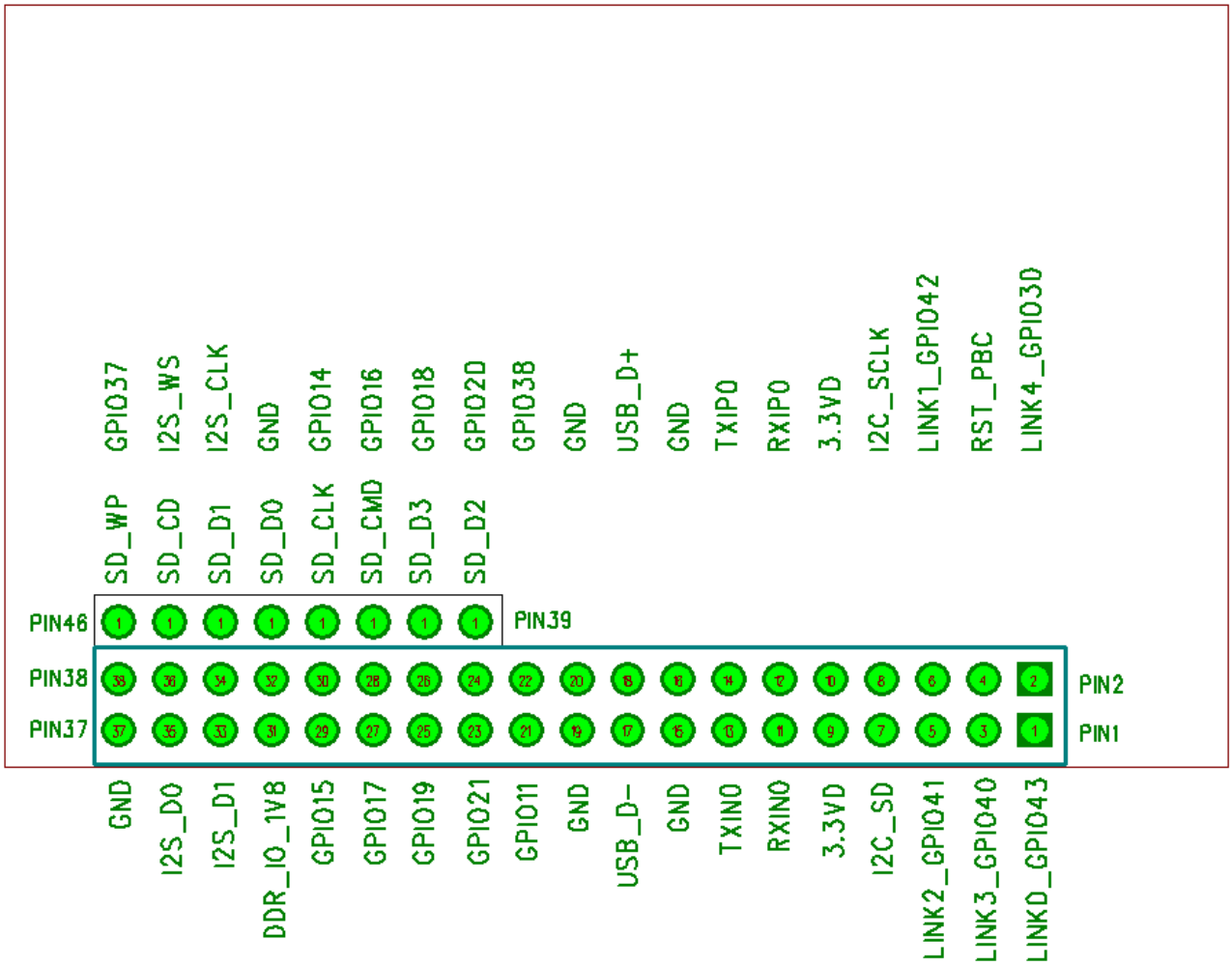
3) RF Characteristics for IEEE802.11n (BW20_MCS7)

Items	Contents			
Specification	IEEE802.11n BW20_MCS7			
Mode	BW20_MCS7 65 Mbps			
Channel frequency	2412 ~ 2484 MHz			
Freq.Error(±13ppm)	±13 ppm			
RX (PER≤-65dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (13±2 dBm)		13		dBm
EVM (≤-28)		-28		dB

4) RF Characteristics for IEEE802.11n (BW40_MCS7)

Items	Contents			
Specification	IEEE802.11n BW40_MCS7			
Mode	BW40_MCS7 135 Mbps			
Channel frequency	2412 ~ 2484 MHz			
Freq.Error(±13ppm)	±13 ppm			
RX (PER≤-65dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (13±2 dBm)		13		dBm
EVM (≤-28)		-28		dB

8.PIN Definition

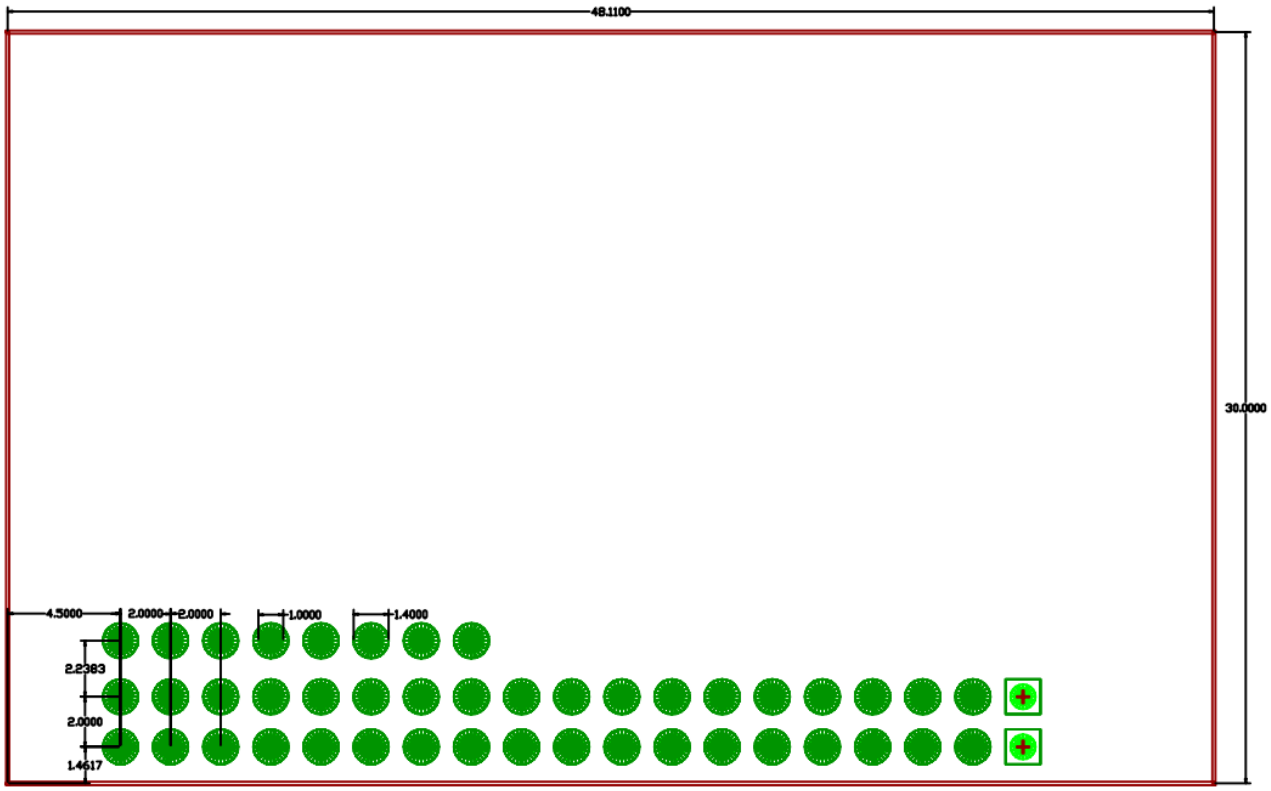


PIN	Function	The corresponding chip pins	Description
1	LINK0_GPIO43	143	GPIO
2	LINK4_GPIO30	139	GPIO
3	LINK3_GPIO40	140	GPIO
4	RST_PBC	148	GPIO
5	LINK2_GPIO41	141	GPIO
6	LINK1_GPIO42	142	GPIO
7	I2C_SD	21	I2C_SD
8	I2C_SCLK	20	I2C_SCLK
9	3.3VD		3.3VD
10	3.3VD		3.3VD
11	RXIN0	34	10/100 PHY Port #0 RXN
12	RXIP0	33	10/100 PHY Port #0 RXP

13	TXIN0	36	10/100 PHY Port #0 TXN
14	TXIP0	35	10/100 PHY Port #0 TXP
15	GND		Ground
16	GND		Ground
17	USB_D-	62	USB Port0 data pin Data-
18	USB_D+	61	USB Port0 data pin Data+
19	GND		Ground
20	GND		Ground
21	GPIO11	29	GPIO0
22	GPIO38	137	GPIO38
23	GPIO21	48	GPIO21
24	GPIO20	47	GPIO20
25	GPIO19	46	GPIO19
26	GPIO18	45	GPIO18
27	GPIO17	44	GPIO17
28	GPIO16	43	GPIO16
29	GPIO15	42	GPIO15
30	GPIO14	40	GPIO14
31	DDR_IO_1V8		DDR IO Supply power 1.8V
32	GND		Ground
33	I2S_D1	16	GPIO2
34	I2S_CLK	19	GPIO3
35	I2S_D0	17	GPIO1
36	I2S_WS	18	GPIO2
37	GND		Ground
38	GPIO37	136	GPIO37
39	SD_D2	57	GPIO29
40	SD_D3	56	GPIO28
41	SD_CMD	55	GPIO27
42	SD_CLK	54	GPIO26
43	SD_D0	52	GPIO25
44	SD_D1	51	GPIO24
45	SD_CD	50	GPIO23
46	SD_WP	49	GPIO22

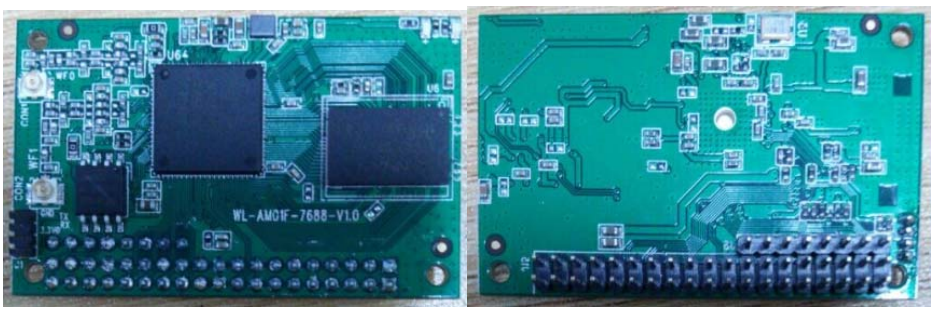
9.Dimensions

Dimensions (mm)	Length	Width	Height
	48.11 (Tolerance:±0.2mm)	**30.0** (Tolerance:±0.2mm)	**1.6** (Tolerance:±0.2mm)



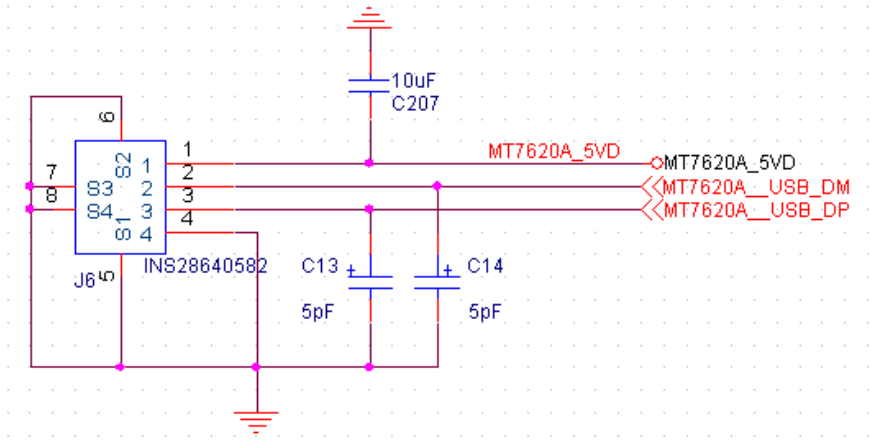
10.Physical map

The picture of top **The picture of bottom**

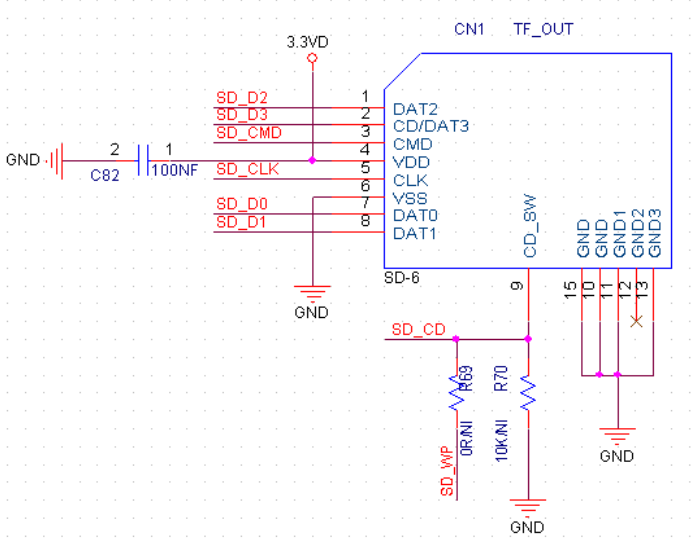


11. Circuit reference pictures

1）USB part reference circuit.



2）SD part reference.



3）part reference.