SHENZHEN HI-LINK ELECTRONIC CO.,LTD

WM7628N-A User Manual

CONTENTS

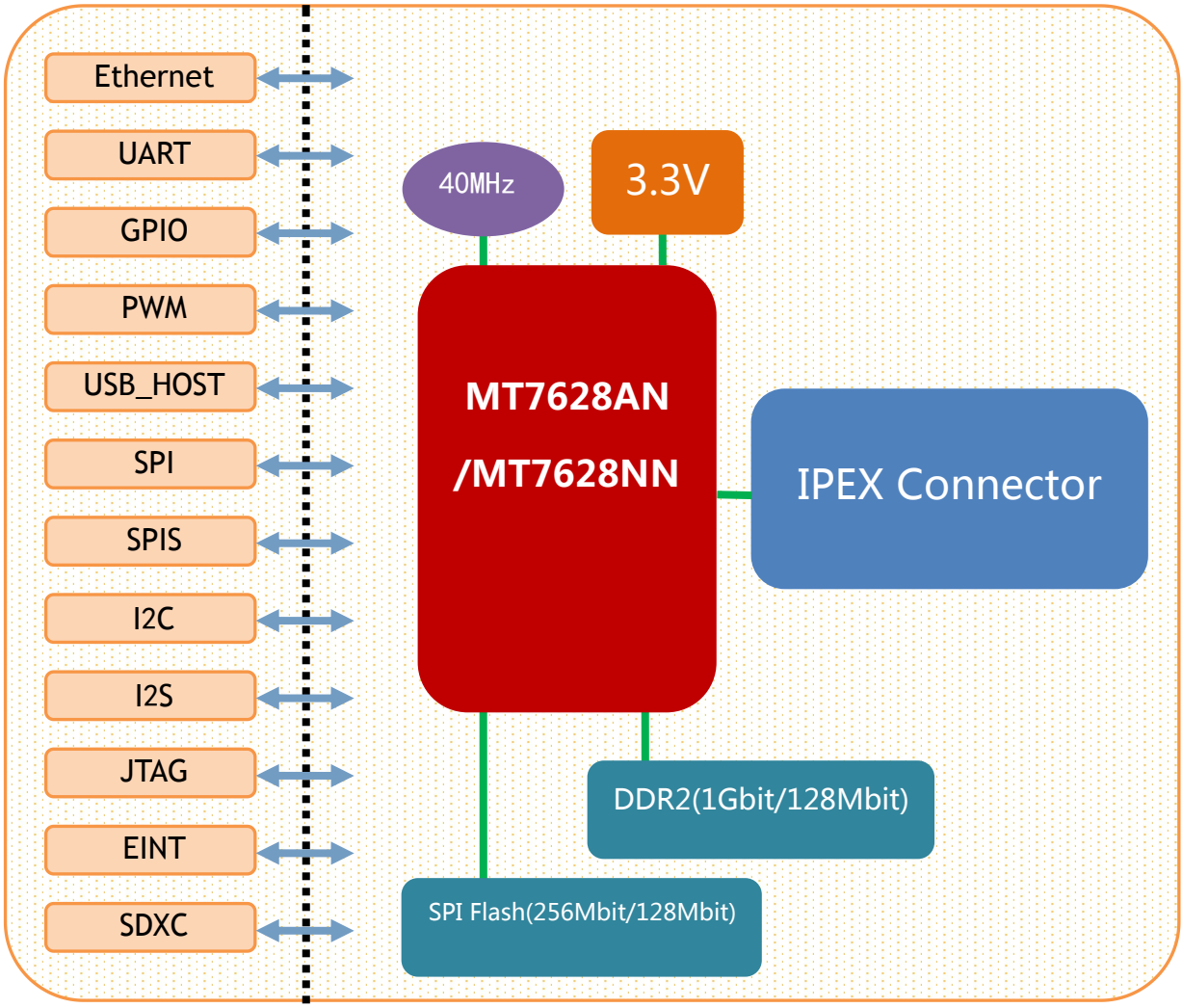
1. INTRODUCTION

WM7628N-A based on MT7628NN is a low cost and low power consumption IOT module developed. This module leads to all the interfaces of MT7628NN,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, at the same time ,it also support secondary development.

1.1. BASIC PARAMETER

- High data processing ability，MCU frequency 580MHz
- 300M 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
- Support Linux 2.6.36 SDK，OpenWrt 3.10

2. DIAGRAM



2.1. SPECIFICATIONS

Item	Parameter	Note
Model	WM7628N-A	Version V1.0
Chip	MT7628AN/MT7628NN	
Kernel	MIPS24KEc	
Basic frequency	580MHz	
RAM	DDR2 128MB	Customizable DDR2 64M/32MB
Flash	32MB	Customizable 16MB/8MB
Temperature	Environment temperature：-40℃~85℃	
Humidity	Working：10~95%（noncondensing） Storage：5~95%（noncondensing）	

Size	18mm×35.2mm×2.8mm	

2.2. INTERFACE NUMBER

Interface	Contain interface	Interface supported
WiFi Standard	IEEE 802.11b/g/n	Support
Ethernet Interface	Five 10/100M ETH PORT	1 WAN、4 LAN
UART	3	2 UART support transmitting
SDIO	1	Non support
SPI	1	Non support
I2C	1	Non support
I2S	1	Non support
PWM	1	Non support
GPIO	More than 8	Defined functions

Notes: 1、The module was default embedded our firmware which based on Linux; the Ethernet, WiFi, UART0 and UART1 of the firmware have the function of transmission

2、Based on actual usage, the module also can be embedded OPENWRT program and LINUX program of MTK original plant before sent out.

3. ELECTRICAL CHARACTERISTIC

3.1. POWER SUPPLY REQUIREMENT

Power supply requirement	
Input voltage	DC:3.3±0.2V
Non-load current	170±50mA
Supply current	≥800mA

3.2. RF PERFORMANCE

■ 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

■ 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

■ 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

■ 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. MODULE PINS DEFINITION

4.1. DEFAULT PIN DEFINITION CHART

PIN	Name(Function 1)	Function 2	Function 3	Function 4	GPIO#	Note
1	GND					
2	3.3VD					Supply current≥800mA
3	3.3VD					Supply current≥800mA
4	GND					

5	SPI_CS0				GPIO# 10	SPI bus chip select 0
6	REF_CLK0				GPIO#38	Reference clock output
7	PERST_N				GPIO# 36	PCIe device reset
8	WDT_RST_N				GPIO# 37	Watchdog reset
9	EPHY_LED4	JTAG_RST_ N			GPIO# 39	
10	EPHY_LED3	JTAG_CLK			GPIO# 40	
11	EPHY_LED2	JTAG_TMS			GPIO# 41	
12	EPHY_LED1	JTAG_TDI			GPIO# 42	
13	EPHY_LED0	JTAG_TDO			GPIO# 43	
14	PORST_N					CPU reset
15	UART_TXD1			PWM_CH0	GPIO# 45	Port 1 date transmission
16	UART_RXD1			PWM_CH1	GPIO#46	Port 1 date reception
17	I2S_SDI	PCMDRX			GPIO#0	I2S date input
18	I2S_SDO	PCMDTX			GPIO#1	I2S date output
19	I2S_WS	PCMCLK			GPIO#2	I2S sound channel selection, 0:left; 1:right
20	I2S_CLK	PCMFS			GPIO#3	I2S
21	GND					
22	ANT					Antennal RF interface(not connect)
23	GND					
24	I2C_SCLK				GPIO# 4	I2C
25	I2C_SD				GPIO# 5	I2C
26	SPI_CS1				GPIO# 6	SP 1
27	SPI_CLK				GPIO# 7	SPI
28	SPI_MISO				GPIO# 9	SPI
29	SPI_MOSI				GPIO# 8	SPI
30	GPIO0				GPIO#11	
31	UART_TXD0				GPIO#12	Port 0 date output
32	UART_RXD0				GPIO#13	Port 0 date input
33	WLED_N				GPIO#44	WiFi LED
34	MDI_RP_P0					
35	MDI_RN_P0					

36	MDI_TP_P0					
37	MDI_TN_P0					
38	MDI_TP_P1	SPIS_CS		PWM_CH0	GPIO#14	
39	MDI_TN_P1	SPIS_CLK		PWM_CH1	GPIO#15	
40	MDI_RP_P1	SPIS_MISO		UART_TXD2	GPIO#16	
41	MDI_RN_P1	SPI_MOSI		UART_RXD2	GPIO#17	
42	MDI_RP_P2		eMMC_D7	PWM_CH0	GPIO#18	
43	MDI_RN_P2		eMMC_D6	PWM_CH1	GPIO#19	
44	MDI_TP_P2	UART_TXD2	eMMC_D5	PWM_CH2	GPIO#20	
45	MDI_TN_P2	UART_RXD2	eMMC_D4	PWM_CH3	GPIO#21	
46	MDI_TP_P3	SD_WP	eMMC_WP		GPIO#22	
47	MDI_TN_P3	SD_CD	eMMC_CD		GPIO#23	
48	MDI_RP_P3	SD_D1	eMMC_D1		GPIO#24	
49	MDI_RN_P3	SD_D0	eMMC_D0		GPIO#25	
50	MDI_RP_P4	SD_CLK	eMMC_CLK		GPIO#26	
51	MDI_RN_P4	SD_CMD	eMMC_CMD		GPIO#28	
52	MDI_TP_P4	SD_D3	eMMC_D3		GPIO#29	
53	MDI_TN_P4	SD_D2	eMMC_D2		GPIO#27	
54	USB_DP					
55	USB_DM					
56	GND					

Notes:

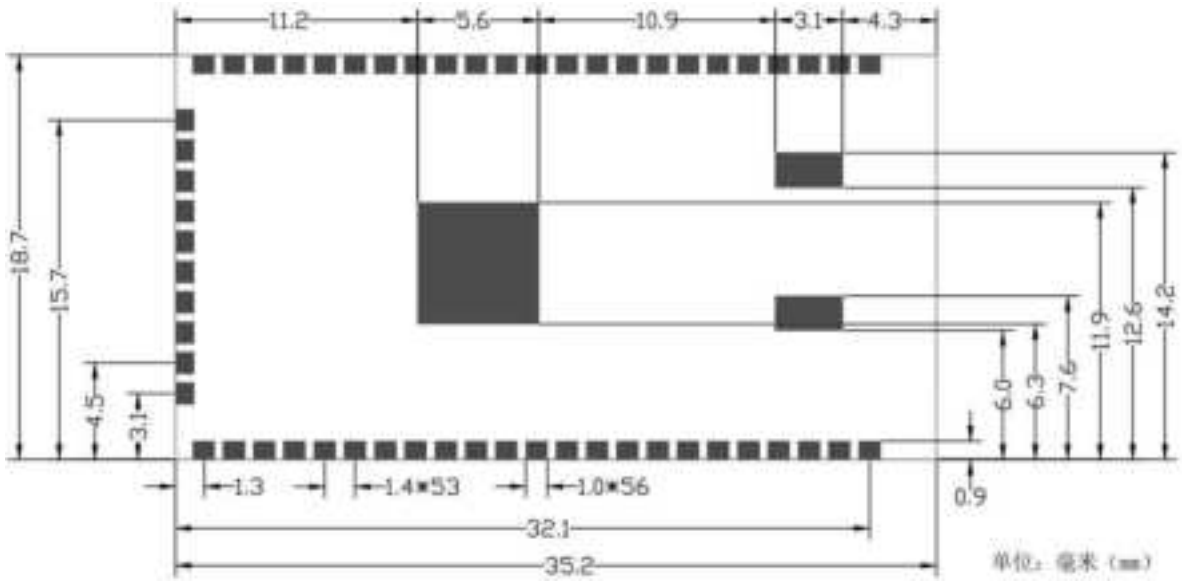
1, All pins default 1,drive current 8MA.

2, Red representation on the name bar: related to the start of the chip, the outside can not be pulled up and down, not connected with the driver source.

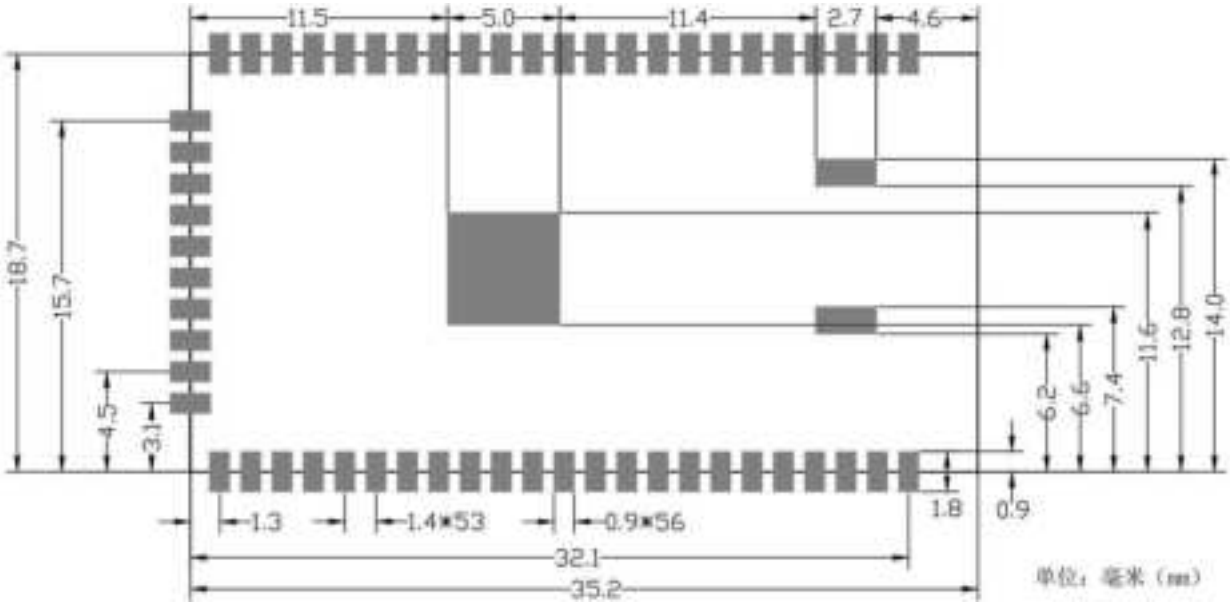
3, Blue representation on the name bar: The default firmware .

4, The module of MT7628NN chip does not have PCIE interface

5. MODULE DIMENSION CHART



Module dimension chart (TOP)



Recommended package size diagram

Notes：

1，The three intermediate pads are hot pads, please ground.

2，Package pad epitaxial size can be appropriately shortened or lengthened according to demand.

6. European label

6.1. European label text version

eVatmaster Consulting GmbH

Bettinastr. 30,60325 Frankfurt am Main,Germany

contact@evatmaster.com

6.2. 7.2European label picture format (for reference only, you can design according to your packaging)

FCC regulatory information

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.
Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user’ s authority to operate the equipment.

End Device Labelling

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains FCC ID: Z4T-WM7628N-A” any similar wording that expresses the same meaning may be used.

RF Exposure Compliance

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Installation Notice

The module is limited to OEM installation ONLY. The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.
The module is limited to installation in mobile application; A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.

FCC Part 15B Compliance of End Device

The OEM integrator is responsible for ensuring that the host product which is installed and operating with the module is in compliant with Part 15B unintentional Radiator requirements, please note that For a Class B digital device or peripheral, the instructions furnished the user manual of the end-user product shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

OEM Installation Guidance Document

FCC ID: Z4T-WM7628N-A

Conditions on using Seeed regulatory approvals:

A. Customer must ensure that its product (the “CUSTOMER Product”) is electrically identical to Seeed reference designs. Customer acknowledges that any modifications to Seeed reference designs may invalidate regulatory approvals in relation to the CUSTOMER Product, or may necessitate notifications to the relevant regulatory authorities.

B. Customer is responsible for ensuring that antennas used with the product are of the same type, with same or lower gains as approved and providing antenna reports to Seeed.

C. Customer is responsible for regression testing to accommodate changes to Seeed reference designs, new antennas, and portable RF exposure safety testing/approvals.

D. Appropriate labels must be affixed to the CUSTOMER Product that comply with applicable regulations in all respects.

E. A user’s manual or instruction manual must be included with the customer product that contains the text as required by applicable law. Without limitation of the foregoing, an example (for illustration purposes only) of possible text to include is set forth below:

1. USA—Federal Communications Commission (FCC)

FCC COMPLIANCE STATEMENT:

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.

INFORMATION TO USER:

2.1 General：

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna

-Increase the distance between the equipment and the receiver.

-Connect the equipment to outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/TV technician for help.

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

System integrators must include the FCC ID on the end product.

2.2 List of applicable FCC rules：

The Seeed module is only FCC authorized (certified) for the transmitterspecific rule parts, FCC 15.247. OEM manufacturer is responsible for compliance to all other FCC rules that apply to the host.

2.3&2.6 Summarize the specific operational use conditions and FCC Radio-Frequency Exposure & Approval Conditions：

Transmitting antenna(s) can only be installed at the display section of computer. When this device

is installed other than notebook computers, at least 20 cm separation distance shall be maintained between the transmitting antenna(s) to the body of user or nearby person.

2.4 Limited module procedures：

The module is an unrestricted module

2.5 Trace antenna designs：

The antenna(s) used for this transmitter must not be collocated or operating in conjunction with any other antenna or transmitter within a host device, except in accordance with FCC multi-transmitter product procedures.

2.7 Antennas：

The module grantee is responsible for providing the documentation to the system integrator on restrictions of use, for continuing compliance of the module including the maximum antenna gain (6dBi), minimum antenna gain (3dBi), Antenna connector is a unique I-PEX connector.

2.8 Label and compliance information：

The regulatory label on the final system must include the statement: “ Contains FCC ID:Z4T-WM7628N-A” using electronic labeling method as documented in KDB 784748.

2.9 Information on test modes and additional testing requirements：

OEM manufacturer should perform additional verification/validation on supported modes and is responsible for validation testing of module + host.

The final system integrator must ensure there is no instruction provided in the user manual or customer documentation indicating how to install or remove the transmitter module except such device has implemented two-ways authentication between moduleand the host system.

2.10 Additional testing, Part 15 Subpart B disclaimer：

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

7. It is forbidden to operate transmitters outside the 2.4-2.4835 GHz frequency band to control or communicate

8. The certified WLAN module will be installed in mobile application.

9.This module is for integration into a host system which is intended.