



EICUT

MT7628 Module manual

Read Manual

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Revision History

Date	Version	Description	Author
2026-04-04	1.0.0	Creation of the document	Sam

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1. Product Overview

The MT7628 module is a compact embedded networking platform based on the MediaTek MT7628 system-on-chip (SoC). It is designed to provide integrated Wi-Fi connectivity, Ethernet networking, and multiple hardware interfaces in a single module, making it suitable for embedded networking and IoT applications.

The module integrates the main processor, wireless communication circuitry, and peripheral interfaces on a single board. This integration simplifies hardware design and allows developers to quickly build devices that require reliable network connectivity.

The MT7628 supports 2.4 GHz Wi-Fi communication, enabling devices to connect to wireless networks or operate as an access point. In addition to wireless connectivity, the module includes several Ethernet interfaces, allowing it to function in wired networking applications such as routers, gateways, and network controllers.

To support communication with external components, the module exposes multiple hardware interfaces, including UART, SPI, I2S, USB, and PCIe. These interfaces allow the module to interact with microcontrollers, sensors, storage devices, audio components, and other peripheral hardware.

The module operates with a 3.3 V power supply and includes several control and reset pins such as PERST_N and CPURST_N, which manage system initialization and boot behavior. Boot configuration is determined through dedicated bootstrap pins that define the device's startup mode during power-up.

Because of its integrated networking capabilities and flexible interfaces, the MT7628 module is widely used in applications such as wireless routers, IoT gateways, smart home devices, industrial controllers, and embedded communication systems.

In summary, the MT7628 module provides a compact and efficient solution for adding network processing, Wi-Fi connectivity, and multiple peripheral interfaces to embedded systems.

1.1. MT7628 Module Pinout

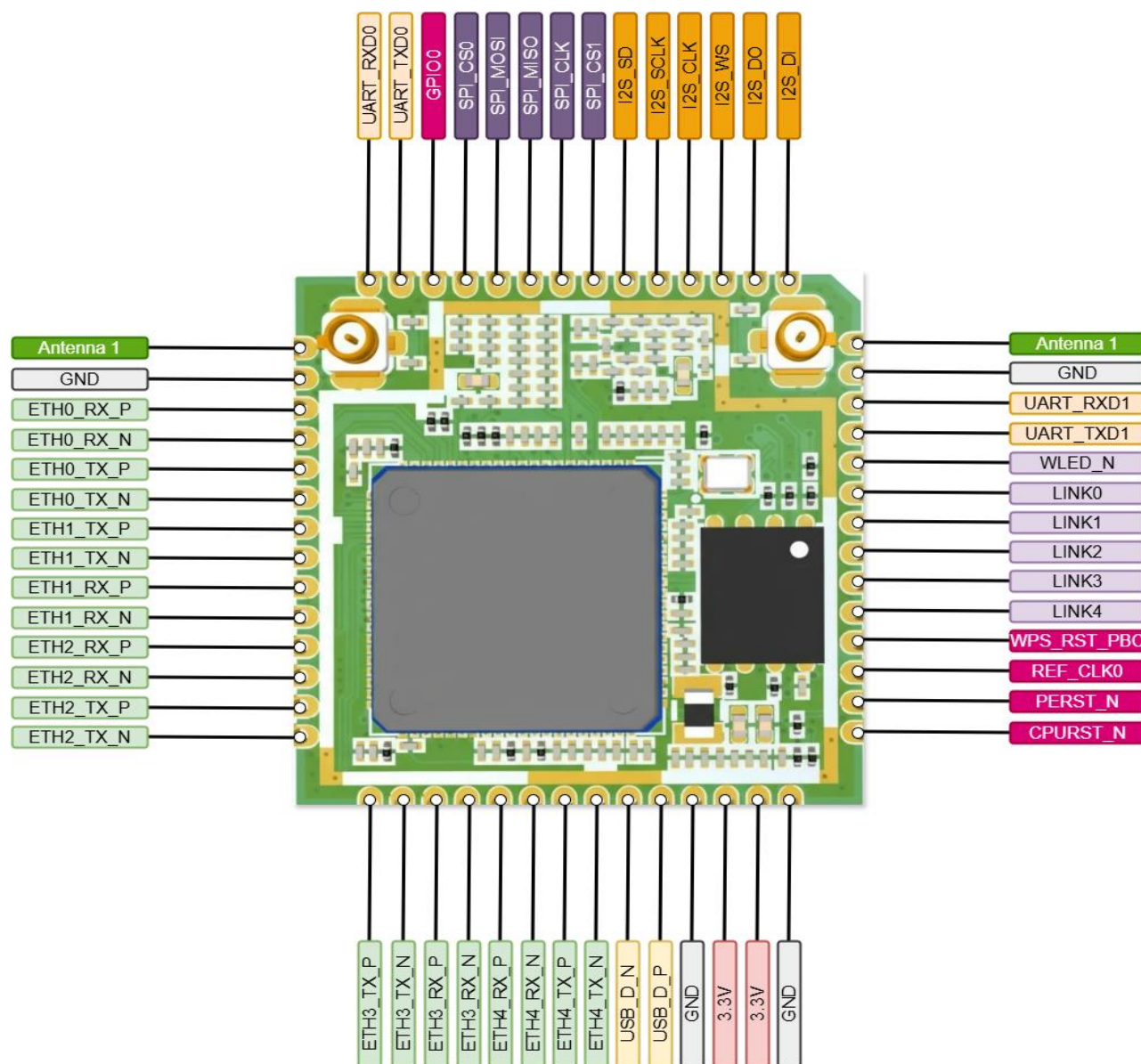


Figure 1-Top View of module

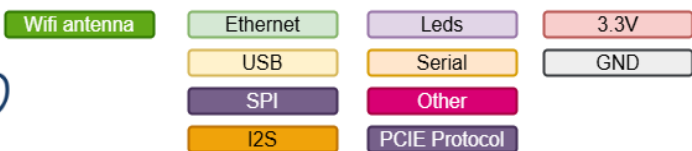
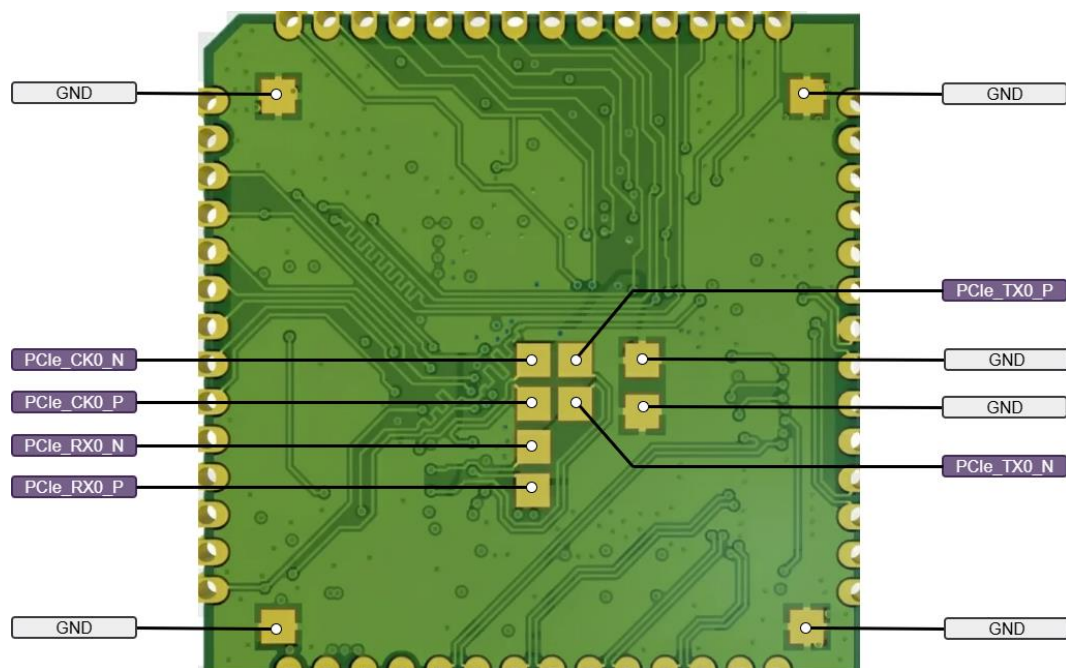


Figure 2-Bottom view of module

Table 1-Module Pinout

#	Pin name	type	Drive	Description
1	ANT0			Antenna 0 input
2	GND			Ground pin
3	UART_RXD1	I	4mA	UART1 Lite RXD
4	UART_TXD1	O,IPD	4mA	UART1 Lite TXD
5	WLED	O	4mA	WLAN Activity LED
6	LINK0	I/O	4mA	10/100 PHY Port #0 activity LED,JTAG_TDO
7	LINK1	I/O	4mA	10/100 PHY Port #1 activity LED,JTAG_TDI
8	LINK2	I/O	4mA	10/100 PHY Port #2 activity LED,JTAG_TMS
9	LINK3	I/O	4mA	10/100 PHY Port #3 activity LED,JTAG_CLK
10	LINK4	I/O	4mA	10/100 PHY Port #4 activity LED,JTAG_TRST_N

11	WPS_RST_PBC	O	4mA	Watchdog time out reset
12	REF_CLK0	O,IPD	4mA	Reference Clock Output
13	PERST_N	I,IPU	4mA	PCIe device reset
14	CPURST_N	I,IPU	4mA	Power on reset
15	GND			Ground pin
16	3.3V			3.3 V power supply
17	3.3V			3.3 V power supply
18	GND			Ground pin
19	USB_D_P	I/O		USB Port 0 data pin Data +
20	USB_D_N	I/O		USB Port 0 data pin Data -
21	ETH4_TX_N	A		10/100 PHY Port #4 TXN
22	ETH4_TX_P	A		10/100 PHY Port #4 TXP
23	ETH4_RX_N	A		10/100 PHY Port #4 RXN
24	ETH4_RX_P	A		10/100 PHY Port #4 RXP
25	ETH3_RX_N	A		10/100 PHY Port #3 RXN
26	ETH3_RX_P	A		10/100 PHY Port #3 RXP
27	ETH3_TX_N	A		10/100 PHY Port #3 TXN
28	ETH3_TX_P	A		10/100 PHY Port #3 TXP
29	ETH2_TX_N	A		10/100 PHY Port #2 TXN
30	ETH2_TX_P	A		10/100 PHY Port #2 TXP
31	ETH2_RX_N	A		10/100 PHY Port #2RXN
32	ETH2_RX_P	A		10/100 PHY Port #2 RXP
33	ETH1_RX_N	A		10/100 PHY Port #1 RXN
34	ETH1_RX_P	A		10/100 PHY Port #1 RXP
35	ETH1_TX_N	A		10/100 PHY Port #1 TXN
36	ETH1_TX_P	A		10/100 PHY Port #1 TXP
37	ETH0_TX_N	A		10/100 PHY Port #0 TXN
38	ETH0_TX_P	A		10/100 PHY Port #0 TXP
39	ETH0_RX_N	A		10/100 PHY Port #0 RXN
40	ETH0_RX_P	A		10/100 PHY Port #0 RXP
41	GND			Ground pin
42	Antenna 1			Antenna 1 input
43	UART_RXD0	I	4mA	UART1 Lite RXD
44	UART_TXD0	O,IPD	4mA	UART1 Lite TXD
45	GPIO0	I/O,IPD	4mA	General Purpose I/O
46	SPI_CS0	O	4mA	SPI chip select 0
47	SPI_MOSI	I/O,IPD	4mA	SPI Master output/Slave input

48	SPI_MISO	I/O	4mA	SPI Master input/Slave output
49	SPI_CLK	O	4mA	SPI clock
50	SPI_CS1	O,IPD	4mA	SPI chip select 1
51	I2C_SD		4mA	I2CData
52	I2C_SCLK		4mA	I2CClock
53	I2S_CLK	I/O	4mA	I2Sclock
54	I2S_WS	O	4mA	I2S word select
55	I2S_DO	I/O,IPD	4mA	I2S data out put
56	I2S_DI	O	4mA	I2S data input
57	GND			Ground pin
58	GND			Ground pin
59	GND			Ground pin
60	GND			Ground pin
61	PCIE_CK0_N	I/O		External reference clock output (negative)
62	PCIE_CK0_P	I/O		External reference clock output (positive)
63	PCIE_RX0_N	I/O		PCIe 0 differential Receiver RX
64	PCIE_RX0_P	I/O		PCIe 0 differential Receiver RX
65	PCIE_TX0_P	I/O		PCIe 0 differential transmit TX
66	PCIE_TX0_N	I/O		PCIe 0 differential transmit TX

Note

IPD : Internal pull-down

IPU : Internal pull-up

I : Input

O : Output

IO : Bi-directional

P : Power

G : Ground

NC : Notconnected

2. Bootstrap Configuration

The bootstrapping pins of the MT7628 are configured using pull-up and pull-down resistors to define the default operating mode during power-up. As shown in the schematic, 4.7 k Ω resistors are used to set the logic level of each bootstrap pin.

In this configuration, UART_TXD0, I2S_DO, SPI_MOSI, and SPI_CS1 are pulled down to GND, while PERST_N, UART_TXD1, and SPI_CLK are pulled up to 3.3V. These default states determine the chip boot mode, enable normal operating mode, and select the appropriate clock and interface settings when the device starts.

This resistor network ensures that the MT7628 enters the intended boot configuration reliably at power-up.

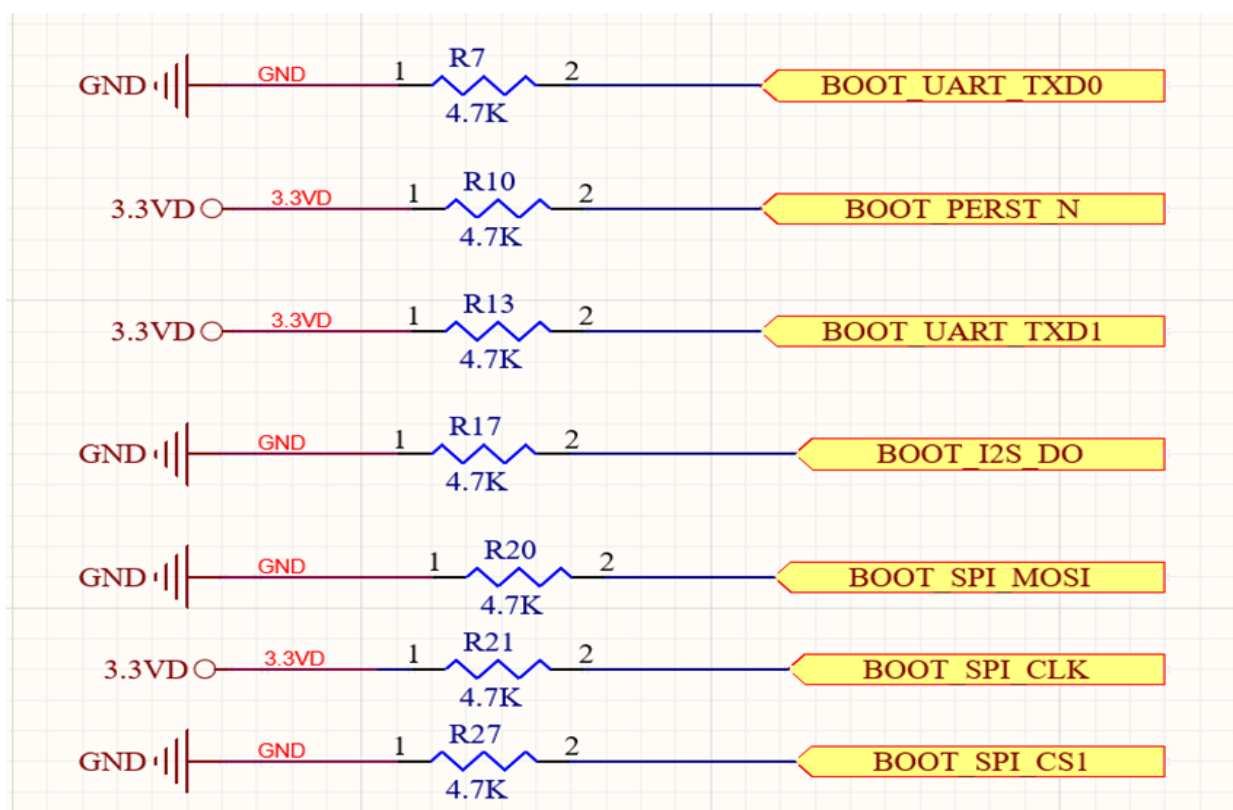


Figure 3-Bootstrap Configuration

2.1. Bootstrapping Pins Description

Table 2-Bootstrapping Pins Description

Pin Name	Boot Strapping Signal Name	Description
UART_TXD1	DBG_JTAG_MODE	0: JTAG_MODE 1: EPHY_LED (default)
PERST_N	XTAL_FREQ_SEL	0: 25 MHz DIP 1: 40 MHz SMD
I2S_SDO	DRAM_TYPE	1: DDR1 0: DDR2 [note] This pin is valid for MT7628AN only. It needs to be pull-low for 7628KN which only supports DDR1.
{SPI_MOSI SPI_CLK, SPI_CS1}	CHIP_MODE[2:0]	A vector to set chip function/test/debug modes. 000 : Boot from PLL (boot from SPI 3-Byte Addr) 001 : Boot from PLL (boot from SPI 4-Byte Addr) 010 : Boot from XTAL (boot from SPI 3-Byte Addr) 011 : Boot from XTAL (boot from SPI 4-Byte Addr)
UART_TXD0	EXT_BGCK	1: Test Mode 0: Normal (default)

3. Maximum Ratings and Operating Conditions

Table 3-Absolute Maximum Ratings

Parameter	Rating
I/O supply voltage	3.63 V
Input, Output, or I/O Voltage	GND -0.3 V to Vcc +0.3 V

Table 4-Maximum Temperatures

Parameter	Rating
Maximum Junction Temperature (Plastic Package)	125 °C
Maximum Lead Temperature (Soldering 10 s)	260 °C

Table 5-Operating Conditions

Parameter	Rating
I/O supply voltage	3.3 V $\pm$ 10%
DDR1 supply voltage	2.5 V $\pm$ 5%
DDR2 supply voltage	1.8 V $\pm$ 5%
Core supply voltage	1.2 V $\pm$ 10%
Ambient Temperature Range	-20 to 55 °C

3.1. Thermal Characteristics

Thermal characteristics without an external heat sink in still air conditions.

Table 6-MT7628KN Thermal characteristics

Parameter	Rating
Thermal Resistance θ_{JA} (°C/W) for JEDEC 2L system PCB	26.1°C/W
Thermal Resistance θ_{JA} (°C/W) for JEDEC 4L system PCB	17.72°C/W
Thermal Resistance θ_{JC} (°C/W) for JEDEC	6.5°C/W
Thermal Resistance ψ_{JT} (°C/W) for JEDEC 2L system PCB	1.81°C/W

Thermal Resistance ψ_{JT} ($^{\circ}\text{C}/\text{W}$) for JEDEC 4L system PCB	1.18$^{\circ}\text{C}/\text{W}$
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Table 7-MT7628NN Thermal characteristics

Parameter	Rating
Thermal Resistance θ_{JA} ($^{\circ}\text{C}/\text{W}$) for JEDEC 2L system PCB	27.01$^{\circ}\text{C}/\text{W}$
Thermal Resistance θ_{JA} ($^{\circ}\text{C}/\text{W}$) for JEDEC 4L system PCB	18.15$^{\circ}\text{C}/\text{W}$
Thermal Resistance θ_{JC} ($^{\circ}\text{C}/\text{W}$) for JEDEC	6.9$^{\circ}\text{C}/\text{W}$
Thermal Resistance ψ_{JT} ($^{\circ}\text{C}/\text{W}$) for JEDEC 2L system PCB	2.41$^{\circ}\text{C}/\text{W}$
Thermal Resistance ψ_{JT} ($^{\circ}\text{C}/\text{W}$) for JEDEC 4L system PCB	1.51$^{\circ}\text{C}/\text{W}$

3.2. DC Electrical Characteristics

Table 8-DC Electrical Characteristics

Parameter	Sym	Conditions	Min	Typ	Max	Unit
3.3 V supply voltage (IO)	Vddc33	-	2.97	3.3	3.63	V
2.5 V supply voltage (DDR1)	Vdd25	-	2.375	2.5	2.625	V
1.8 V supply voltage (DDR2)	Vdd18	-	1.71	1.8	1.89	V
1.2 V supply voltage	Vdd12	-	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
DDR2 Current	Icc18	-	-	-	-	mA

4. Dimension

The following Figure indicates the dimensions of the MT7628-Module.

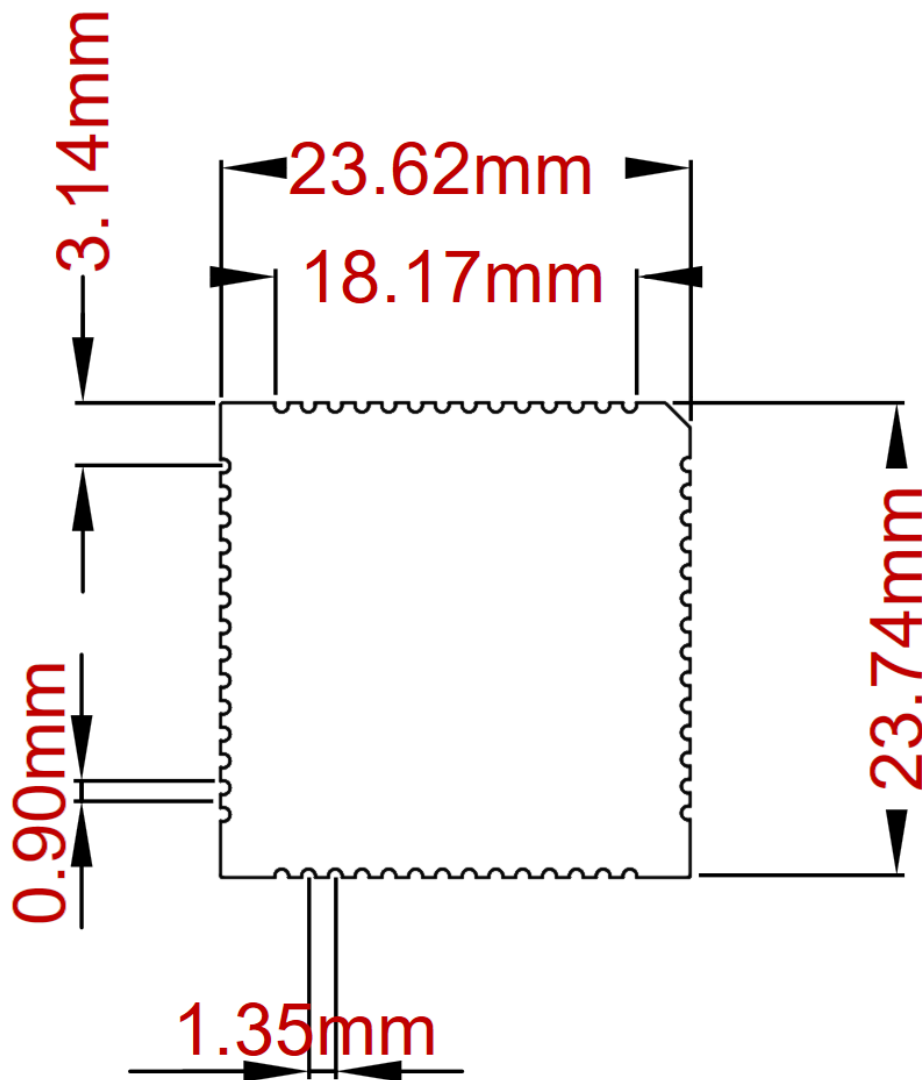


Figure 4-Top View

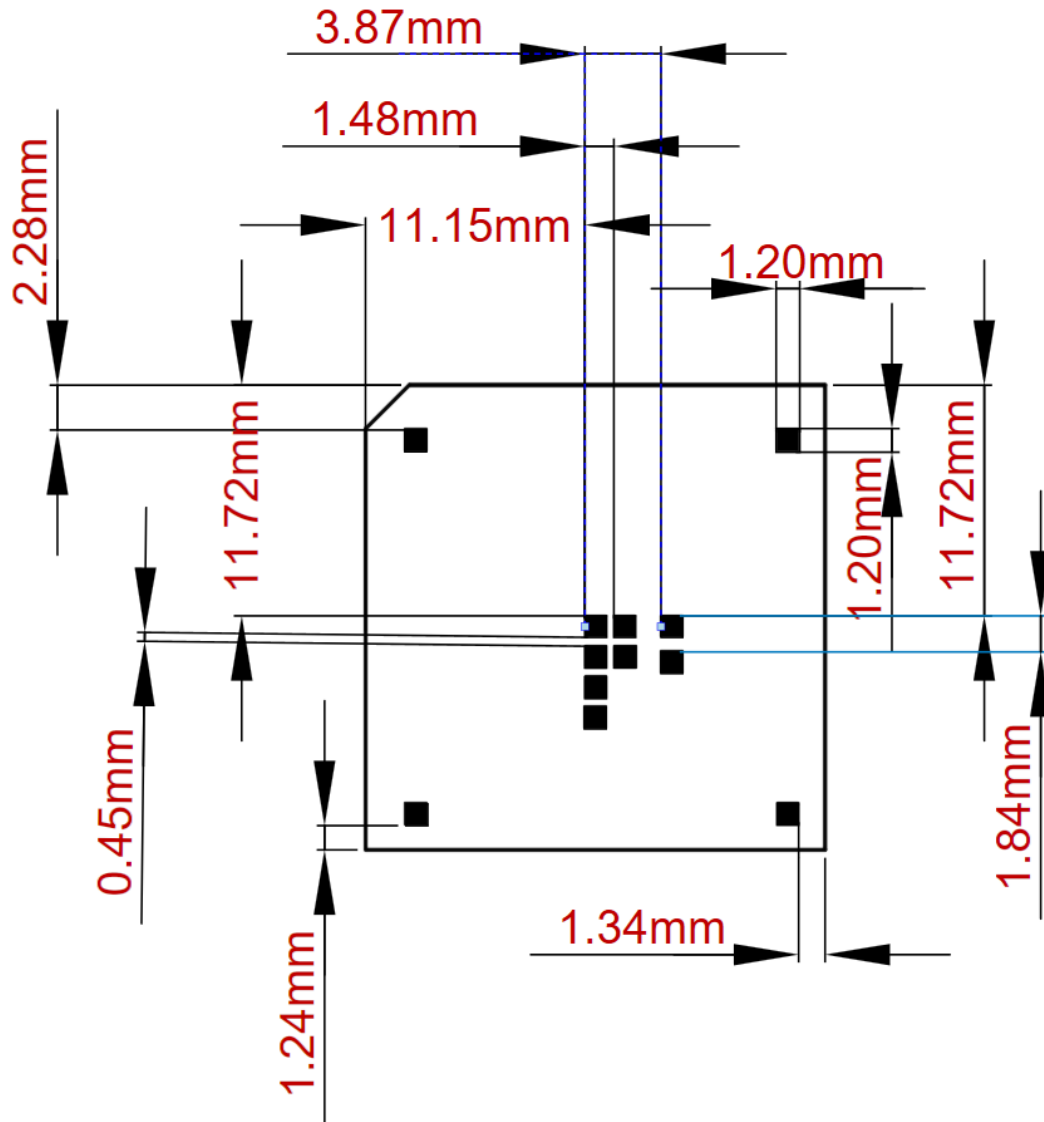


Figure 5-Bottom view