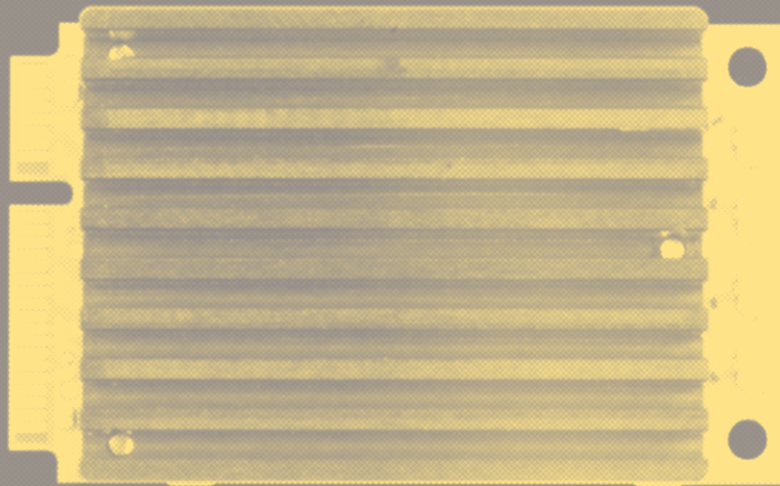




Mini Pini is an 802.11ax Wi-Fi 6 radio module for ultra-high speed enterprise connectivity. Device comes out in three different versions:

Mini Pini 4x4 is based on Qualcomm QCN9074 chipset for 2.4/5GHz IEEE802.11ax/ac/n/g/b/a applications. New radio can perform station functionality with 4x4 MIMO (4 spatial streams). It is a wireless LAN radio with native 160 MHz support. 4x4 version comes out in industrial (-40-85°C) temperature range, and also in commercial (0-60°C) temperature range.

Mini Pini 2x2 is based on Qualcomm QCN9072 chipset for 2.4/5GHz IEEE802.11ax/ac/n/g/b/a applications. This radio can perform station functionality with 2x2 MIMO (2 spatial streams). It is a wireless LAN radio with native 160 MHz support. 2x2 version comes out in industrial (-40-85°C) temperature range.

Features

- 2x2/4x4 160MHz 802.11ax Wi-Fi 6 PCIe radio module
- Dual band: 2.4 GHz, 5 GHz full band support
- PCI Express 3.0 dual-lane interface
- 30x50.95x15.05mm size PCIe radio card
- Dual-synthesizer WLAN radio up to 160MHz bandwidth support
- Supports 20/40 MHz in 2.4 GHz
- Supports 20/40/80/160 MHz in 5 GHz
- Data rates of up to 4804 Mbps in 802.11ax 160 MHz 4x4 channels in 5GHz
- Data rates of up to 1147 Mbps in 802.11ax 40 MHz 4x4 channels in 2.4GHz mode
- Data rates of up to 2402 Mbps in 802.11ax 160 MHz 2x2 channels in 5GHz
- Data rates of up to 573.5 Mbps in 802.11ax 40 MHz 2x2 channels in 2.4GHz mode
- DL/UL MU-MIMO, up to 4 users per PPDU
- DL/UL MU-OFDMA, up to 37 users per PPDU
- TxBF, MU-MIMO, MU-OFDMA/TxBF, ML, STBC
- Dynamic frequency selection (DFS) and Agile DFS (dynamic switching between 4 and 3+1)
- PTA (3-wire) and WCI/MCI (2-wire) coexistence
- 802.11e-compatible bursting
- Supports monitor mode
- AES-CCMP/GCMP at 128/256 bits
- WEP, TKIP, WAPI-2 hardware encryption
- WPA/WPA2-Personal/WPA2-Enterprise and WPA3 Personal
- FIPS ECB

Table of Contents

1. Specification	3
2. Module pin out and Pin description	4
3. Electrical characteristics	6
Radio characteristics per chain	
3.1. Mini Pini 4x4	
3.2. Mini Pini 2x2	
4. Mechanical characteristics	7
5. Ordering information	8
6. Module Warning	9
7. FCC Warning	10
8. IC Warning	10
9. Document Revision History	10

1. Specification

Platform	
Chipset code	QCN-9074/QCN-9072
Interface	Mini-PCIe card
Linux Support	QSDK
Mainline Kernel	from 4.4.60 upward
Wi-Fi	
Standard	802.11 a/b/g/n/ac/ax
Band	2.4/5
MIMO	MU-MIMO 4x4, MIMO 2x2
Monitor Mode	yes
Antenna Connector	U.FL
Module Spec	
Power Supply	3.3V
Temperature Range	0°C to 65°C or -40°C to 85°C
Dimension (mm)	30x50.95x15.05xmm
Reference Design	PN02.7
Certifications	TBD

You can find quick user guide and more documentation about Mini Pini at: <https://wiki.8devices.com/minipini>

2. Module pin out and Pin description

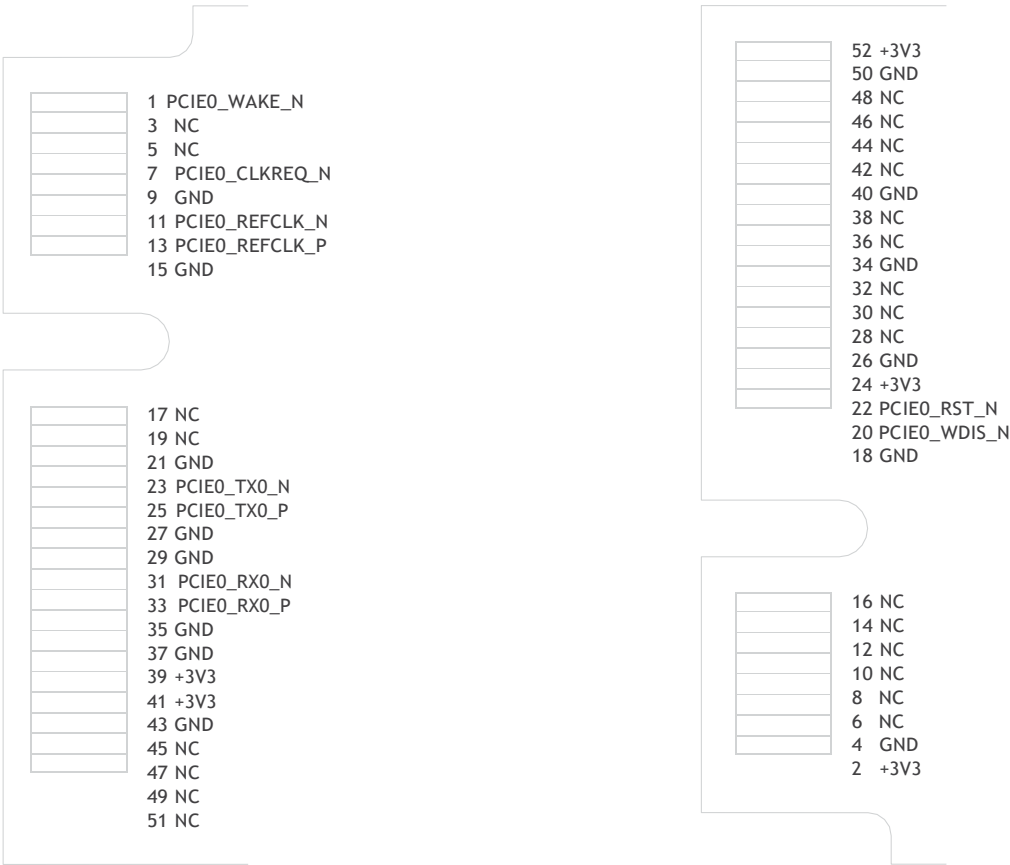


TABLE 3-1. I/O DESCRIPTION (PIN TYPE) PARAMETERS

Symbol	Description
GND	Ground
NC	Not connected
I	Digital input signal
O	Digital output signal
B	Digital bidirectional signal

TABLE 3-2. POWER, GROUND, NC

Pin ID	Pin name	Type	Description
2, 24, 39, 41, 52	+3V3	I	3.3V input voltage
4, 9, 15, 18, 21, 26, 27, 29, 34, 35, 37, 40, 43, 50	GND	GND	Ground
3, 5, 6, 8, 9, 10, 12, 14, 15, 16, 17, 19, 28, 30, 32, 36, 38, 42, 44, 45, 46, 47, 48, 49, 51, 20	NC	NC	NC

TABLE 3-3. PCIE GEN3

Pin ID	Pin name	Type	Description
7	PCIE0_CLKREQ_N	B	PCIe clock request
22	PCIE0_RST_N	I	PCIe reset
1	PCIE0_WAKE_N	B	PCIe wake
11	PCIE0_REFCLK_N	I	Reference clock
13	PCIE0_REFCLK_P	I	
23	PCIE0_TX0_N	O	PCIe transmitter differential signal
25	PCIE0_TX0_P	O	
33	PCIE0_RX0_P	I	PCIe receiver differential signal
31	PCIE0_RX0_N	I	

3. Electrical characteristics

TABLE 4-1. POWER SUPPLY DC CHARACTERISTICS

Symbol	Parameter	Minimum	Typical	Maximum	Units
+3V3	3.3 V Supply voltage	3	3.3	3.6	V
	3.3 V Supply current			3	A

TABLE 4-2. POWER CONSUMPTION MINI PINI 4X4

Scenario		Voltage V	Current, A	Total power W
TX	MCS0	3.3	2.4	7.92
	MCS11	3.3	1.74	5.76
RX	MCS0	3.3	0.8	2.64
	MCS11	3.3	0.76	2.52
Max throughput client side	MCS0	3.3	3.01	9.96
	MCS11	3.3	2.43	8.04

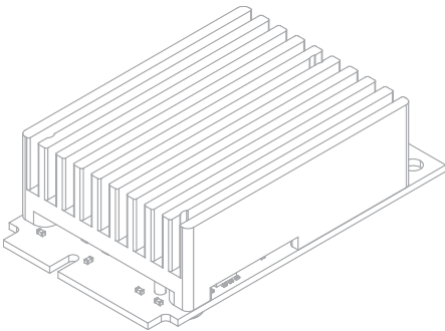
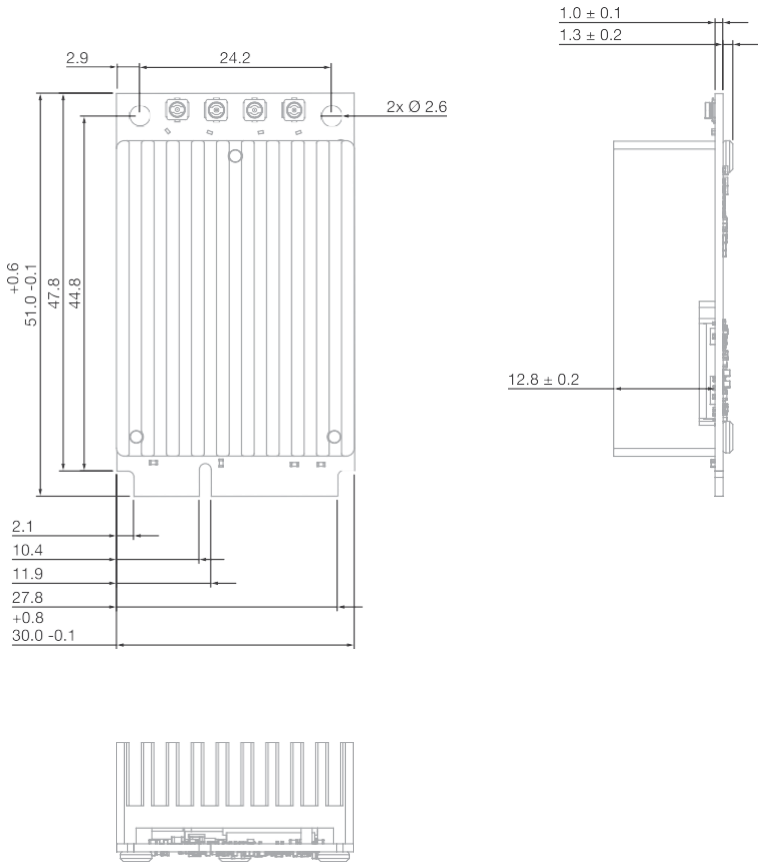
TABLE 4-3. POWER CONSUMPTION MINI PINI 2X2

Scenario		Voltage V	Current, A	Total power W
TX	MCS0	3.3	1.66	5.52
	MCS11	3.3	1.27	4.2
RX	MCS0	3.3	0.61	2.04
	MCS11	3.3	0.58	1.92
Max throughput client side	MCS0	3.3	2.21	7.32
	MCS11	3.3	1.7	5.64

TABLE 4-4. TEMPERATURE LIMIT RATINGS

Parameter	Minimum	Maximum	Units
Storage Temperature (Commercial)	0	+110	°C
Storage Temperature (Industrial)	-40	+110	°C
Commercial Operating Temperature	0	+65	°C
Industrial Operating Temperature	-40	+85	°C
Humidity	30	60	%RH
Storage humidity	15	70	%RH

4. Mechanical characteristics



5. Ordering information

TABLE. 7-1. MINI PINI RADIO CARD ORDER NUMBERS AND DESCRIPTIONS

Order Number	Description
MiniPini25 4x4	Mini-PCle 4x4 radio card, commercial temperature grade, 0-60°C
MiniPini25-I 4x4	Mini-PCle 4x4 radio card, industrial temperature grade, -40+85°C
MiniPini25 2x2	Mini-PCle 2x2 radio card, commercial temperature grade, 0-60°C
MiniPini25-I 2x2	Mini-PCle 2x2 radio card, industrial temperature grade, -40+85°C

6. Module warning

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01r01.

13.1 List of applicable:

FCC rules CFR 47 FCC PART 15 SUBPART C&E has been investigated. It is applicable to the modular.

13.2 Specific operational use conditions:

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

13.3 Limited module procedures:

Not applicable

13.4 Trace antenna designs:

Not applicable

13.5 RF exposure considerations:

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance of 20cm from your body.

13.6 Antennas:

This radio transmitter FCC ID: Z9W-MP25 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna Manufacturer	Antenna Chain	Antenna type	Input impedance (Ohm)	Maximum antenna gain
LYNwave Headquarter	chain 0 & chain 1 & chain 2 & chain 3	monopole	50	3.3 dBi/2.4-2.5GHz 3.3 dBi/5.15-5.25GHz 3.3dBi/5.25-5.35GHz 4.6dBi/5.45-5.725GHz 4.6dBi/5.725-5.85GHz

13.7 Label and compliance information:

The final end product must be labeled in a visible area with the following" Contains FCC ID: Z9W-MP25

13.8 Information on test modes and additional testing requirements:

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

13.9 Additional testing, Part 15 Subpart B disclaimer:

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.

This radio transmitter [IC:11468A-MP25 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device. The antenna gain is 3.3 dBi/2.4-2.5GHz, 3.3 dBi/5.15-5.25GHz, 3.3dBi/5.25-5.35GHz, 4.6dBi/5.45-5.725GHz, 4.6dBi/5.725-5.85GHz, Antenna type: Monopole

Cet émetteur radio [IC:11468A-MP25] a été approuvé par innovation, science et développement économique Canada pour fonctionner avec les types d'antennes énumérés ci - dessous et pour afficher le gain maximal admissible. Le gain du type d'antenne non inclus dans cette liste est supérieur au gain maximal de l'un des types énumérés et ne doit pas être utilisé avec cet équipement. Le gain d'antenne est de 3.3 dBi/2.4-2.5GHz, 3.3 dBi/5.15-5.25GHz, 3.3dBi/5.25-5.35GHz, 4.6dBi/5.45-5.725GHz, 4.6dBi/5.725-5.85GHz, Type d'antenne: Monopole

7. FCC Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

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

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.

FCC Radiation Exposure Statement:

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

8. IC Warning

This device complies with Innovation, Science and Economic Development Canada licence-exempt RSS standard (s). Operation is subject to the following two conditions:

- This device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation of the device.

Le onjunc areil est conforme aux CNR d' l'innovation, la science et le développement économique Canada licables aux areils radio exempts de licence:

L'exploitation est autorisée aux deux conditions suivantes:

- L'areil ne doit pas produire de brouillage.
- L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, onj si le brouillage est susceptible d'en compromettre le fonctionnement.

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

Tous les changements ou modifications non expressément approuvée par le responsable de la conformité pourrait vider l'utilisateur est habilité à exploiter l'équipemen.

ISED Radiation Exposure Statement

This equipment complies with Canada 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.

Déclaration d'exposition aux radiations

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

9. Document Revision History

Revision	Revision Date	Description
v1.0	2023-05-30	Initial release
v1.1	2023-12-18	Updated 4/5. Tables, 6 mechanical characteristics
v1.2	2024-01-12	Updated Table 4-2
v1.3	2024-01-23	Added Mini Pini 2x2 information about radio performance and power consumption
v1.4	2024-07-09	Added Module, FCC, IC warnings