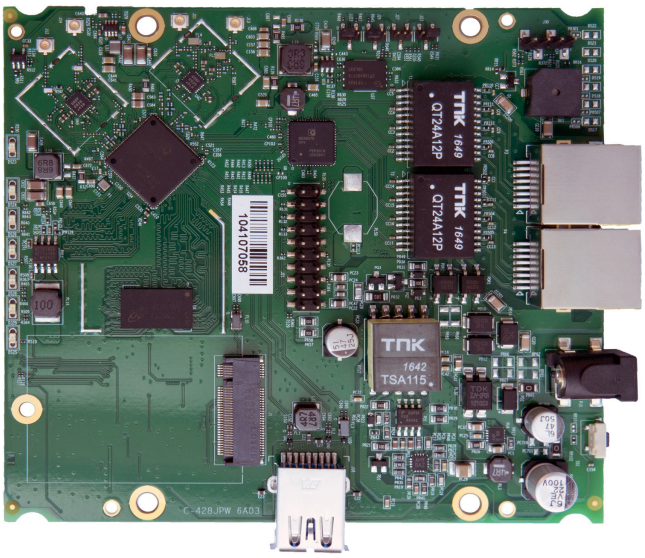
Multi-function IPQ4028 Embedded Board with on-board Wireless

710MHz CPU / 2x GE Port / Dual Band 802.11ac Wave 2



Model: WPJ428

KEY FEATURES

- Qualcomm Atheros IPQ4028 Quad-core ARM cortex-A7 710MHz CPU
- 2x2 On-board 5GHz radio, up to 867Mbps physical data rate
- 2x2 On-board 2.4GHz radio, up to 300Mbps physical data rate

APPLICATIONS

- 802.11n/ac Access Point
- Point-to-Point High Capacity Wireless Router

Specifications

Chipset	CPU: Qualcomm Atheros IPQ4028 710MHz
Reference Design	DK03
System Memory	256MB DDR3
NOR Flash	32MB
NAND Flash	128MB
Wireless	On-board 2x2 2.4GHz 802.11b/g/n On-board 2x2 5GHz 802.11a/n/ac 4x U.FL connectors
Frequency Range	2.412~2.462GHz, 5.180~5.320GHz, 5.500~5.720GHz, 5.745~5.825GHz
Modulation Techniques	OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Interface	2x Gigabit Ethernet LAN RJ45 Port with Auto MDI-X 1x USB 3.0 Port 1x M.2 (NGFF) “B Key” Socket for 4G Module (Note1) Note1: The configuration is not applicable for this FCC applicant. FCC ID: TK4WPJ428
Reset Button	1x F/W Reset Button
LED	7x LED Indicators for MMZ/MMS/MPS
Power over Ethernet	Passive PoE 24V, for network cable length < 20m (LV version), IEEE 802.3af/at or Passive PoE 48V (HV version)
DC Power	1x DC Jack Connector: 24V (LV version), 48V (HV version)
Power Consumption (Board Only)	19W
Operating Voltage	3.3V, 5V
Operating System	Compex OS
Certification	RoHS Compliance
Environmental	Temperature: Operating: -20°C to 70°C, Storage: -40°C to 90°C Humidity (non-condensing): Operating: 5% to 95%, Storage: Max. 90%
Dimensions (W x H x D)	117 x 105 x 32 mm
Extras	2 x SIM Card Slots (Note2) Note2: The configuration is not applicable for this FCC applicant. 1 x Buzzer
Other Features	Surge Suppressor

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RF Performance Table

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
2.4GHz 802.11b	1Mbps	20dBm		±2dB
	2Mbps	20dBm		±2dB
	5.5Mbps	20dBm		±2dB
	11Mbps	20dBm		±2dB
2.4GHz 802.11g	6Mbps	18dBm		±2dB
	9Mbps	18dBm		±2dB
	12Mbps	18dBm		±2dB
	18Mbps	18dBm		±2dB
	24Mbps	18dBm		±2dB
	36Mbps	17dBm		±2dB
	48Mbps	16dBm		±2dB
	54Mbps	15dBm		±2dB
2.4GHz 802.11n/ac VHT20	MCS 0	18dBm	21dBm	±2dB
	MCS 1	18dBm	21dBm	±2dB
	MCS 2	18dBm	21dBm	±2dB
	MCS 3	18dBm	21dBm	±2dB
	MCS 4	17dBm	20dBm	±2dB
	MCS 5	16dBm	19dBm	±2dB
	MCS 6	15dBm	18dBm	±2dB
	MCS 7	14dBm	17dBm	±2dB
	MCS 8	13dBm	16dBm	±2dB
2.4GHz 802.11n/ac VHT40	MCS 0	17dBm	20dBm	±2dB
	MCS 1	17dBm	20dBm	±2dB
	MCS 2	17dBm	20dBm	±2dB
	MCS 3	17dBm	20dBm	±2dB
	MCS 4	17dBm	20dBm	±2dB
	MCS 5	16dBm	19dBm	±2dB
	MCS 6	15dBm	18dBm	±2dB
	MCS 7	14dBm	17dBm	±2dB
	MCS 8	13dBm	16dBm	±2dB
	MCS 9	12dBm	15dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
2.4GHz 802.11b	1Mbps	TBA	±2dB
	2Mbps	TBA	±2dB
	5.5Mbps	TBA	±2dB
	11Mbps	TBA	±2dB
2.4GHz 802.11g	6Mbps	-94dBm	±2dB
	9Mbps	-93dBm	±2dB
	12Mbps	-92dBm	±2dB
	18Mbps	-90dBm	±2dB
	24Mbps	-87dBm	±2dB
	36Mbps	-85dBm	±2dB
	48Mbps	-81dBm	±2dB
	54Mbps	-77dBm	±2dB
2.4GHz 802.11n/ac VHT20	MCS 0	TBA	±2dB
	MCS 1	TBA	±2dB
	MCS 2	TBA	±2dB
	MCS 3	TBA	±2dB
	MCS 4	TBA	±2dB
	MCS 5	TBA	±2dB
	MCS 6	TBA	±2dB
	MCS 7	TBA	±2dB
	MCS 8	TBA	±2dB
2.4GHz 802.11n/ac VHT40	MCS 0	TBA	±2dB
	MCS 1	TBA	±2dB
	MCS 2	TBA	±2dB
	MCS 3	TBA	±2dB
	MCS 4	TBA	±2dB
	MCS 5	TBA	±2dB
	MCS 6	TBA	±2dB
	MCS 7	TBA	±2dB
	MCS 8	TBA	±2dB
	MCS 9	TBA	±2dB

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RF Performance Table

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
5GHz 802.11a	6Mbps	16dBm		±2dB
	9Mbps	16dBm		±2dB
	12Mbps	16dBm		±2dB
	18Mbps	16dBm		±2dB
	24Mbps	16dBm		±2dB
	36Mbps	15dBm		±2dB
	48Mbps	14dBm		±2dB
	54Mbps	13dBm		±2dB
5GHz 802.11n/ac VHT20	MCS 0	16dBm	19dBm	±2dB
	MCS 1	16dBm	19dBm	±2dB
	MCS 2	16dBm	19dBm	±2dB
	MCS 3	16dBm	19dBm	±2dB
	MCS 4	15dBm	18dBm	±2dB
	MCS 5	14dBm	17dBm	±2dB
	MCS 6	13dBm	16dBm	±2dB
	MCS 7	12dBm	15dBm	±2dB
	MCS 8	12dBm	15dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 0	16dBm	19dBm	±2dB
	MCS 1	16dBm	19dBm	±2dB
	MCS 2	16dBm	19dBm	±2dB
	MCS 3	16dBm	19dBm	±2dB
	MCS 4	16dBm	19dBm	±2dB
	MCS 5	16dBm	19dBm	±2dB
	MCS 6	14dBm	17dBm	±2dB
	MCS 7	13dBm	16dBm	±2dB
	MCS 8	12dBm	15dBm	±2dB
	MCS 9	11dBm	14dBm	±2dB
5GHz 802.11ac VHT80	MCS 0	16dBm	19dBm	±2dB
	MCS 1	16dBm	19dBm	±2dB
	MCS 2	16dBm	19dBm	±2dB
	MCS 3	16dBm	19dBm	±2dB
	MCS 4	16dBm	19dBm	±2dB
	MCS 5	15dBm	18dBm	±2dB
	MCS 6	13dBm	16dBm	±2dB
	MCS 7	12dBm	15dBm	±2dB
	MCS 8	11dBm	14dBm	±2dB
	MCS 9	10dBm	13dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps	-93dBm	±2dB
	9Mbps	-92dBm	±2dB
	12Mbps	-91dBm	±2dB
	18Mbps	-89dBm	±2dB
	24Mbps	-87dBm	±2dB
	36Mbps	-84dBm	±2dB
	48Mbps	-80dBm	±2dB
	54Mbps	-79dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	-90dBm	±2dB
	MCS 1	-87dBm	±2dB
	MCS 2	-85dBm	±2dB
	MCS 3	-82dBm	±2dB
	MCS 4	-79dBm	±2dB
	MCS 5	-75dBm	±2dB
	MCS 6	-72dBm	±2dB
	MCS 7	-71dBm	±2dB
	MCS 8	-67dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 0	-88dBm	±2dB
	MCS 1	-84dBm	±2dB
	MCS 2	-82dBm	±2dB
	MCS 3	-80dBm	±2dB
	MCS 4	-76dBm	±2dB
	MCS 5	-71dBm	±2dB
	MCS 6	-69dBm	±2dB
	MCS 7	-68dBm	±2dB
	MCS 8	-64dBm	±2dB
	MCS 9	-63dBm	±2dB
5GHz 802.11ac VHT80	MCS 0	-84dBm	±2dB
	MCS 1	-81dBm	±2dB
	MCS 2	-78dBm	±2dB
	MCS 3	-76dBm	±2dB
	MCS 4	-72dBm	±2dB
	MCS 5	-66dBm	±2dB
	MCS 6	-65dBm	±2dB
	MCS 7	-62dBm	±2dB
	MCS 8	-60dBm	±2dB
	MCS 9	-60dBm	±2dB

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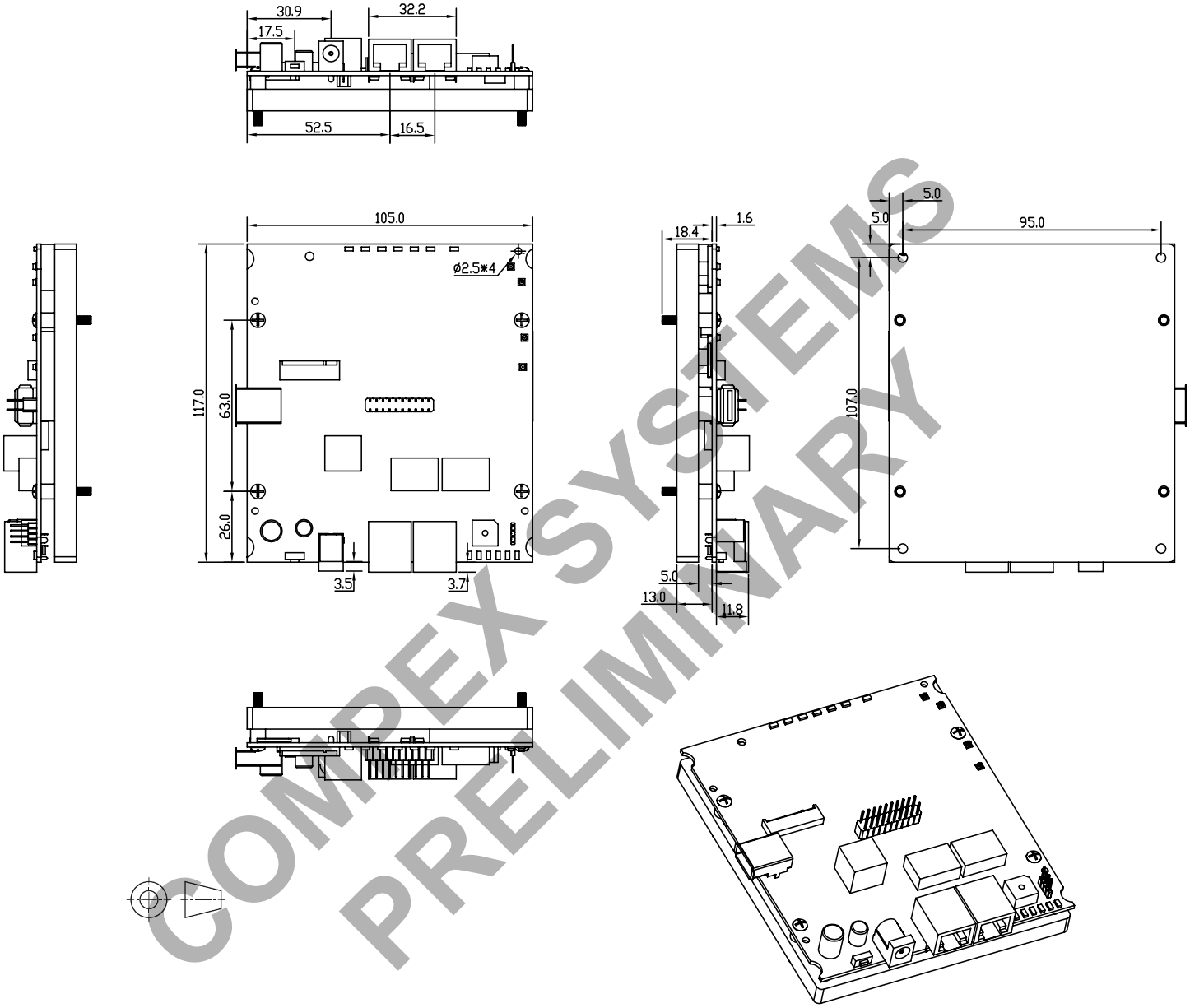
Mechanical Dimensions



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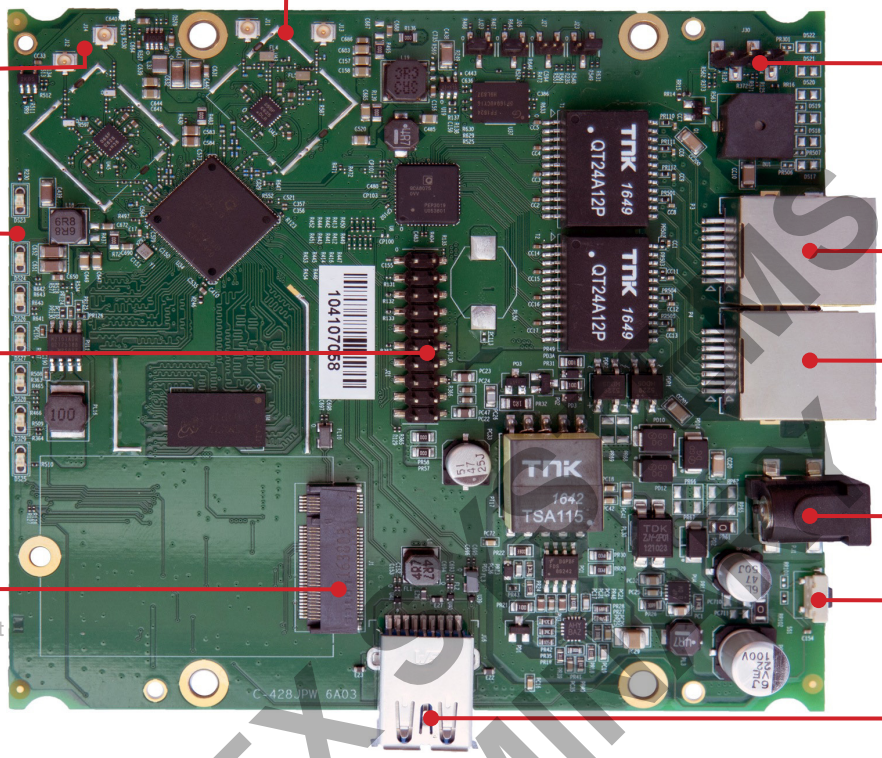
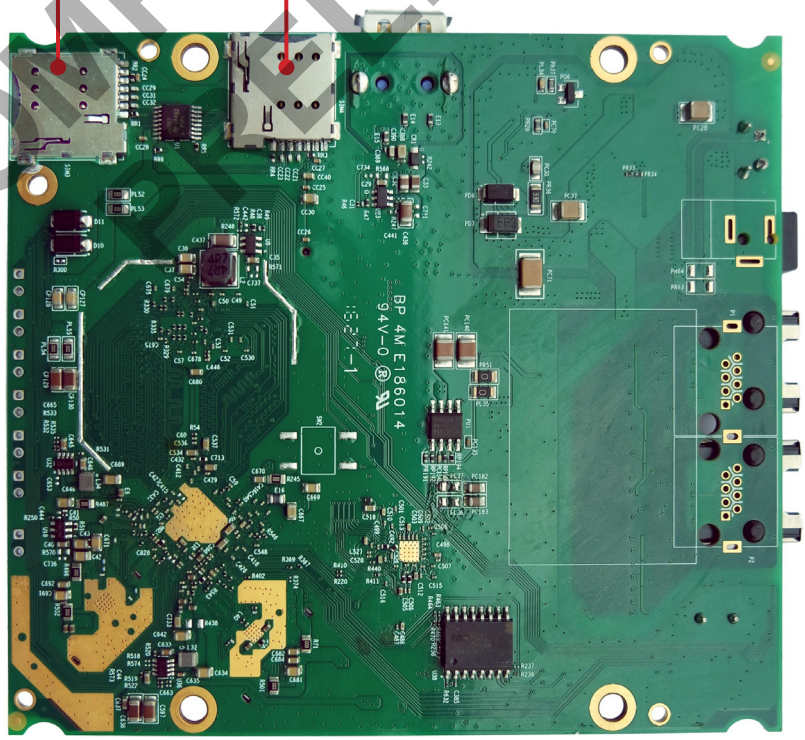
Component Map





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Firmware / Software

The WPJ428 is shipped with Compex firmware. SDKs with QCA binary drivers are available for software developers.

Supported Operating System

Ordering Options

Item Code	Firmware	Processor	Power Solutions
WPJ428HV 6A03PO16512BR-TE	QCA Reference Firmware	IPQ4028	IEEE 802.3af/at or Passive PoE 48V
WPJ428LV 6A03PO16512BR-TE	QCA Reference Firmware	IPQ4028	DC Jack: 24V

Antenna Description

Antenna Type	Frequency Band (MHz)	TX Paths	Per Chain Max Antenna Gain (dBi)	
			Ant 0	Ant 1
Panel Antenna	2412 ~ 2462	1	11	--
		2	11	11
Panel Antenna	5150 ~ 5250, 5745 ~ 5785	1	25	--
		2	25	25
Panel Antenna	2412 ~ 2462	1	8	--
		2	8	8
	5180 ~ 5825	1	10	--
		2	10	10

Note 1: The device didn't support beam-forming technology and Cyclic Delay Diversity (CDD) technology, and the transmit signals are uncorrected, so no add array gain to the band power and band PSD.

Note 2: For SISO mode, only the Ant 0 chain can transmit. 11a&11b&11g mode support SISO mode, 11n mode support MIMO mode.

Note 3: When the device working on full band, only the panel antenna (10dBi) can be used. Panel antenna (25dBi) was used when the device only working on UNII-1 & UNII-3 bands.

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Federal Communications Commission (FCC) Interference Statement

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 generate, 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 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.

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.

RF exposure warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 70 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

Caution :This device is only defined as point-to-point product by the manufacturer.