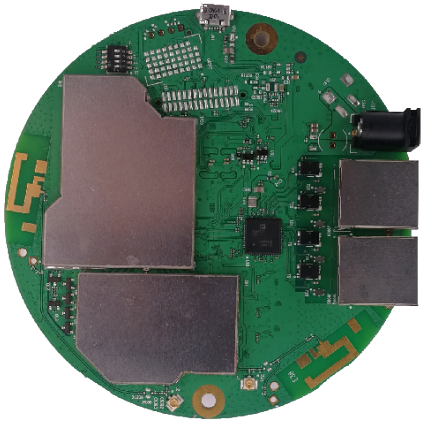
Qualcomm's IPQ6000 WiFi 6 (802.11ax) Embedded Board

Dual Band Dual Concurrent / MU-MIMO OFDMA



Model: CP03

KEY FEATURES

- Qualcomm Atheros IPQ6000 Quad Core ARM 64 bit A53 1.2GHz processor
- 2x2 on-board 2.4GHz radio, up to 573Mbps physical data rate
- 2x2 on-board 5GHz radio, up to 1201Mbps physical data rate
- 2 on board radios (Dual Band Concurrent Radio)
- Supports Dynamic Frequency Selection (DFS)

APPLICATIONS

- 802.11ax MU-MIMO OFDMA Access Point
- Mesh router supporting EasyMesh
- Smart AP TWT

Specifications

Chipset	Qualcomm Atheros IPQ6000 Quad Core ARM 64 bit A53 1.2GHz processor 'Cypress' Series
Reference Design	Qualcomm Atheros CP03
System Memory	DDR3L 512MB 16-bit interface
NAND Flash	128MB
NOR Flash	16MB
Wireless	On-board 2x2 2.4GHz MU-MIMO OFDMA 802.11b/g/n/ax, max 20dBm per chain On-board 2x2 5GHz MU-MIMO OFDMA 802.11a/n/ac/ax, max 20dBm per chain 2x U.FL Connectors, diplexer allows dual band concurrent operation
Frequency Range	2.412~2.472GHz, 5.150~5.825GHz
Modulation Techniques	OFDMA: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM,1024-QAM
Interface	2x 1Gbps Ethernet Ports 1x MicroUSB 2.0 Port 1x Serial Interface 12 Pin Connectors
LED	4x LED Indicators
DC Power	1x DC Jack Connector: 12V
Power Consumption (Board Only)	13W (Max)
Certification	REACH and RoHS Compliance
Environmental Temperature	Operating: -20°C to 60°C, Storage: -40°C to 90°C
Environmental Humidity, Non-Condensing	Operating: 5% to 95%, Storage: Max. 90%
Dimension (Diameter x Height)	100mm x 23.5mm (Without Heatsink)

1.The Serial Port is a 4-pin header (TTL). A Serial Converter is available to change the TTL signals on the board to RS-232 signals for debugging.
**Configurations are subject to change without notifications.*

Last Updated: 16/10/2020

RF Performance Table for 2.4GHz

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
2.4GHz 802.11b	1Mbps	20dBm	23dBm	±2dB
	2Mbps	20dBm	23dBm	±2dB
	5.5Mbps	20dBm	23dBm	±2dB
	11Mbps	20dBm	23dBm	±2dB
2.4GHz 802.11g	6Mbps	20dBm	23dBm	±2dB
	9Mbps	20dBm	23dBm	±2dB
	12Mbps	20dBm	23dBm	±2dB
	18Mbps	20dBm	23dBm	±2dB
	24Mbps	20dBm	23dBm	±2dB
	36Mbps	20dBm	23dBm	±2dB
	48Mbps	20dBm	23dBm	±2dB
	54Mbps	18dBm	21dBm	±2dB
2.4GHz 802.11n HT20	MCS 0	19dBm	22dBm	±2dB
	MCS 1	19dBm	22dBm	±2dB
	MCS 2	19dBm	22dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	19dBm	22dBm	±2dB
	MCS 6	18dBm	21dBm	±2dB
	MCS 7	17dBm	20dBm	±2dB
2.4GHz 802.11n HT40	MCS 0	18dBm	21dBm	±2dB
	MCS 1	18dBm	21dBm	±2dB
	MCS 2	18dBm	21dBm	±2dB
	MCS 3	18dBm	21dBm	±2dB
	MCS 4	18dBm	21dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
2.4GHz 802.11b	1Mbps	-97	±2dB
	2Mbps	-95	±2dB
	5.5Mbps	-93	±2dB
	11Mbps	-91	±2dB
2.4GHz 802.11g	6Mbps	-95	±2dB
	9Mbps	-93	±2dB
	12Mbps	-91	±2dB
	18Mbps	-89	±2dB
	24Mbps	-86	±2dB
	36Mbps	-83	±2dB
	48Mbps	-80	±2dB
	54Mbps	-78	±2dB
2.4GHz 802.11n HT20	MCS 0	-95	±2dB
	MCS 1	-93	±2dB
	MCS 2	-91	±2dB
	MCS 3	-88	±2dB
	MCS 4	-85	±2dB
	MCS 5	-83	±2dB
	MCS 6	-81	±2dB
	MCS 7	-78	±2dB
2.4GHz 802.11n HT40	MCS 0	-92	±2dB
	MCS 1	-90	±2dB
	MCS 2	-88	±2dB
	MCS 3	-85	±2dB
	MCS 4	-83	±2dB
	MCS 5	-81	±2dB
	MCS 6	-78	±2dB
	MCS 7	-75	±2dB

RF Performance Table for 2.4GHz

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
2.4GHz 802.11ax HE20	MCS 0	19dBm	22dBm	±2dB
	MCS 1	19dBm	22dBm	±2dB
	MCS 2	19dBm	22dBm	±2dB
	MCS 3	19dBm	22dBm	±2dB
	MCS 4	19dBm	22dBm	±2dB
	MCS 5	19dBm	22dBm	±2dB
	MCS 6	18dBm	21dBm	±2dB
	MCS 7	17dBm	20dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	15dBm	18dBm	±2dB
	MCS 10	14dBm	17dBm	±2dB
	MCS 11	14dBm	17dBm	±2dB
2.4GHz 802.11ax HE40	MCS 0	18dBm	21dBm	±2dB
	MCS 1	18dBm	21dBm	±2dB
	MCS 2	18dBm	21dBm	±2dB
	MCS 3	18dBm	21dBm	±2dB
	MCS 4	18dBm	21dBm	±2dB
	MCS 5	18dBm	21dBm	±2dB
	MCS 6	17dBm	20dBm	±2dB
	MCS 7	16dBm	19dBm	±2dB
	MCS 8	15dBm	18dBm	±2dB
	MCS 9	15dBm	18dBm	±2dB
	MCS 10	14dBm	17dBm	±2dB
	MCS 11	14dBm	17dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
2.4GHz 802.11ax HE20	MCS 0	-95	±2dB
	MCS 1	-93	±2dB
	MCS 2	-90	±2dB
	MCS 3	-87	±2dB
	MCS 4	-84	±2dB
	MCS 5	-81	±2dB
	MCS 6	-79	±2dB
	MCS 7	-76	±2dB
	MCS 8	-73	±2dB
	MCS 9	-70	±2dB
	MCS 10	-68	±2dB
	MCS 11	-65	±2dB
2.4GHz 802.11ax HE40	MCS 0	-92	±2dB
	MCS 1	-90	±2dB
	MCS 2	-87	±2dB
	MCS 3	-85	±2dB
	MCS 4	-83	±2dB
	MCS 5	-79	±2dB
	MCS 6	-77	±2dB
	MCS 7	-74	±2dB
	MCS 8	-71	±2dB
	MCS 9	-68	±2dB
	MCS 10	-65	±2dB
	MCS 11	-63	±2dB

RF Performance Table for 5GHz

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
5GHz 802.11a	6Mbps	20dBm	23dBm	±2dB
	9Mbps	20dBm	23dBm	±2dB
	12Mbps	20dBm	23dBm	±2dB
	18Mbps	20dBm	23dBm	±2dB
	24Mbps	20dBm	23dBm	±2dB
	36Mbps	20dBm	23dBm	±2dB
	48Mbps	20dBm	23dBm	±2dB
	54Mbps	18dBm	21dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	20dBm	23dBm	±2dB
	MCS 4	20dBm	23dBm	±2dB
	MCS 5	20dBm	23dBm	±2dB
	MCS 6	18dBm	21dBm	±2dB
	MCS 7	17dBm	20dBm	±2dB
	MCS 8	17dBm	20dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	20dBm	23dBm	±2dB
	MCS 4	20dBm	23dBm	±2dB
	MCS 5	20dBm	23dBm	±2dB
	MCS 6	18dBm	21dBm	±2dB
	MCS 7	17dBm	20dBm	±2dB
	MCS 8	17dBm	20dBm	±2dB
	MCS 9	16dBm	19dBm	±2dB
5GHz 802.11ac VHT80	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	20dBm	23dBm	±2dB
	MCS 4	20dBm	23dBm	±2dB
	MCS 5	20dBm	23dBm	±2dB
	MCS 6	18dBm	21dBm	±2dB
	MCS 7	17dBm	20dBm	±2dB
	MCS 8	16dBm	19dBm	±2dB
	MCS 9	16dBm	19dBm	±2dB

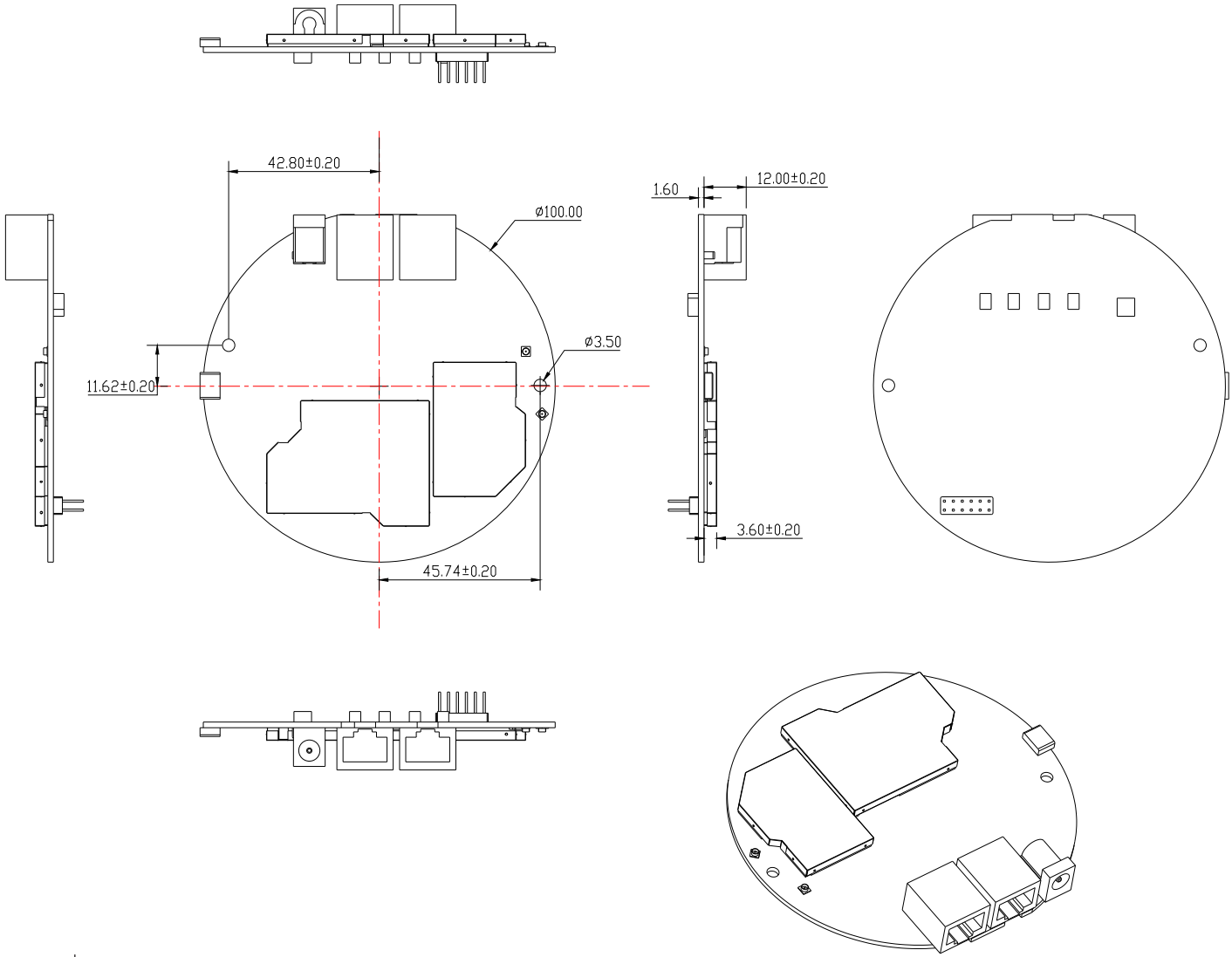
	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps	-95	±2dB
	9Mbps	-93	±2dB
	12Mbps	-90	±2dB
	18Mbps	-88	±2dB
	24Mbps	-86	±2dB
	36Mbps	-84	±2dB
	48Mbps	-81	±2dB
	54Mbps	-79	±2dB
5GHz 802.11n/ac VHT20	MCS 0	-96	±2dB
	MCS 1	-94	±2dB
	MCS 2	-91	±2dB
	MCS 3	-89	±2dB
	MCS 4	-87	±2dB
	MCS 5	-85	±2dB
	MCS 6	-82	±2dB
	MCS 7	-79	±2dB
	MCS 8	-76	±2dB
5GHz 802.11n/ac VHT40	MCS 0	-93	±2dB
	MCS 1	-91	±2dB
	MCS 2	-88	±2dB
	MCS 3	-86	±2dB
	MCS 4	-84	±2dB
	MCS 5	-81	±2dB
	MCS 6	-78	±2dB
	MCS 7	-74	±2dB
	MCS 8	-72	±2dB
	MCS 9	-69	±2dB
5GHz 802.11ac VHT80	MCS 0	-90	±2dB
	MCS 1	-88	±2dB
	MCS 2	-85	±2dB
	MCS 3	-83	±2dB
	MCS 4	-80	±2dB
	MCS 5	-78	±2dB
	MCS 6	-75	±2dB
	MCS 7	-72	±2dB
	MCS 8	-69	±2dB
	MCS 9	-66	±2dB

RF Performance Table for 5GHz

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
5GHz 802.11ax HE20	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	20dBm	23dBm	±2dB
	MCS 4	20dBm	23dBm	±2dB
	MCS 5	20dBm	23dBm	±2dB
	MCS 6	18dBm	21dBm	±2dB
	MCS 7	17dBm	20dBm	±2dB
	MCS 8	17dBm	20dBm	±2dB
	MCS 9	16dBm	19dBm	±2dB
	MCS 10	15dBm	18dBm	±2dB
	MCS 11	15dBm	18dBm	±2dB
5GHz 802.11ax HE40	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	20dBm	23dBm	±2dB
	MCS 4	20dBm	23dBm	±2dB
	MCS 5	20dBm	23dBm	±2dB
	MCS 6	18dBm	21dBm	±2dB
	MCS 7	17dBm	20dBm	±2dB
	MCS 8	17dBm	20dBm	±2dB
	MCS 9	16dBm	19dBm	±2dB
	MCS 10	15dBm	18dBm	±2dB
	MCS 11	15dBm	18dBm	±2dB
5GHz 802.11ax HE80	MCS 0	20dBm	23dBm	±2dB
	MCS 1	20dBm	23dBm	±2dB
	MCS 2	20dBm	23dBm	±2dB
	MCS 3	20dBm	23dBm	±2dB
	MCS 4	20dBm	23dBm	±2dB
	MCS 5	20dBm	23dBm	±2dB
	MCS 6	18dBm	21dBm	±2dB
	MCS 7	17dBm	20dBm	±2dB
	MCS 8	16dBm	19dBm	±2dB
	MCS 9	16dBm	19dBm	±2dB
	MCS 10	15dBm	18dBm	±2dB
	MCS 11	15dBm	18dBm	±2dB

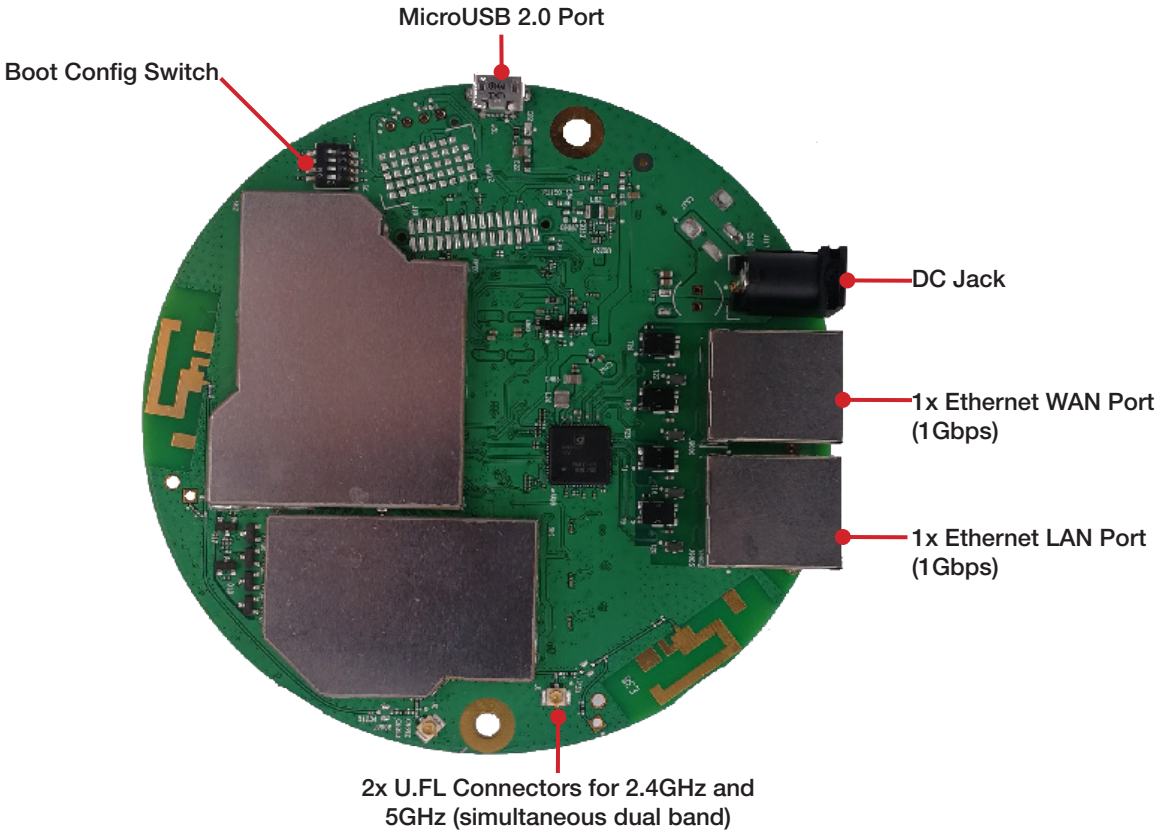
	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11ax HE20	MCS 0	-96	±2dB
	MCS 1	-94	±2dB
	MCS 2	-91	±2dB
	MCS 3	-89	±2dB
	MCS 4	-86	±2dB
	MCS 5	-83	±2dB
	MCS 6	-80	±2dB
	MCS 7	-77	±2dB
	MCS 8	-74	±2dB
	MCS 9	-71	±2dB
	MCS 10	-68	±2dB
	MCS 11	-66	±2dB
5GHz 802.11ax HE40	MCS 0	-93	±2dB
	MCS 1	-91	±2dB
	MCS 2	-88	±2dB
	MCS 3	-85	±2dB
	MCS 4	-82	±2dB
	MCS 5	-79	±2dB
	MCS 6	-77	±2dB
	MCS 7	-74	±2dB
	MCS 8	-71	±2dB
	MCS 9	-68	±2dB
	MCS 10	-65	±2dB
	MCS 11	-63	±2dB
5GHz 802.11ax HE80	MCS 0	-90	±2dB
	MCS 1	-87	±2dB
	MCS 2	-84	±2dB
	MCS 3	-81	±2dB
	MCS 4	-78	±2dB
	MCS 5	-75	±2dB
	MCS 6	-72	±2dB
	MCS 7	-70	±2dB
	MCS 8	-67	±2dB
	MCS 9	-65	±2dB
	MCS 10	-62	±2dB
	MCS 11	-59	±2dB

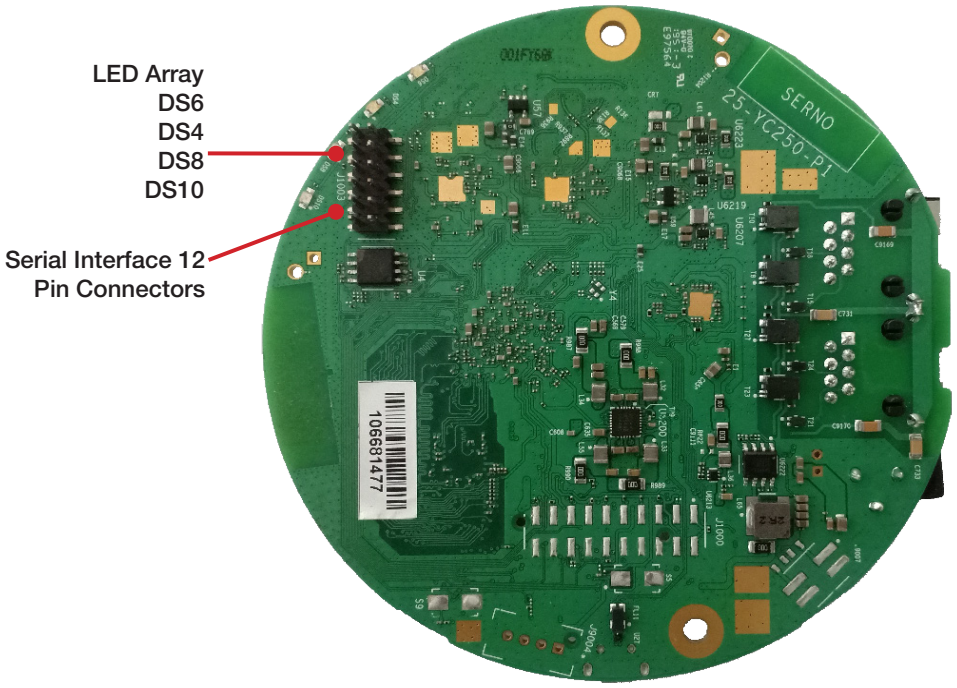
Mechanical Dimensions



All dimensions are in mm.

Component Map





Firmware / Software

Firmware	OpenWRT Barrier Breaker

Development Kits

SDK	SDKs with QCA binary drivers are available for software developers.
Accessory	Serial Converter , Power Supply Only if available

Ordering Options

Item Code	Processor	Power Solutions
AP.CP03 PR16512R1.01-TE	IPQ6000	12V DC