



OPEN

Compute Project

DELTA AG9032 V1

Switch Specification

Revision 0.0

Delta Electronics, Inc.

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1. Revision History

Rev	Date	Description	Page	Editor
0.0	05/21/2018	Initial draft		WISH.HO

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As of March 31, 2016, the following persons or entities have made this Specification available under the Open Web Foundation Final Specification Agreement (OWFa 1.0), which is available at <http://www.openwebfoundation.org/legal/the-owf-1-0-agreements/owfa-1-0>:

Delta Electronics, Inc.

3. Scope

This document defines the technical specification for the AG9032 V1 switch submitted to the Open Compute Project Agema Open Platform Switch

4. Overview

The AG9032 V1 is a high performance, high-density next generation switch with target application for Data Center Networks. It has Thirty-Two 100GbE QSFP28 ports which support 100GE Applications. In addition to the rich bandwidth, the AG9032 V1 provides comprehensive capability on layer 2 and layer 3 features, including SNMP, Spanning Tree, VLAN, QinQ, Trunk, QoS, RIP, OSPF, IGMP, DVMRP, PIM-DM, PIM-SM, Access Control, etc. This product which aims for Data Center Networks also supports advance features such as MPLS, TRILL, PFC, VEPA, QCN, VxLAN and NVGRE to meet the high-demanding Data Center high performance and virtualization requirement. This product is good for Data Center Aggregation switch application.

4.1. Features:

- Equipment
 - 3200Gbps switching bandwidth
 - Support Jumbo Frame up to 9416 bytes
 - Automatic address learning function to build the packet-forwarding information table. The table contains up to 136K MAC addresses from smart buffer.
 - System support unified forwarding table (UFT) for shared resource between MAC, IP Entries and Store-and-Forward transmission to remove bad packets from the network
 - Alternate Store-Forward (ASF) mode – Cut-through is available to minimize the latency
 - Power supply LED / System LED/ FAN status LED indication.
 - Extensive system LED and per port LEDs.
 - Redundant power supply. (Shipment with one power supply by default).
 - Standard 1U chassis high.
 - 17” rack mountable.
 - Memory Management
 - 16MB of packet buffer memory
 - Explicit Congestion Notification (ECN)
 - Weighted Random Early Detection (WRED)
 - Text-based management through in-band telnet sessions, and out-of-band management or serial RJ-45 console port (VT100).
 - AG9032 V1: 1 x AC Power Supply (AC SKU)
 - AG9032 V1 DP: 2 x AC Power Supply (AC SKU)
 - AG9032 V1-DC: 2 x DC Power Supply (for DC SKU only)
 - 2.0 USB port
- Software environment support
 - ONIE and Diagnostic code
 - ONL/ONLP
 - OpenNSL
 - SAI/SONIC

4.2. Airflow

AG9032 V1 supports dual directional airflow of Front-to-Back and Back-to-Front. Separate Power supply and Fan Tray parts can be selected to provide different direction of airflow

4.3. Standard 1U chassis high AC/DC and DC/DC Power Supply Features

Redundant Power Supply – Hot Swappable (shipment with one power supply by default)

800W AC/DC Power Supply

Input: AC100 ~ 240 V

Output: DC 12V

800W DC/DC Power Supply

Input: DC -48 ~ -60 V

Output: DC 12V

4.4. Key Components

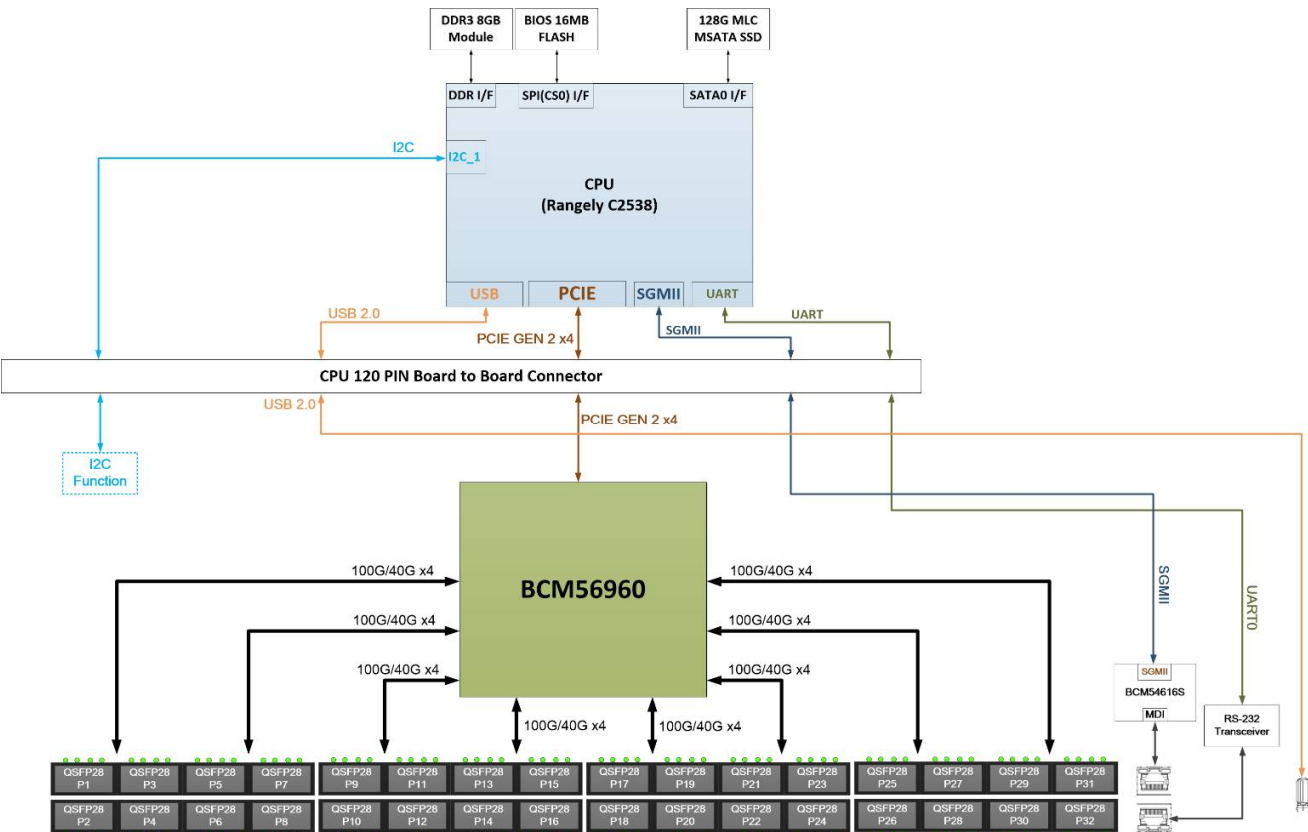
Item	Feature	Detailed Description
1	Switch Controller	BCM56960 x 1
2	PHY	BCM54616S x 1 (for OOB port)
3	CPU	Intel Rangeley C2538 -2.4GHz
4	BIOS Flash	16MB SPI-Flash
5	mSATA Device	128GB SSD
6	System Memory	8GB DDR3-SDRAM

4.5. Port Requirements

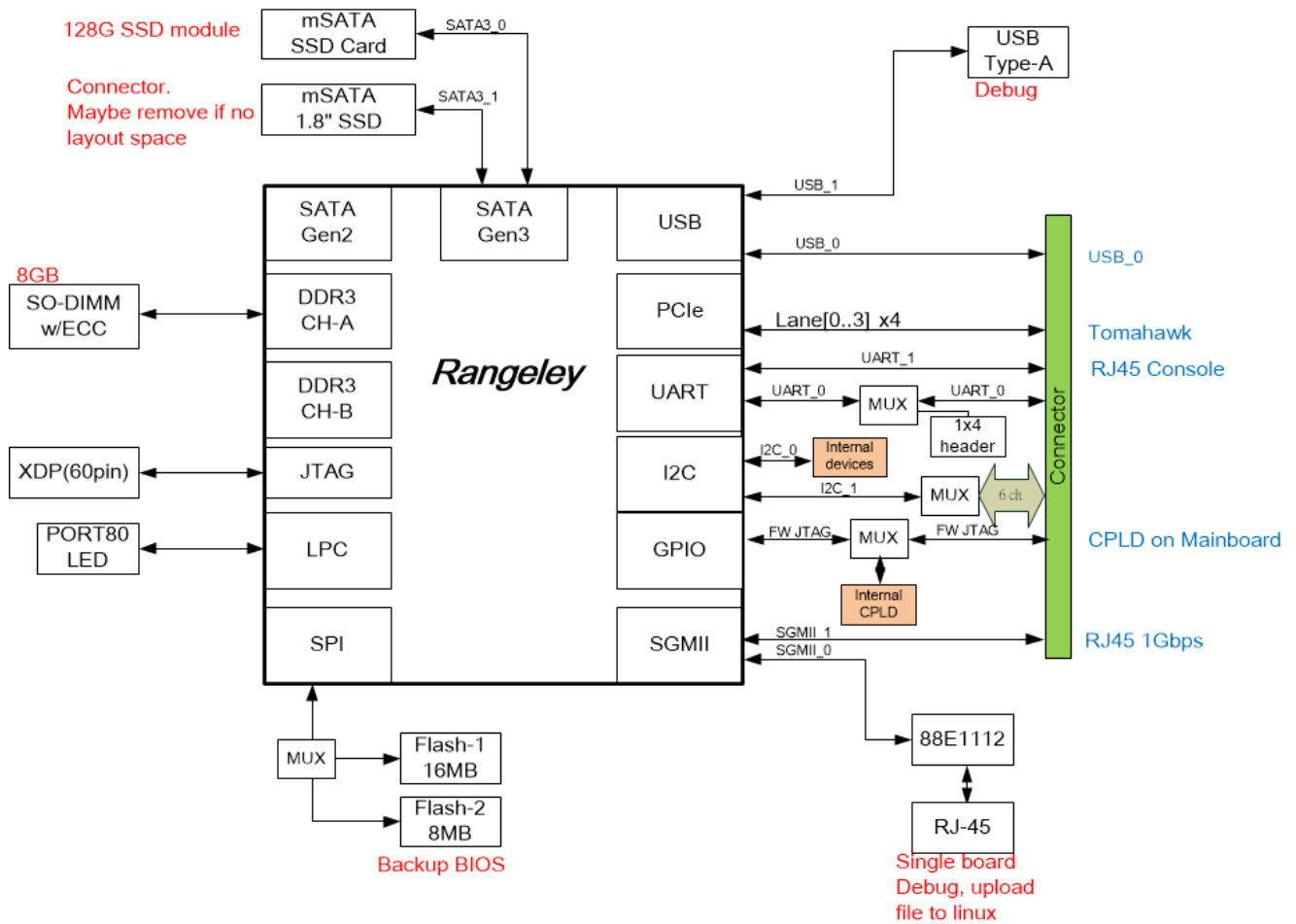
Item	Feature	Detailed Description
1	Speed Capability per Port	100Gbps
2	Full-Duplex Flow Control	Support the IEEE 802.3x PAUSE frame

5. Hardware Functionality

5.1. System Block Diagram

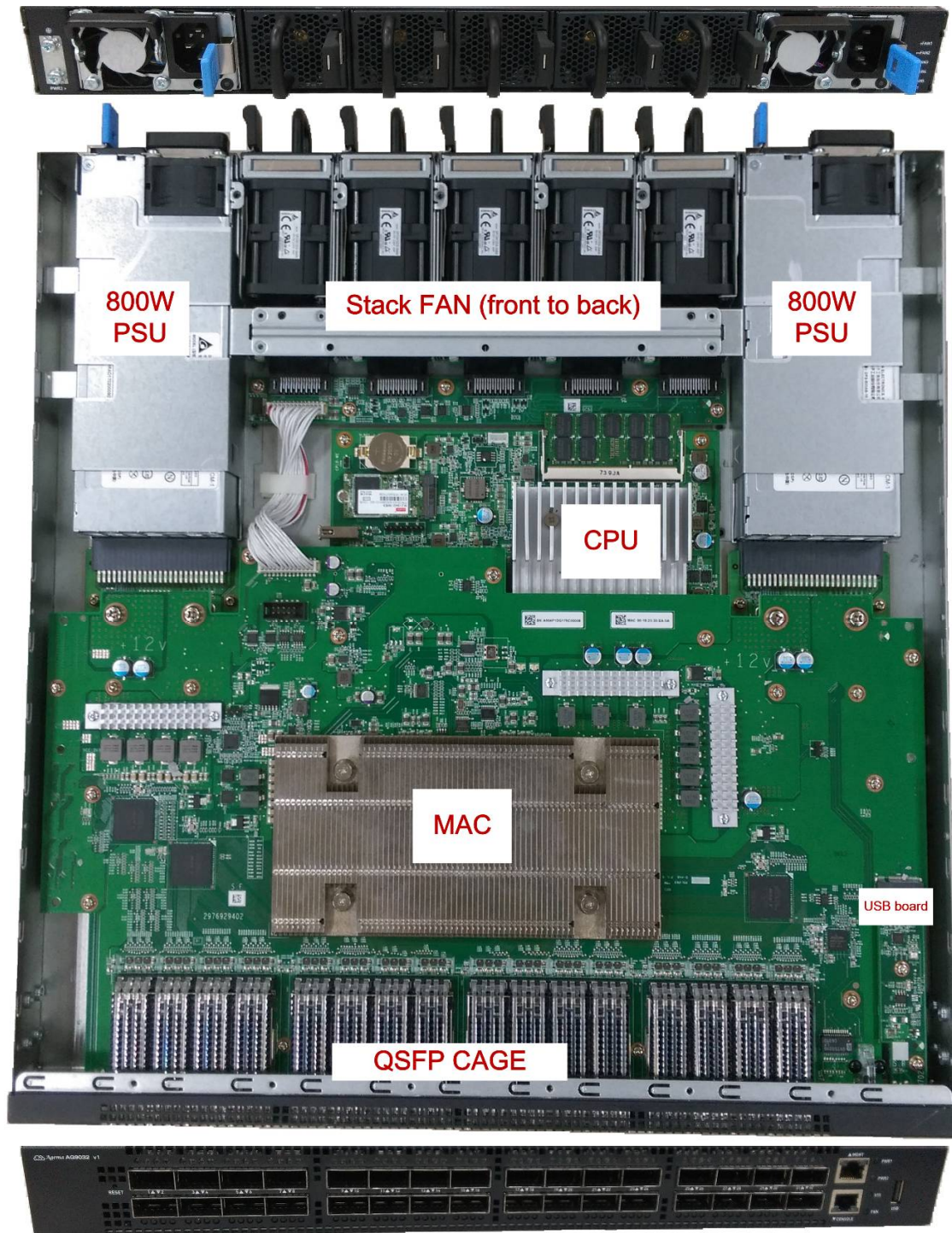


5.2. CPU Subsystem



5.3. Physical Dimensions

	Inches	Millimeters
Length	18.1	460
Width	17.26	438.5
Height	1.7	43



5.4. LED Definition for System

5.4.1. System, Management, PSU LED

Feature	Detailed Description	Comment
<i>Power 1 LED</i>	Solid Green – Power Supplier 1 is supplied to the switch & operating normally Blinking Amber – Power Supplier 1 failed. Off – Power is Disconnected.	At front
<i>Power 2 LED</i>	Solid Green – Power Supplier 2 is supplied to the switch & operating normally Blinking Amber – Power Supplier 2 failed. Off – Power is Disconnected.	At front
<i>System LED</i>	Solid Green – Normal operation Blinking Green – Booting progress Solid Red – System is failed Off – No Power	At front
<i>FAN Status LED</i>	Solid Green – FAN operating normally. Solid Amber – FAN failed.	At front
<i>Management (RJ-45) Two LEDs /port</i>	Link LED: (on the left side) Off –No link is established on the port. Solid Yellow - A valid link at 10/100Mbps is established on the port. Solid Green – A valid link at 1000Mbps is established on the port. Act LED: (on the right side) Off –No link is established on the port. Blinking green – Activity, transmitting or receiving packet at this port.	At front

Feature	Detailed Description	Comment
PSU LED	Solid green – Good AC input. Solid red – NO AC input.	At rear

<i>FAN Status LED</i>	Green – FAN operating normally. Red – FAN failed.	At rear
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Table 1: System LED

5.4.2. QSFP28 100G, 40G, 50G, 25G, 10G, 1G LED

The Fiber port LEDs was decoding by BCM56960 LED interface for 10G/25G/50G/40G/100G ports. This chapter defined Speed and Link/Activity, breakout status LED signals from BCM56960 LED shift out

BCM56960 provides two series LED interface for TTL shift register IC to indicate.

LED_CLK0/DATA0: It is used to display port [8:1],[32:25] status.

LED_CLK1/DATA1: It is used to display port [24:9] status.

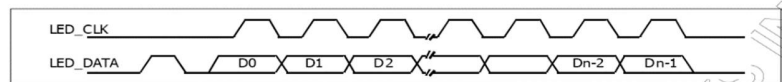


Figure 5: Single LED Refresh Cycle

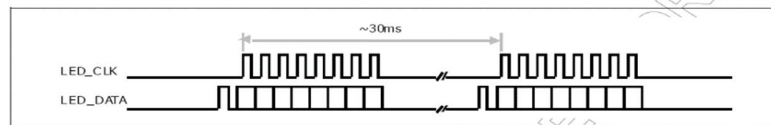


Figure 6: LED Refresh Timing

Figure 1: BCM56960 Series LED

LED 1

■ Green	100G operation
■ Amber	40G operation
■ White	50G operation
■ Blue	25G operation
■ Purple	10G operation
■ Purple	1G operation
■ Off	No Link

LEDs2 working in breakout only.

■ Blue	25G operation
■ Purple	10G operation
■ Purple	1G operation
■ Off	40G/100G operation (Assuming LED 1 is illuminated) or No Link

LEDs3 working in breakout only.

■ White	50G operation
■ Blue	25G operation
■ Purple	10G operation
■ Purple	1G operation
■ Off	40G/100G operation (Assuming LED 1 is illuminated) or No Link

LEDs4 working in breakout only.

■ Blue	25G operation
■ Purple	10G operation
■ Purple	1G operation
■ Off	40G/100G operation (Assuming LED 1 is illuminated) or No Link

No link: Off / Linkup: Solid, LED / Traffic: Flashing

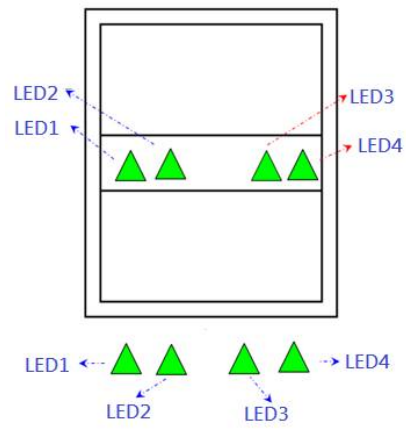
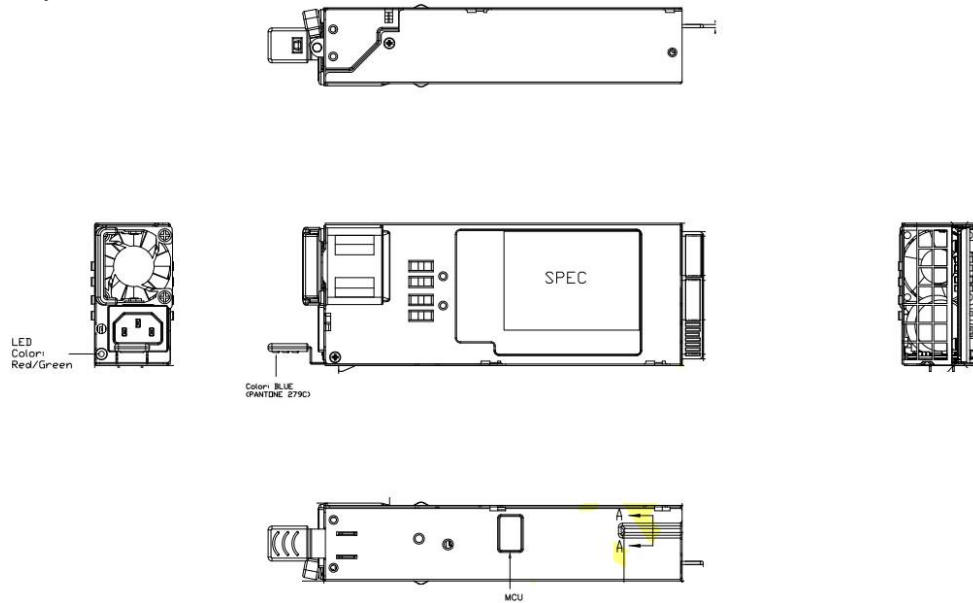


Figure 2: QSFP28 LED indication

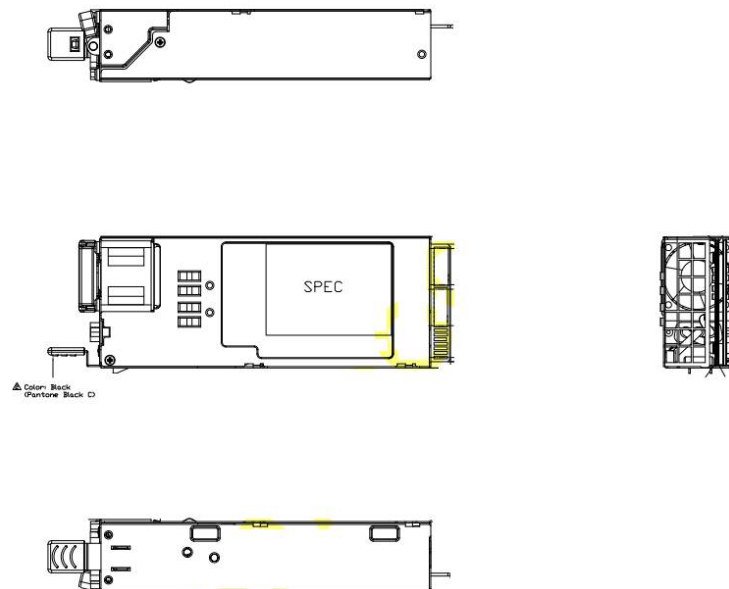
5.5.AC/DC Power Supply

	AC	DC
Front to Back (Normal)	DPS-800AB-16 D	DPS-800AB-14 D
Back to Front (Reverse)	DPS-800AB-25 B	DPS-800AB-36 A

➤ AC PSU Physical Dimension

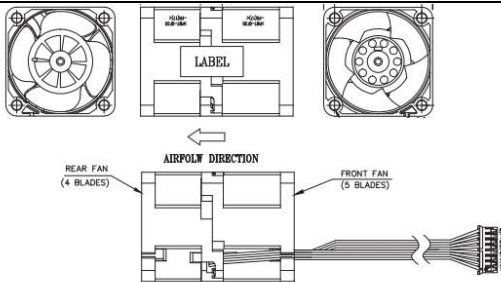
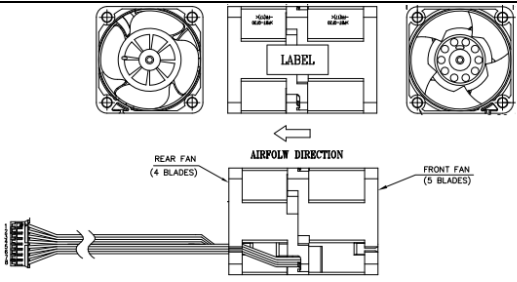


➤ DC PSU Physical Dimension

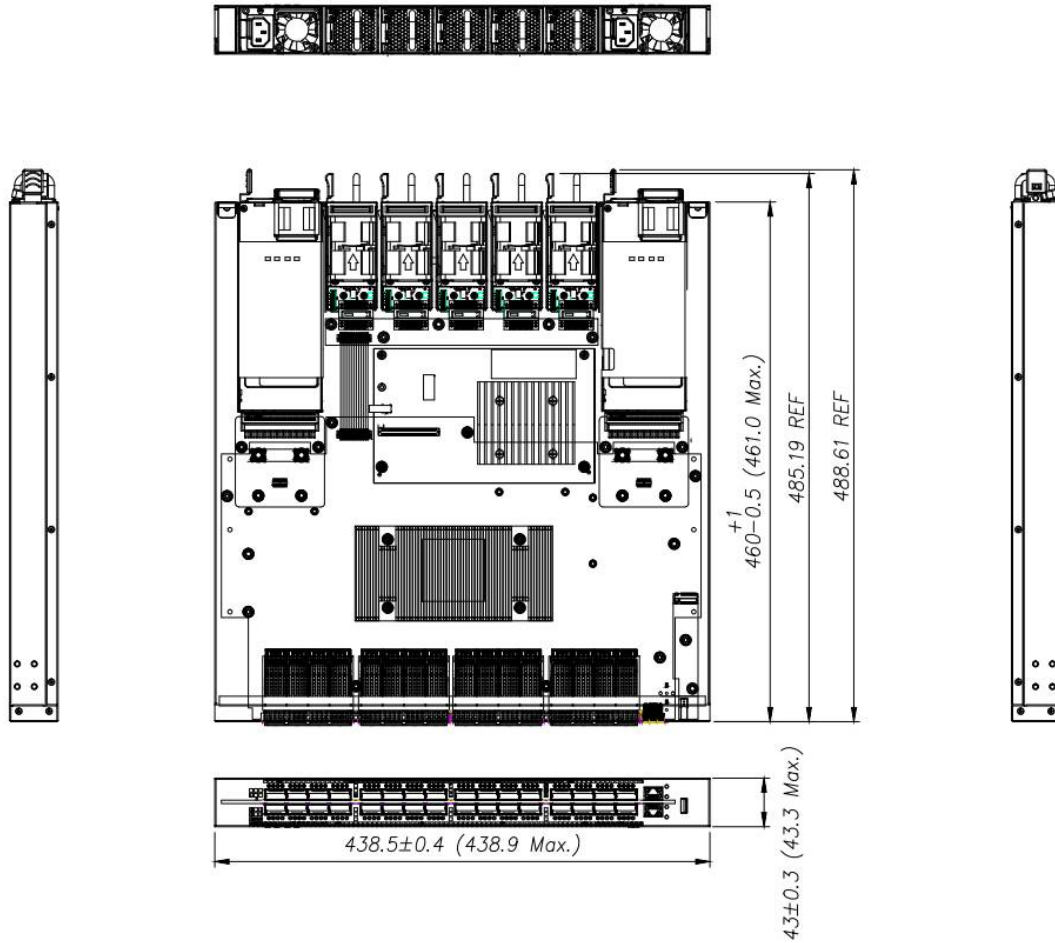


5.6. Fan specification

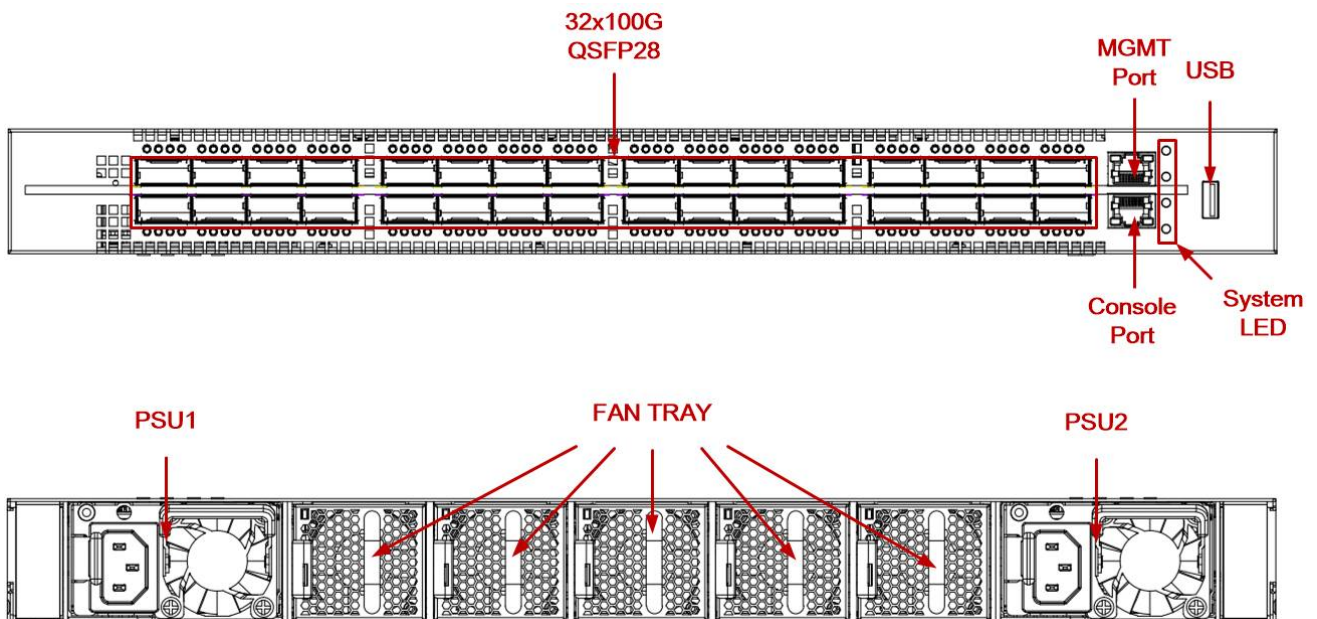
	Stack DC FAN
Front to Back (Normal)	GFC0412DS-SM06XMP
Back to Front (Reverse)	GFC0412DS-SM06XMQ

Front to Back (Normal)	Back to Front (Reverse)
 NOTES: - CABLE WIRE UL:1061 AWG#28 FRONT FAN (5 BLADES) PIN1: BLACK WIRE----(-) PIN2: RED WIRE----(+) PIN3: YELLOW WIRE----(F00) PIN4: BLUE WIRE SPEED----(PWM) REAR FAN (4 BLADES) PIN5: WHITE WIRE----(-) PIN6: ORANGE WIRE----(+) PIN7: BROWN WIRE----(F00) PIN8: GREEN WIRE SPEED----(PWM) - HOUSING: JWT A2001H02-8P OR EQUIVALENT - TERMINAL: JWT A2001TOP-2 OR EQUIVALENT - THIS PRODUCT IS RoHS COMPLIANT	 NOTES: - CABLE WIRE UL:1061 AWG#28 FRONT FAN (5 BLADES) PIN1: BLACK WIRE----(-) PIN2: RED WIRE----(+) PIN3: YELLOW WIRE----(F00) PIN4: BLUE WIRE SPEED----(PWM) REAR FAN (4 BLADES) PIN5: WHITE WIRE----(-) PIN6: ORANGE WIRE----(+) PIN7: BROWN WIRE----(F00) PIN8: GREEN WIRE SPEED----(PWM) - HOUSING: JWT A2001H02-8P OR EQUIVALENT - TERMINAL: JWT A2001TOP-2 OR EQUIVALENT - THIS PRODUCT IS RoHS COMPLIANT

5.7. Mechanicals



5.8.Faceplate layout and artwork



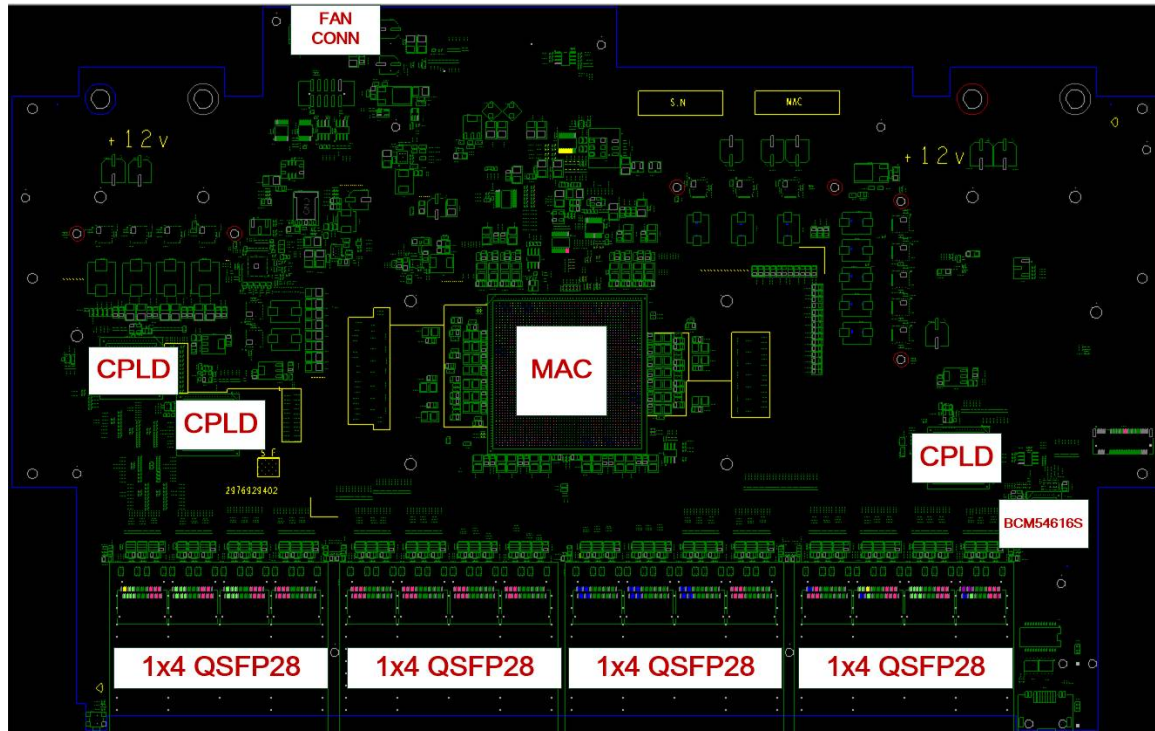
5.9. PCB Stack up

[illegible]

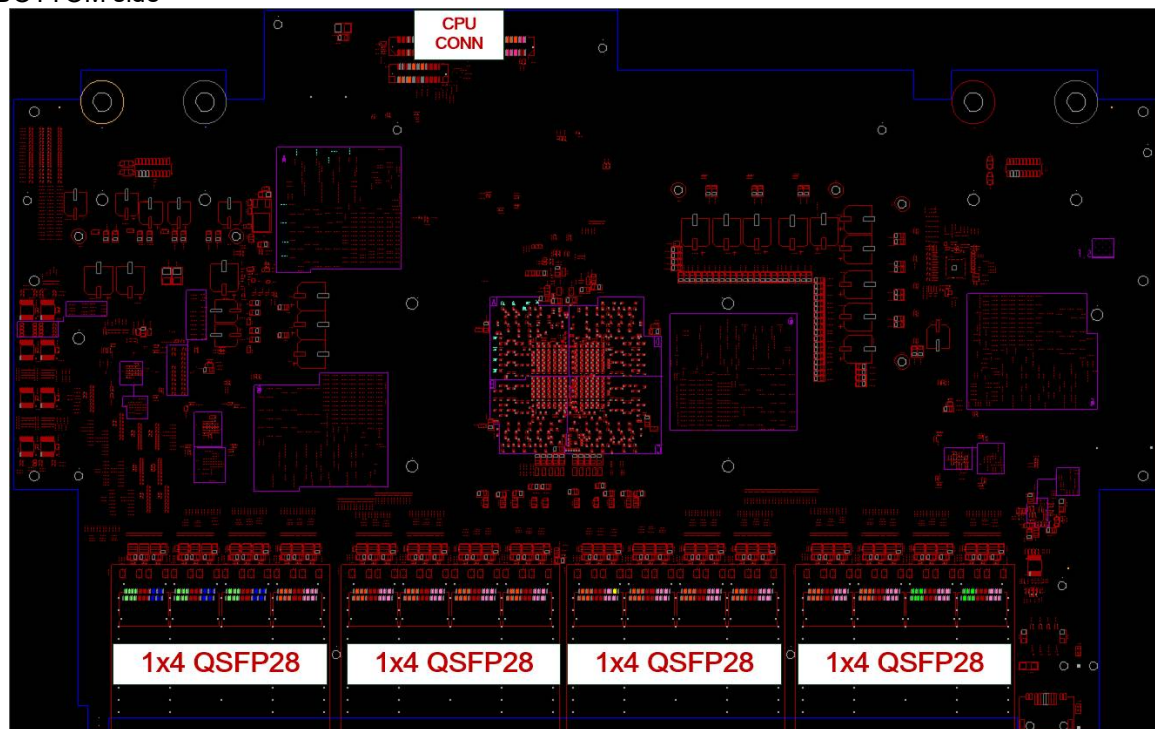
5.10. PCB board outlook

5.10.1. SWBD

➤ TOP side



➤ BOTTOM side



The image shows a custom PCB layout for a Raspberry Pi 4. The components are labeled as follows:

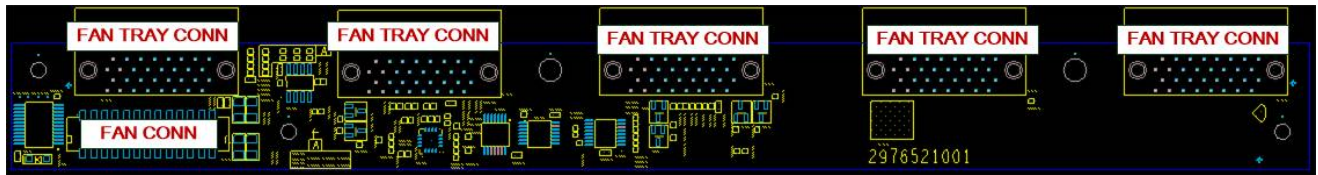
- Battery**: A large circular component at the top left.
- SSD CONN**: A connector for an SSD, located near the top center.
- CPU CONN**: A connector for the CPU, located near the bottom center.
- CPLD**: A small component, located near the bottom center.
- DDR Module**: A large rectangular component at the top right.
- CPU**: The main processing unit, located in the center-right area.

The board also features various other components, including capacitors, resistors, and connectors, all labeled with their respective part numbers and values. The layout is color-coded, with green for the PCB, blue for the components, and red for the labels.

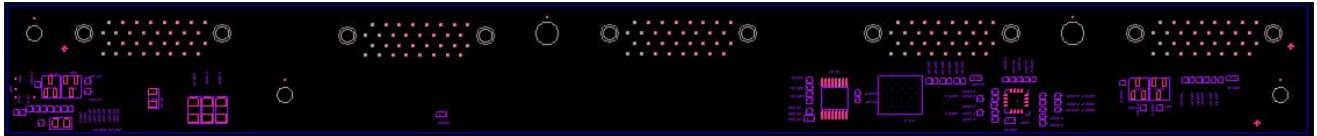


5.10.3. FAN CTRL BD

➤ TOP side

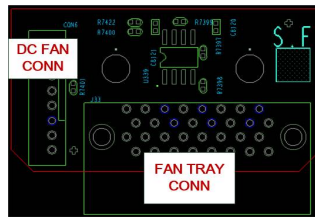


➤ BOTTOM side

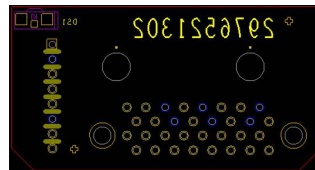


5.10.4. FAN TRAY BD

- TOP side

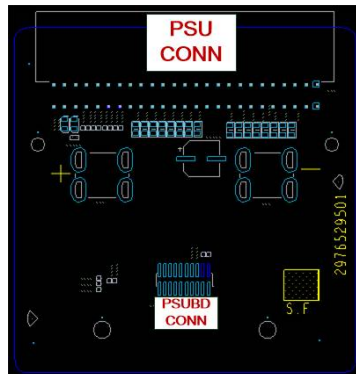


- BOTTOM side

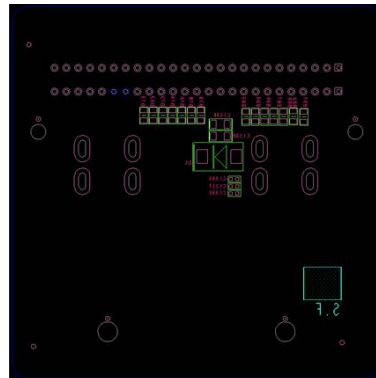


5.10.5. PSU BD

➤ TOP side



➤ BOTTOM side



6. Technical Specs and Environmental Requirements

■ Network Protocol and Standards Compatibility

IEEE 802.3 10Base-T on console port
IEEE 802.3u 100Base-TX on console port
IEEE 802.3ab 1000BASE-T on console port
IEEE 802.3x Flow-Control
IEEE 802.3z 1000BASE-X
IEEE 802.3ae 10Gb/s Ethernet
IEEE 802.3ba 40GE
IEEE 802.3bm 100GBASE-SR4

■ Interface

32 QSFP28 slots
1 10/100/1000Mbps console port
1 RJ-45 management port
1 USB console port

■ Physical Dimensions

(W x D x H) 438.5x460x43 mm
Weight: 8.3 kg

■ Environmental Specifications

Operating temperature: 0 to 40°C
Storage temperature: -20 to 70°C
Operating Humidity: 10 to 90% RH
Storage Humidity 5 to 95% RH

■ Electromagnetic Emission

FCC, CB, CE, VCCI, C-Tick

■ Safety

UL/cUL, CB, CE LVD