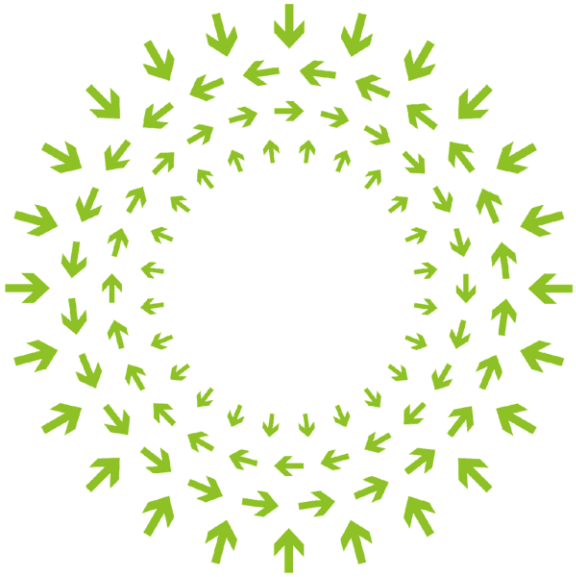


OPEN Compute Project

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EG1050 Enterprise Edge Gateway

1.1
Design Specification
May 30 2023

Author: Jeff Catlin

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1. License

1.1. OPTION B: Open Web Foundation (OWF) CLA

Contributions to this Specification are made under the terms and conditions set forth in Open Web Foundation Modified Contributor License Agreement ("OWF CLA 1.0") ("Contribution License") by:

CELESTICA

Usage of this Specification is governed by the terms and conditions set forth in **Open Web Foundation Modified Final Specification Agreement ("OWFa 1.0") ("Specification License").**
You can review the applicable OWFa1.0 Specification License(s) referenced above by the contributors to this Specification on the OCP website at http://www.opencompute.org/participate/legal-documents/. For actual executed copies of either agreement, please contact OCP directly.
Notes:

1) The above license does not apply to the Appendix or Appendices. The information in the Appendix or Appendices is for reference only and non-normative in nature.

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2. Compliance with OCP Tenets

2.1. Openness

This specification is fully open sourced through the Open Compute foundation.

2.2. Efficiency

The EG1050 calls out the minimum requirements for a cost-conscious Enterprise POE Gateway switch. These minimal requirements lead to the most cost effective and power efficient design(s) for this type of product

2.3. Impact

The EG1050 specification and product is expected to result in follow on design and/or product contributions stimulating an ecosystem of consumers and suppliers working on follow on projects for the Enterprise market in Open Compute.

2.4. Scale

The EG1050 is envisioned to be a high-volume Ethernet Edge Gateway switch that can be used for numerous use cases by a wide range of customers. It envisioned that the product will be widely deployed in the market

2.5. Sustainability

The EG1050 is strategically built to maximize performance while accounting for reuse and recyclability so the user does not have to accept performance or functional degradation at any point in the product's lifespan.

The EG1050 incorporates modularity into the product design, delivering sub-design and individual component reuse across multiple applications. The switch allows ease of serviceability with standard tools without damaging the components. Higher value components are designed to be easily separated for reuse while maintaining desired system functionality. Upgrading of the most common failure components is modularized allowing extended lifecycle of the product.

3. Version Table

Date	Version #	Author	Description
3/31/2023	1.0	Jeff Catlin	Initial Release
5/30/2023	1.1	Jeff Catlin	Minor clean up based on review feedback

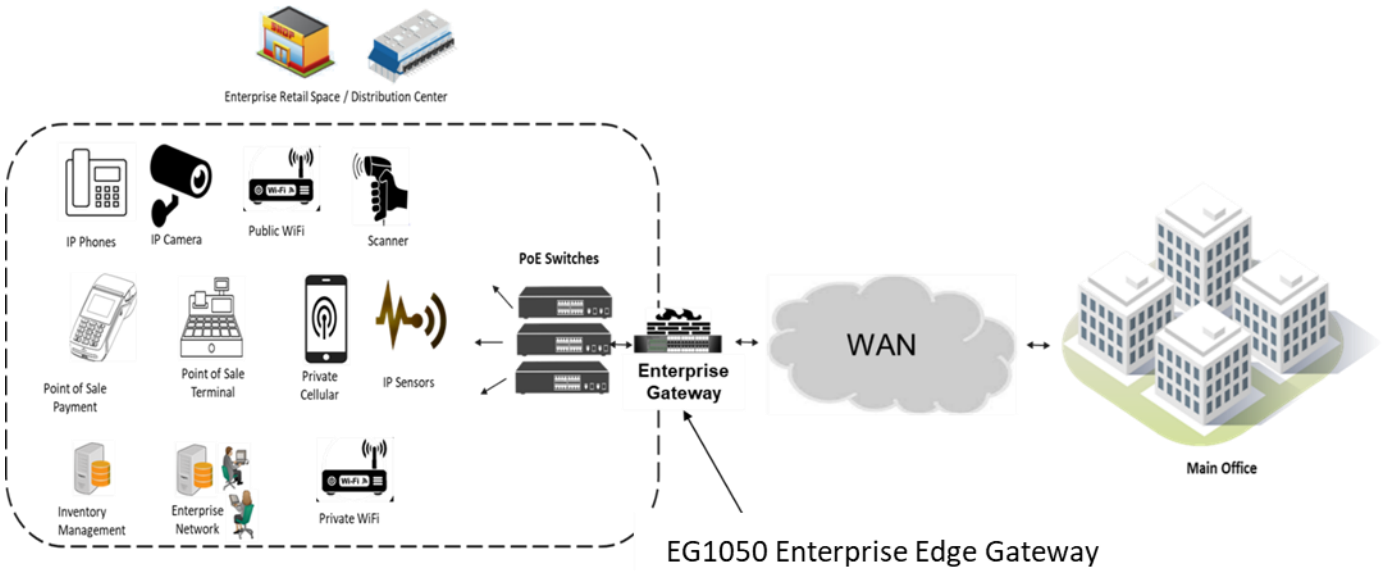
4. Scope

This document defines the technical details for a design specification based on the Enterprise Edge Gateway Base Specification contributed to Open Compute By Amazon Web Services.

5. Overview

The EG1050 is a Networking device that is intended to sit at the Edge of an Enterprise remote network. This remote network will be connected to the main corporate or campus network through some type of Wide Area Network (WAN) connection. Through this WAN connection the EG1050will be capable of performing SASE / SD-WAN functions such as, Firewalling, Zero Trust Network Access, Secure Web Gateway, Anti-Virus protection and others. The WAN connections could be from standard Ethernet interfaces, optical, or cellular backhaul connections.

On the Local Area Networking (LAN) side the EG1050 will provide connections to additional network infrastructure devices (switches, Wi-Fi APs, sub-GHz gateways), a larger number of IOT devices located in the edge network, and end users. These IOT devices could include card readers, environmental sensors, weight sensors, control systems, cameras, and many other types of devices. Connectivity to users/devices in the local area network can be from wired connections supporting Power Over Ethernet or Wi-Fi connections.



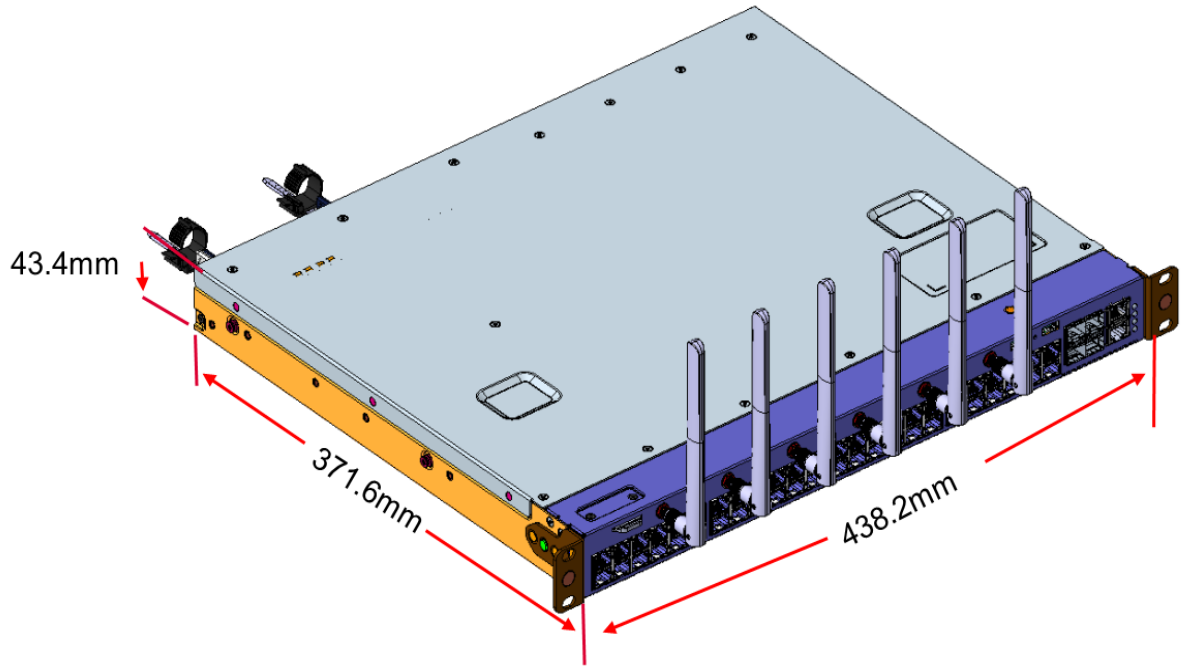
6. Rack Compatibility

The EG1050 is rack mountable in a standard 19" EIA-310 rack. Mounting of the E1050 in the rack can be accomplished through the supplied rack mounting ears or rail kit.

7. Physical Specifications

The E1050 is a 1RU design with the following dimensions

Length	371.6+ mm
Width	438.2 mm
Height	43.4mm



8. Thermal Design Requirements

Airflow Direction

The EG1050 supports Front to Back airflow with the system fans drawing air into the unit from the front (port side) with the heated air exiting from the rear of the unit (power side).

Cooling System

The EG1050 supports four redundant system cooling fans.

Thermal Monitoring

The EG1050 Main PCB supports 4 internal on-board and component thermal sensors that are readable from the system CPU. The system fan speed can be adjusted based upon reading of this thermal sensor(s).

Environmental:

The EG1050 supports the following environmental conditions for operating and storage temperatures:

Operating: 0-45C @6000ft, 10% - 95% (non-condensing)
Storage: -20C – 60C, 5%-90% (non-condensing)

9. I/O System

The EG1050 starts with two base SKUs being a 28-port and a 52-port version (including uplink ports). Additional functionality can be added to these base designs at build time.

	CPU Module	Wi-Fi	LTE/5G	PoE
Base Model 24 Ports	Build Option	Build Option	Build Option	Build Option
Base Module 48 Ports	Build Option	Build Option	Build Option	Build Option

Option 1

24 ports of standard 1G (10Mb, 100Mb, 1Gb, 2.5Gb full/half duplex capable) RJ45 Ethernet. These ports will optionally (separate orderable SKU) support Power over Ethernet (PoE). Power over Ethernet support for these ports will support 802.3 AF/AT/BT type 4 class 8. Reference PoE table below.

Option 2

32 ports of standard 1Gb (10Mb,100Mb,1Gb full/half duplex capable) RJ45 Ethernet plus 16 ports of 2.5Gb (10Mb, 100Mb, 1Gb, 2.5Gb full/half duplex capable) RJ45 Ethernet. All of these 48 ports will optionally (separate orderable SKU) support Power over Ethernet (PoE). Power over Ethernet support for these ports will support 802.3 AF/AT/BT type 4 class 8. Reference PoE table below.
Ethernet Uplink Ports

The EG1050 supports four SFP28 ports capable of 10Gb/25Gb operation. These ports will support any MSA compliant SFP28 module.

	Type 1	Type 2	Type 3	Type 4
Name	PoE	PoE+	PoE++ UPoE	High Power PoE
PoE Standard	IEEE 802.3af	IEEE 802.3at	IEEE 802.3bt	IEEE 802.3bt
Max. Power Per Port	15.4W	30W	60W	100W
Power to PD	12.95W	25.5W	51W	71.3W
Twisted Pair Used	2-Pair	2-Pair	4-Pair	4-Pair
Supported Cables	Cat5e	Cat5e	Cat6A	Cat6A
Typical Application	IP Phone	Video Phone	MGMT Device	LED Lighting

Power Over Ethernet Overview

Management Port

The EG1050 supports a RJ45 and an SFP 1Gb management interface connecting to the system CPU.

Serial Console Port

The EG1050 supports a RJ45 serial console port for system management

USB Port

The EG1050 supports two USB 3.0 type A ports connecting to the system CPU

Luggage Tag

The EG1050 supports a pull out “Luggage Tag” that includes the system serial number and MAC address information

Wireless Connectivity Options

The EG1050 supports build options (orderable SKUs) for wireless connectivity options including:

Wi-Fi Connectivity

The EG1050 has the ability to support an optional embedded Wi-Fi access point through an optional M.2 Wi-Fi module. The Wi-Fi circuitry communicates to the internal EG1050 modular CPU for configuration, management, and connecting user traffic to the Local Area Network as well as the uplink ports. This Wi-Fi network could be used to connect local users/devices to the LAN/WAN. Wi-Fi standards such as 802.1ax and 802.1be will be supported. If Wi-Fi is ordered as an option antennas will be included with that SKU

Cellular Connectivity

The EG1050has the ability to support optional cellular connectivity through an optional M.2 Cellular modular. This cellular connectivity can be used as an out of band management channel and/or a backup WAN link should the primary connectivity fail. Cellular options such as LTE and/or 5G will be supported. If Cellular is ordered as an option antennas will be included with that SKU

Embedded CPU /CPU Module

The EG1050 supports Broadcom Trident3 X2 Switching silicon that supports an embedded CPU. This embedded CPU can be used to run the “Standard” Network Operating System.

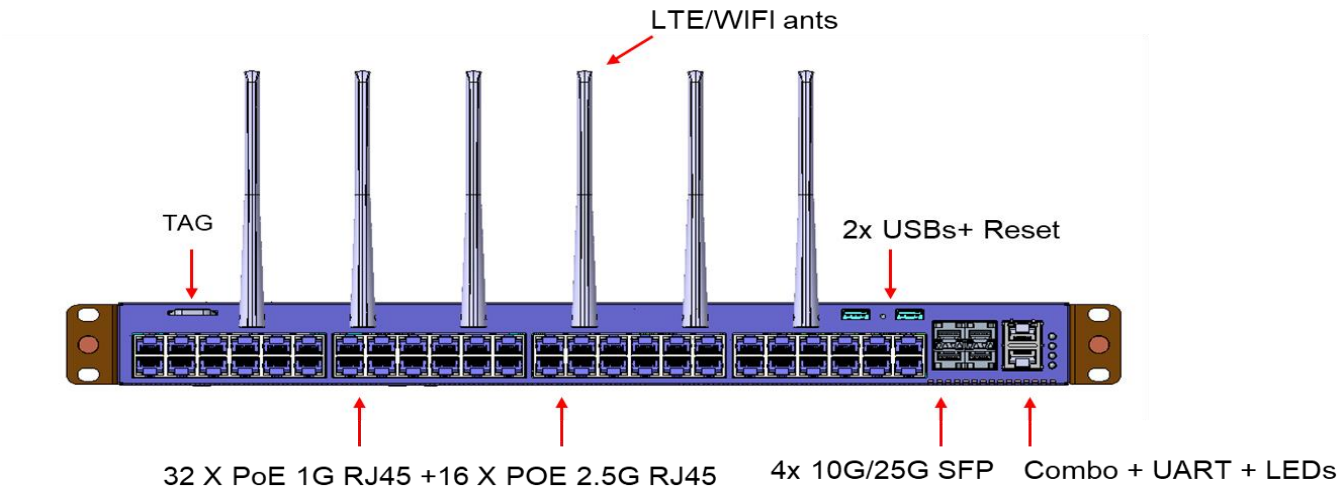
The EG1050 also supports an optional CPU module (orderable SKU) that can support higher performance CPU options. This optional CPU module if installed can run more advanced Network Operating Systems and/or advanced functions such as functions found in SD-WAN / SASE implementations. This optional CPU is required for Wi-Fi and Cellular options.

CPU Module Options

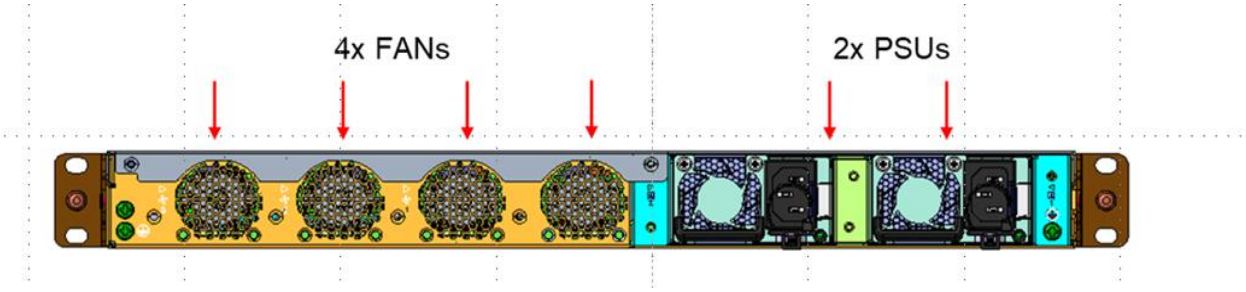
COMe Module Basic	Intel x86 Hewitt Lake
DDR Memory	32G
SSD	256G
COMe Module Compact	Intel x86 Denverton
DDR Memory	32G
SSD	256

TPM 2.0

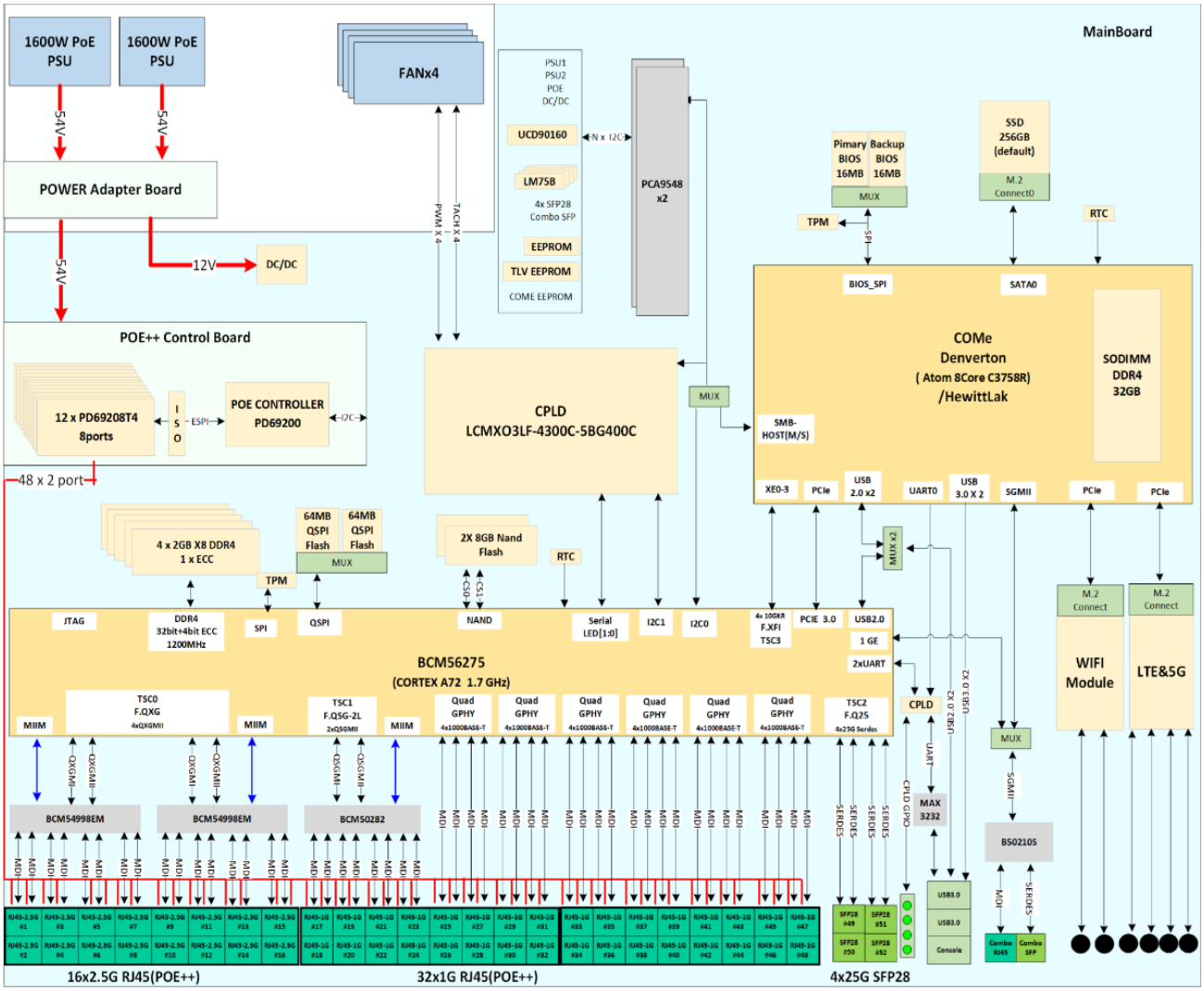
The EG1050 support a TPM 2.0 module. The design allows for a TPM module to be supported utilizing the embedded CPU or the optional COMe CPU module.



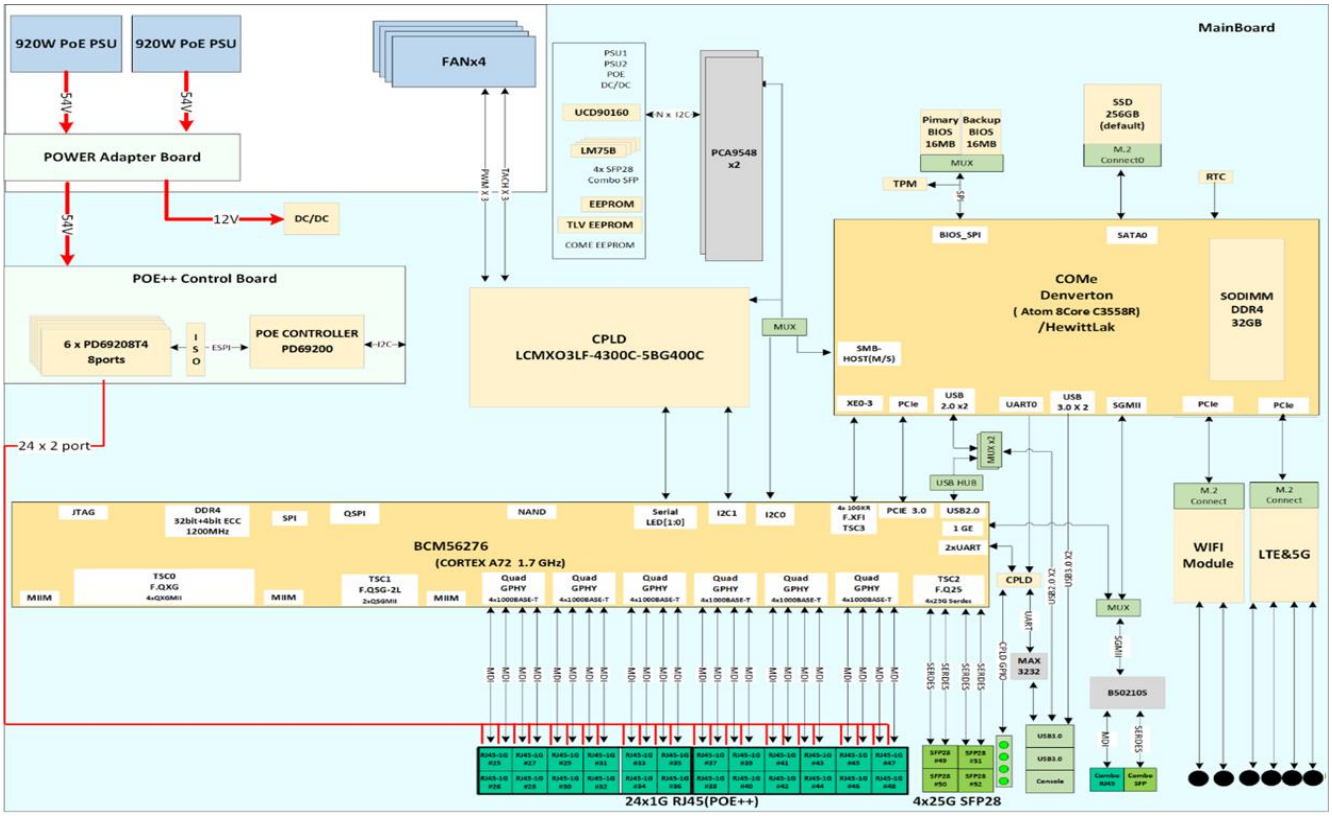
EG1050 Front View



EG1050 Rear View



EG1050-52 Block Diagram 48 port SKU all options



EG1050-24 Block Diagram 24 port SKU all options

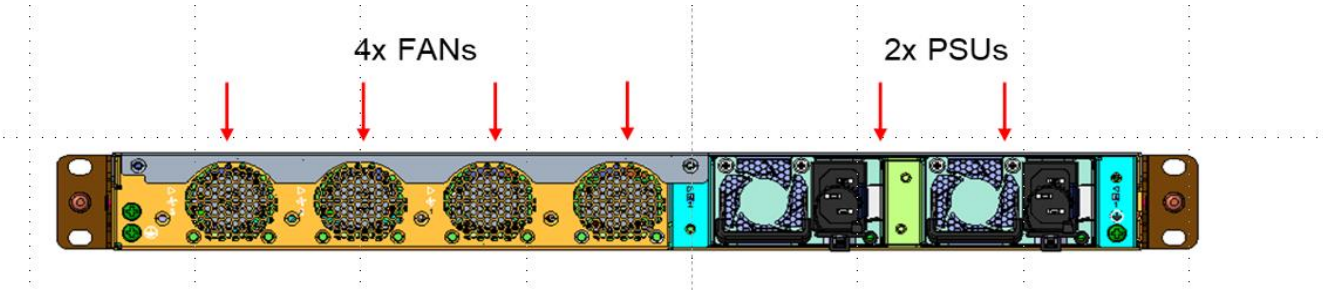
LEDS

The EG1050 Supports the following LEDs

System Status LEDs	Four bi-colored LEDs on the front of the unit to indicate overall system status (FAN, PSU, ALM, SYS)
RJ45 Network Ports	Each port supports two LEDs to indicate link, traffic, PoE status
SFP 28 Uplink ports	Each port supports two bi-colored LEDs to indicate link and traffic status
RJ45/SFP Management ports	Each port supports two LEDs to indicate link and traffic status
PSU	Each power supply supports a single LED to indicate status

10. Rear Side Power, I/O, Expansion Board and Midplane Subsystems

The rear side of the EG1050 supports the following:

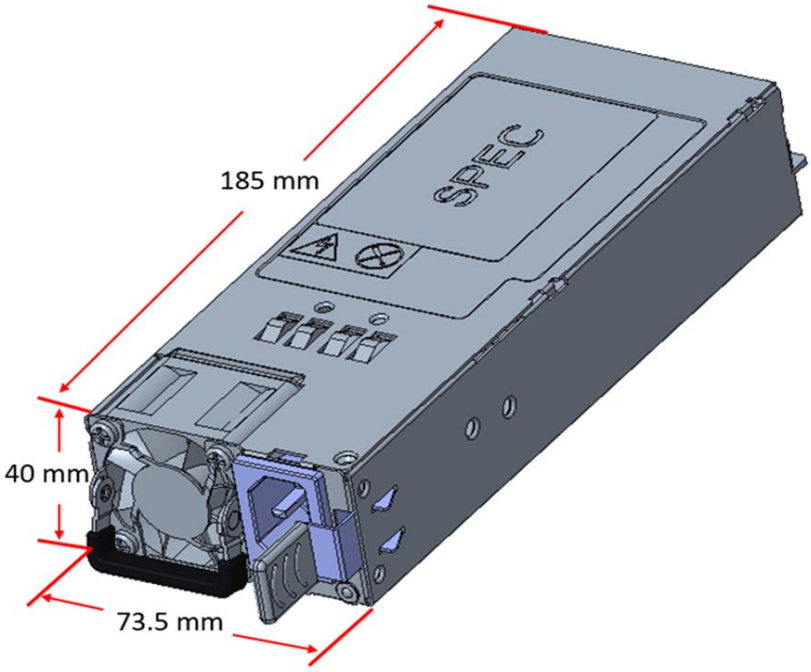


System power supplies

The EG1050 supports redundant field replaceable AC power supply modules. The power supply modules will support input voltage from 90V-264V. Multiple power supply wattage options are offered to match the desired Power Over Ethernet requirement of the end user.

Power Supply Options:

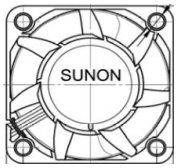
- 550W non-POE usage
- 920W POE usage
- 1600W POE usage



Power supply mechanical

System Fans

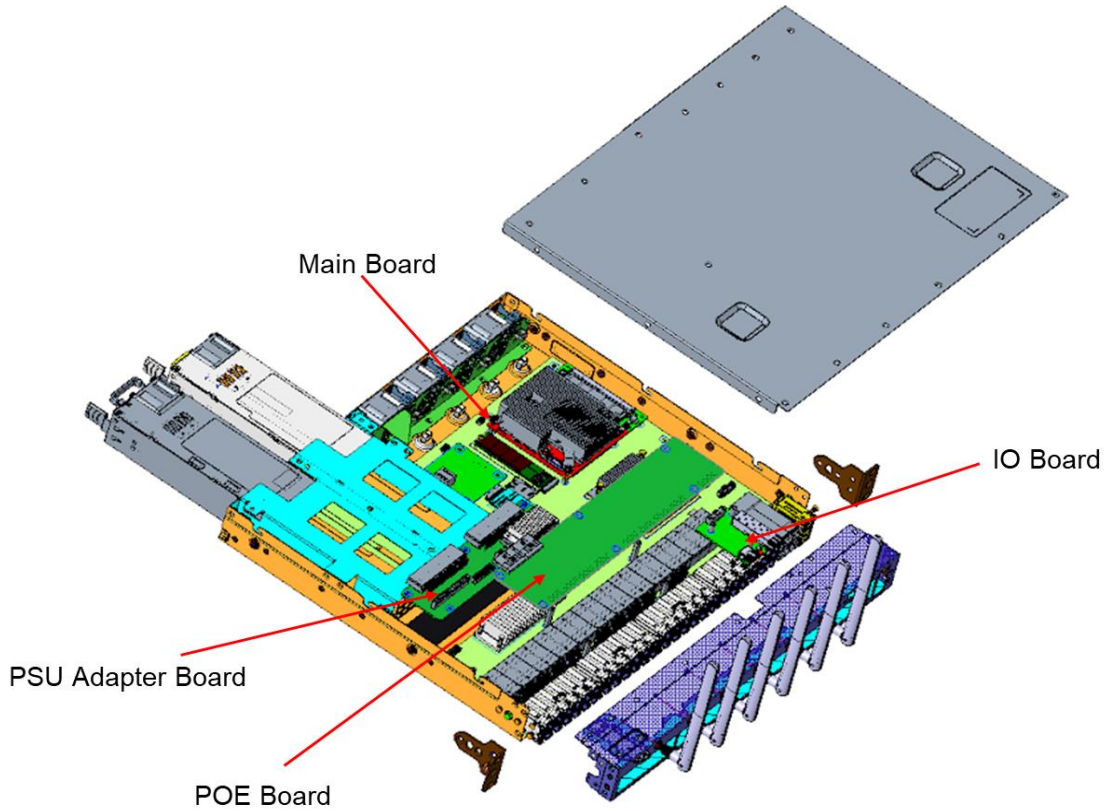
The EG1050 supports redundant system cooling fan assembly supporting four (3+1) system fans.



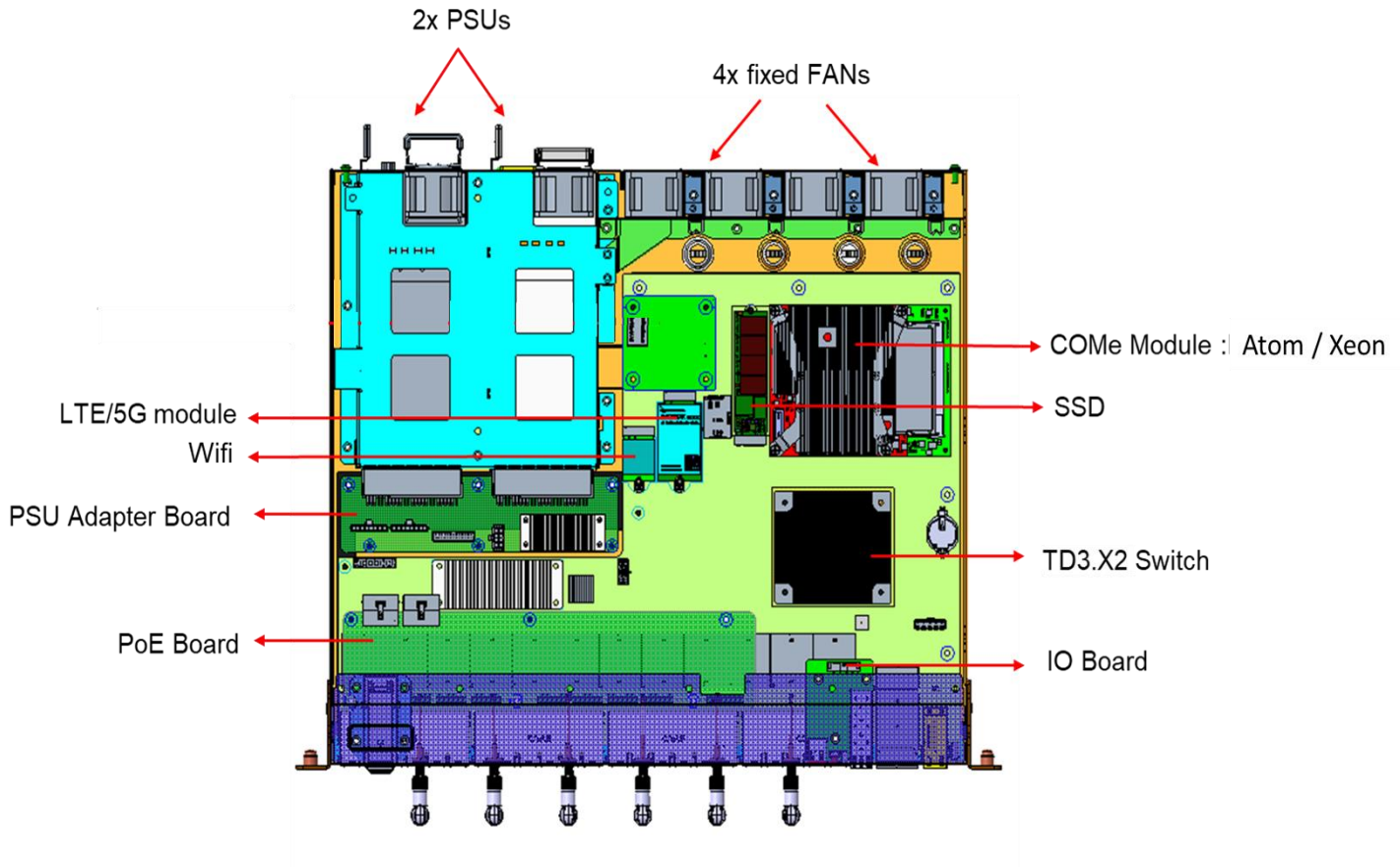
Sunron 4028 Fan MAX speed:28600RPM MAX airflow:33.3CFM MAX static pressure:4.2 in-H2O

11. Mechanical

EG1050 Exploded Diagram

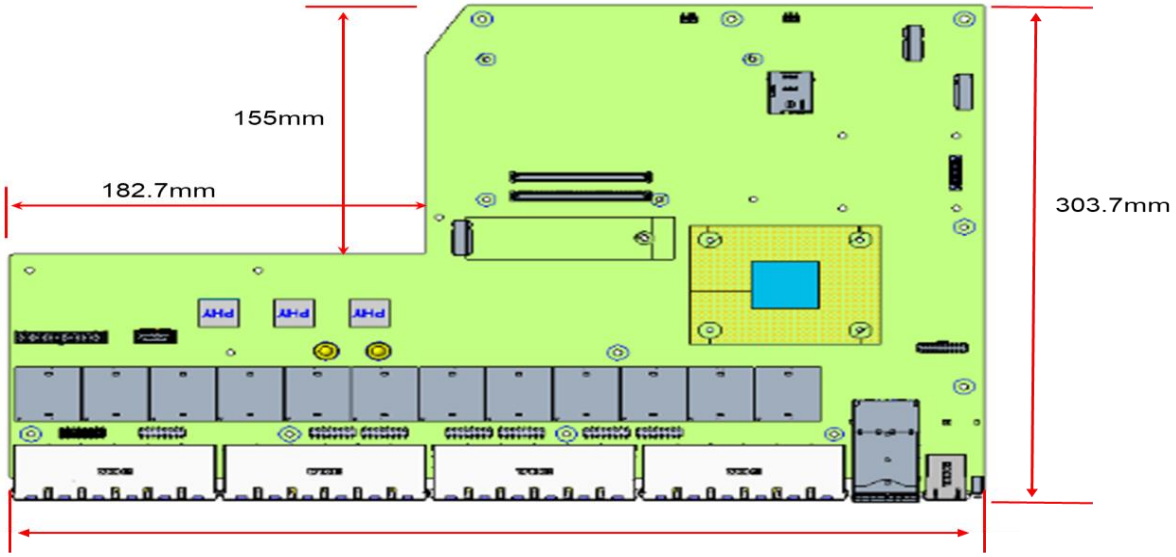


E1050 Layout

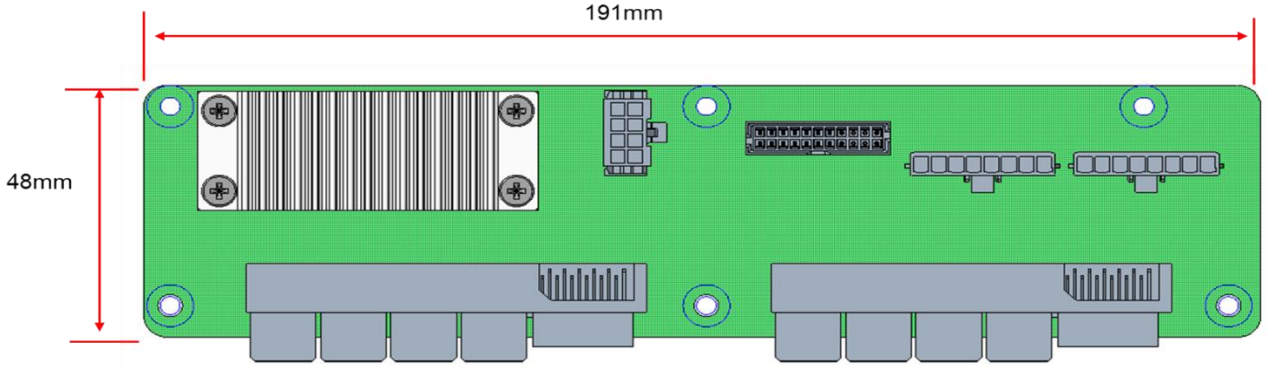


E1050 PCB Mechanical

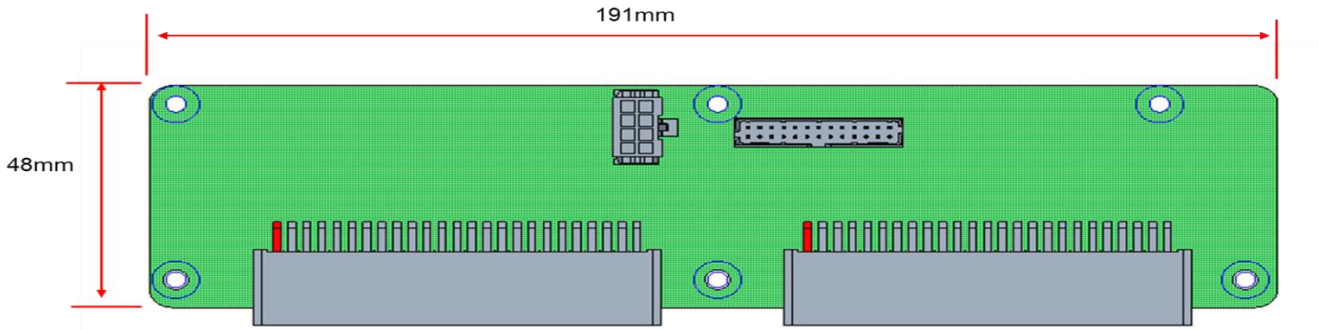
Main Board



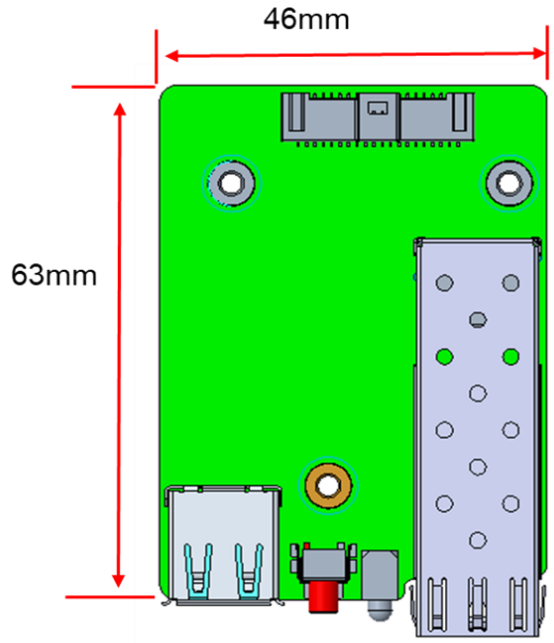
Power Adapter Board POE



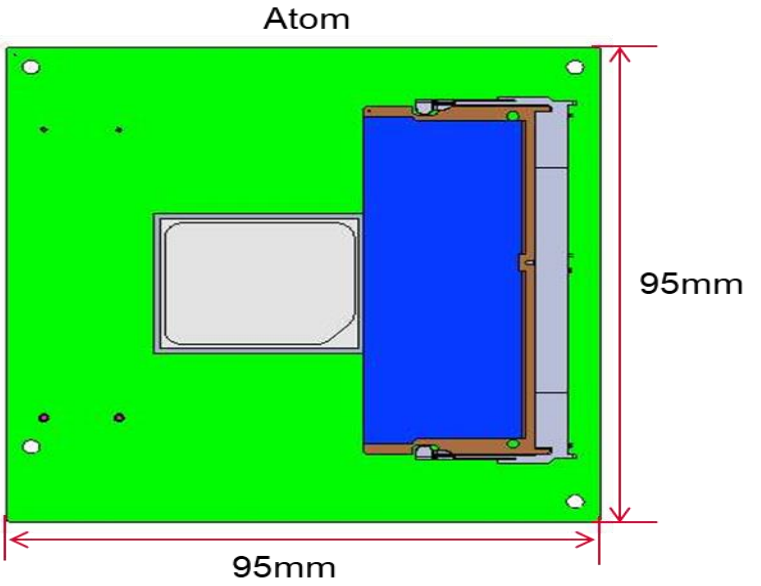
Power Adapter Board non POE



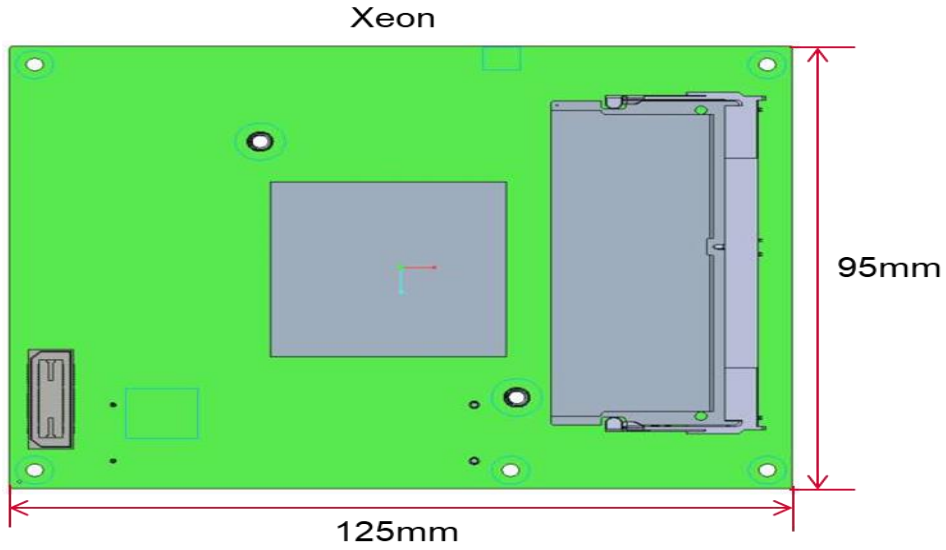
I/O Board



COMe Module Atom



COMe Module Xeon



Cellular Module

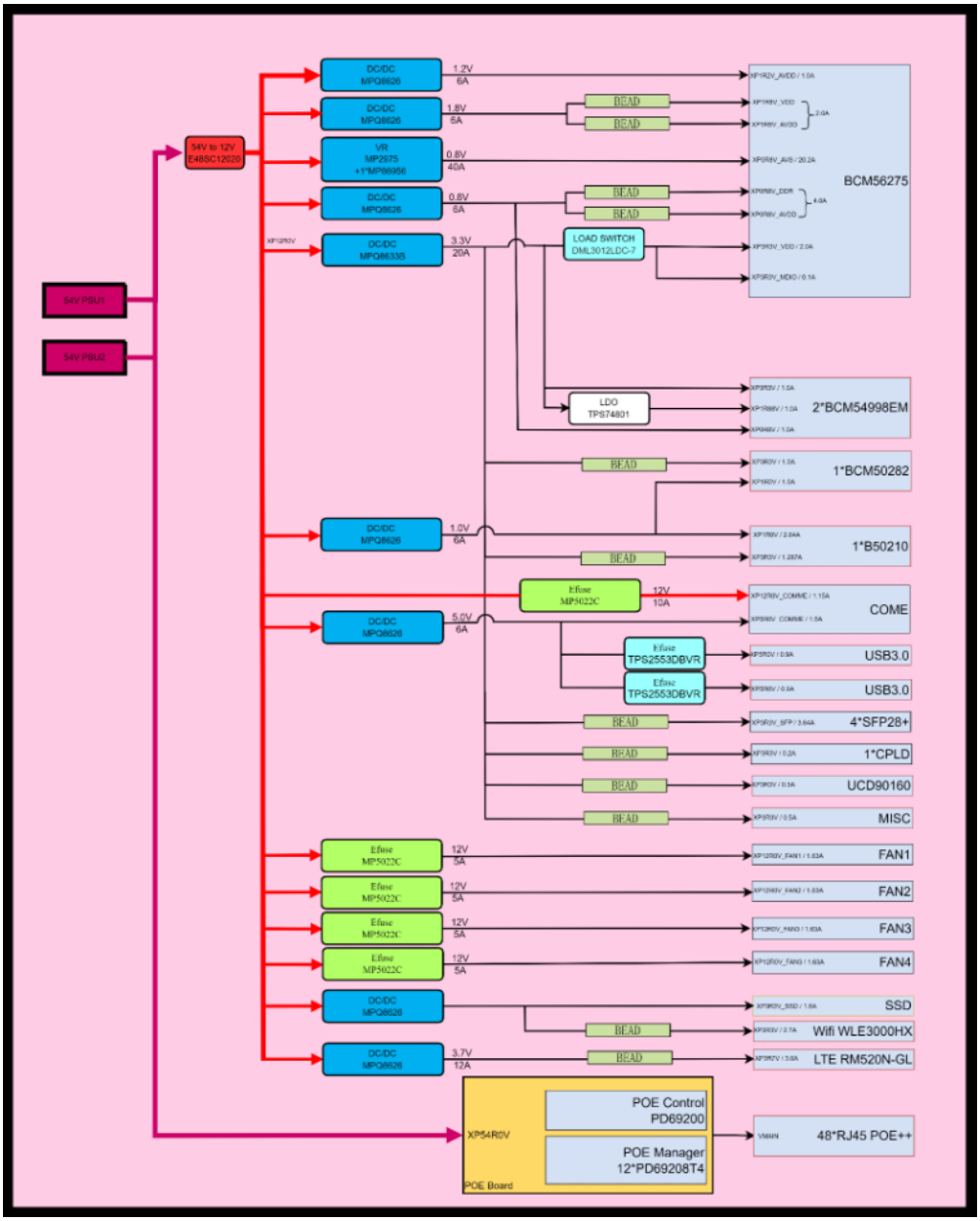


Wi-Fi Module



12. Onboard Power System

The Onboard power system of the EG1050 will accept power from the two redundant power supply modules and distribute this power to components throughout the design by way of various power converters and regulators. An overview of the power system is shown below.



Power system overview 48 port SKU with all options

Power supply modules

There will be various power supply module offered for the EG1050 to meet the required power budget of the design. The following is a list of power supply modules that will be available:

- 550W non-POE usage
- 920W POE usage
- 1600W POE usage

13. Environmental Regulations/Environmental Requirements

Regulatory requirements:

Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE)
European Union ROHS directive: 2011/65/EU
SVHC requirements of REACH directive: (EC) No. 1907/2006
FCC Class B for USA, Canada, Europe, China, Japan
Safety: UL/CSA/IEC/EN 60950-1/62368-1
PSU CE, CCC, KC, TUV, and BSMI.
LTE GCF and PTCRB certified

Environmental

Operating: 0-45C @6000ft, 10% - 95% (non-condensing)
Storage: -40C ~ + 70C,
Storage Humidity 5%-95% (non-condensing)

Acoustic

100% load at 40 C ambient < 46 dBA SPL
Spectrum: 20 Hz to 20 kHz no tones > 20 dB over 1/3rd octave smoothed
Spectrum: 750 Hz to 7.5 kHz no more than five tones > 12 dB over 1/3rd octave smoothed

14. Software Support

The EG1050 will support the following software:

Open Network Install Environment – ONIE
Open Networking Linux – ONL
Software for Open Networking In the Cloud – SONiC
Distributed Enterprise operating System - DENT

15. System Firmware

The EG1050 supports a commercial BIOS from AMI.

16 Hardware Management

The EG1050 supports the Open Compute Baseline Hardware Management Profile.

17 Security

TPM

The EG1050 support a TPM 2.0 module. The design allows for a TPM module to be supported utilizing the embedded CPU or the optional COMe CPU module.

Secure Boot

The EG1050 supports secure boot

MACsec

The EG1050 supports 802.1AE MACsec on all networking interfaces.

Appendix A - Checklist for IC approval of this Specification (to be completed by contributor(s) of this Spec)

Complete all the checklist items in the table with links to the section where it is described in this spec or an external document .

Item	Status or Details	Link to detailed explanation
Is this contribution entered into the OCP Contribution Portal?	Yes	
Was it approved in the OCP Contribution Portal?	TBD	To be voted on by IC
Is there a Supplier(s) that is building a product based on this Spec? (Supplier must be an OCP Solution Provider)	Yes	Celestica
Will Supplier(s) have the product available for GENERAL AVAILABILITY within 12 months ?	Yes	Design underway available ~12 months

Appendix B-__ <supplier name> - OCP Supplier Information and Hardware Product Recognition Checklist

(to be provided by each supplier seeking OCP recognition for a Hardware Product based on this specification)

Company: Celestica
Contact Info: jcatlin@celestica.com

Product Name: EG1050
Product SKU#: EG1050
Link to Product Landing Page: https://www.celestica.com/our-expertise/hardware-platform-solutions/networking

The following is needed for OCP hardware product recognition:

For OCP Inspired™

- All Suppliers must be a Silver, Gold or Platinum Member.
- Declare product is 100% compliant with specification
- Complete the OCP Inspired™ Product Recognition Checklist, which includes hardware management conformance checks and security profile.

For OCP Accepted™

- All Suppliers must be an OCP Member. All corporate membership levels are eligible.
- Complete the OCP Accepted™ Product Recognition Checklist, which includes hardware management conformance checks, security profile and open system firmware conformance checks.
- Submit a design package meeting OCP Hardware Design Guideline Contribution Checklist (if not already submitted by the contributor). If already submitted, declare the product is 100% compliant with the design package.
- Submit a firmware package including a firmware image, build scripts, documentation, test results and a tool that verifies modifications
- Submit the BMC source code, if applicable to product type

Please complete the OCP Inspired™ Product Recognition Submission Checklist or OCP Accepted™ Product Recognition Checklist and the following table.

Item	Details	Links
Which product recognition?	OCP Inspired™	Provide link for the appropriate Product Checklist
If OCP Accepted™, who provided the Design Package?		Link to OCP Contribution Database
Where can a potential adopter purchase the product?		Link to OCP Marketplace