

ACCTON TECHNOLOGY CORPORATION

Accton AS6712-32X / AS6812-32X

Switch Specification

Revision 1.0



OPEN
Compute Project

Revision History

Revision	Date	Author	Description
.01	2/5/2014	Jeff Catlin	Initial Release
.02	3/8/2015	Jeff Catlin	Minor editorial clean up
1.0	8/4/2017	Jeff Catlin	Minor edit to license text, added support for AS6812-32X

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Description	Manufacturer	Part Number
X86 CPU	Intel	C2538 – 2.4GHz 3.0V
SDRAM 4GB SO-DIMM w/ECC (x2)	Innodisk	M3D0-4GHS2LPC 4GB 1.35V
USB to NAND Flash 8GB	ATP	AF8GSSGH-AC1
SPI NOR Flash 8MB	Winbound	W25Q64FVSSIG
TPM	STMicroelectronics	ST33ZP24AR28PVSP ST
FPGA	Microsemi	A2F200M3F-FGG256
mSATA Connector	TE Connectivity	1775838-2
P2041 CPU	Freescale	P2041NSN7PNC 1.5GHz 1.0V FCPBGA780 FREESCALE
SDRAM: DDRIII 2GB with ECC SO-DIMM	UNIGEN	UG25U7200N8UU-ACD
NOR Flash (Boot): 128MB	NUMONYX	JS28F00AM29EWHA
CPLD	Altera	EPM570 (TQFP144 package)
SD CARD: 8GB	Transcend	TS8GSDHC10M
AC Power Supply	Compuware	CPR-4011-4M11 Front to back airflow CPR-4011-4M21 Back to front airflow
DC Power Supply	Universal Microelectronics	UM400D01- Front to back airflow UM400D01-01- Back to front airflow
12V DC Power Module	Edge-Core	PSU-12V-400
Switching Silicon	Broadcom	BCM56850
10/100/1000 PHY	Broadcom	BCM54616S
CPLD	Altera	EPM1270F256C5N (* 3)
Fans	Sunon	PF40561BX-Q020-S99 (Front to Back airflow) PF40561BX-Q010-S99 (Back to Front airflow)
QSFP+ Connector	TE Connectivity	2110819-1
QSFP+ Cage	TE Connectivity	TE 2170378-3
Connector RJ45 2x1 (x1)	UDE	FS2G6

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Scope

This document outlines the technical specifications for the Accton AS6712-32X Open Switch Platform submitted to the Open Compute Foundation.

Overview

This document describes the technical specifications of the AS6712-32X Top of Rack/Leaf switch designed by Accton Technology Corporation. The AS6712-32X is a cost optimized switch design focused on Leaf/Top of Rack deployments which support 10G/40Gb server connectivity and providing 40Gb uplinks to the distribution/Spine layer of the network. The switch supports thirty two QSFP+ ports that each operate at 4x10GGb with break out cables or 40Gb.

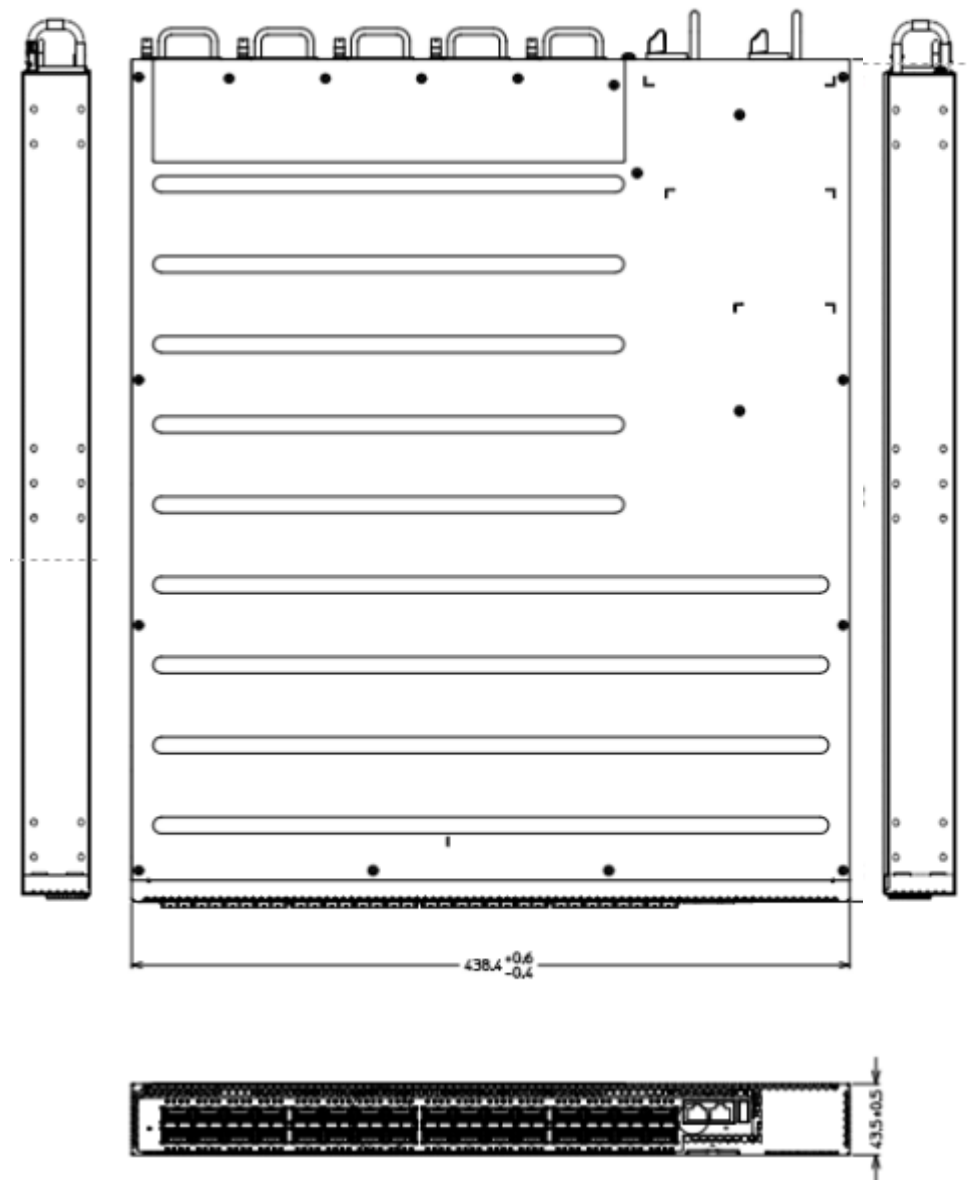
The AS6712-32X is a PHY-Less design with the QSFP+ connections directly attaching to the Serdes interfaces of the Broadcom BCM56850 Trident 2 switching silicon providing the lowest cost, latency, and power. The AS6812-32X SKU is made from the exact components referenced in this specification with the one exception being substituting the Broadcom BCM56850 Trident 2 silicon with the BCM56860 Trident 2+ silicon. The Trident 2 and Trident 2+ silicon are pin compatible and that is the only difference between the two SKUs (AS6712-32X, AS6812-32X). All references to the AS6712-32X in this specification are applicable to the AS6812-32X. The AS6712-32X supports traditional features found in Top of Rack / Spine switches such as:

- Redundant field replaceable power supply and fan units
- Support for “Front to Back” or “Back to Front” air flow direction
- Supports a modular CPU card that allows flexibility in the CPU and/or memory configurations that can be offered.
- The AS6712-32X is a 1RU design that supports standard 19” rack deployments as well as standard 21” Open Rack deployments

Physical Overview

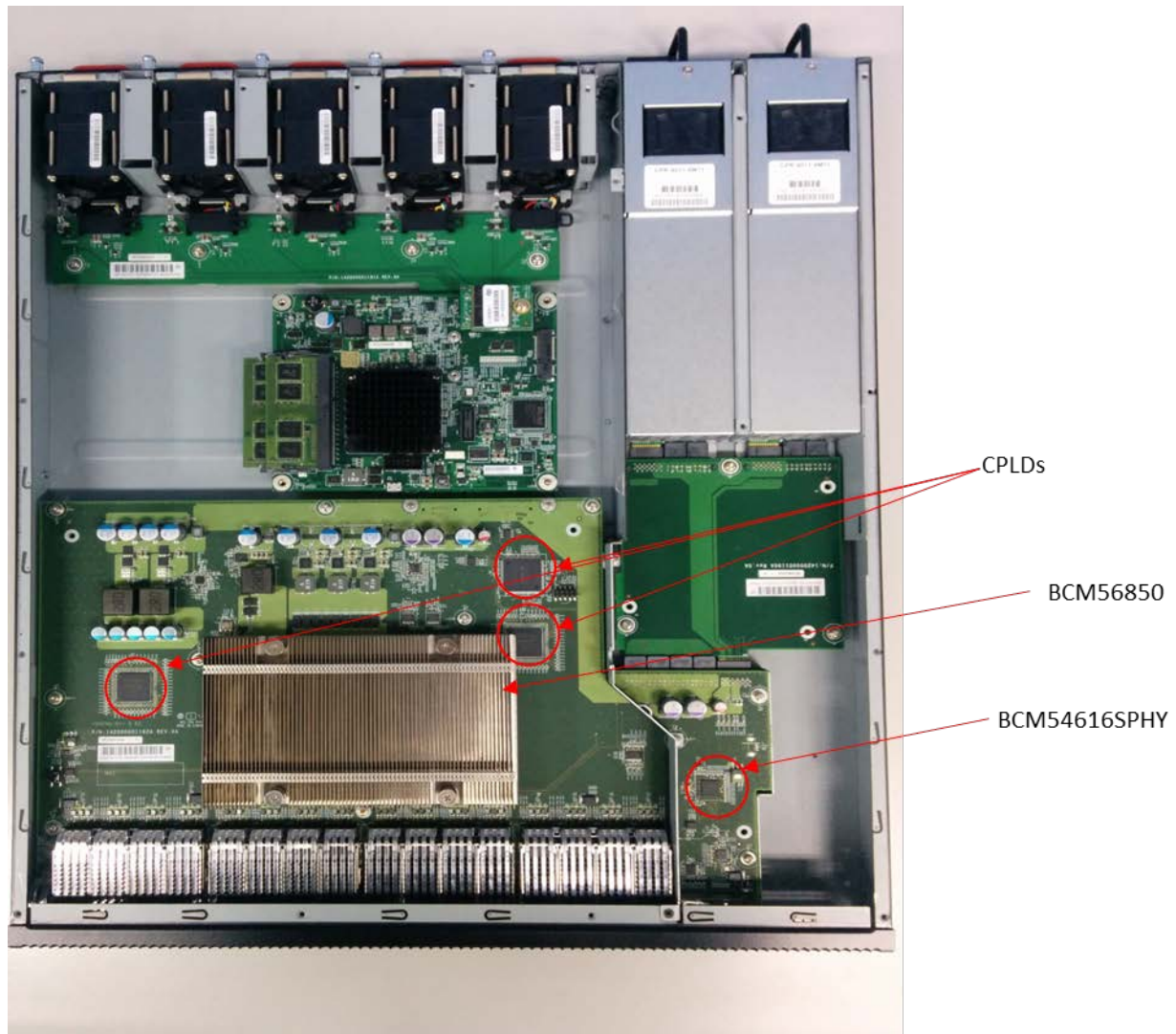
Dimensions

	Inches	Millimeters
Length	20.27	515
Width	17.25	438.4
Height	1.73	44

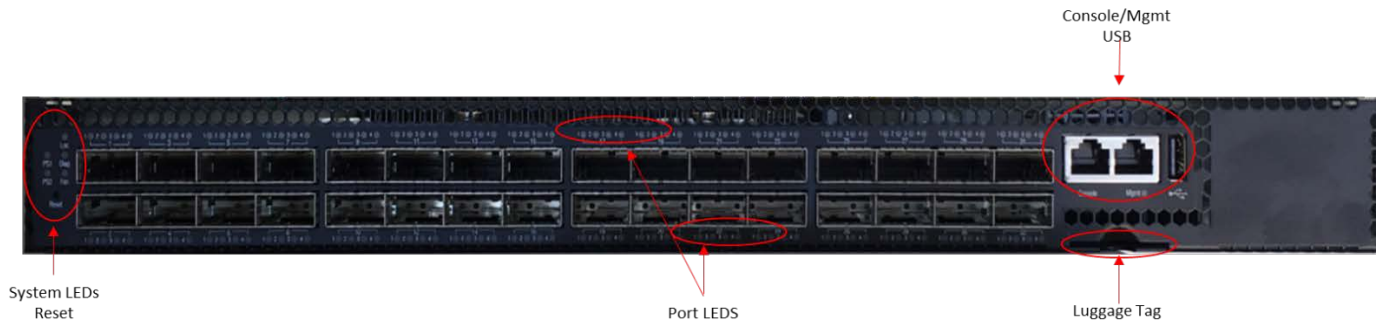


Top View

The top view of the AS6712-32X shows the PCBs and associated components in the AS6712-32X system



Front View



The front panel view of the AS6712-32X includes the following key components:

- Thirty two QSFP+ ports
 - Capable of operating at 40Gb Ethernet with standard QSFP+ modules or 10Gb Ethernet via QSFP to SFP+ break out cables (4x10Gb)
- System LEDs
- Mini USB 2.0 type “A” port
 - Used for optional external storage
- RJ45 RS232 management port
 - Supports asynchronous mode with the default being eight data bits, one stop bit, no parity
- RJ45 10/100/1000 Ethernet management port
 - Connected directly to the system CPU
- Reset switch
- Pull out “Luggage tag” to show model number, serial number, and base MAC address

Front Panel LED Definitions

LED Name	Description	State
PSU1	Led to indicate status of Power Supply 1	Green - Normal Amber - Fault Off – No Power
PSU2	Led to indicate status of Power Supply 1	Green - Normal Amber - Fault Off – No Power
Diag	LED to indicate system diagnostic test results	Green – Normal Amber – Fault detected
FAN	LED to indicate the status of the system fans	Green – All fans operational Amber – One or more fan fault
LOC	LED to indicate Location of switch in Data Center	Amber Flashing – Set by management to locate switch Off – Function not active
QSFP+ Port LED Each QSFP+ Port has four LEDs to indicate status		On Green/ Flashing QSFP Port has valid link at 40G. Flashing indicates activity
		On Orange/ Flashing QSFP Port(s) have valid link at 10G. Flashing indicates activity
OOB LED	LED to indicate link status of 10/100/1000 management port	On Green - port has link Off – No link Flashing indicates activity.

QSFP+ Interface Module Support

40Gb SFP+ Optical Modules	Standard 40Gb QSFP+ modules including but not limited to: 40GBASE-SR4, 40GBASE-LR4, 40GBASE-ER, AOC Cables
Direct Attach Copper (DAC)	Standard DAC cables including but not limited to: Passive cable up to 7m

Rear View



Redundant power
supply modules

4+1 Redundant fans color
coded for airflow direction

The rear view of the AS6712-32X includes the following key components:

- Five (4+1) redundant hot swappable fan modules
 - o LED per fan module to indicate status
 - o Color coding to indicate airflow direction
- Two redundant hot swappable power supply modules
 - o LED per power supply to indicate status
 - o Color coding to indicate airflow direction

Field Replaceable Units

Power Supply Modules

The AS6712-32X supports two redundant power supply modules as listed below

Compuware 400 Watt PSU: AC Input Range 90-264VAC / 47-63Hz

- CPR-4011-4M11 Front to back airflow
- CPR-4011-4M21 Back to front airflow

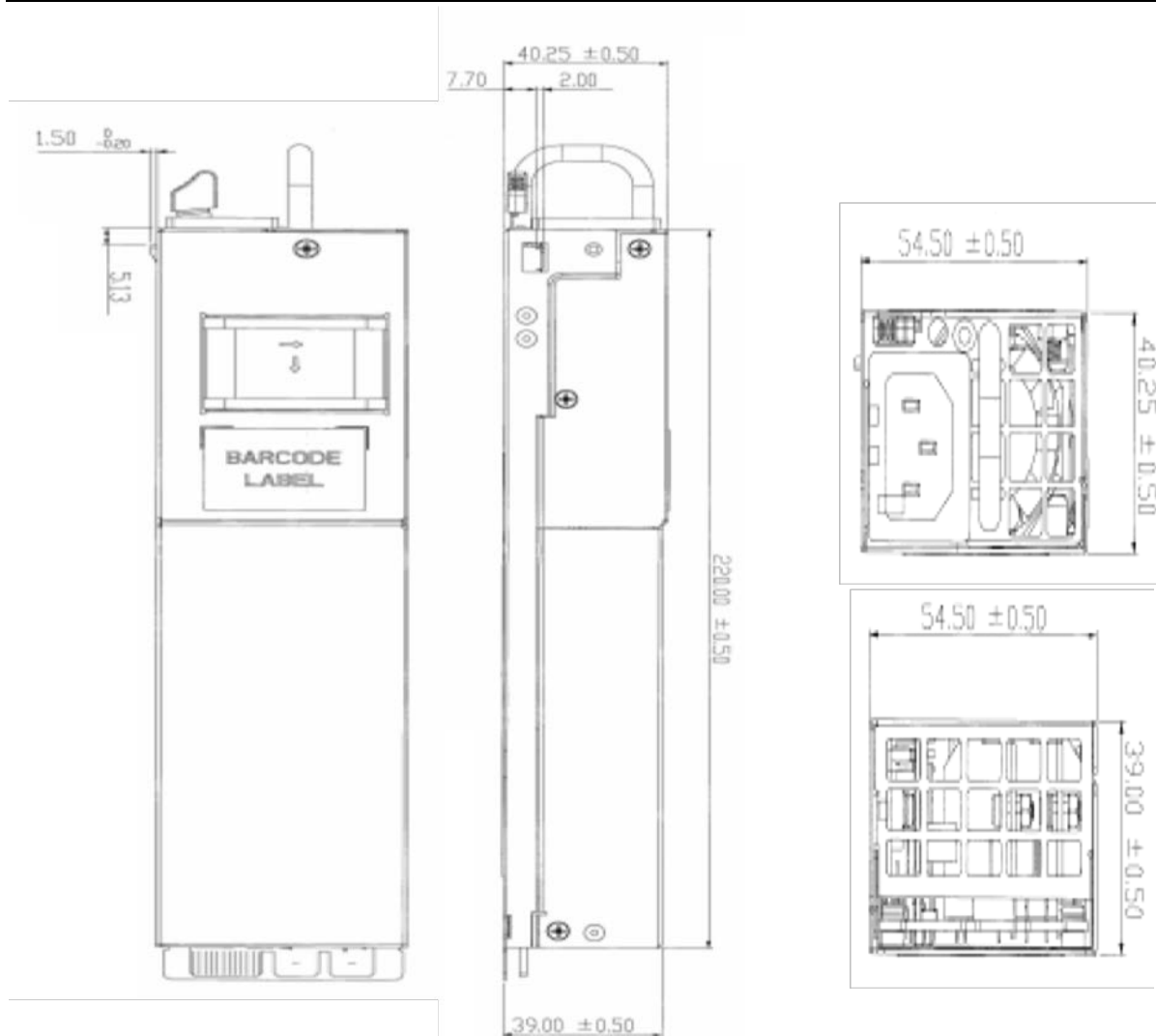
Universal Microelectronics 400W PSU: 48V DC Input range 36-75Vdc

- UM400D01-Front to back airflow
- UM400D01-01-Back to front airflow

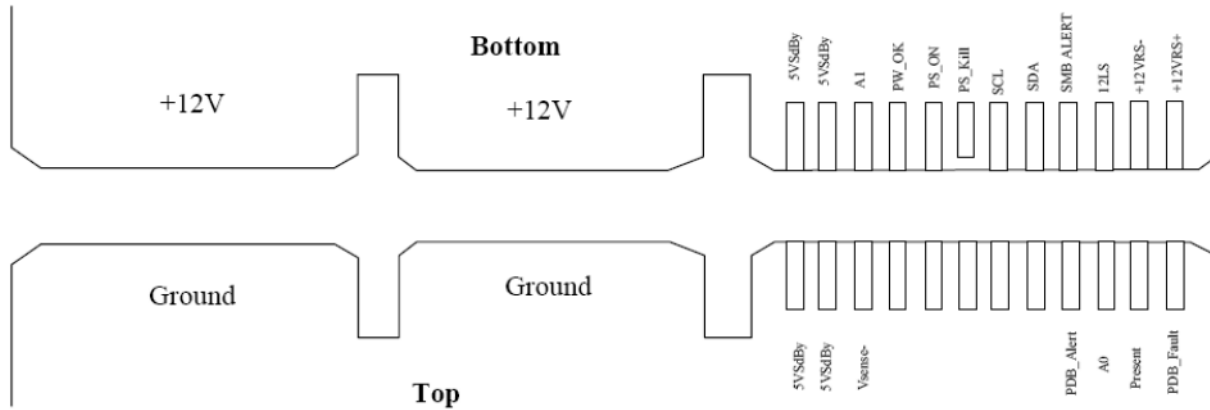
Edge-Core 400 Watt 12V DC Module

- PSU-12V-400

	<u>Inches</u>	<u>Millimeters</u>
Length	8.66	220
Width	1.58	40.25
Height	2.15	54.5



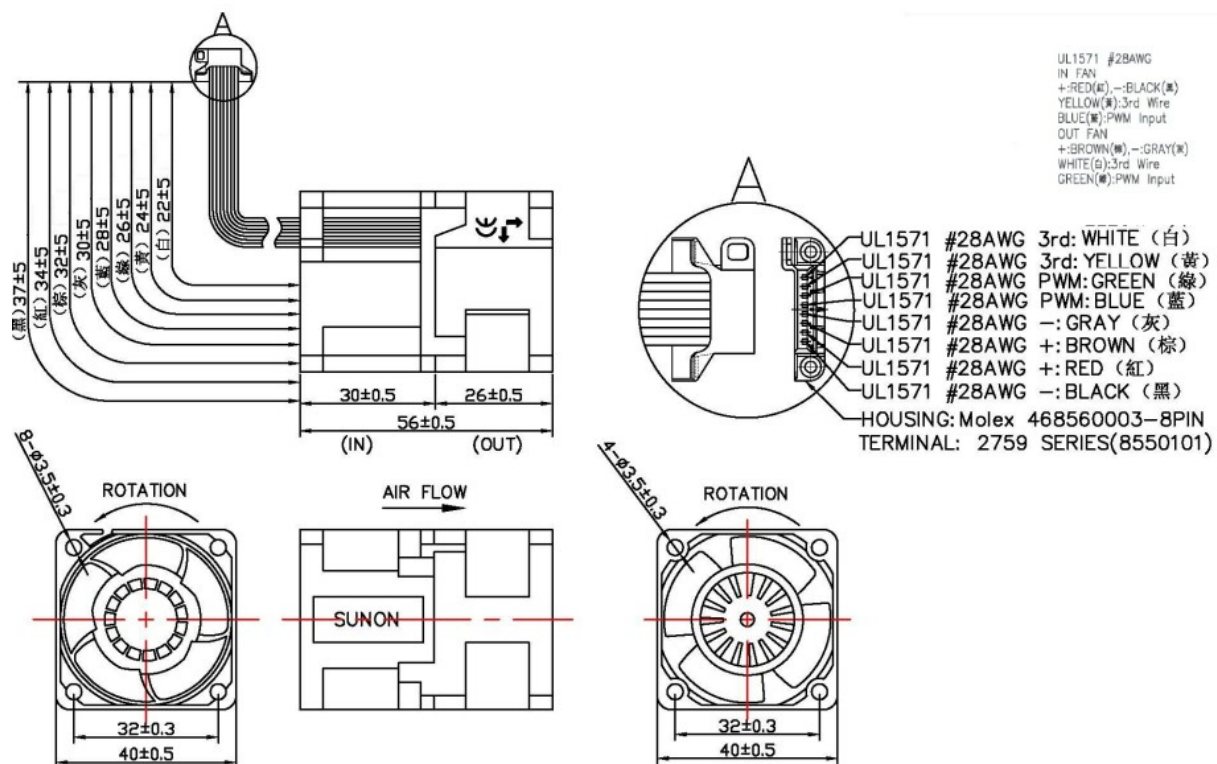
PSU Pin-Out



Fan Modules

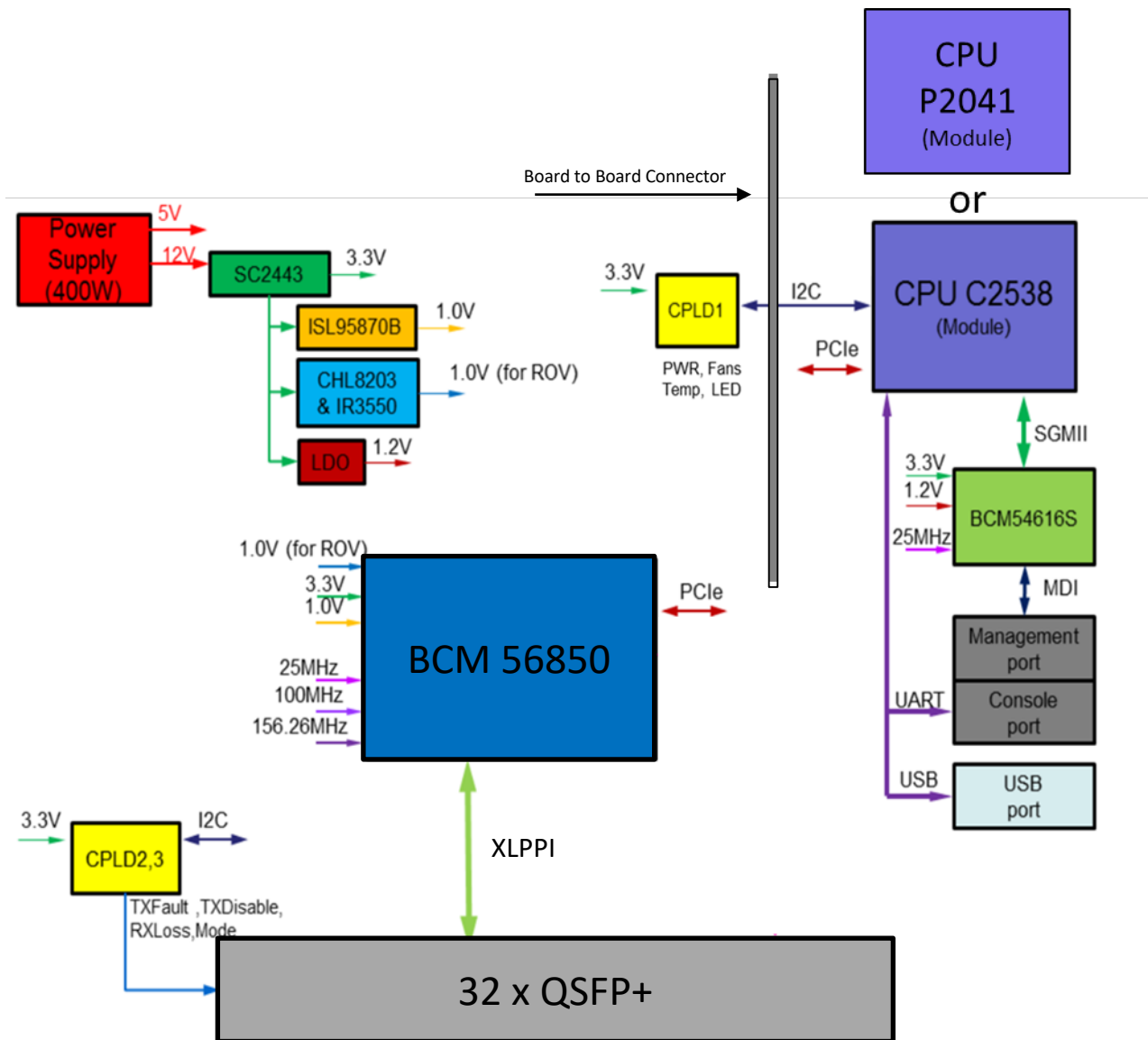
The AS6712-32X supports five individual fan modules. Each fan module supports two 40mmx40mmx56mm fans shown below.

Description	Manufacturer	Part Number
Fan – Front to back airflow	Sunon	PF40561BX-Q020-S99
Fan – Back to front airflow	Sunon	PF40561BX-Q010-S99

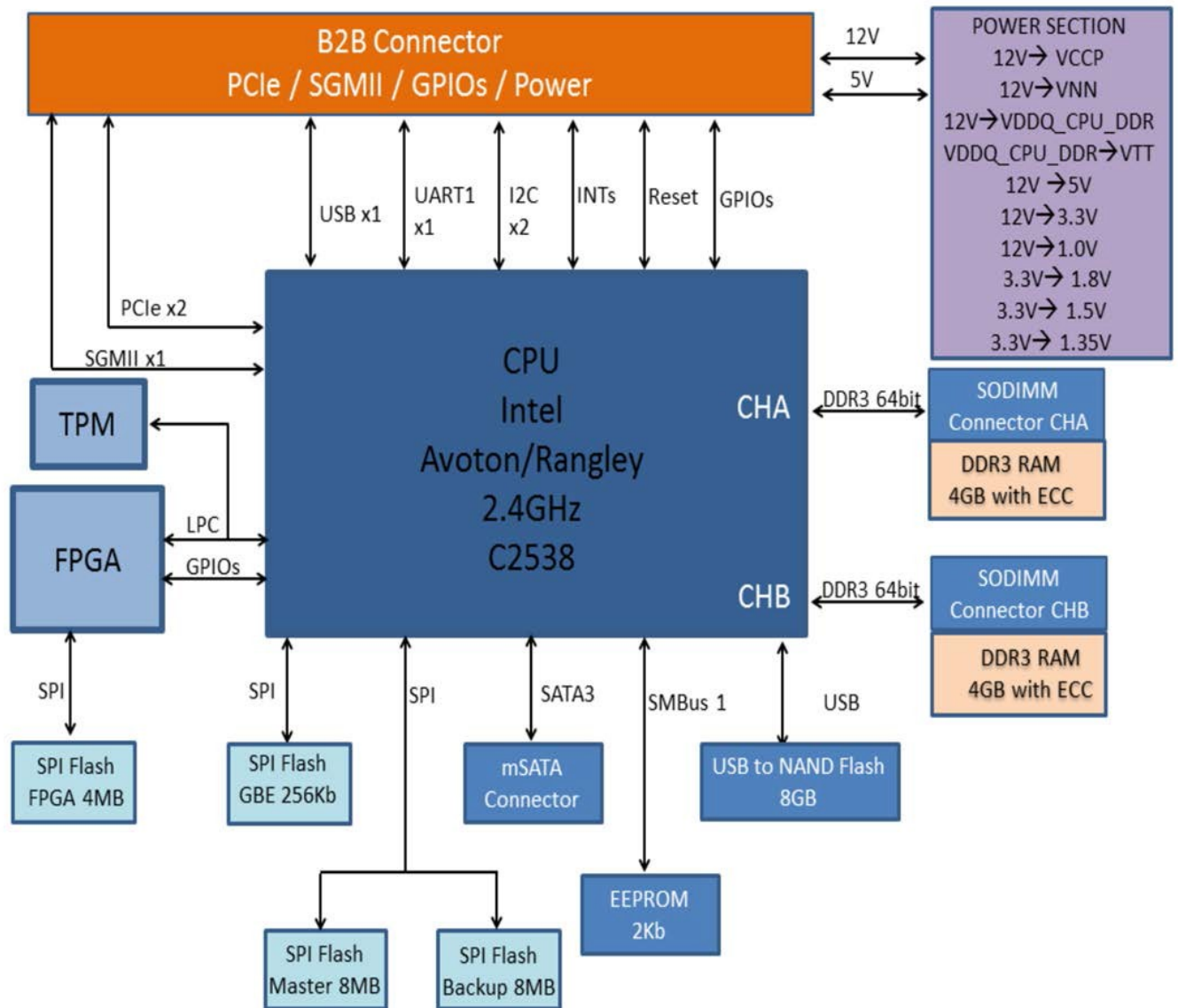


System Overview:

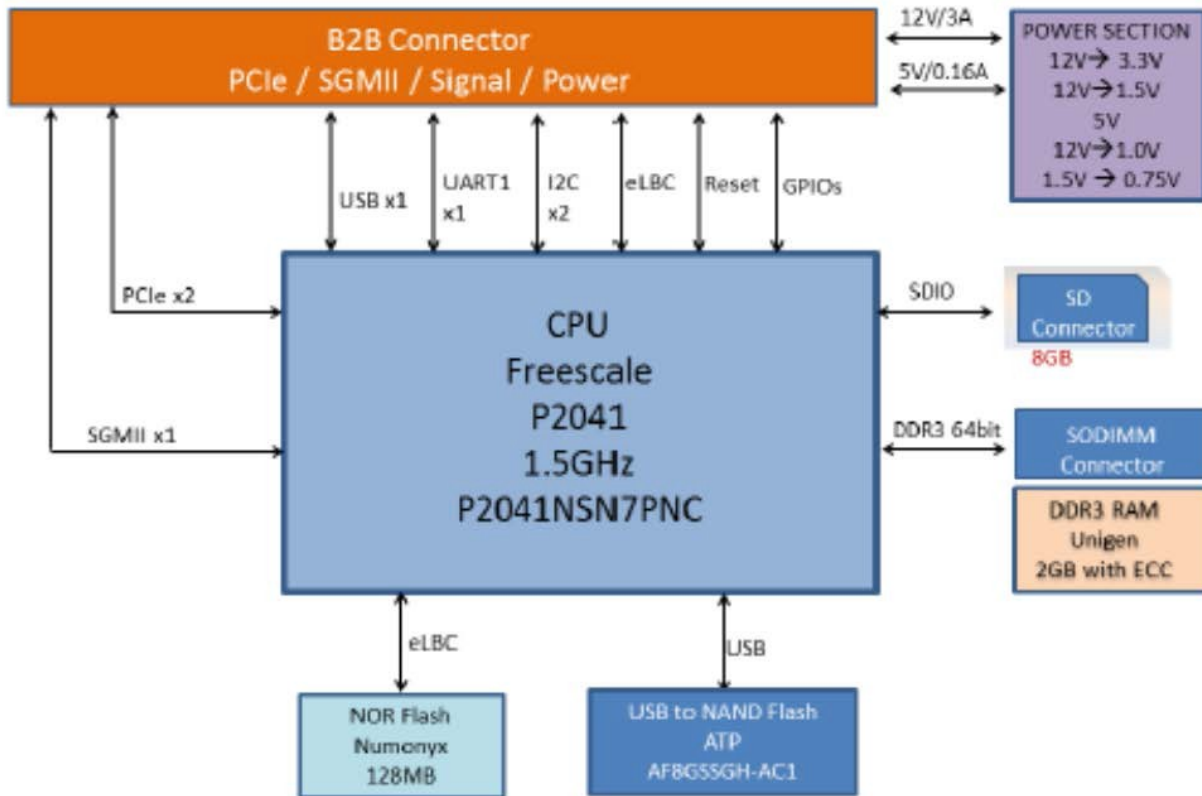
Main PCB Block Diagram



X86 CPU Module Block Diagram



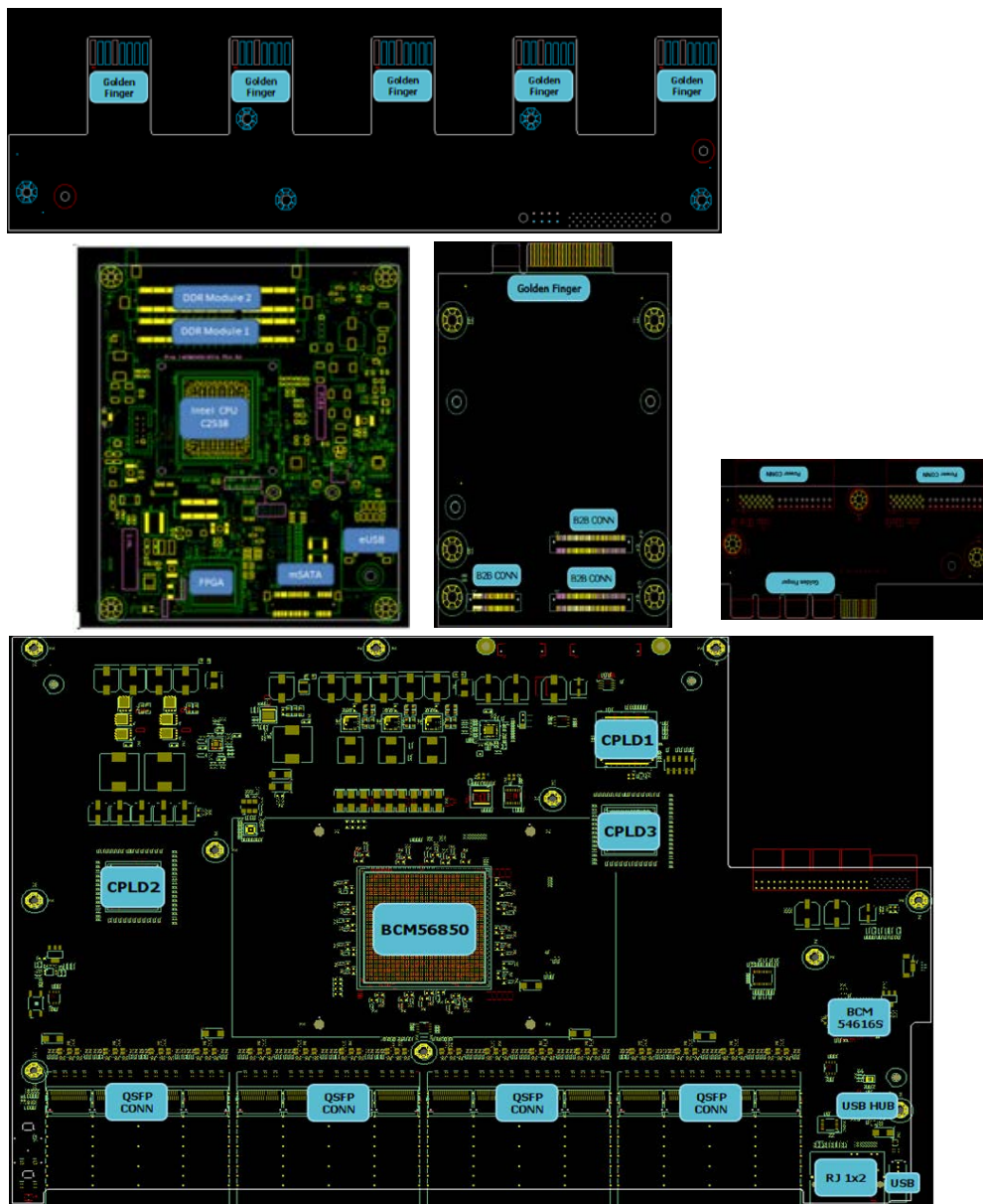
P2041 CPU Module Block Diagram



PCB Board Set

The AS6712-32X is composed of six unique PCB assemblies as follows:

- Main switch PCB which supports the switching silicon and all front panel connections
- X86 CPU module PCB which provides the control processor and associated components
- P2041 CPU module PCB which provides the control processor and associated components
- Fan PCB which provides connectivity for the 5 Fan modules in the system
- Power PCB which connects the power supplies to the main PCB
- Extension PCB which connects the Fan PCB, Main PCB, and CPU Module(s)



Main Switch PCB

The Main Switch PCB is a fourteen layer board supporting the switching silicon, front panel networking and management ports, LEDs, and connections to other PCBs required in building the system.

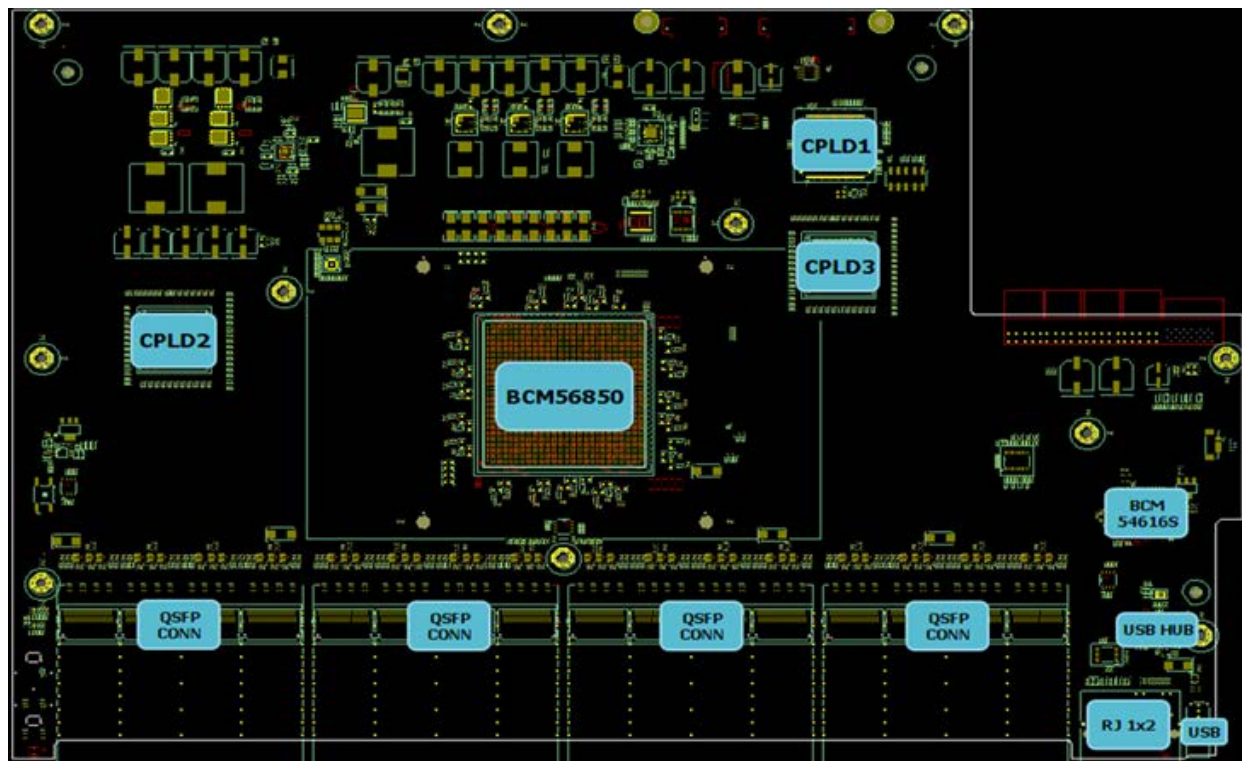
Main PCB Dimensions

	Inches	Millimeters
Length	10.17	258.5
Width	15.27	383.02

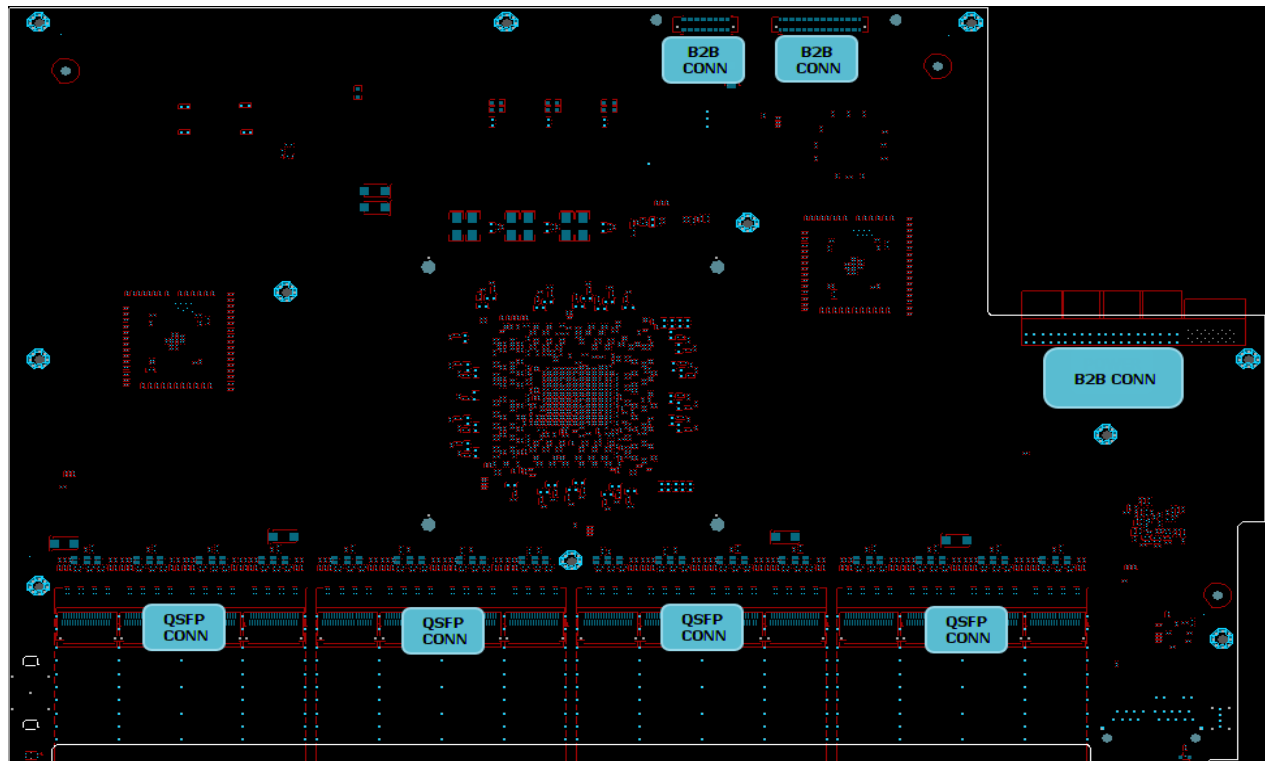
Main PCB major components

Description	Manufacturer	Part Number
Switching Silicon	Broadcom	BCM56854
10/100/1000 PHY	Broadcom	BCM54616S
CPLD	Altera	EPM1270F256C5N (3 pieces)
QSFP+ Connector	TE Connectivity	2110819-1
QSFP+ Cage	TE Connectivity	2170378-3
Connector RJ45	UDE	FS2G6
B2B Connector (Power PCB)	ALLTOP	C21432-P28H5-Y
B2B Connector (Extension PCB)	SAMTEC	LSHM-130-04.0-L-DV-A-N-K-TR
B2B Connector (Extension PCB)	SAMTEC	150-04.0-L-DV-A-N-K-TR

Main PCB Top view



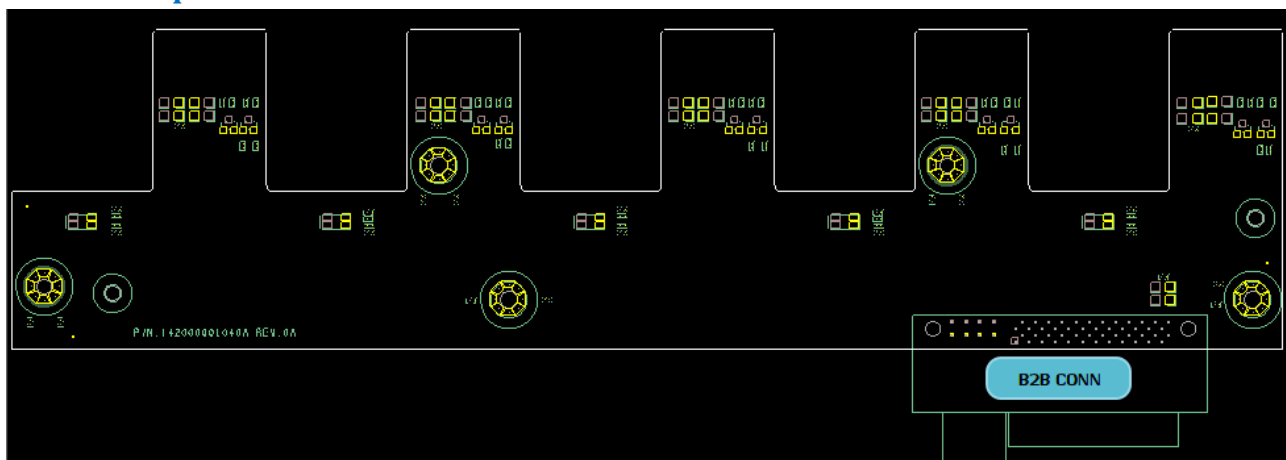
Main PCB Bottom View



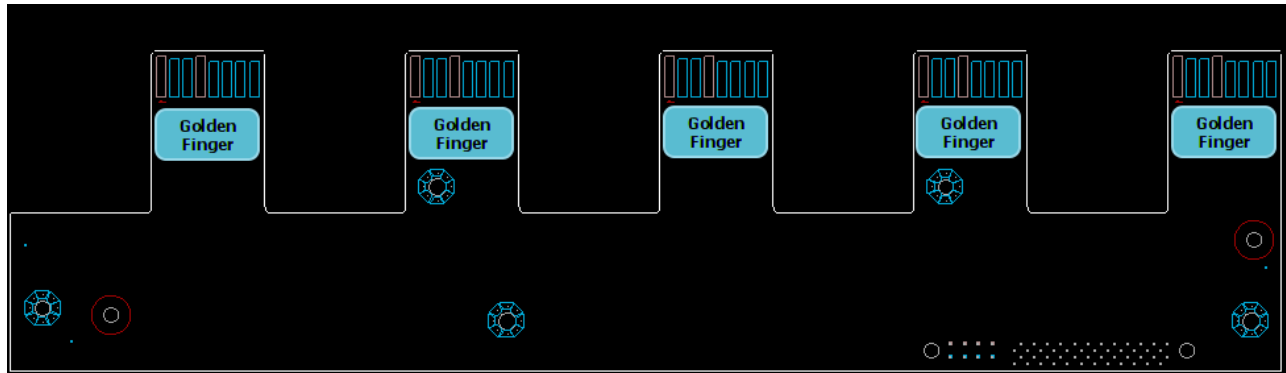
Fan PCB

The Fan PCB is four layers and provides the power, management and connectivity for the 5 system fan modules. The Fan PCB connects to the Main Switch PCB via the extension PCB.

Fan PCB Top View



Fan PCB Bottom View



Fan PCB Dimensions

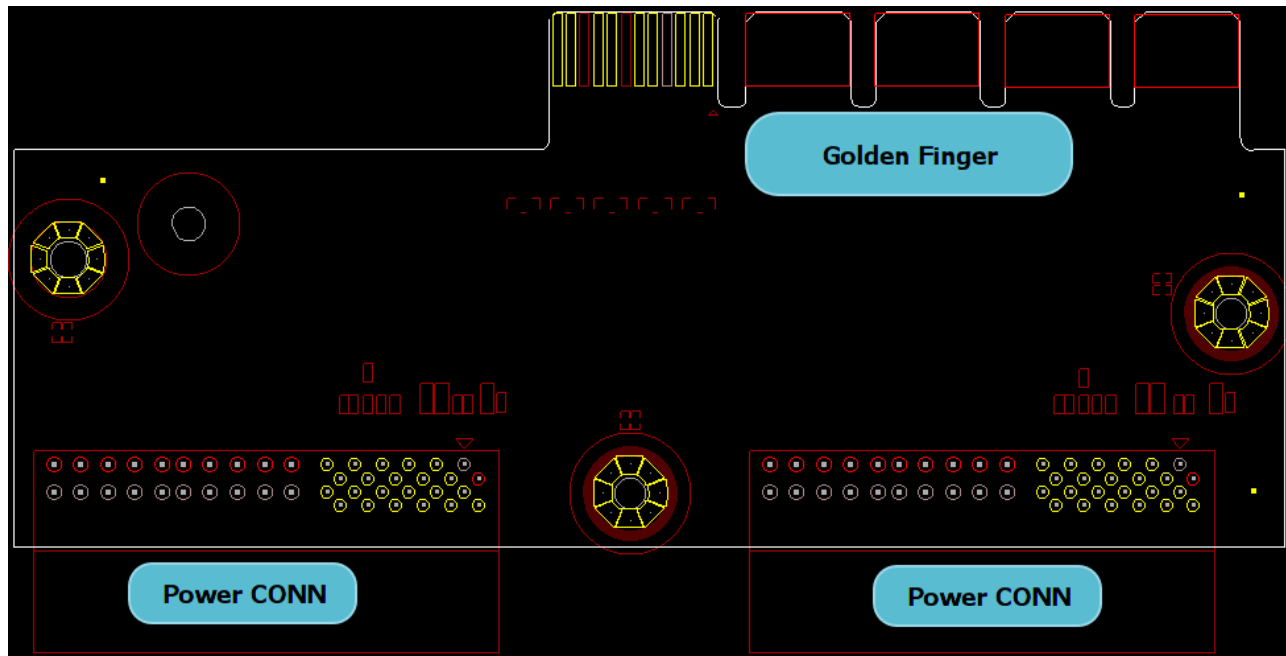
	<u>Inches</u>	<u>Millimeters</u>
Length	9.54	242.5
Width	2.39	60.9

Fan PCB major components

<u>Description</u>	<u>Manufacturer</u>	<u>Part Number</u>
B2B Connector	Alltop	C21431-P49H5-Y

Power PCB

The power PCB is four layers and connects the main PCB board to the common PSU units used in the AS6712-32x.



Power PCB Dimensions

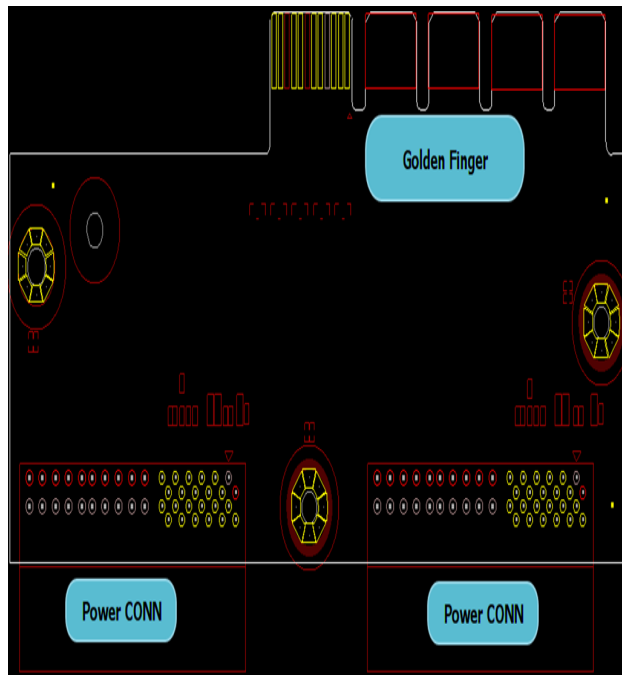
	<u>Inches</u>	<u>Millimeters</u>
Length	1.944	49.39
Width	4.62	117.6

Power PCB major components

<u>Description</u>	<u>Manufacturer</u>	<u>Part Number</u>
Power connector	Alltop	C21440-126H5-Y

Extension PCB

The Extension PCB is four layers and connects the main PCB with the fan PCB and CPU PCB



Extension PCB Dimensions

	<u>Inches</u>	<u>Millimeters</u>
Length	3.26	83
Width	4.42	112.5

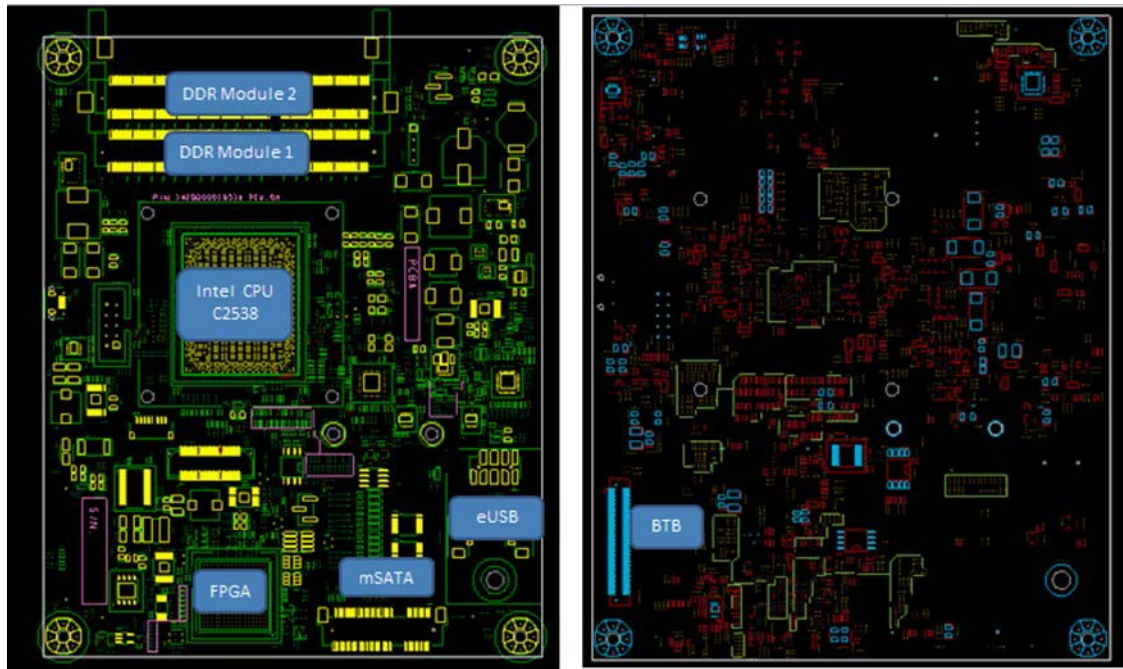
Extension PCB major components

<u>Description</u>	<u>Manufacturer</u>	<u>Part Number</u>
B2B Connector	SAMTEC	130-04.0-L-DV-A-N-K-TR (*1)
B2B Connector	SAMTEC	150-04.0-L-DV-A-N-K-TR (* 2)

X86 CPU Module PCB

The x86 CPU module is a 12 layer PCB and supports the communication processor and associated components for the CPU subsystem. The communication processor utilized is an Intel Atom C2000 series communication processor. This family of Intel SoCs offers a wide range of pin compatible options scaling from two to eight cores, a thermal design power (TDP) of 7W to 20W, integrated HW acceleration, and Intel Xeon Instruction Set Architecture compatibility.

X86 CPU PCB Top and Bottom side



X86 CPU PCB Dimensions

	Inches	Millimeters
Length	5.98	151.9
Width	4.83	122

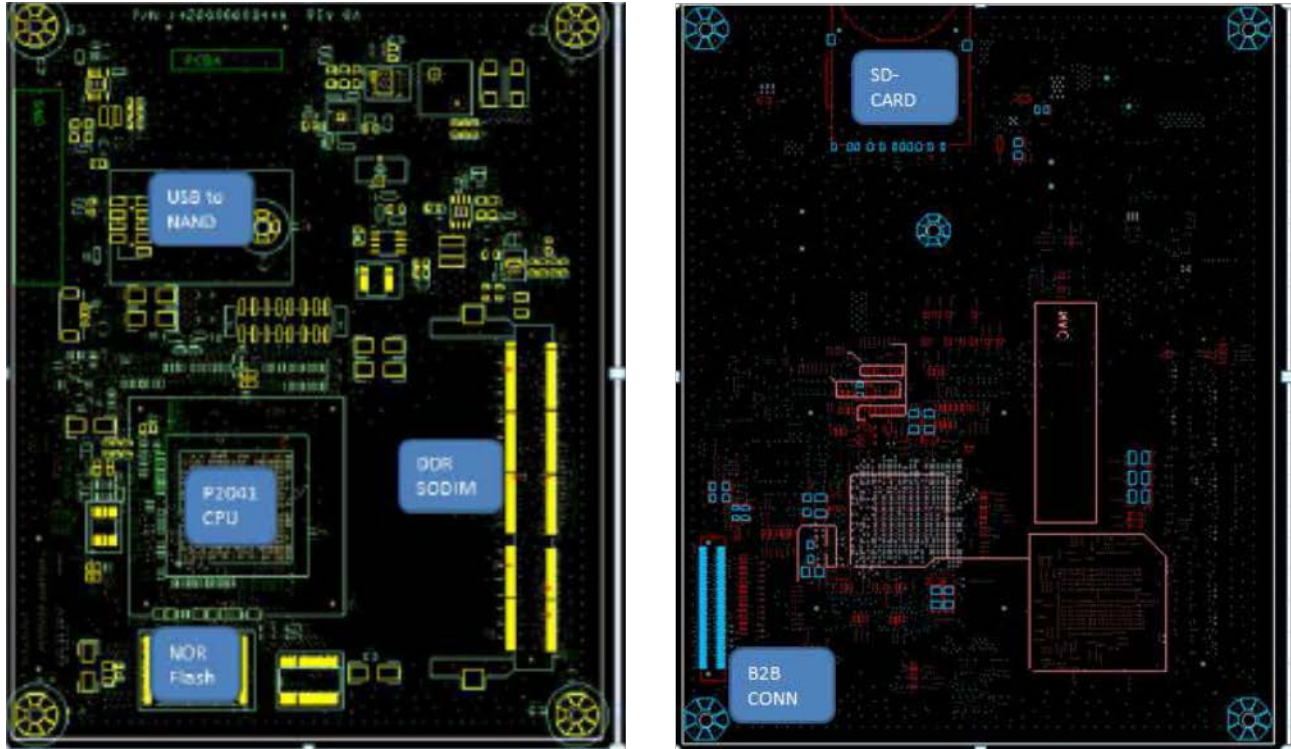
X86 CPU PCB major components

Description	Manufacturer	Part Number
CPU	Intel	C2538 – 2.4GHz 3.0V
SDRAM 4GB SO-DIMM w/ECC (x2)	Innodisk	M3D0-4GHS2LPC 4GB 1.35V
USB to NAND Flash 8GB	ATP	AF8GSSGH-AC1
SPI NOR Flash 8MB (x2)	Winbound	W25Q64FVSSIG
Trusted Platform Module (TPM)	STMicroelectronics	ST33ZP24AR28PVSP ST
FPGA	Microsemi	A2F200M3F-FGG256
mSATA Connector	TE Connectivity	1775838-2

P2041 CPU Module PCB

The P2041 CPU module is an 8 layer PCB and supports the communication processor and associated components for the CPU subsystem. The communication processor utilized The P2041 QorIQ integrated communication processor which combines four PowerArchitecture® processor cores with high performance data path acceleration logic with network and peripheral bus interfaces required for networking, telecom/datacom, wireless infrastructure, and aerospace applications.

P2041 CPU PCB Top and Bottom side



P2041 CPU PCB Dimensions

	<u>Inches</u>	<u>Millimeters</u>
Length	5.98	151.9
Width	4.83	122

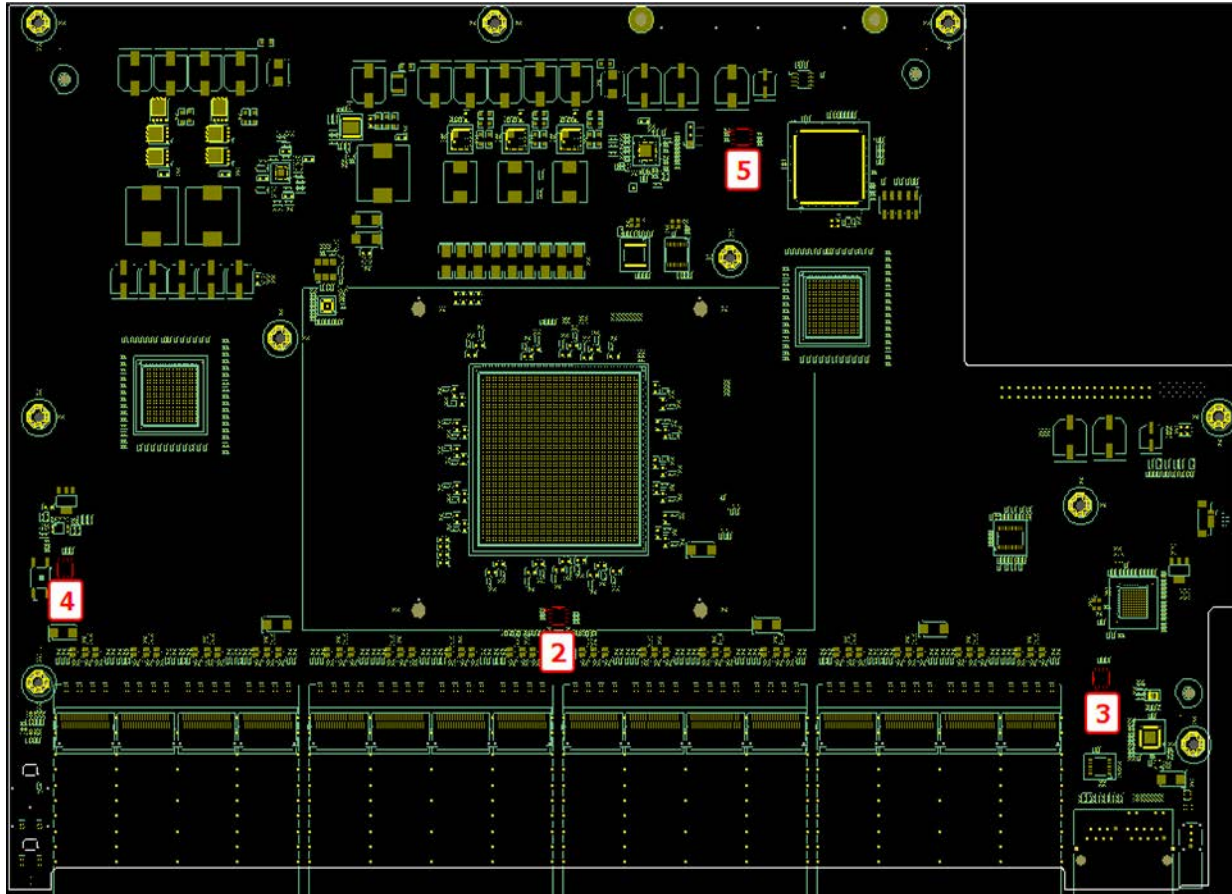
P2041 CPU PCB major components

<u>Description</u>	<u>Manufacturer</u>	<u>Part Number</u>
CPU	Freescall	P2041NSN7PNC 1.5GHz 1.0V FCPBGA780 FREESCALE
SDRAM: DDRIII 2GB with ECC SO-DIMM	UNIGEN	UG25U7200N8UU-ACD
USB to NAND Flash 8GB	ATP	AF8GSSGH-AC1
NOR Flash (Boot): 128MB	NUMONYX	JS28F00AM29EWHA
CPLD	Altera	EPM570 (1 pcs, TQFP144 package)
SD CARD: 8GB	Transcend	TS8GSDHC10M

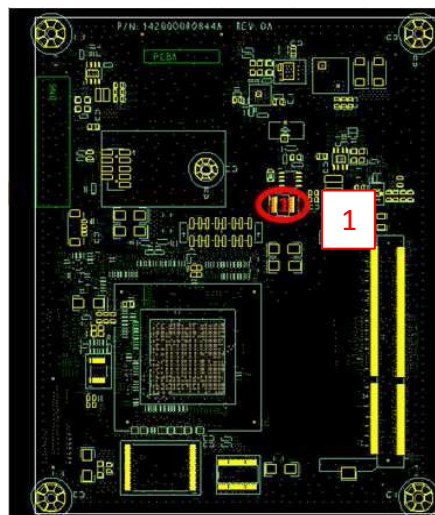
Thermal Monitoring

The AS6712-32X contains 5 system fans used to cool device. The system is also designed with several temperature sensors to detect temperature at several locations within the system. The system supports three temperature sensors on the main PCB board and one temperature sensor on the CPU board.

Main PCB Thermal sensor locations



CPU Module thermal sensor location



Software Support

The AS6712-32X supports a base software package composed of the following components:

BIOS support

The AS6712-32X Supports AMI AptioV BIOS version A01 or greater with the x86 CPU module

U-Boot

The AS6712-32X Supports U-Boot version 1.4.0.2 or greater with the P2041 CPU module

ONIE

The AS6712-32X supports ONIE version 2014.08 or greater with the P2041 CPU Module

Open Network Linux

See <http://opennetlinux.org/> for latest supported version

Specifications

Power Consumption

The total estimated system power consumption of the AS6712-32X ~400 Watts. This is based upon worst case power assumptions for traffic, optics used, and environmental conditions. Typical power consumption will be less.

Environmental

- Weight 20.06 lbs. / 9.1 kg
- 0 to 40 Degrees C operating range
- -40 to 40 Degrees C storage temperate range
- Humidity 5% to 95% non-condensing (operational and storage)
- Vibration – IEC 68-2-36, IEC 68-2-6
- Shock – IEC 68-2-29
- Acoustic Noise Level – Under 60dB in 40 degree C
- Altitude - 15,000 (4572 meters) tested operational altitude

Safety

- UL/ Canada
- CB (Issued by TUV/RH)
- China CCC

Electromagnetic Compatibility

- CE
- EN55022 Class A
- EN55024
- EN61000-3-2
- EN61000-3-3
- FCC Title 47, Part 15, Subpart B Class A
- VCCI Class A
- CCC

ROHS

Restriction of Hazardous Substances (6/6)

Compliance with Environmental procedure 020499-00 primarily focused on Restriction of Hazardous Substances (ROHS Directive 2002/95/EC) and Waste and Electrical and Electronic Equipment (WEEE Directive 2002/96/EC)