Accton AS5712-54X

Leaf Switch Specification

Revision .07

Revision History

Revision	Date	Author	Description
.01	4/1/2014	Jeff Catlin	Initial Release
.02	4/10/2014	Jeff Catlin	Product model number change, Addition of 48V DC PSUs, Misc. Edits
.03	4/16/2014	Jeff Catlin	Added block diagrams
.04	5/7/2014	Jeff Catlin	Update pictures, add connector part numbers, add 12V DC power module part number
.05	5/12/2014	Jeff Catlin	Clean up model number inconsistencies
.06	6/7/2014	Jeff Catlin	Add P2041 CPU Module, Add Fan Cables, Add PSU pin out
.07	6/27/2014	Jeff Catlin	Addition of mSATA connection to x86 CPU module

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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	BCM56854
10/100/1000 PHY	Broadcom	BCM54616S
CPLD	Altera	CPM570 (3 pieces)
Fans	Sunon	PF40561BX-Q020-S99 (Front to Back airflow) PF40561BX-Q010-S99 (Back to Front airflow)
Cage/Connector SFP+ 2x8 (x3)	All Best	R-OP-008320-7-B-N-42-F5
Cage/Connector QSFP+ 2x2 (x1)	All Best	R-TR-Q2-4CMA-OU
Cage QSFP+ 1x2 (x1)	All Best	H-OR-Q2-4CX1-F5F
Connector QSFP+ 1x1 (x2)	All Best	R-CT-Q1-9CX2
Connector RJ45 2x1 (x1)	UDE	M1-C2100CK13-1

Scope

This document outlines the technical specifications for the Accton AS5712-54X Open Switch Platform submitted to the Open Compute Foundation.

Overview

This document describes the technical specifications of the AS5712-54X Top of Rack/Leaf switch designed by Accton Technology Corporation. The AS5712-54X is a cost optimized switch design focused on Leaf/Top of Rack deployments which support 10Gb server connectivity and providing 40Gb uplinks to the distribution/Spine layer of the network. The switch supports forty eight SFP+ ports that each operate at 1Gb or 10Gb and six QSFP+ ports that operate at 40Gb each or can be broken out into four 10Gb (or 1Gb) ports each.

The AS5712-54X is a PHY-Less design with the SFP+ and QSFP+ connections directly attaching to the Serdes interfaces of the Broadcom BCM56854 720G Trident 2 switching silicon providing the lowest cost, latency, and power. AS5712-54X supports traditional features found in Top of Rack 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 AS5712-54X is a 1RU design that supports standard 19" rack deployments as well as standard 21" Open Rack deployments.

Physical Overview

Dimensions

	Inches	Millimeters
Length	18.622	473
Width	17.42	442.5
Height	1.73	43.95

Top View

The top view of the AS5712-54X shows the PCBs and associated components in the AS5712-54X system

CPU Module

CPLDs

BCM56854 Trident 2

BCM54616S PHY
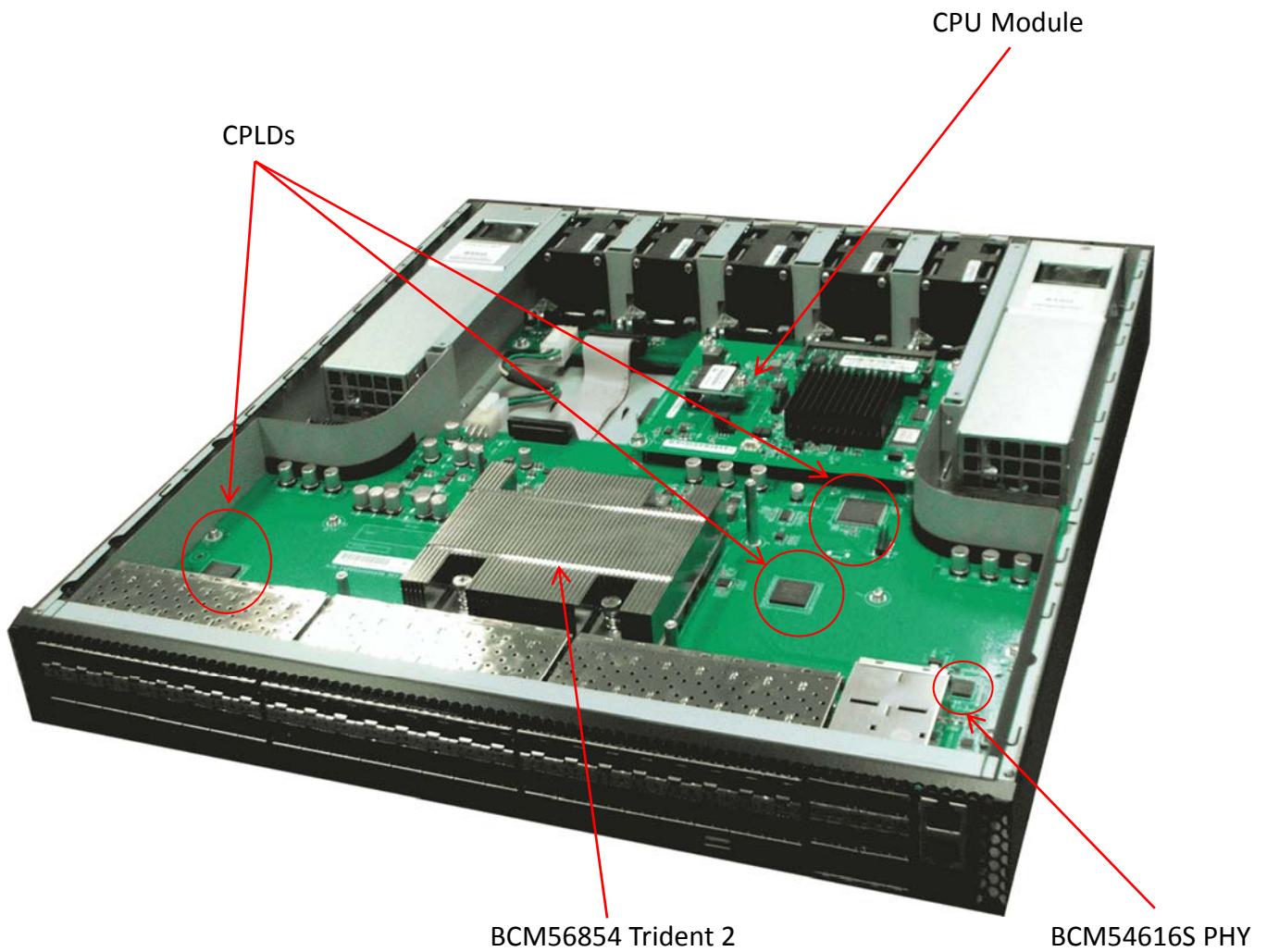
Front View
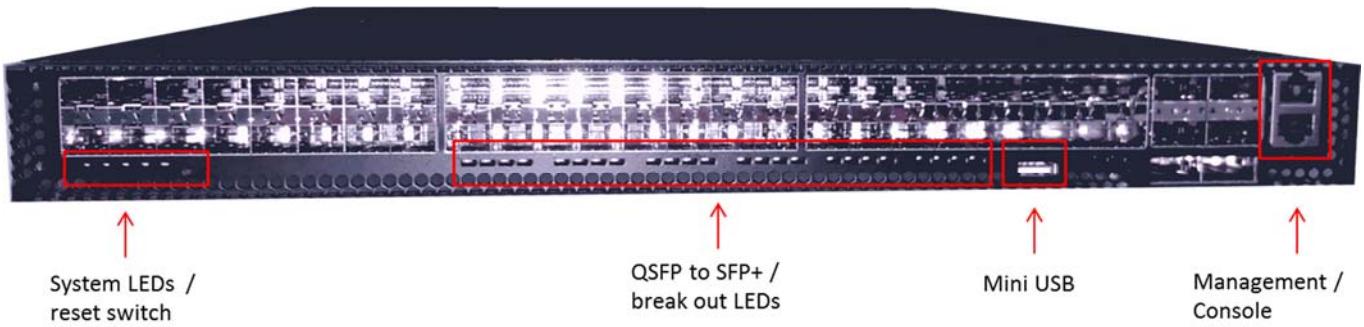
The front panel view of the AS5712-54X includes the following key components:

- Forty Eight SFP+ Ports
- Six QSFP+ ports
- System LEDS
- Mini USB 2.0 type "A" port
- RJ45 RS232 management port
- RJ45 10/100/1000 Ethernet management port
- Reset switch

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
SFP+ LEDS	LED built into SFP+ cage (one per SFP+ port) to indicate port status	On Green/Flashing – Port has link at 10G flashing indicates activity On Amber/Flashing Port has link at 1G flashing indicates activity Off – No Link
QSFP+ Port LED	Each QSFP+ Port has one LED to indicate status	On Green/Flashing – Port has link at 40G flashing indicates activity Off - No link
QSFP Break out LEDs	Each QSFP+ has four LEDs to indicate status of the individual 10G ports	On Green/Flashing – Individual 10G port has link at 10G flashing indicates activity Off – No Link
OOB LED	LED to indicate link status of 10/100/1000 management port	On Green - port has link Off – No link
OOB LED	LED to indicate activity status of 10/100/1000 management port	Amber Flashing– Activity on port Off – No activity

SFP+ Interface Module support

1Gb SFP Modules	Standard 1Gb SFP modules including but not limited to: 1000Base-T, 1000BASE-SX, 1000BASE-LX, 1000BASE-EX
10Gb SFP+ Optical Modules	Standard 10Gb SFP+ modules including but not limited to: 10GBASE-SR, 10GBASE-LR, 10GBASE-ER, AOC Cables
Direct Attach Copper (DAC)	Standard DAC cables including but not limited to Passive cable up to 5m, Active cable up to 10m

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 5m, Active cable up to 10m

Rear View

Redundant power supply modules

4+1 Redundant fans color coded for direction

Redundant power supply modules
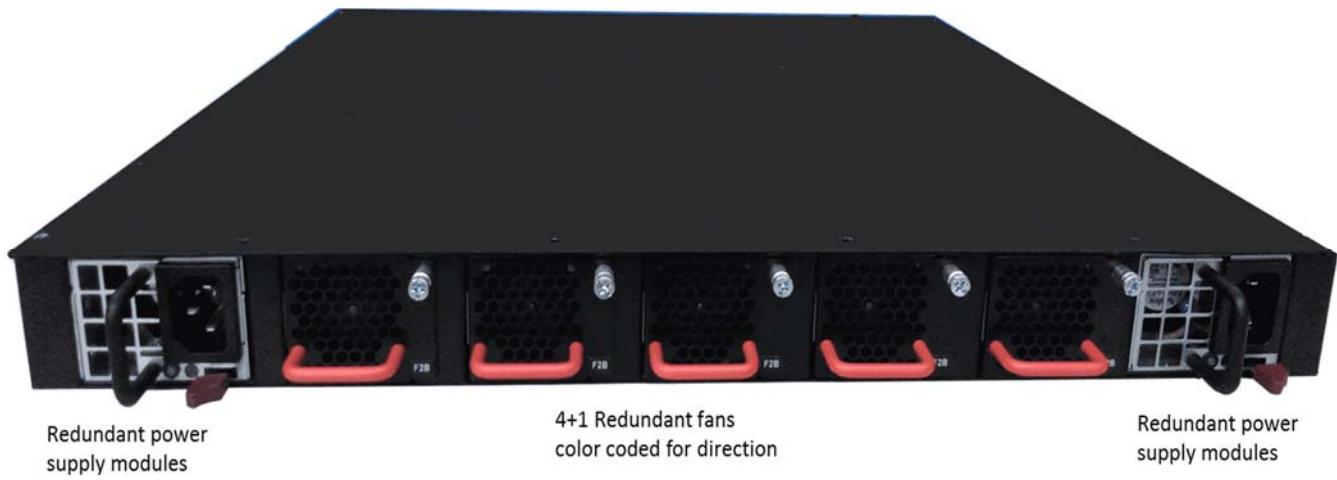
The rear view of the AS5712-54X includes the following key components:

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

Field Replaceable Units

Power Supply Modules

The AS5712-54X 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		
	Inches	Millimeters
Length	8.66	220
Width	1.58	40.25
Height	2.15	54.5
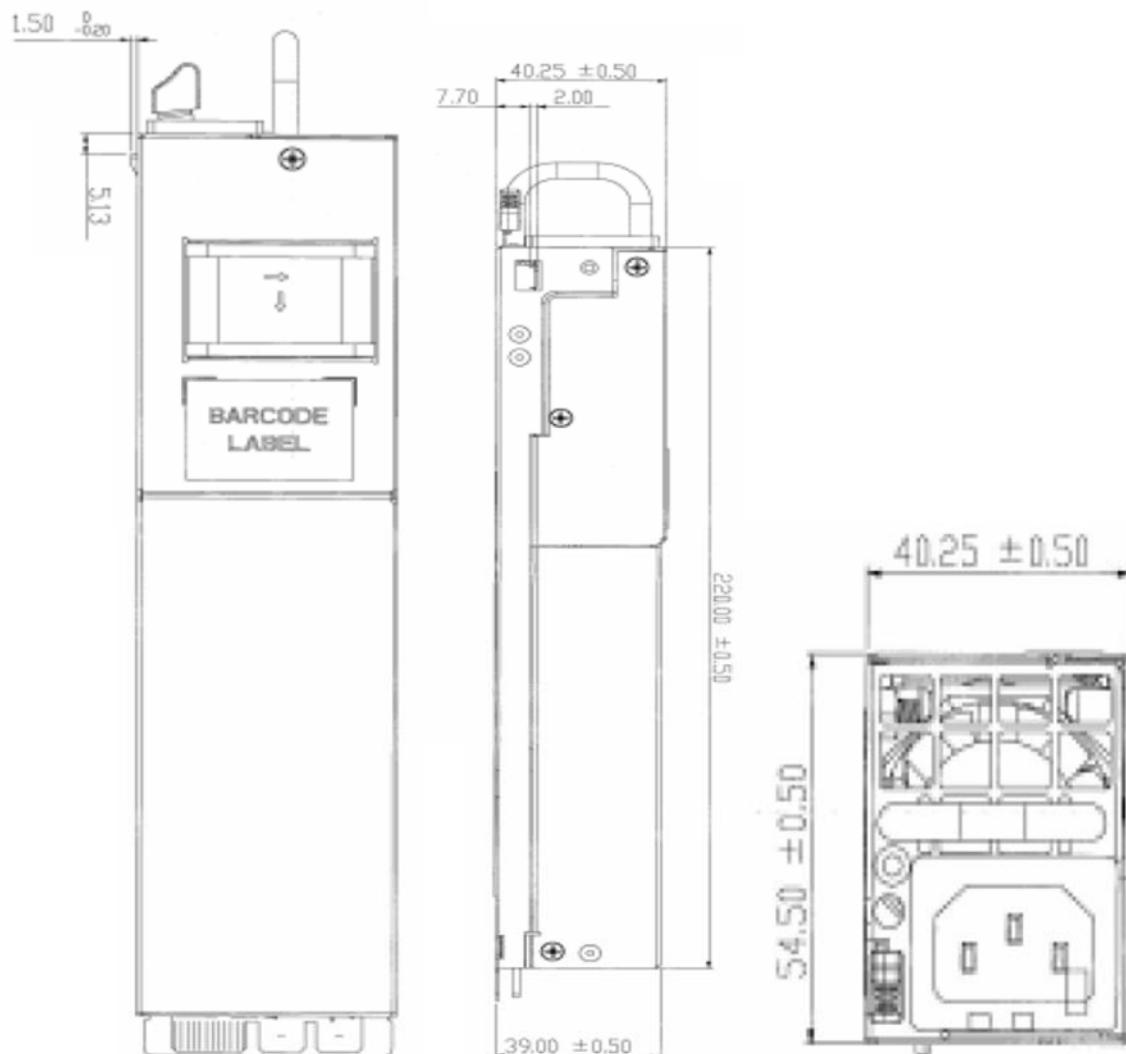
PSU Pin-Out
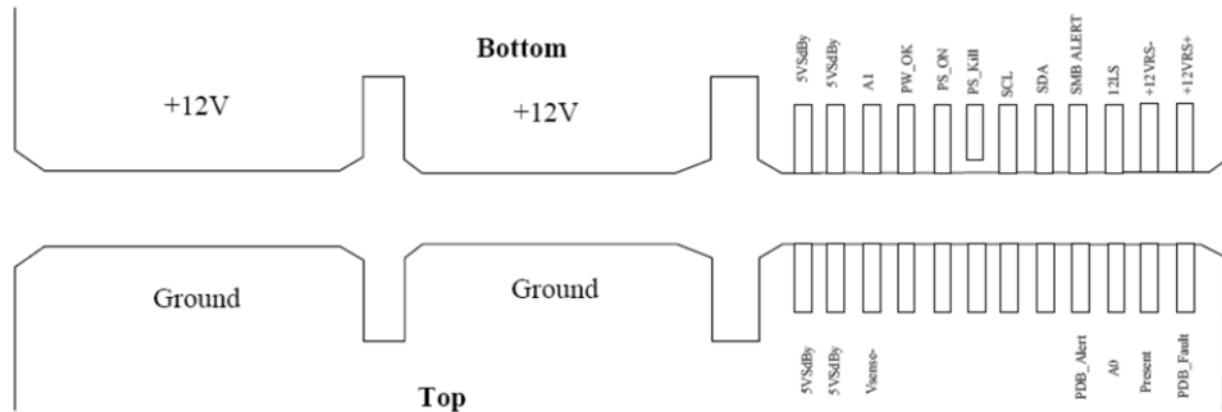
Fan Modules

The AS5712-54X supports five individual fan modules. Each fan module supports two
40mmx40mmx54mm fans

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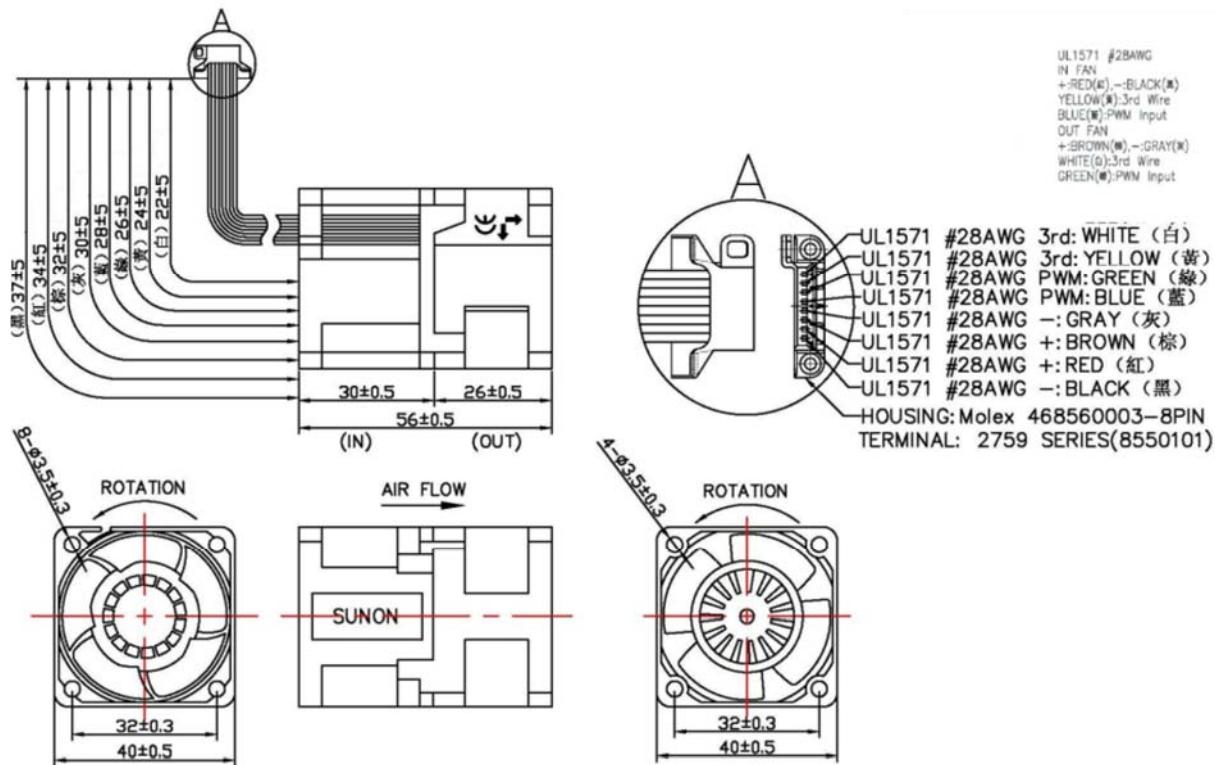
System Overview:

Main PCB Block Diagram
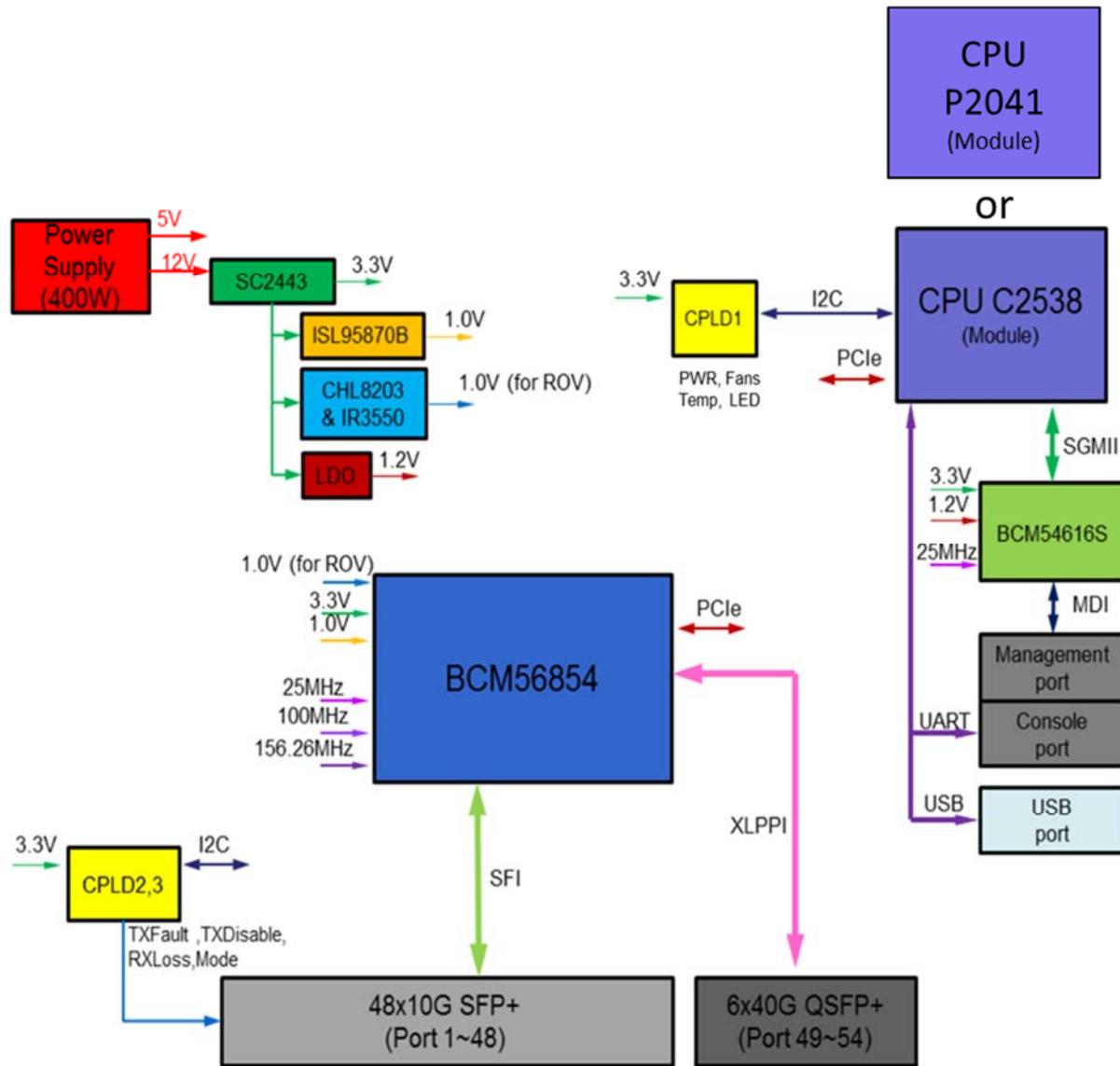
X86 CPU Module Block Diagram
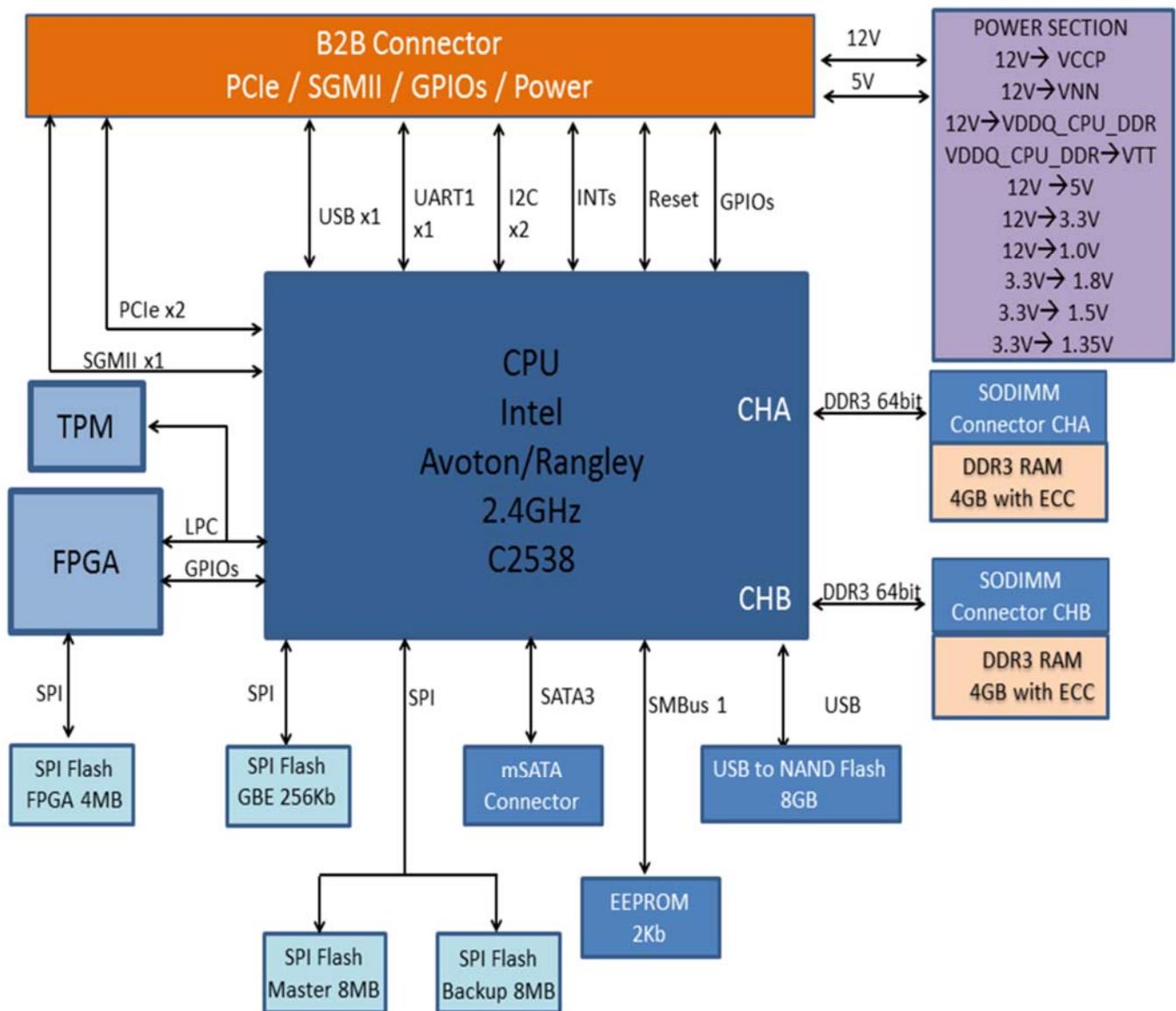
P2041 CPU Module Block Diagram
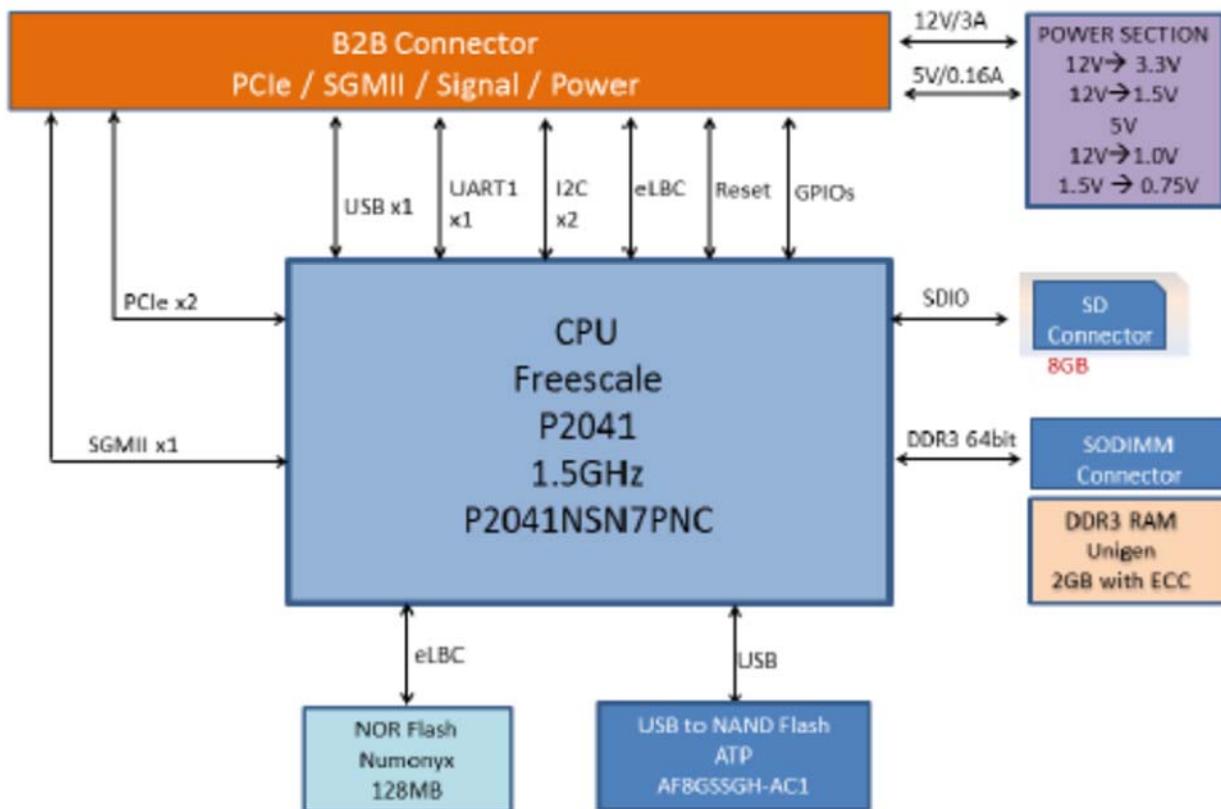
PCB Board Set

The AS5712-54X is composed of 4 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

Fan PCB

CPU PCB
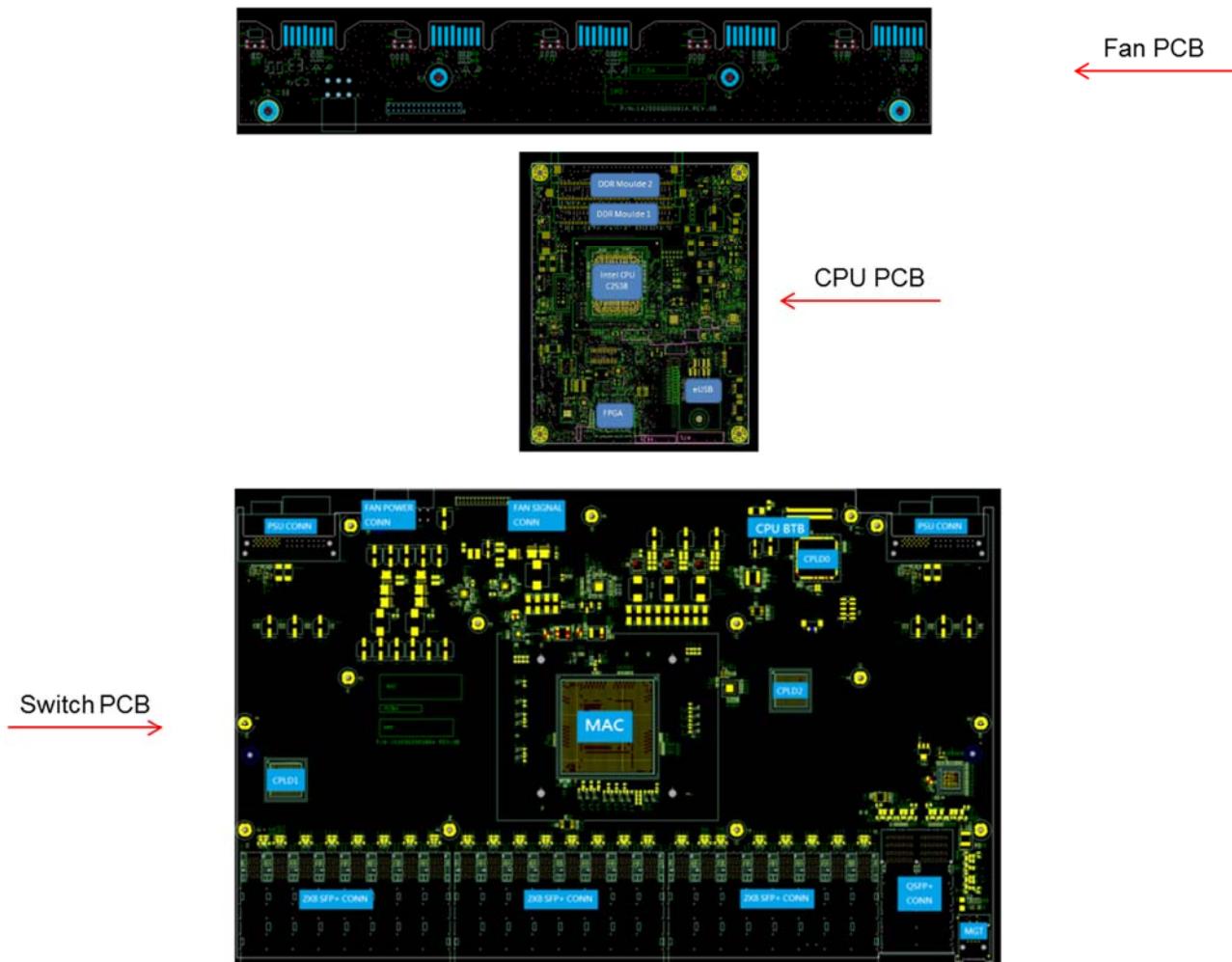
Switch PCB

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	9.95	252.70
Width	16.28	413.50

Main PCB major components

Description	Manufacturer	Part Number
Switching Silicon	Broadcom	BCM56854
10/100/1000 PHY	Broadcom	BCM54616S
CPLD	Altera	CPM570 (3 pieces)
Cage/Connector SFP+ 2x8 (x3)	All Best	R-OP-008320-7-B-N-42-F5
Cage/Connector QSFP+ 2x2 (x1)	All Best	R-TR-Q2-4CMA-OU
Cage QSFP+ 1x2 (x1)	All Best	H-OR-Q2-4CX1-F5F
Connector QSFP+ 1x1 (x2)	All Best	R-CT-Q1-9CX2
Connector RJ45 2x1 (x1)	UDE	M1-C2100CK13-1

Main PCB Top view
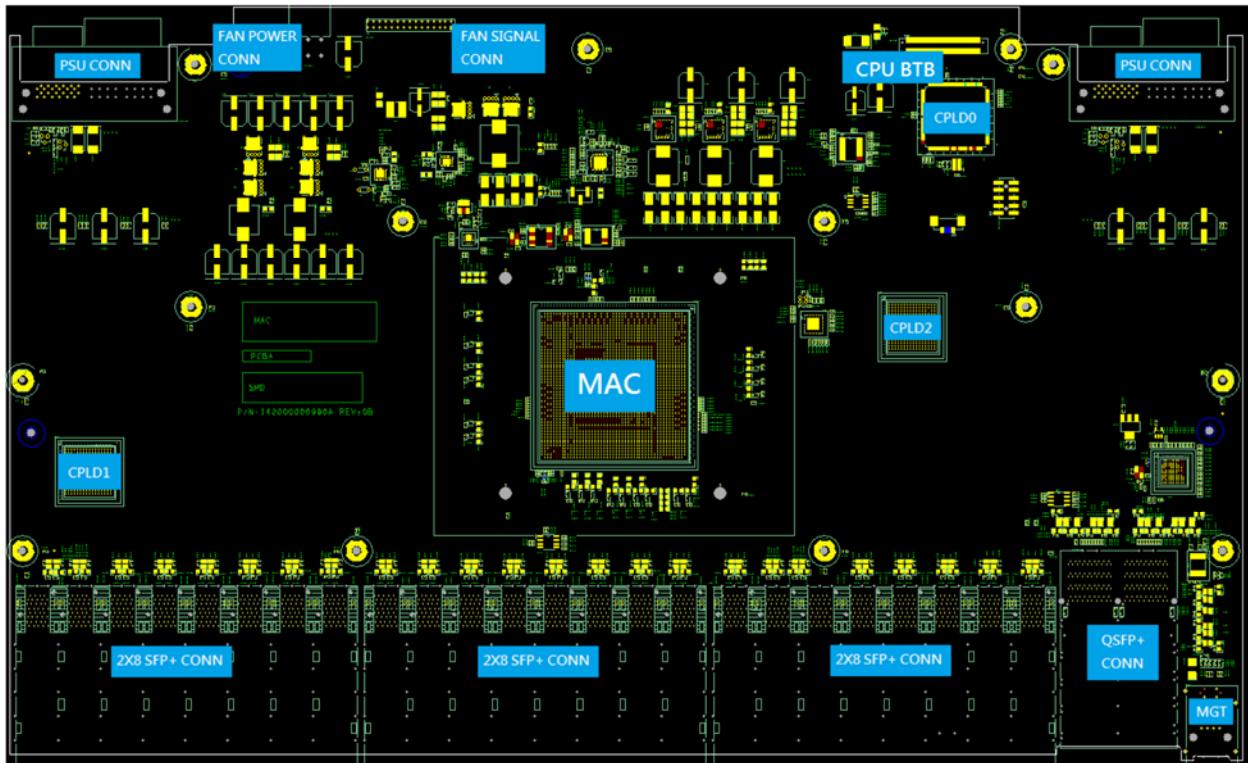
Main PCB Bottom View
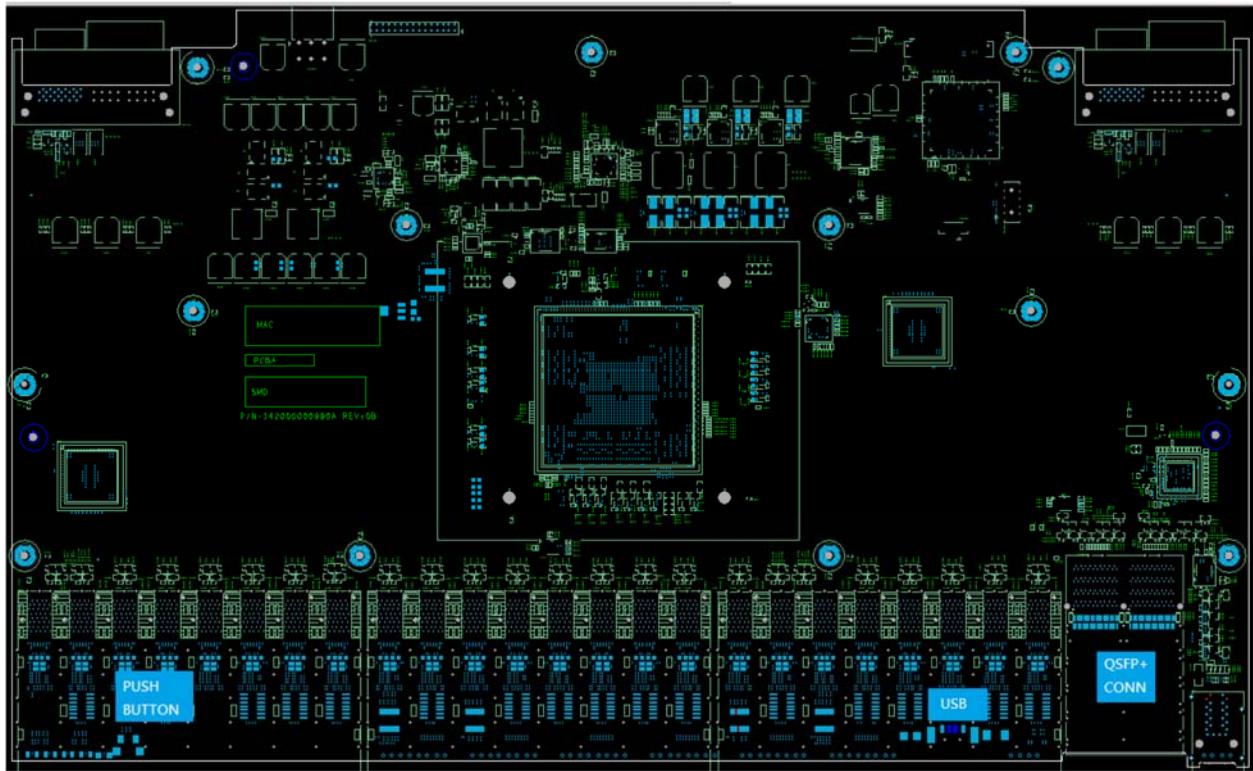
Fan PCB

The Fan PCB is 4 layers and provides the power, management and connectivity for the 5 system fan modules. The Fan PCB connects to the Main Switch PCB via a small cable assembly for power and a small cable assembly for management signals.
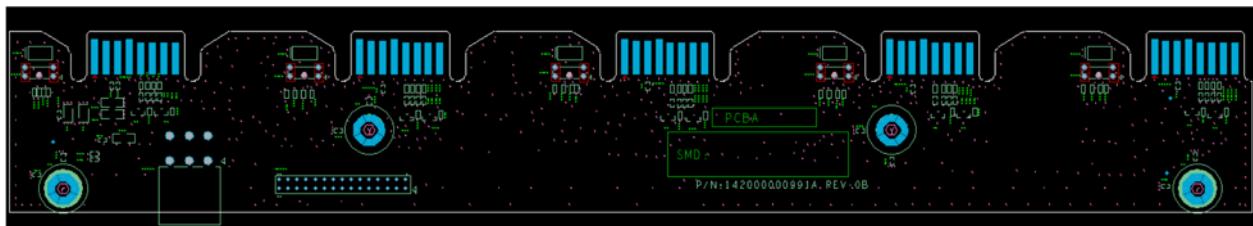
Fan PCB Dimensions

	Inches	Millimeters
Length	10.86	275.75
Width	1.57	40

Fan Signal Cable

接點圖:

P1		P2
1	紅	1
2	灰	2
3	灰	3
4	灰	4
5	灰	5
.		.
.		.
27	灰	27
28	灰	28
29	灰	29
30	灰	30

第1PIN紅邊

130±10

Note:
1. 一般導通測試;
2. Open/Short Test:100%;
3. Conductor Resistance:2Ω (Max);
4. Insulation Resistance:10MΩ (Min)
5. 所有材料需符合RoHS標準.
6. operating temperature range:-40˚C-80˚C
7. Storage temperature:15˚C-30˚C

| 2	FLAT CABLE UL2651#28 30P PITCH=1.0MM 紅灰排	1	
1	IDC CONNECTOR 30P(2*15) SOCKET PITCH:2.0MM 二件式,有防呆	2	G/F
ITEM	DESCRIPTION	Q'TY	REMARK

Fan Power Cable

30±5

120±10

WIRE TABLE:

P1		P2
1	RED	3
2	WHITE	2
3	BLACK	1
4	GREEN	6
5	BLUE	5
6	YELLOW	4

Note:
1. 一般導通測試;
2. Open/Short Test:100%;
3. Conductor Resistance:2Ω (Max);
4. Insulation Resistance:10MΩ (Min)
5. 所有材料需符合RoHS標準.
6. operating temperature range:-10˚C-80˚C
7. Storage temperature:15˚C-30˚C

4	H.S TUBE: Φ7*30MM 600V 黑色 WOER	1	EA
3	TERMINAL:I42002BS-2 WST	12	EA
2	HOUSING: P6-I42002 WST	2	EA
1	WIRE: UL 1007#20 瑞興/聯電	6	EA
ITEM	DESCRIPTION	Q'TY	UNIT

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.

CPU PCB Top and Bottom side
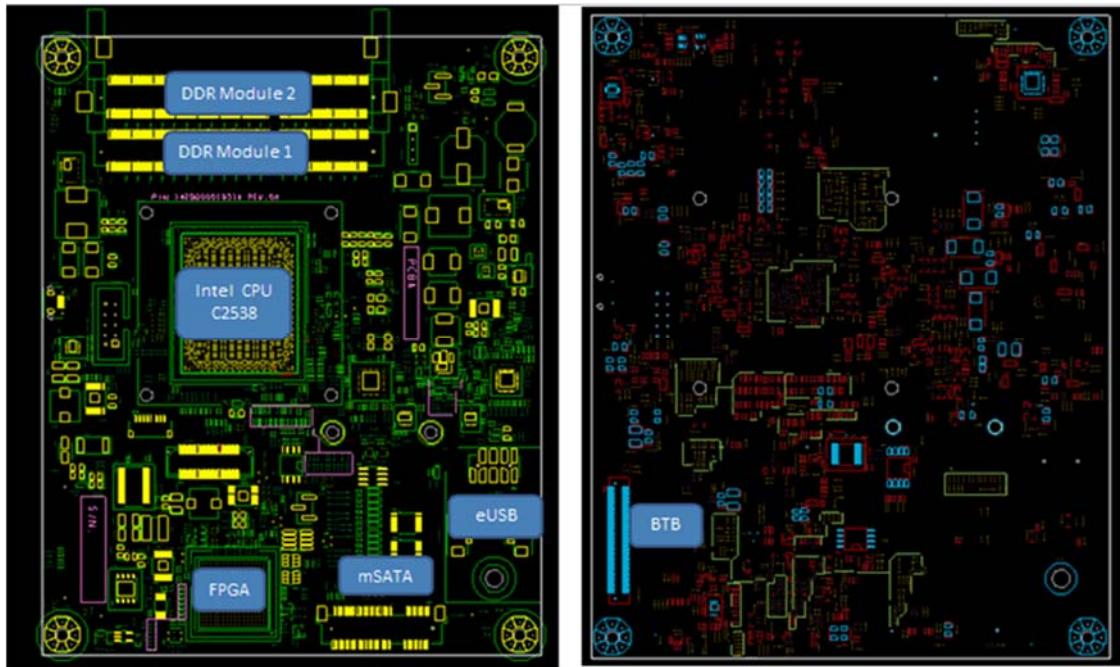
CPU PCB Dimensions

	Inches	Millimeters
Length	5.98	151.9
Width	4.83	122

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.

CPU PCB Top and Bottom side
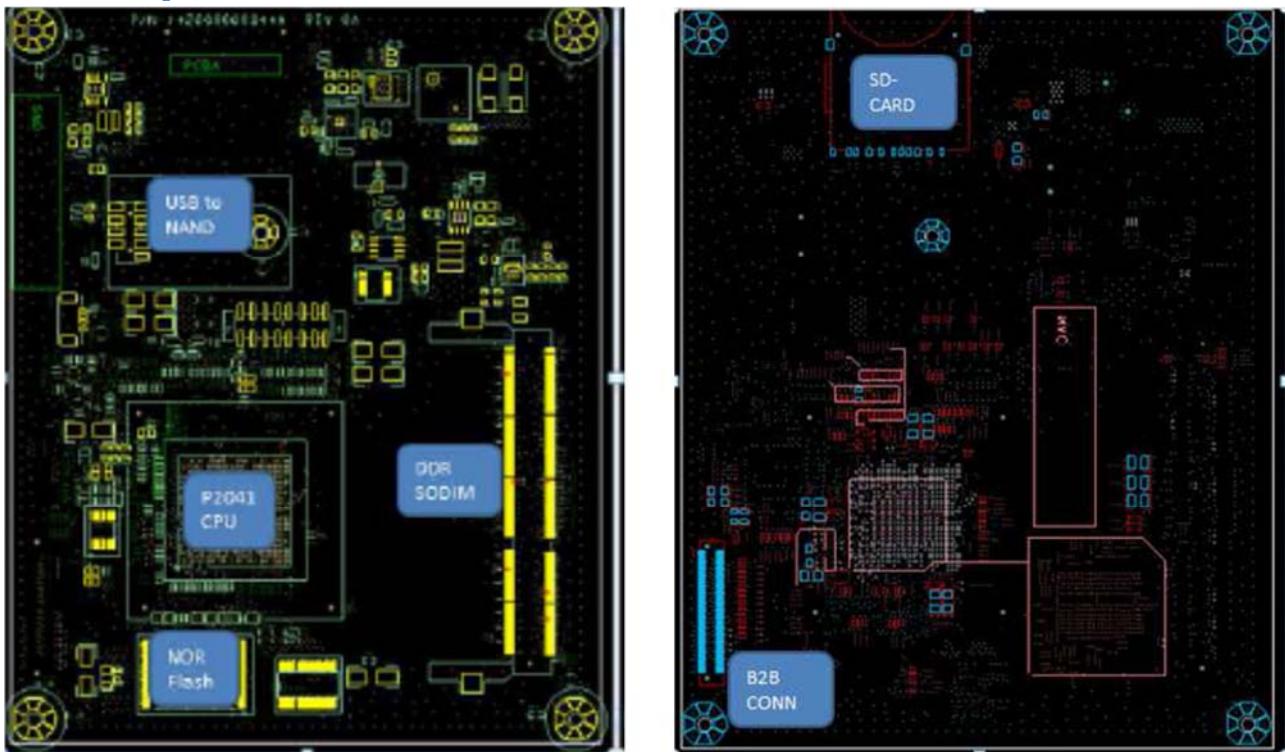
CPU PCB Dimensions

	Inches	Millimeters
Length	5.98	151.9
Width	4.83	122

CPU PCB major components

Description	Manufacturer	Part Number
CPU	Freescale	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

Software Support

The AS5712-54X supports a base software package composed of Open Source components.

BIOS support

The AS5712-54x Supports Coreboot/SeaBios with the x86 CPU

U-Boot

The AS5712-54x Supports U-Boot with the P2041 CPU module

ONIE

Support for ONIE with both CPU modules

Open Network Linux

Support for ONL with both CPU modules

Power/Environmental/Agency Certifications

Power Consumption

The total estimated system power consumption of the AS5410-54X is ~360 Watts. This is based upon worst case power assumptions for traffic, optics used, and environmental conditions.

Environmental

- 0 to 40 Degrees C standard operating range
- -40 to 70 Degrees C storage
- Humidity 5% to 95% non-condensing
- Vibration – IEC 68-2-36, IEC 68-2-6
- Shock – IEC 68-2-29
- Acoustic Noise Level – Under 60dB in 40 degree C

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)