OPEN

Compute Project

Wedge 100C Technical Specification

REVISION HISTORY

Date	Name	Description
January 13, 2017	Cavium	Version 0.9x submitted and under official review

Scope

This document outlines the technical specifications for the Wedge 100C Open Switch Platform submitted to the Open Compute Foundation

Contents

1. Overview

The Wedge100C platform is a 1RU ToR platform with 32 QSFP28 ports that can be used for any combination of 10/25/40/50/100GE interfaces. The wedge-100 switch supports thirty two QSFP28 ports that each can operate at 4x10G or 4x25G with QSFP28-4xSFP28 break out cables, 2x50G with QSFP28-2xQSFP28 break out cables, 40G with standard QSFP+ optics/DAC cables, and 100G with QSFP28 optics/DAC cables. The Wedge100C system uses Cavium CNX88091 Switch Chip that can support 32 QSFP28 100GE ports.

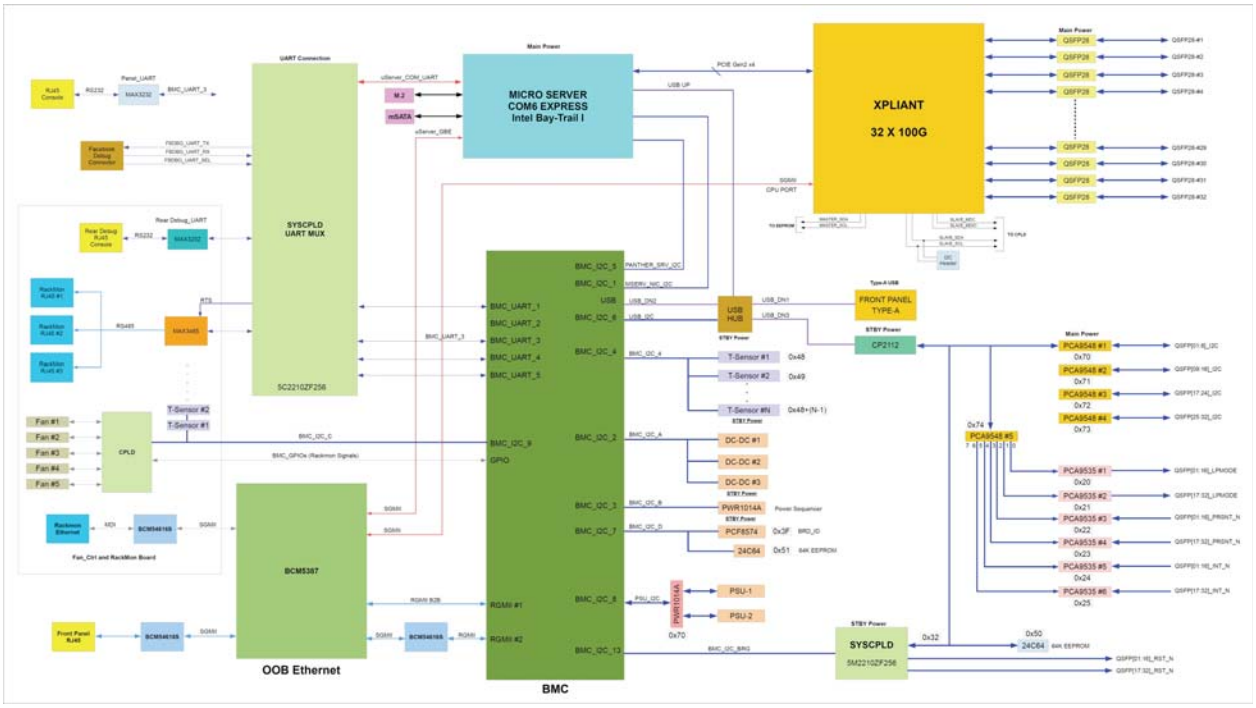
1.1 License

1.2 Features

Wedge 100C is a 1RU top of rack switch based on Cavium CNX88091 Switch ASIC. Main feature list of Wedge 100C is listed below:

- One Cavium CNX88091 Switch ASIC:
  - 32 SERDES block supporting 128x25G SERDES ports
  - 32x100G, or 64x50G, or 128x25G
  - PCIe Gen2 x4 Lane control interface
- COMe as CPU module
  - Low SKU
- Network interface
  - 32 port of QSFP28 interface
  - Each QSFP28 port can be configured into 1x100G mode, or 2x50G mode, or 4x25G mode, or 1x40G mode, or 4x10G mode.
- Front panel management and debug interface
  - 10/100/1000 RJ45 GBE OOB port
  - RJ45 console port
  - Type-A USB2 port
  - Facebook 14-pin debug connector
- Rack Monitor Interface
  - Rack monitor interface is on rear panel
  - 3 RJ45 ports are used for OCP rack V2 rack monitor function
  - 1 RJ45 port is used for JayBOX GPIO
- Fan tray
  - Five 40mmx56mm CR fantray on rear panel
  - As used in Wedge 100 switch.
- PSU
  - PowerOne SPDFCBK-15G
  - PowerOne SPDFCBK-16G
- Two tri-clor System LEDs
- Two system LED on front panel

1.3 Wedge 100C Block Diagram



1.4 Wedge 100C SKUs / Configurations

Two SKUs are defined for Wedge 100C: Standard 19-in SKU and OpenRack 21-in SKU.

- Standard 19-in SKU: Wedge100C system is powered by hot-pluggable PSU, PSU can be AC input, or DC (56V)input.
- OpenRack 21-in SKU: Wedge100C system is used in OpenRack V2, and is powered by 12.5V power bar.

Both standard SKU and OpenRack SKU share the same main board PCB.

2. Wedge 100C Mechanical

2.1 Dimension Requirement

Wedge100C standard SKU is 1RU 19-in pizza box switch. OpenRack SKU is 1RU 21-in pizza box, that can be placed on top of OpenRack V2 rack.

2.1.1 Chassis

Feature Name	Description	Comment
Chassis width	440mm (17.32”)	Outer dimension
Chassis depth	507mm (19.97”)	Outer dimension
Chassis height	44mm (1.732”)	Outer dimension

Table 1 Standard SKU chassis Dimension

Feature Name	Description	Comment
Chassis width	534mm(21’’)	Outer dimension
Chassis depth	797.5mm(31.4’’)	Outer dimension
Chassis height	46.3mm(1.82’’)	Outer dimension

Table 2 OpenRack SKU Chassis Dimension

2.2 COM-E PCB Dimension

Figure 1 and Figure 2shows the details of the COMe module dimension. The A-side is also referred as the top side, while the B-side is referred to as the bottom side.

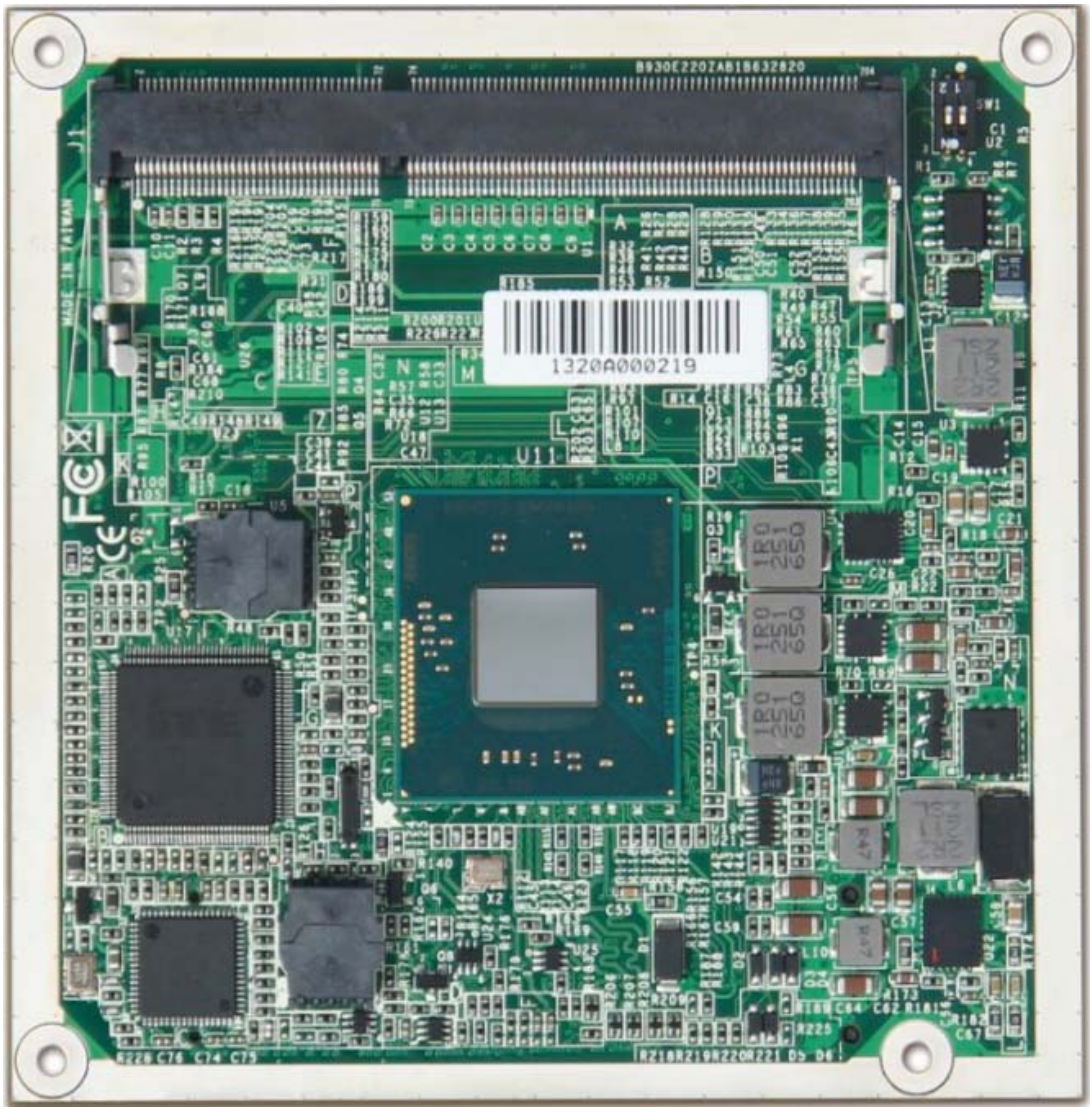


Figure 1 COM-E CPU Module Top side

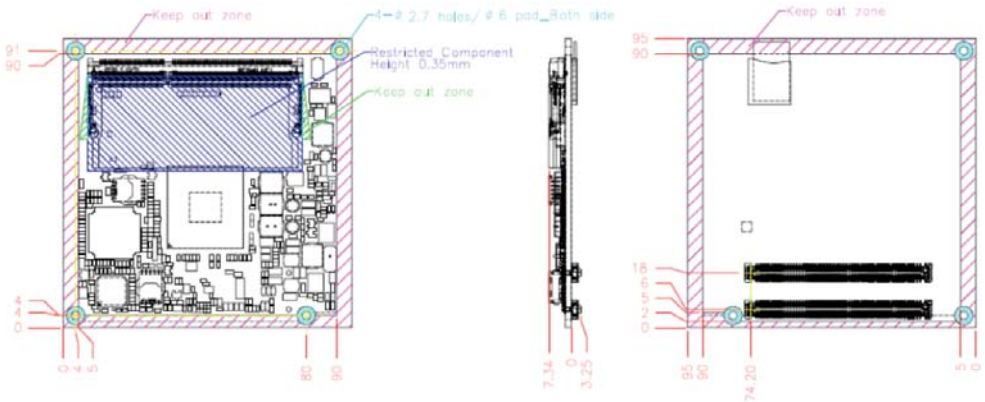
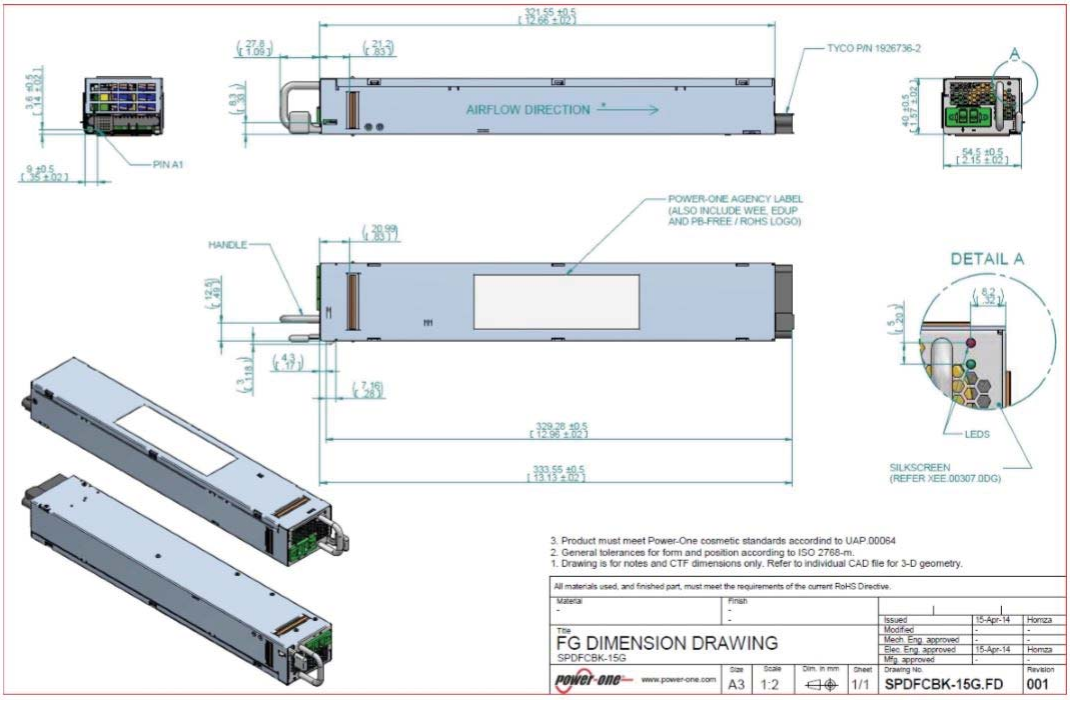


Figure 2 COM-E CPU Module Dimension

2.2.1. PSU

Wedge 100C 19-in SKU use the same PSU as in Wedge 100:

- SPDFCBK-14G : AC input PSU, 750W
- SPDFCBK-15G : DC input PSU, 750W
- SPDFCBK-16G : DC input PSU, 400W



2.2.1.1. PSU output

Input	Output	Voltage (V)	Current (A)	Power [W]	Ambient Temperature Range	Model
54VDC typ 40V~72V	V1	12	62	750	-5C ~ 55C	SPDFCBK-15G
	VSB	3.3	3	10		
54VDC typ 40V~72V	V1	12	33	400	-5C ~ 55C	SPDFCBK-16G
	VSB	3.3	3	10		
120/240Vac	V1	12	62	750	-5C ~ 55C	SPDFCBK-14G
	VSB	3.3	3	10		

2.2.1.2. PSU output connector

	vendor	MPN	notes
PSU side	Tyco Electronics	2-1926736-2	
Chassis side	Tyco Electronics	2-1926733-5	

PS side: Tyco Electronics P/N: 2-1926736-2

Chassis side: Tyco Electronics P/N: 2-1926733-5

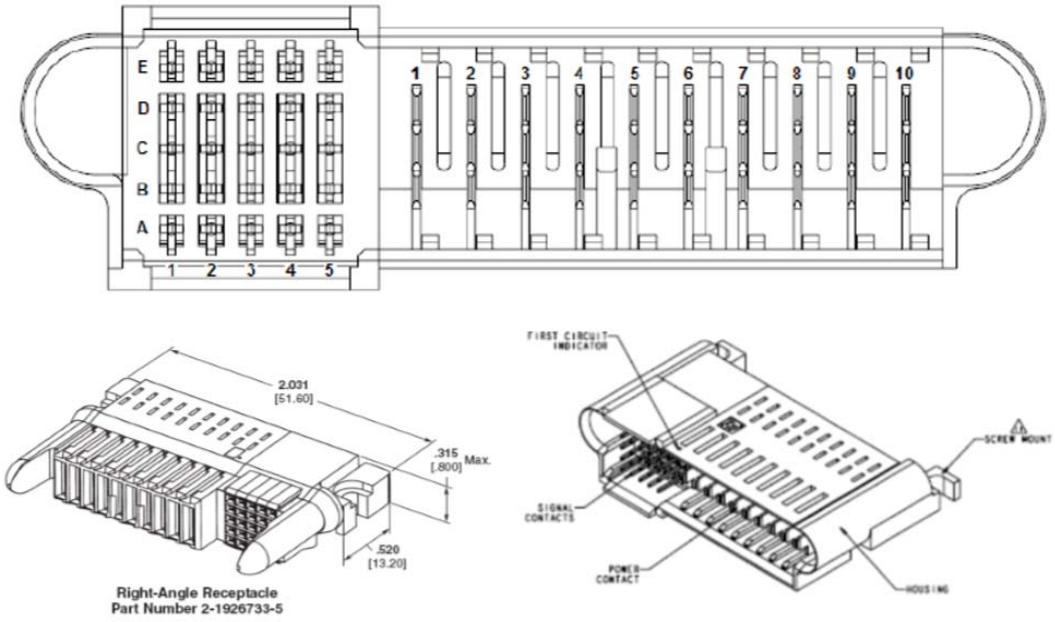


Figure 3 PSU Output Connector

2.2.1.3. PSU output signals

Pin	Signal name	IO	Description	Amp per pin
1	PGND		Power ground (return)	25
2	PGND		Power ground (return)	25
3	PGND		Power ground (return)	25
4	PGND		Power ground (return)	25
5	PGND		Power ground (return)	25
6	V1		12V VDC main output	25
7	V1		12V VDC main output	25
8	V1		12V VDC main output	25
9	V1		12V VDC main output	25
10	V1		12V VDC main output	25
A1	VSB		Standby positive output (+3.3V)	
B1	VSB		Standby positive output (+3.3V)	
C1	VSB		Standby positive output (+3.3V)	
D1	VSB		Standby positive output (+3.3V)	
E1	VSB		Standby positive output (+3.3V)	
A2	SGND		Signal ground (return)	
B2	SGND		Signal ground (return)	
C2	nc		No connect	
D2	nc		No connect	
E2	nc		No connect	
A3	PSKILL	In	Power supply kill (lagging pin), disable	
B3	nc		No connect	
C3	SDA	Inout	I2C data signal line	
D3	V1_SENSE_R		Main output negative sense	
E3	V1_SENSE		Main output positive sense	
A4	SCL	In	I2C clock signal line	
B4	PSON		PSU ON input connect (reference to	
C4	SMB_ALERT	Out	SMB alert signal output	
D4	ISHARE		Current share signal	
E4	INPUT_OK	Out	DC input OK signal, Active High	
A5	A0	In	Address 0	
B5	nc		No connect	
C5	PWOK	Out	Power OK signal output, Active High	

D5	A1	In	Address 1	
E5	PRESENT_L	Out	Power supply present	

Table 3 PSU Output Signals

2.2.1.4. PSU I2C address

PS_A1 and PS_A0 signals are used to set I2C address of PSU.

PS_A1	PS_A0	PSU_ID (MUC) Address	EEPROM Address
0	0	0x58	0x50
0	1	0x59	0x51
1	0	0x5A	0x52
1	1	0x5B	0x53

Figure 4 PowerOne PSU I2C address

On Wedge 100C, in default PS_A0 is pull-up, PS_A1 is pull-down, so the PSU I2C should be 0x59 for MCU, and 0x51 for PSU EEPROM.

2.2.2. Fan tray

Wedge 100C reuses the fan tray as used in Wedge 100.

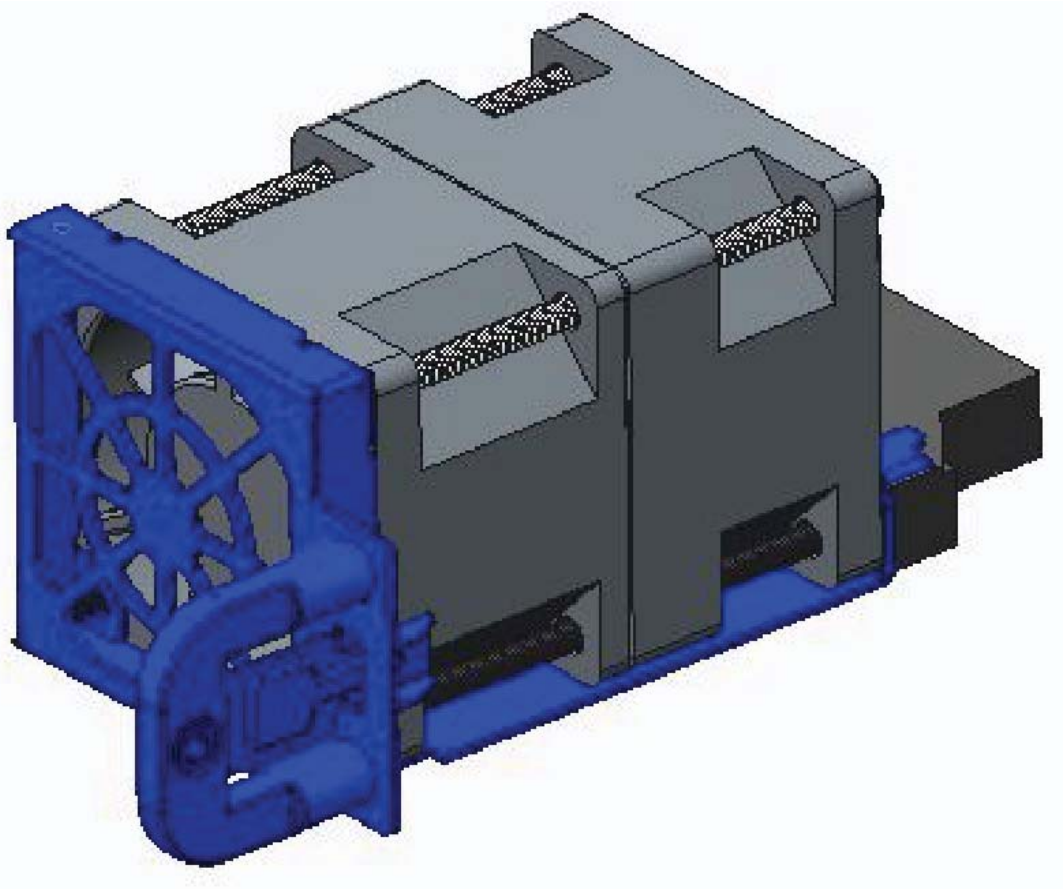


Figure 5 Wedge 100C fan tray

Fantray use Delta Counter-rotating fan GFB0412EHS-DA06

Item	Description
Rated voltage	12 VDC
Operating voltage	10.8 ~ 12.6 VDC
Input current	1.40A, 1.68A Max
Input power	16.80W, Max 20.16W
speed	Front 16000, Rear 15400 RPM +/-10%
Max Air flow at zero static	66.824 mmH2O, Min 54.127 mmH2O
acoustic	64.5 dB-A
Lead Wire	Front Fan
	Rear Fan

Table 4 Fan Specification

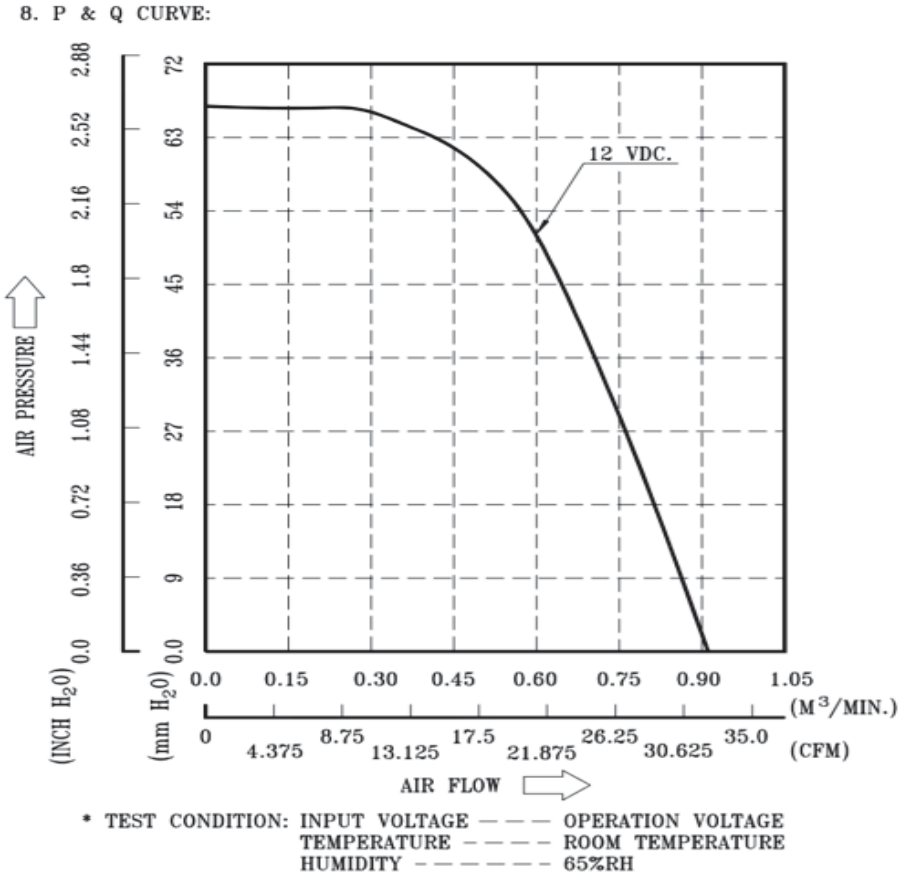


Figure 6 PQ curve of CR fan GFB0412EHS-DA06

2.3 Wedge 100C placement and layout

2.3.1. Wedge 100C top view

The following are top view of Wedge 100C.

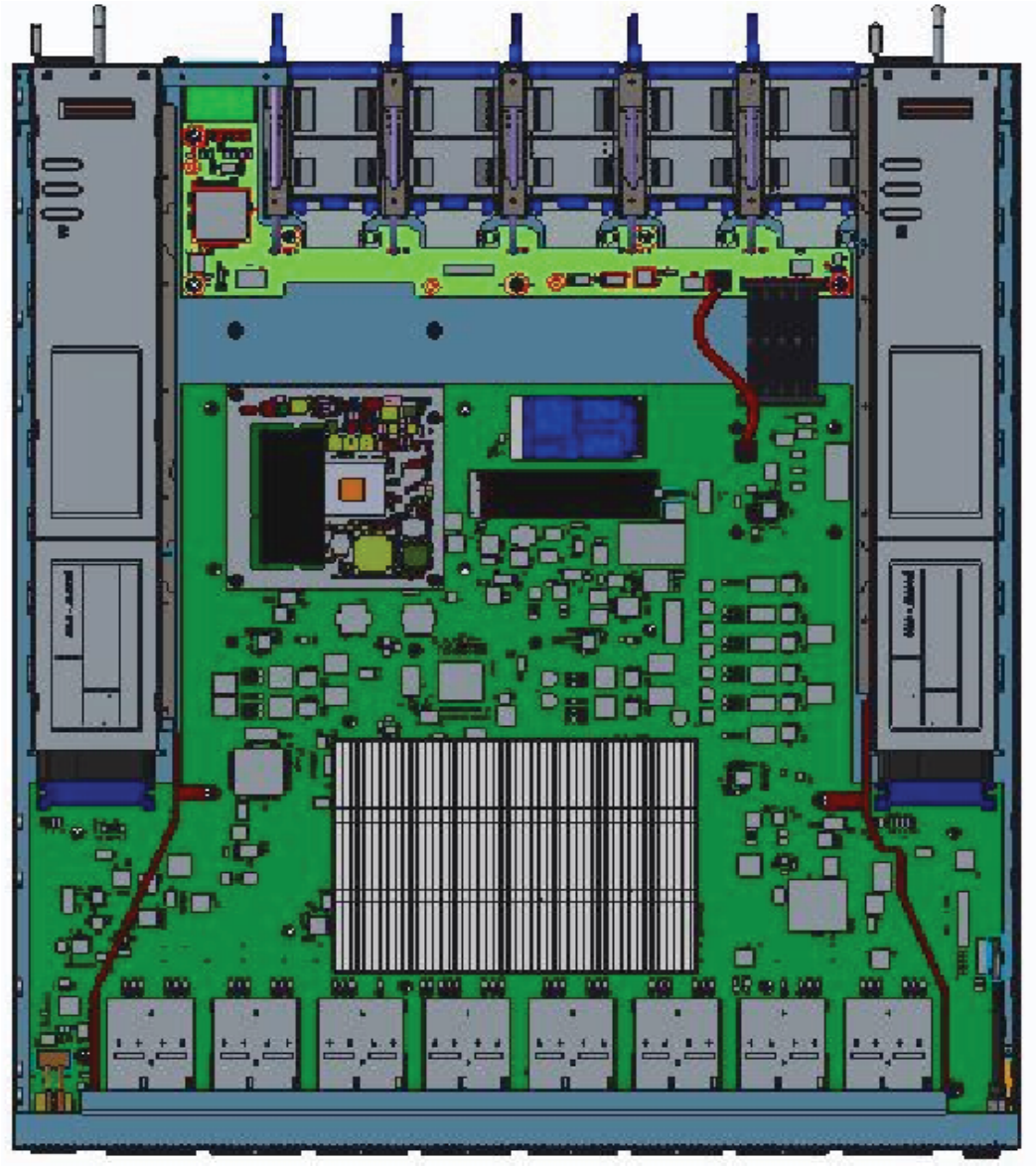


Figure 7 Wedge 100C top view (subject to change without notice)

2.3.2. Wedge 100C front panel view

Figure 8: Wedge 100C front panel view

2.3.3. Wedge 100C rear panel view

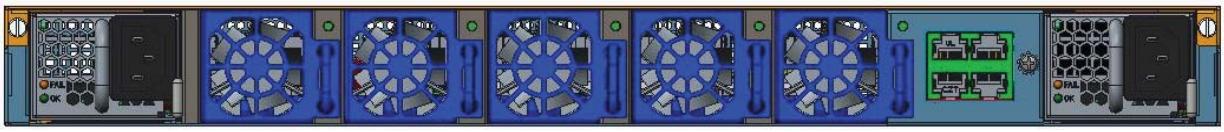


Figure 9: Wedge 100C rear panel view

3. Wedge 100C Thermal

3.1. System Airflow or Volumetric Flow

The unit of airflow (or volumetric flow) used for this specification is CFM (cubic feet per minute). The maximum allowable airflow per Watt in the system must be 0.16 CFM. The desired airflow per watt is 0.1 CFM or lower in the system at the mean temperature (plus or minus standard deviation).

3.2. Operational Ambient Temperatures

The minimum and average operational ambient temperatures for Wedge 100C would be 20°C and 25°C, respectively. The maximum operational temperature would be 30°C when the inlet / outlet of enclosure has less than 50% opening, or 35°C when the inlet / outlet of enclosure has greater than 50% opening.

3.3. Thermal Margin

The thermal margin is the difference between the maximum theoretical safe temperature and the actual temperature. The minimum 5% thermal margin in Tjunction / Tcase or both is allowed for every component on the card. The stabilized / operational target temperature for every components on the card should be at least 8% below its maximum theoretical safe temperature.

3.4. Front panel vent design for QSFP28

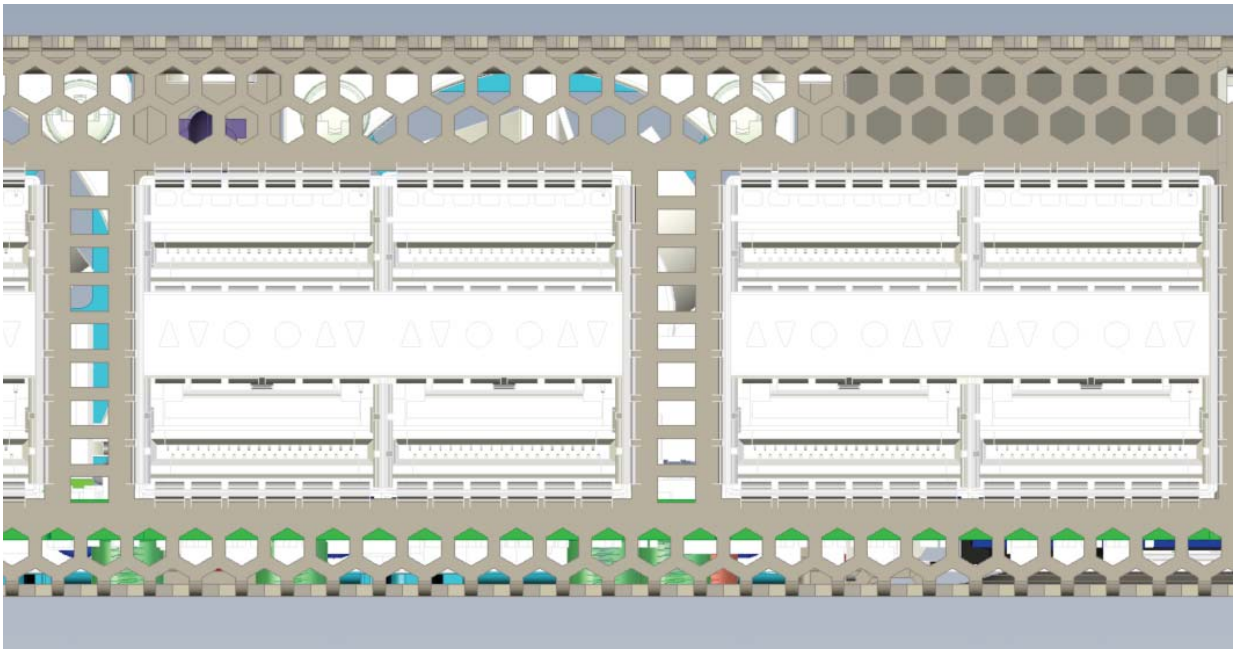


Figure 10 Front panel vent design for QSFP28

3.5. Separate air channel design for PSU

The fan used inside PSU is much less powerful than system CR fan, each PSU need dedicated air channel to separate main air flow channel from two PSU air channel. Metal air baffle is recommended to use. Proper methods need to be implemented to isolate the air channel as much as possible.

3.6. Cavium CNX88091 Heat Sink Requirements

The heatsink could be the following design:

- Solder fin design
- Alumina base with embedded copper heat-pipe. 4 heat-pipe design is recommended.
- Proper heatsink mounting design to avoid tilting of heatsink during shock and vibration
- Should be designed in such a way to dissipate power up to 220Watts

CNX88091 Thermal Spec	Max	Note
Power dissipation (P)	165	
Max Junction temperature (Tj)	110	
Max Ambient temperature (Ta)	50	
Max calculated thermal resistance	0.20c/w	

Table 5 Cavium CNX88091 Thermal Specification

3.7. Temperature Sensors

Wedge 100C main board and fan tray board need to provide multiple temperature sensors for the CPU to know the thermal status of the system. The following spots are critical for thermal policy and better to place sensors on the following spots:

- Left PSU air inlet on main board.
- Right PSU air inlet on main board
- The middle point between Front panel and Cavium chip
- The middle point between Cavium chip and COMe module
- Multiple sensors on fan control board

Additionally, over-temperature thresholds are configurable and an alert mechanism is provided to enable thermal shutdown and / or an increase in airflow. The sensors are accurate to +/-2C.

The ambient temperature sensor can be a *TMP75* from Texas Instruments or an equivalent part from other vendors. Its I2C address can be set to 0x98 to 0x9F. 8 TMP75 temperature sensors can share one i2c bus. 5 TMP75 are used in Wedge 100C.

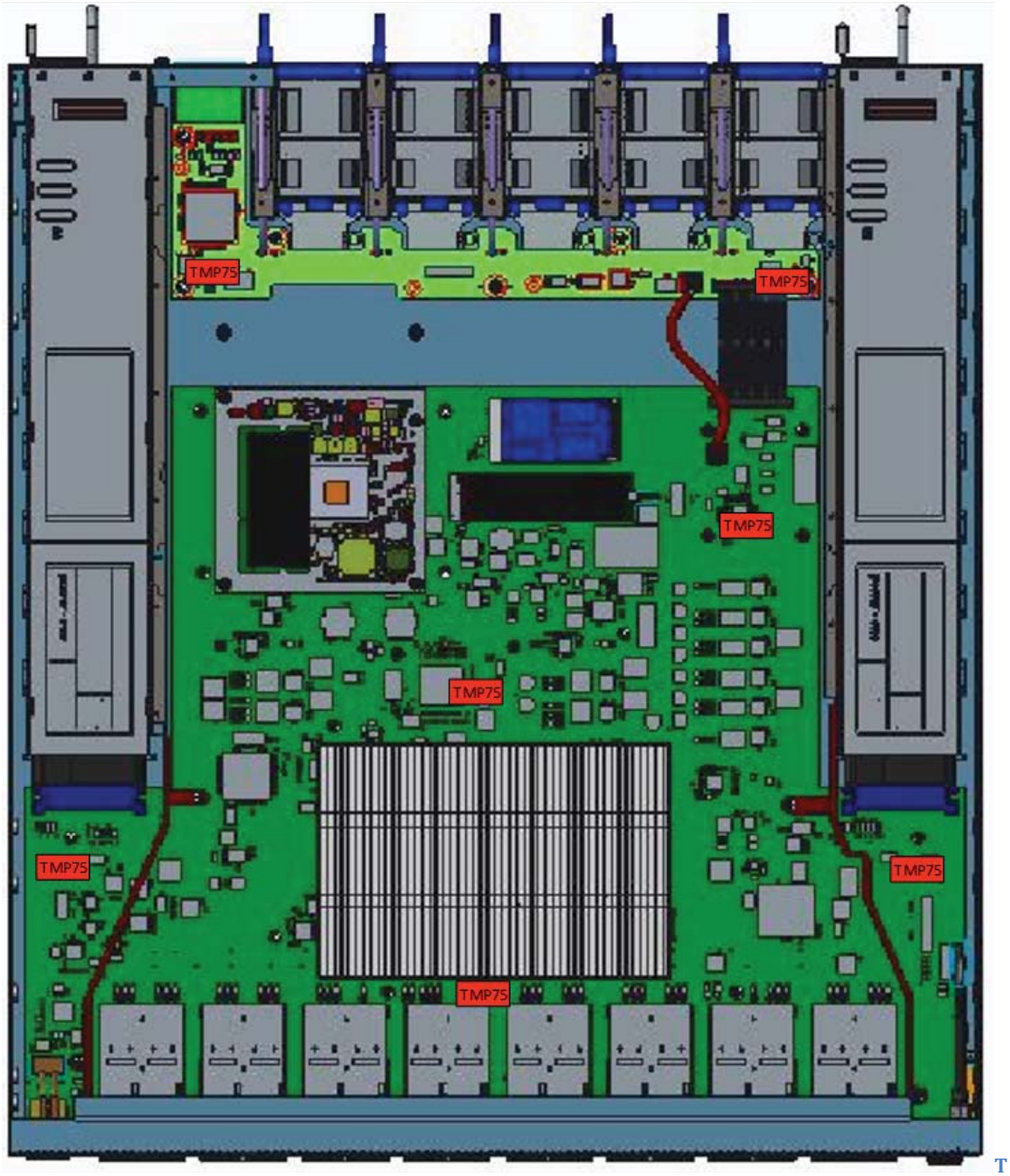


Table 6 Temperature Sensor Placement

Temperature sensors provide a mechanism to provide thermal alerts and over temperature notifications. The BMC on baseboard must be able to receive these alerts in a timely fashion to allow the system to take action quickly. The I2C alert signal must be used. In some cases, an over temperature condition may occur which forces Wedge 100C to power-off immediately. This condition must be logged before shutdown.

4. Wedge 100C Main board Electrical

4.1. Cavium CNX88091 Port Mapping

Wedge 100C qsfp28 ports are numbered in the following sequence.

Figure 11 QSFP port numbering

The following table shows the Cavium CNX88091 serdes port mapping to external signals.

ASIC	PIN NUM	PIN NAME	NET NAME	QSFP Port	QSFP CHANNEL	Swapping Details	QSFP connector
U900	AT2	NW_SD_RX_0_N	SMA Connection	QSFP1	RX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	CONNECTOR1 J2600
U900	AT1	NW_SD_RX_0_P	SMA Connection		RX CH-1N		
U900	AV2	NW_SD_RX_1_N	P2_RD+		RX CH-2P		
U900	AV1	NW_SD_RX_1_P	P2_RD-		RX CH-2N		
U900	AY2	NW_SD_RX_2_N	P4_RD+		RX CH-4P		
U900	AY1	NW_SD_RX_2_P	P4_RD-		RX CH-4N		
U900	BB2	NW_SD_RX_3_N	P3_RD-		RX CH-3N		
U900	BB1	NW_SD_RX_3_P	P3_RD+		RX CH-3P		
U900	AT6	NW_SD_TX_0_N	SMA Connection		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	AT5	NW_SD_TX_0_P	SMA Connection		TX CH-1P		
U900	AV6	NW_SD_TX_1_N	P2_TD+		TX CH-2P		
U900	AV5	NW_SD_TX_1_P	P2_TD-		TX CH-2N		
U900	AY6	NW_SD_TX_2_N	P4_TD-		TX CH-4N		
U900	AY5	NW_SD_TX_2_P	P4_TD+		TX CH-4P		
U900	BB6	NW_SD_TX_3_N	P3_TD+		TX CH-3P		
U900	BB5	NW_SD_TX_3_P	P3_TD-		TX CH-3N		
U900	BD2	NW_SD_RX_4_N	P5_RD+	QSFP0	RX CH-1P	QSFP CHANNELS	
U900	BD1	NW_SD_RX_4_P	P5_RD-		RX CH-1N		

U900	BF2	NW_SD_RX_5_N	P6_RD+		RX CH-2P	SWAPPED WITH IN THE QUAD	
U900	BF1	NW_SD_RX_5_P	P6_RD-		RX CH-2N		
U900	BH2	NW_SD_RX_6_N	P8_RD+		RX CH-4P		
U900	BH1	NW_SD_RX_6_P	P8_RD-		RX CH-4N		
U900	BK2	NW_SD_RX_7_N	P7_RD-		RX CH-3N		
U900	BK1	NW_SD_RX_7_P	P7_RD+		RX CH-3P		
U900	BD6	NW_SD_TX_4_N	P5_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BD5	NW_SD_TX_4_P	P5_TD-		TX CH-1N		
U900	BF6	NW_SD_TX_5_N	P6_TD+		TX CH-2P		
U900	BF5	NW_SD_TX_5_P	P6_TD-		TX CH-2N		
U900	BH6	NW_SD_TX_6_N	P8_TD-		TX CH-4N		
U900	BH5	NW_SD_TX_6_P	P8_TD+		TX CH-4P		
U900	BK6	NW_SD_TX_7_N	P7_TD+		TX CH-3P		
U900	BK5	NW_SD_TX_7_P	P7_TD-		TX CH-3N		
U900	BN5	NW_SD_RX_8_N	P13_RD+	QSFP2	RX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BP5	NW_SD_RX_8_P	P13_RD-		RX CH-1N		
U900	BN7	NW_SD_RX_9_N	P14_RD+		RX CH-2P		
U900	BP7	NW_SD_RX_9_P	P14_RD-		RX CH-2N		
U900	BN9	NW_SD_RX_10_N	P16_RD+		RX CH-4P		
U900	BP9	NW_SD_RX_10_P	P16_RD-		RX CH-4N		
U900	BN11	NW_SD_RX_11_N	P15_RD-		RX CH-3N		
U900	BP11	NW_SD_RX_11_P	P15_RD+		RX CH-3P		
U900	BC9	NW_SD_TX_8_N	P13_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BD9	NW_SD_TX_8_P	P13_TD-		TX CH-1N		
U900	BC11	NW_SD_TX_9_N	P14_TD-		TX CH-2N		
U900	BD11	NW_SD_TX_9_P	P14_TD+		TX CH-2P		
U900	BC13	NW_SD_TX_10_N	P16_TD-		TX CH-4N		
U900	BD13	NW_SD_TX_10_P	P16_TD+		TX CH-4P		
U900	BC15	NW_SD_TX_11_N	P15_TD+		TX CH-3P		
U900	BD15	NW_SD_TX_11_P	P15_TD-		TX CH-3N		
U900	BK9	NW_SD_RX_12_N	P9_RD-	QSFP3	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN	
U900	BL9	NW_SD_RX_12_P	P9_RD+		RX CH-1P		
U900	BK11	NW_SD_RX_13_N	P10_RD-		RX CH-2N		

U900	BL11	NW_SD_RX_13_P	P10_RD+		RX CH-2P	THE QUAD	
U900	BK13	NW_SD_RX_14_N	P12_RD-		RX CH-4N		
U900	BL13	NW_SD_RX_14_P	P12_RD+		RX CH-4P		
U900	BK15	NW_SD_RX_15_N	P11_RD+		RX CH-3P		
U900	BL15	NW_SD_RX_15_P	P11_RD-		RX CH-3N		
U900	BF9	NW_SD_TX_12_N	P9_TD+		TX CH-1P		
U900	BG9	NW_SD_TX_12_P	P9_TD-		TX CH-1N		
U900	BF11	NW_SD_TX_13_N	P10_TD+		TX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BG11	NW_SD_TX_13_P	P10_TD-		TX CH-2N		
U900	BF13	NW_SD_TX_14_N	P12_TD+		TX CH-4P		
U900	BG13	NW_SD_TX_14_P	P12_TD-		TX CH-4N		
U900	BF15	NW_SD_TX_15_N	P11_TD-		TX CH-3N		
U900	BG15	NW_SD_TX_15_P	P11_TD+		TX CH-3P		
U900	BN13	NW_SD_RX_16_N	P17_RD-	QSFP5	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	CONNECTOR2 J2700
U900	BP13	NW_SD_RX_16_P	P17_RD+		RX CH-1P		
U900	BN15	NW_SD_RX_17_N	P18_RD-		RX CH-2N		
U900	BP15	NW_SD_RX_17_P	P18_RD+		RX CH-2P		
U900	BN17	NW_SD_RX_18_N	P20_RD-		RX CH-4N		
U900	BP17	NW_SD_RX_18_P	P20_RD+		RX CH-4P		
U900	BN19	NW_SD_RX_19_N	P19_RD-		RX CH-3N		
U900	BP19	NW_SD_RX_19_P	P19_RD+		RX CH-3P		
U900	BF17	NW_SD_TX_16_N	P17_TD-		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BG17	NW_SD_TX_16_P	P17_TD+		TX CH-1P		
U900	BF19	NW_SD_TX_17_N	P18_TD-		TX CH-2N		
U900	BG19	NW_SD_TX_17_P	P18_TD+		TX CH-2P		
U900	BF21	NW_SD_TX_18_N	P20_TD-		TX CH-4N		
U900	BG21	NW_SD_TX_18_P	P20_TD+		TX CH-4P		
U900	BF23	NW_SD_TX_19_N	P19_TD-		TX CH-3N		
U900	BG23	NW_SD_TX_19_P	P19_TD+		TX CH-3P		
U900	BK17	NW_SD_RX_20_N	P21_RD-	QSFP4	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN	
U900	BL17	NW_SD_RX_20_P	P21_RD+		RX CH-1P		
U900	BK19	NW_SD_RX_21_N	P22_RD-		RX CH-2N		

U900	BL19	NW_SD_RX_21_P	P22_RD+		RX CH-2P	THE QUAD	
U900	BK21	NW_SD_RX_22_N	P24_RD-		RX CH-4N		
U900	BL21	NW_SD_RX_22_P	P24_RD+		RX CH-4P		
U900	BK23	NW_SD_RX_23_N	P23_RD-		RX CH-3N		
U900	BL23	NW_SD_RX_23_P	P23_RD+		RX CH-3P		
U900	BF25	NW_SD_TX_20_N	P21_TD-		TX CH-1N		
U900	BG25	NW_SD_TX_20_P	P21_TD+		TX CH-1P		
U900	BF27	NW_SD_TX_21_N	P22_TD-		TX CH-2N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BG27	NW_SD_TX_21_P	P22_TD+		TX CH-2P		
U900	BF29	NW_SD_TX_22_N	P24_TD-		TX CH-4N		
U900	BG29	NW_SD_TX_22_P	P24_TD+		TX CH-4P		
U900	BF31	NW_SD_TX_23_N	P23_TD-		TX CH-3N		
U900	BG31	NW_SD_TX_23_P	P23_TD+		TX CH-3P		
U900	BN21	NW_SD_RX_24_N	P25_RD-	QSFP7	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BP21	NW_SD_RX_24_P	P25_RD+		RX CH-1P		
U900	BN23	NW_SD_RX_25_N	P26_RD-		RX CH-2N		
U900	BP23	NW_SD_RX_25_P	P26_RD+		RX CH-2P		
U900	BN25	NW_SD_RX_26_N	P28_RD-		RX CH-4N		
U900	BP25	NW_SD_RX_26_P	P28_RD+		RX CH-4P		
U900	BN27	NW_SD_RX_27_N	P27_RD-		RX CH-3N		
U900	BP27	NW_SD_RX_27_P	P27_RD+		RX CH-3P		
U900	BC17	NW_SD_TX_24_N	P25_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BD17	NW_SD_TX_24_P	P25_TD-		TX CH-1N		
U900	BC19	NW_SD_TX_25_N	P26_TD-		TX CH-2N		
U900	BD19	NW_SD_TX_25_P	P26_TD+		TX CH-2P		
U900	BC21	NW_SD_TX_26_N	P28_TD-		TX CH-4N		
U900	BD21	NW_SD_TX_26_P	P28_TD+		TX CH-4P		
U900	BC23	NW_SD_TX_27_N	P27_TD-		TX CH-3N		
U900	BD23	NW_SD_TX_27_P	P27_TD+		TX CH-3P		
U900	BK25	NW_SD_RX_28_N	P30_RD-	QSFP6	RX CH-2N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BL25	NW_SD_RX_28_P	P30_RD+		RX CH-2P		
U900	BK27	NW_SD_RX_29_N	P29_RD-		RX CH-1N		
U900	BL27	NW_SD_RX_29_P	P29_RD+		RX CH-1P		

U900	BK29	NW_SD_RX_30_N	P32_RD-		RX CH-4N		
U900	BL29	NW_SD_RX_30_P	P32_RD+		RX CH-4P		
U900	BK31	NW_SD_RX_31_N	P31_RD-		RX CH-3N		
U900	BL31	NW_SD_RX_31_P	P31_RD+		RX CH-3P		
U900	BF33	NW_SD_TX_28_N	P30_TD-		TX CH-2N		
U900	BG33	NW_SD_TX_28_P	P30_TD+		TX CH-2P		
U900	BF35	NW_SD_TX_29_N	P29_TD-		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BG35	NW_SD_TX_29_P	P29_TD+		TX CH-1P		
U900	BF37	NW_SD_TX_30_N	P32_TD-		TX CH-4N		
U900	BG37	NW_SD_TX_30_P	P32_TD+		TX CH-4P		
U900	BF39	NW_SD_TX_31_N	P31_TD-		TX CH-3N		
U900	BG39	NW_SD_TX_31_P	P31_TD+		TX CH-3P		
U900	BN29	NW_SD_RX_32_N	P33_RD-	QSFP9	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	CONNECTOR3 J2800
U900	BP29	NW_SD_RX_32_P	P33_RD+		RX CH-1P		
U900	BN31	NW_SD_RX_33_N	P34_RD-		RX CH-2N		
U900	BP31	NW_SD_RX_33_P	P34_RD+		RX CH-2P		
U900	BN33	NW_SD_RX_34_N	P36_RD-		RX CH-4N		
U900	BP33	NW_SD_RX_34_P	P36_RD+		RX CH-4P		
U900	BN35	NW_SD_RX_35_N	P35_RD-		RX CH-3N		
U900	BP35	NW_SD_RX_35_P	P35_RD+		RX CH-3P		
U900	BC25	NW_SD_TX_32_N	P33_TD-		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BD25	NW_SD_TX_32_P	P33_TD+		TX CH-1P		
U900	BC27	NW_SD_TX_33_N	P34_TD-		TX CH-2N		
U900	BD27	NW_SD_TX_33_P	P34_TD+		TX CH-2P		
U900	BC29	NW_SD_TX_34_N	P36_TD-		TX CH-4N		
U900	BD29	NW_SD_TX_34_P	P36_TD+		TX CH-4P		
U900	BC31	NW_SD_TX_35_N	P35_TD-		TX CH-3N		
U900	BD31	NW_SD_TX_35_P	P35_TD+		TX CH-3P		
U900	BK33	NW_SD_RX_36_N	P37_RD-	QSFP8	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BL33	NW_SD_RX_36_P	P37_RD+		RX CH-1P		
U900	BK35	NW_SD_RX_37_N	P38_RD-		RX CH-2N		
U900	BL35	NW_SD_RX_37_P	P38_RD+		RX CH-2P		

U900	BK37	NW_SD_RX_38_N	P40_RD-		RX CH-4N	
U900	BL37	NW_SD_RX_38_P	P40_RD+		RX CH-4P	
U900	BK39	NW_SD_RX_39_N	P39_RD+		RX CH-3P	
U900	BL39	NW_SD_RX_39_P	P39_RD-		RX CH-3N	
U900	BC33	NW_SD_TX_36_N	P37_TD-		TX CH-1N	
U900	BD33	NW_SD_TX_36_P	P37_TD+		TX CH-1P	
U900	BC35	NW_SD_TX_37_N	P38_TD-		TX CH-2N	QSFP CHANNELS SWAPPED WITH IN THE QUAD
U900	BD35	NW_SD_TX_37_P	P38_TD+		TX CH-2P	
U900	BC37	NW_SD_TX_38_N	P40_TD-		TX CH-4N	
U900	BD37	NW_SD_TX_38_P	P40_TD+		TX CH-4P	
U900	BC39	NW_SD_TX_39_N	P39_TD-		TX CH-3N	
U900	BD39	NW_SD_TX_39_P	P39_TD+		TX CH-3P	
U900	BN37	NW_SD_RX_40_N	P45_RD+		RX CH-1P	
U900	BP37	NW_SD_RX_40_P	P45_RD-		RX CH-1N	
U900	BN39	NW_SD_RX_41_N	P46_RD+		RX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD
U900	BP39	NW_SD_RX_41_P	P46_RD-		RX CH-2N	
U900	BN41	NW_SD_RX_42_N	P48_RD+		RX CH-4P	
U900	BP41	NW_SD_RX_42_P	P48_RD-		RX CH-4N	
U900	BN43	NW_SD_RX_43_N	P47_RD-		RX CH-3N	
U900	BP43	NW_SD_RX_43_P	P47_RD+		RX CH-3P	
U900	BF41	NW_SD_TX_40_N	P45_TD+	QSFP10	TX CH-1P	
U900	BG41	NW_SD_TX_40_P	P45_TD-		TX CH-1N	
U900	BF43	NW_SD_TX_41_N	P46_TD+		TX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD
U900	BG43	NW_SD_TX_41_P	P46_TD-		TX CH-2N	
U900	BC41	NW_SD_TX_42_N	P48_TD-		TX CH-4N	
U900	BD41	NW_SD_TX_42_P	P48_TD+		TX CH-4P	
U900	BC43	NW_SD_TX_43_N	P47_TD+		TX CH-3P	
U900	BD43	NW_SD_TX_43_P	P47_TD-		TX CH-3N	
U900	BL50	NW_SD_RX_44_N	P41_RD+		RX CH-1P	
U900	BL51	NW_SD_RX_44_P	P41_RD-		RX CH-1N	
U900	BJ50	NW_SD_RX_45_N	P42_RD-	QSFP11	RX CH-2N	QSFP CHANNELS SWAPPED WITH IN THE QUAD
U900	BJ51	NW_SD_RX_45_P	P42_RD+		RX CH-2P	
U900	BG50	NW_SD_RX_46_N	P44_RD-		RX CH-4N	

U900	BG51	NW_SD_RX_46_P	P44_RD+		RX CH-4P		
U900	BE50	NW_SD_RX_47_N	P43_RD+		RX CH-3P		
U900	BE51	NW_SD_RX_47_P	P43_RD-		RX CH-3N		
U900	BL46	NW_SD_TX_44_N	P41_TD-		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BL47	NW_SD_TX_44_P	P41_TD+		TX CH-1P		
U900	BJ46	NW_SD_TX_45_N	P42_TD+		TX CH-2P		
U900	BJ47	NW_SD_TX_45_P	P42_TD-		TX CH-2N		
U900	BG46	NW_SD_TX_46_N	P44_TD-		TX CH-4N		
U900	BG47	NW_SD_TX_46_P	P44_TD+		TX CH-4P		
U900	BE46	NW_SD_TX_47_N	P43_TD+		TX CH-3P		
U900	BE47	NW_SD_TX_47_P	P43_TD-		TX CH-3N		
U900	BL53	NW_SD_RX_48_N	P53_RD+	QSFP12	RX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	CONNECTOR 4 J2900
U900	BL54	NW_SD_RX_48_P	P53_RD-		RX CH-1N		
U900	BJ53	NW_SD_RX_49_N	P54_RD+		RX CH-2P		
U900	BJ54	NW_SD_RX_49_P	P54_RD-		RX CH-2N		
U900	BG53	NW_SD_RX_50_N	P56_RD+		RX CH-4P		
U900	BG54	NW_SD_RX_50_P	P56_RD-		RX CH-4N		
U900	BE53	NW_SD_RX_51_N	P55_RD-		RX CH-3N		
U900	BE54	NW_SD_RX_51_P	P55_RD+		RX CH-3P		
U900	BC46	NW_SD_TX_48_N	P53_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BC47	NW_SD_TX_48_P	P53_TD-		TX CH-1N		
U900	BA46	NW_SD_TX_49_N	P54_TD+		TX CH-2P		
U900	BA47	NW_SD_TX_49_P	P54_TD-		TX CH-2N		
U900	AW46	NW_SD_TX_50_N	P56_TD-		TX CH-4N		
U900	AW47	NW_SD_TX_50_P	P56_TD+		TX CH-4P		
U900	AU46	NW_SD_TX_51_N	P55_TD+		TX CH-3P		
U900	AU47	NW_SD_TX_51_P	P55_TD-		TX CH-3N		
U900	BC50	NW_SD_RX_52_N	P49_RD-	QSFP13	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BC51	NW_SD_RX_52_P	P49_RD+		RX CH-1P		
U900	BA50	NW_SD_RX_53_N	P50_RD-		RX CH-2N		
U900	BA51	NW_SD_RX_53_P	P50_RD+		RX CH-2P		
U900	AW50	NW_SD_RX_54_N	P52_RD-		RX CH-4N		

U900	AW51	NW_SD_RX_54_P	P52_RD+		RX CH-4P		
U900	AU50	NW_SD_RX_55_N	P51_RD+		RX CH-3P		
U900	AU51	NW_SD_RX_55_P	P51_RD-		RX CH-3N		
U900	BA43	NW_SD_TX_52_N	P49_TD-		TX CH-1N		
U900	BA44	NW_SD_TX_52_P	P49_TD+		TX CH-1P		
U900	AW43	NW_SD_TX_53_N	P50_TD+		TX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	AW44	NW_SD_TX_53_P	P50_TD-		TX CH-2N		
U900	AU43	NW_SD_TX_54_N	P52_TD-		TX CH-4N		
U900	AU44	NW_SD_TX_54_P	P52_TD+		TX CH-4P		
U900	AR46	NW_SD_TX_55_N	P51_TD+		TX CH-3P		
U900	AR47	NW_SD_TX_55_P	P51_TD-		TX CH-3N		
U900	BC53	NW_SD_RX_56_N	P61_RD+		RX CH-1P		
U900	BC54	NW_SD_RX_56_P	P61_RD-		RX CH-1N		
U900	BA53	NW_SD_RX_57_N	P62_RD+		RX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	BA54	NW_SD_RX_57_P	P62_RD-		RX CH-2N		
U900	AW53	NW_SD_RX_58_N	P64_RD+		RX CH-4P		
U900	AW54	NW_SD_RX_58_P	P64_RD-		RX CH-4N		
U900	AU53	NW_SD_RX_59_N	P63_RD-		RX CH-3N		
U900	AU54	NW_SD_RX_59_P	P63_RD+		RX CH-3P		
U900	AN46	NW_SD_TX_56_N	P61_TD+	QSFP14	TX CH-1P		
U900	AN47	NW_SD_TX_56_P	P61_TD-		TX CH-1N		
U900	AL46	NW_SD_TX_57_N	P62_TD+		TX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	AL47	NW_SD_TX_57_P	P62_TD-		TX CH-2N		
U900	AJ46	NW_SD_TX_58_N	P64_TD-		TX CH-4N		
U900	AJ47	NW_SD_TX_58_P	P64_TD+		TX CH-4P		
U900	AF46	NW_SD_TX_59_N	P63_TD+		TX CH-3P		
U900	AF47	NW_SD_TX_59_P	P63_TD-		TX CH-3N		
U900	AR53	NW_SD_RX_60_N	P57_RD+		RX CH-1P		
U900	AR54	NW_SD_RX_60_P	P57_RD-		RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	AN53	NW_SD_RX_61_N	P58_RD+		RX CH-2P		
U900	AN54	NW_SD_RX_61_P	P58_RD-	QSFP15	RX CH-2N		
U900	AL53	NW_SD_RX_62_N	P60_RD+		RX CH-4P		
U900	AL54	NW_SD_RX_62_P	P60_RD-		RX CH-4N		

U900	AJ53	NW_SD_RX_63_N	P59_RD-		RX CH-3N		
U900	AJ54	NW_SD_RX_63_P	P59_RD+		RX CH-3P		
U900	AJ49	NW_SD_TX_60_N	P57_TD-		TX CH-1N		
U900	AJ50	NW_SD_TX_60_P	P57_TD+		TX CH-1P		
U900	AF49	NW_SD_TX_61_N	P58_TD+		TX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	AF50	NW_SD_TX_61_P	P58_TD-		TX CH-2N		
U900	AD49	NW_SD_TX_62_N	P60_TD-		TX CH-4N		
U900	AD50	NW_SD_TX_62_P	P60_TD+		TX CH-4P		
U900	AB49	NW_SD_TX_63_N	P59_TD+		TX CH-3P		
U900	AB50	NW_SD_TX_63_P	P59_TD-		TX CH-3N		
U900	E8	NW_SD_RX_64_N	P73_RD-		RX CH-1N		
U900	D8	NW_SD_RX_64_P	P73_RD+		RX CH-1P		
U900	E6	NW_SD_RX_65_N	P74_RD-		RX CH-2N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	D6	NW_SD_RX_65_P	P74_RD+		RX CH-2P		
U900	E4	NW_SD_RX_66_N	P76_RD-		RX CH-4N		
U900	D4	NW_SD_RX_66_P	P76_RD+		RX CH-4P		
U900	E2	NW_SD_RX_67_N	P75_RD+		RX CH-3P		
U900	D2	NW_SD_RX_67_P	P75_RD-		RX CH-3N		
U900	P2	NW_SD_TX_64_N	P73_TD+	QSFP31	TX CH-1P		
U900	P1	NW_SD_TX_64_P	P73_TD-		TX CH-1N		
U900	T2	NW_SD_TX_65_N	P74_TD-		TX CH-2N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	CONNECTOR5 J3000
U900	T1	NW_SD_TX_65_P	P74_TD+		TX CH-2P		
U900	P5	NW_SD_TX_66_N	P76_TD+		TX CH-4P		
U900	P4	NW_SD_TX_66_P	P76_TD-		TX CH-4N		
U900	T5	NW_SD_TX_67_N	P75_TD-		TX CH-3N		
U900	T4	NW_SD_TX_67_P	P75_TD+		TX CH-3P		
U900	B10	NW_SD_RX_68_N	P77_RD+		RX CH-1P		
U900	A10	NW_SD_RX_68_P	P77_RD-		RX CH-1N		
U900	B8	NW_SD_RX_69_N	P78_RD+		RX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	A8	NW_SD_RX_69_P	P78_RD-	QSFP30	RX CH-2N		
U900	B6	NW_SD_RX_70_N	P80_RD+		RX CH-4P		
U900	A6	NW_SD_RX_70_P	P80_RD-		RX CH-4N		

U900	B4	NW_SD_RX_71_N	P79_RD-		RX CH-3N		
U900	A4	NW_SD_RX_71_P	P79_RD+		RX CH-3P		
U900	M8	NW_SD_TX_68_N	P77_TD+		TX CH-1P		
U900	L8	NW_SD_TX_68_P	P77_TD-		TX CH-1N		
U900	M6	NW_SD_TX_69_N	P78_TD+		TX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	L6	NW_SD_TX_69_P	P78_TD-		TX CH-2N		
U900	M4	NW_SD_TX_70_N	P80_TD-		TX CH-4N		
U900	L4	NW_SD_TX_70_P	P80_TD+		TX CH-4P		
U900	M2	NW_SD_TX_71_N	P79_TD+		TX CH-3P		
U900	L2	NW_SD_TX_71_P	P79_TD-		TX CH-3N		
U900	E16	NW_SD_RX_72_N	P65_RD-		RX CH-1N		
U900	D16	NW_SD_RX_72_P	P65_RD+		RX CH-1P		
U900	E14	NW_SD_RX_73_N	P66_RD-		RX CH-2N		
U900	D14	NW_SD_RX_73_P	P66_RD+		RX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	E12	NW_SD_RX_74_N	P68_RD-		RX CH-4N		
U900	D12	NW_SD_RX_74_P	P68_RD+		RX CH-4P		
U900	E10	NW_SD_RX_75_N	P67_RD+		RX CH-3P		
U900	D10	NW_SD_RX_75_P	P67_RD-		RX CH-3N		
U900	J8	NW_SD_TX_72_N	P65_TD-	QSFP29	TX CH-1N		
U900	H8	NW_SD_TX_72_P	P65_TD+		TX CH-1P		
U900	J6	NW_SD_TX_73_N	P66_TD+		TX CH-2P		
U900	H6	NW_SD_TX_73_P	P66_TD-		TX CH-2N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	J4	NW_SD_TX_74_N	P68_TD-		TX CH-4N		
U900	H4	NW_SD_TX_74_P	P68_TD+		TX CH-4P		
U900	J2	NW_SD_TX_75_N	P67_TD+		TX CH-3P		
U900	H2	NW_SD_TX_75_P	P67_TD-		TX CH-3N		
U900	B18	NW_SD_RX_76_N	P69_RD+		RX CH-1P		
U900	A18	NW_SD_RX_76_P	P69_RD-		RX CH-1N		
U900	B16	NW_SD_RX_77_N	P70_RD+		RX CH-2P		
U900	A16	NW_SD_RX_77_P	P70_RD-	QSFP28	RX CH-2N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	B14	NW_SD_RX_78_N	P72_RD+		RX CH-4P		
U900	A14	NW_SD_RX_78_P	P72_RD-		RX CH-4N		
U900	B12	NW_SD_RX_79_N	P71_RD-		RX CH-3N		

U900	A12	NW_SD_RX_79_P	P71_RD+		RX CH-3P		
U900	M16	NW_SD_TX_76_N	P69_TD+		TX CH-1P		
U900	L16	NW_SD_TX_76_P	P69_TD-		TX CH-1N		
U900	M14	NW_SD_TX_77_N	P70_TD+		TX CH-2P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	L14	NW_SD_TX_77_P	P70_TD-		TX CH-2N		
U900	M12	NW_SD_TX_78_N	P72_TD-		TX CH-4N		
U900	L12	NW_SD_TX_78_P	P72_TD+		TX CH-4P		
U900	M10	NW_SD_TX_79_N	P71_TD+		TX CH-3P		
U900	L10	NW_SD_TX_79_P	P71_TD-		TX CH-3N		
U900	E24	NW_SD_RX_80_N	P89_RD-	QSFP27	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	CONNECTOR6 J3100
U900	D24	NW_SD_RX_80_P	P89_RD+		RX CH-1P		
U900	E22	NW_SD_RX_81_N	P90_RD-		RX CH-2N		
U900	D22	NW_SD_RX_81_P	P90_RD+		RX CH-2P		
U900	E20	NW_SD_RX_82_N	P92_RD-		RX CH-4N		
U900	D20	NW_SD_RX_82_P	P92_RD+		RX CH-4P		
U900	E18	NW_SD_RX_83_N	P91_RD+		RX CH-3P		
U900	D18	NW_SD_RX_83_P	P91_RD-		RX CH-3N		
U900	J16	NW_SD_TX_80_N	P89_TD-		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	H16	NW_SD_TX_80_P	P89_TD+		TX CH-1P		
U900	J14	NW_SD_TX_81_N	P90_TD+		TX CH-2P		
U900	H14	NW_SD_TX_81_P	P90_TD-		TX CH-2N		
U900	J12	NW_SD_TX_82_N	P92_TD-		TX CH-4N		
U900	H12	NW_SD_TX_82_P	P92_TD+		TX CH-4P		
U900	J10	NW_SD_TX_83_N	P91_TD+		TX CH-3P		
U900	H10	NW_SD_TX_83_P	P91_TD-		TX CH-3N		
U900	B26	NW_SD_RX_84_N	P93_RD+	QSFP26	RX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	A26	NW_SD_RX_84_P	P93_RD-		RX CH-1N		
U900	B24	NW_SD_RX_85_N	P94_RD+		RX CH-2P		
U900	A24	NW_SD_RX_85_P	P94_RD-		RX CH-2N		
U900	B22	NW_SD_RX_86_N	P96_RD+		RX CH-4P		
U900	A22	NW_SD_RX_86_P	P96_RD-		RX CH-4N		
U900	B20	NW_SD_RX_87_N	P95_RD-		RX CH-3N		

U900	A20	NW_SD_RX_87_P	P95_RD+		RX CH-3P		
U900	M24	NW_SD_TX_84_N	P93_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	L24	NW_SD_TX_84_P	P93_TD-		TX CH-1N		
U900	M22	NW_SD_TX_85_N	P94_TD+		TX CH-2P		
U900	L22	NW_SD_TX_85_P	P94_TD-		TX CH-2N		
U900	M20	NW_SD_TX_86_N	P96_TD-		TX CH-4N		
U900	L20	NW_SD_TX_86_P	P96_TD+		TX CH-4P		
U900	M18	NW_SD_TX_87_N	P95_TD+		TX CH-3P		
U900	L18	NW_SD_TX_87_P	P95_TD-		TX CH-3N		
U900	E32	NW_SD_RX_88_N	P81_RD-	QSFP25	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	D32	NW_SD_RX_88_P	P81_RD+		RX CH-1P		
U900	E30	NW_SD_RX_89_N	P82_RD-		RX CH-2N		
U900	D30	NW_SD_RX_89_P	P82_RD+		RX CH-2P		
U900	E28	NW_SD_RX_90_N	P84_RD-		RX CH-4N		
U900	D28	NW_SD_RX_90_P	P84_RD+		RX CH-4P		
U900	E26	NW_SD_RX_91_N	P83_RD+		RX CH-3P		
U900	D26	NW_SD_RX_91_P	P83_RD-		RX CH-3N		
U900	J24	NW_SD_TX_88_N	P81_TD-		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	H24	NW_SD_TX_88_P	P81_TD+		TX CH-1P		
U900	J22	NW_SD_TX_89_N	P82_TD+		TX CH-2P		
U900	H22	NW_SD_TX_89_P	P82_TD-		TX CH-2N		
U900	J20	NW_SD_TX_90_N	P84_TD-		TX CH-4N		
U900	H20	NW_SD_TX_90_P	P84_TD+		TX CH-4P		
U900	J18	NW_SD_TX_91_N	P83_TD+		TX CH-3P		
U900	H18	NW_SD_TX_91_P	P83_TD-		TX CH-3N		
U900	B34	NW_SD_RX_92_N	P85_RD+	QSFP24	RX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	A34	NW_SD_RX_92_P	P85_RD-		RX CH-1N		
U900	B32	NW_SD_RX_93_N	P86_RD+		RX CH-2P		
U900	A32	NW_SD_RX_93_P	P86_RD-		RX CH-2N		
U900	B30	NW_SD_RX_94_N	P88_RD+		RX CH-4P		
U900	A30	NW_SD_RX_94_P	P88_RD-		RX CH-4N		
U900	B28	NW_SD_RX_95_N	P87_RD-		RX CH-3N		
U900	A28	NW_SD_RX_95_P	P87_RD+		RX CH-3P		

U900	M32	NW_SD_TX_92_N	P85_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	L32	NW_SD_TX_92_P	P85_TD-		TX CH-1N		
U900	M30	NW_SD_TX_93_N	P86_TD+		TX CH-2P		
U900	L30	NW_SD_TX_93_P	P86_TD-		TX CH-2N		
U900	M28	NW_SD_TX_94_N	P88_TD-		TX CH-4N		
U900	L28	NW_SD_TX_94_P	P88_TD+		TX CH-4P		
U900	M26	NW_SD_TX_95_N	P87_TD+		TX CH-3P		
U900	L26	NW_SD_TX_95_P	P87_TD-		TX CH-3N		
U900	E40	NW_SD_RX_96_N	P105_RD-	QSFP23	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	CONNECTOR7 J3200
U900	D40	NW_SD_RX_96_P	P105_RD+		RX CH-1P		
U900	E38	NW_SD_RX_97_N	P106_RD-		RX CH-2N		
U900	D38	NW_SD_RX_97_P	P106_RD+		RX CH-2P		
U900	E36	NW_SD_RX_98_N	P108_RD-		RX CH-4N		
U900	D36	NW_SD_RX_98_P	P108_RD+		RX CH-4P		
U900	E34	NW_SD_RX_99_N	P107_RD+		RX CH-3P		
U900	D34	NW_SD_RX_99_P	P107_RD-		RX CH-3N		
U900	J32	NW_SD_TX_96_N	P105_TD-		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	H32	NW_SD_TX_96_P	P105_TD+		TX CH-1P		
U900	J30	NW_SD_TX_97_N	P106_TD+		TX CH-2P		
U900	H30	NW_SD_TX_97_P	P106_TD-		TX CH-2N		
U900	J28	NW_SD_TX_98_N	P108_TD-		TX CH-4N		
U900	H28	NW_SD_TX_98_P	P108_TD+		TX CH-4P		
U900	J26	NW_SD_TX_99_N	P107_TD+		TX CH-3P		
U900	H26	NW_SD_TX_99_P	P107_TD-		TX CH-3N		
U900	B42	NW_SD_RX_100_N	P109_RD+	QSFP22	RX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	A42	NW_SD_RX_100_P	P109_RD-		RX CH-1N		
U900	B40	NW_SD_RX_101_N	P110_RD+		RX CH-2P		
U900	A40	NW_SD_RX_101_P	P110_RD-		RX CH-2N		
U900	B38	NW_SD_RX_102_N	P112_RD+		RX CH-4P		
U900	A38	NW_SD_RX_102_P	P112_RD-		RX CH-4N		
U900	B36	NW_SD_RX_103_N	P111_RD-		RX CH-3N		
U900	A36	NW_SD_RX_103_P	P111_RD+		RX CH-3P		

U900	M40	NW_SD_TX_100_N	P109_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	L40	NW_SD_TX_100_P	P109_TD-		TX CH-1N		
U900	M38	NW_SD_TX_101_N	P110_TD+		TX CH-2P		
U900	L38	NW_SD_TX_101_P	P110_TD-		TX CH-2N		
U900	M36	NW_SD_TX_102_N	P112_TD-		TX CH-4N		
U900	L36	NW_SD_TX_102_P	P112_TD+		TX CH-4P		
U900	M34	NW_SD_TX_103_N	P111_TD+		TX CH-3P		
U900	L34	NW_SD_TX_103_P	P111_TD-		TX CH-3N		
U900	E48	NW_SD_RX_104_N	P97_RD-	QSFP21	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	D48	NW_SD_RX_104_P	P97_RD+		RX CH-1P		
U900	E46	NW_SD_RX_105_N	P98_RD-		RX CH-2N		
U900	D46	NW_SD_RX_105_P	P98_RD+		RX CH-2P		
U900	E44	NW_SD_RX_106_N	P100_RD-		RX CH-4N		
U900	D44	NW_SD_RX_106_P	P100_RD+		RX CH-4P		
U900	E42	NW_SD_RX_107_N	P99_RD+		RX CH-3P		
U900	D42	NW_SD_RX_107_P	P99_RD-		RX CH-3N		
U900	J40	NW_SD_TX_104_N	P97_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	H40	NW_SD_TX_104_P	P97_TD-		TX CH-1N		
U900	J38	NW_SD_TX_105_N	P98_TD+		TX CH-2P		
U900	H38	NW_SD_TX_105_P	P98_TD-		TX CH-2N		
U900	J36	NW_SD_TX_106_N	P100_TD-		TX CH-4N		
U900	H36	NW_SD_TX_106_P	P100_TD+		TX CH-4P		
U900	J34	NW_SD_TX_107_N	P99_TD+		TX CH-3P		
U900	H34	NW_SD_TX_107_P	P99_TD-		TX CH-3N		
U900	B50	NW_SD_RX_108_N	P101_RD+	QSFP20	RX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	A50	NW_SD_RX_108_P	P101_RD-		RX CH-1N		
U900	B48	NW_SD_RX_109_N	P102_RD+		RX CH-2P		
U900	A48	NW_SD_RX_109_P	P102_RD-		RX CH-2N		
U900	B46	NW_SD_RX_110_N	P104_RD+		RX CH-4P		
U900	A46	NW_SD_RX_110_P	P104_RD-		RX CH-4N		
U900	B44	NW_SD_RX_111_N	P103_RD-		RX CH-3N		
U900	A44	NW_SD_RX_111_P	P103_RD+		RX CH-3P		
U900	J44	NW_SD_TX_108_N	P101_TD+		TX CH-1P	QSFP	

U900	H44	NW_SD_TX_108_P	P101_TD-		TX CH-1N	CHANNELS SWAPPED WITH IN THE QUAD	
U900	J42	NW_SD_TX_109_N	P102_TD+		TX CH-2P		
U900	H42	NW_SD_TX_109_P	P102_TD-		TX CH-2N		
U900	M44	NW_SD_TX_110_N	P104_TD-		TX CH-4N		
U900	L44	NW_SD_TX_110_P	P104_TD+		TX CH-4P		
U900	M42	NW_SD_TX_111_N	P103_TD+		TX CH-3P		
U900	L42	NW_SD_TX_111_P	P103_TD-		TX CH-3N		
U900	K53	NW_SD_RX_112_N	P125_RD-	QSFP18	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	CONNECTOR 0 J3300
U900	K54	NW_SD_RX_112_P	P125_RD+		RX CH-1P		
U900	H53	NW_SD_RX_113_N	P126_RD+		RX CH-2P		
U900	H54	NW_SD_RX_113_P	P126_RD-		RX CH-2N		
U900	F53	NW_SD_RX_114_N	P128_RD+		RX CH-4P		
U900	F54	NW_SD_RX_114_P	P128_RD-		RX CH-4N		
U900	D53	NW_SD_RX_115_N	P127_RD-		RX CH-3N		
U900	D54	NW_SD_RX_115_P	P127_RD+		RX CH-3P		
U900	P46	NW_SD_TX_112_N	P125_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	P47	NW_SD_TX_112_P	P125_TD-		TX CH-1N		
U900	M46	NW_SD_TX_113_N	P126_TD+		TX CH-2P		
U900	M47	NW_SD_TX_113_P	P126_TD-		TX CH-2N		
U900	K46	NW_SD_TX_114_N	P128_TD-		TX CH-4N		
U900	K47	NW_SD_TX_114_P	P128_TD+		TX CH-4P		
U900	H46	NW_SD_TX_115_N	P127_TD+		TX CH-3P		
U900	H47	NW_SD_TX_115_P	P127_TD-		TX CH-3N		
U900	K50	NW_SD_RX_116_N	P121_RD-	QSFP19	RX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	K51	NW_SD_RX_116_P	P121_RD+		RX CH-1P		
U900	H50	NW_SD_RX_117_N	P122_RD-		RX CH-2N		
U900	H51	NW_SD_RX_117_P	P122_RD+		RX CH-2P		
U900	F50	NW_SD_RX_118_N	P124_RD+		RX CH-4P		
U900	F51	NW_SD_RX_118_P	P124_RD-		RX CH-4N		
U900	D50	NW_SD_RX_119_N	P123_RD+		RX CH-3P		
U900	D51	NW_SD_RX_119_P	P123_RD-		RX CH-3N		

U900	T46	NW_SD_TX_116_N	P121_TD-		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	T47	NW_SD_TX_116_P	P121_TD+		TX CH-1P		
U900	V43	NW_SD_TX_117_N	P122_TD+		TX CH-2P		
U900	V44	NW_SD_TX_117_P	P122_TD-		TX CH-2N		
U900	T43	NW_SD_TX_118_N	P124_TD-		TX CH-4N		
U900	T44	NW_SD_TX_118_P	P124_TD+		TX CH-4P		
U900	P43	NW_SD_TX_119_N	P123_TD-		TX CH-3N		
U900	P44	NW_SD_TX_119_P	P123_TD+		TX CH-3P		
U900	V53	NW_SD_RX_120_N	P117_RD+	QSFP16	RX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	V54	NW_SD_RX_120_P	P117_RD-		RX CH-1N		
U900	T53	NW_SD_RX_121_N	P118_RD+		RX CH-2P		
U900	T54	NW_SD_RX_121_P	P118_RD-		RX CH-2N		
U900	P53	NW_SD_RX_122_N	P120_RD+		RX CH-4P		
U900	P54	NW_SD_RX_122_P	P120_RD-		RX CH-4N		
U900	M53	NW_SD_RX_123_N	P119_RD-		RX CH-3N		
U900	M54	NW_SD_RX_123_P	P119_RD+		RX CH-3P		
U900	Y49	NW_SD_TX_120_N	P117_TD+		TX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	Y50	NW_SD_TX_120_P	P117_TD-		TX CH-1N		
U900	V49	NW_SD_TX_121_N	P118_TD+		TX CH-2P		
U900	V50	NW_SD_TX_121_P	P118_TD-		TX CH-2N		
U900	T49	NW_SD_TX_122_N	P120_TD-		TX CH-4N		
U900	T50	NW_SD_TX_122_P	P120_TD+		TX CH-4P		
U900	P49	NW_SD_TX_123_N	P119_TD+		TX CH-3P		
U900	P50	NW_SD_TX_123_P	P119_TD-		TX CH-3N		
U900	AF53	NW_SD_RX_124_N	P113_RD+	QSFP17	RX CH-1P	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	AF54	NW_SD_RX_124_P	P113_RD-		RX CH-1N		
U900	AD53	NW_SD_RX_125_N	P114_RD+		RX CH-2P		
U900	AD54	NW_SD_RX_125_P	P114_RD-		RX CH-2N		
U900	AB53	NW_SD_RX_126_N	P116_RD+		RX CH-4P		
U900	AB54	NW_SD_RX_126_P	P116_RD-		RX CH-4N		
U900	Y53	NW_SD_RX_127_N	P115_RD-		RX CH-3N		
U900	Y54	NW_SD_RX_127_P	P115_RD+		RX CH-3P		

U900	AD46	NW_SD_TX_124_N	P113_TD-		TX CH-1N	QSFP CHANNELS SWAPPED WITH IN THE QUAD	
U900	AD47	NW_SD_TX_124_P	P113_TD+		TX CH-1P		
U900	AB46	NW_SD_TX_125_N	P114_TD+		TX CH-2P		
U900	AB47	NW_SD_TX_125_P	P114_TD-		TX CH-2N		
U900	Y46	NW_SD_TX_126_N	P116_TD-		TX CH-4N		
U900	Y47	NW_SD_TX_126_P	P116_TD+		TX CH-4P		
U900	V46	NW_SD_TX_127_N	P115_TD+		TX CH-3P		
U900	V47	NW_SD_TX_127_P	P115_TD-		TX CH-3N		

Table 7 Wedge 100C Cavium CNX88091 port mapping

4.2. PCIe Bus

COMe PCIe Bus 0 Lane[0:3] is assigned to Cavium CNX88091 Switch ASIC PCIe gen2 interface. PCIe Bus 0 lane[4:7] is not used on Wedge 100C.

PCIe clock input of Cavium CNX88091 is driven by the PCIe clock from COMe module.

4.3. USB bus

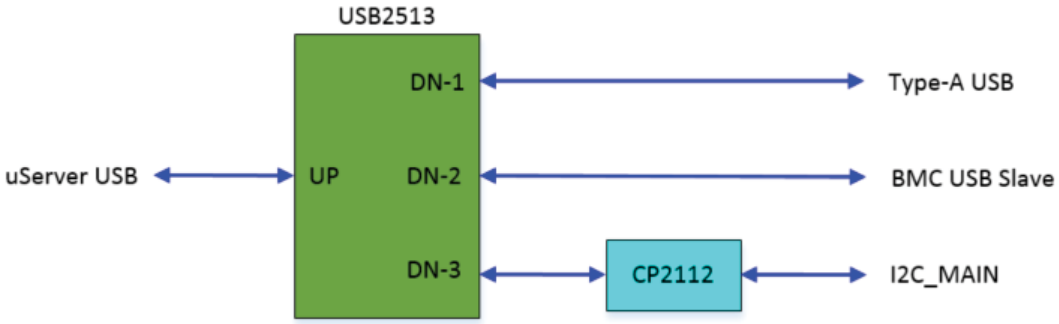


Figure 12 Wedge 100C USB connection

4.4. UART Connection

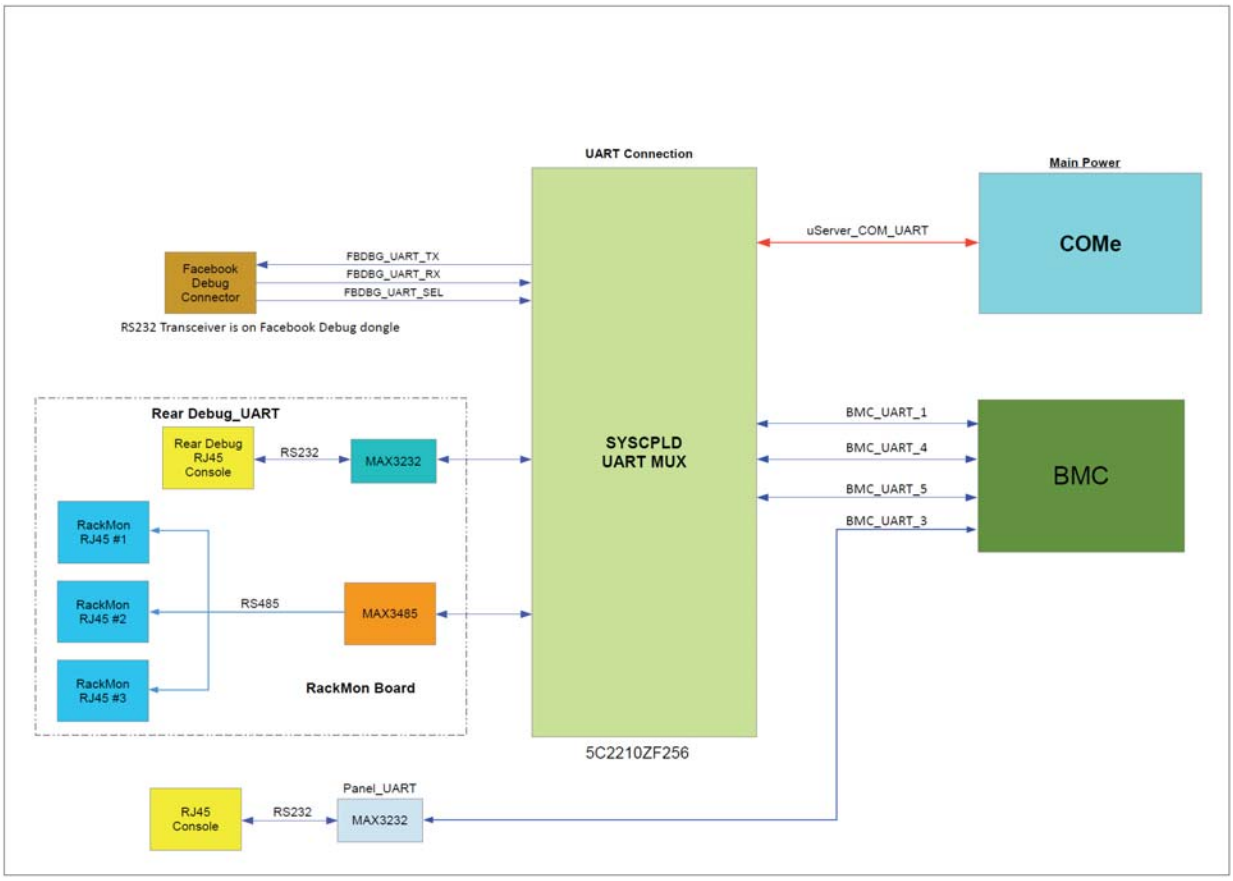


Figure 13 Wedge 100C UART Connection

The following UART interfaces are provided:

- Front panel console interface, RJ45 connector
- Rackmon RS485 UART port, rear facebook rackmon RJ45 connector
- Debug UART port in Facebook proprietary 14-pin debug interface

4.5. OOB Ethernet Connection

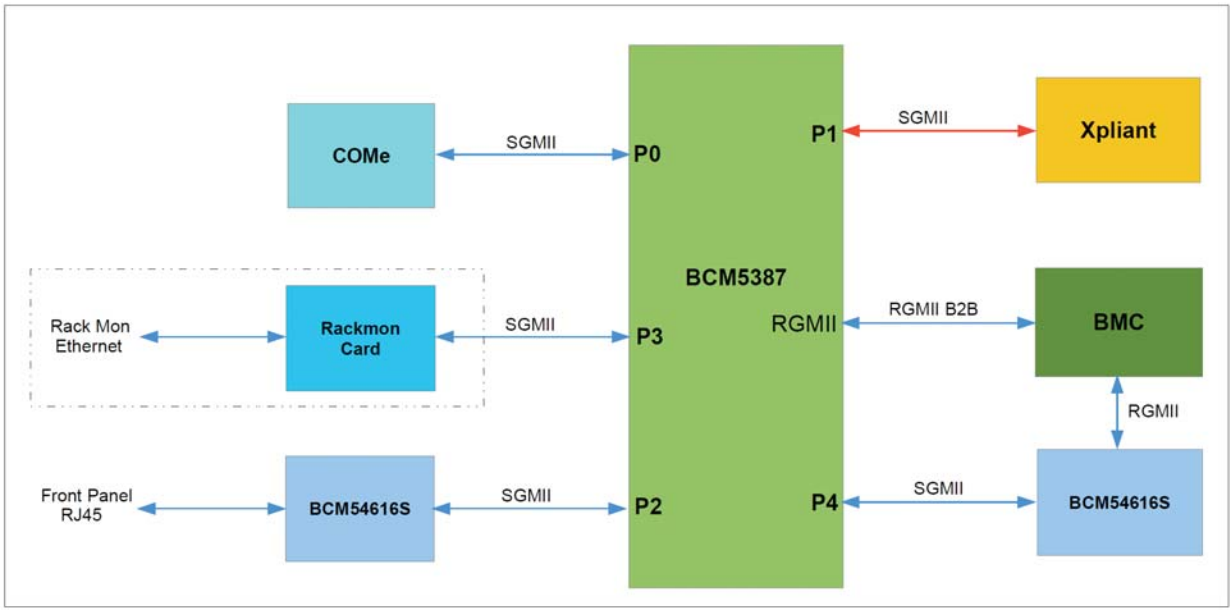


Figure 14 Wedge 100C OOB Ethernet port diagram

4.6. I2C Bus

I2C architecture of Wedge 100C is given below.

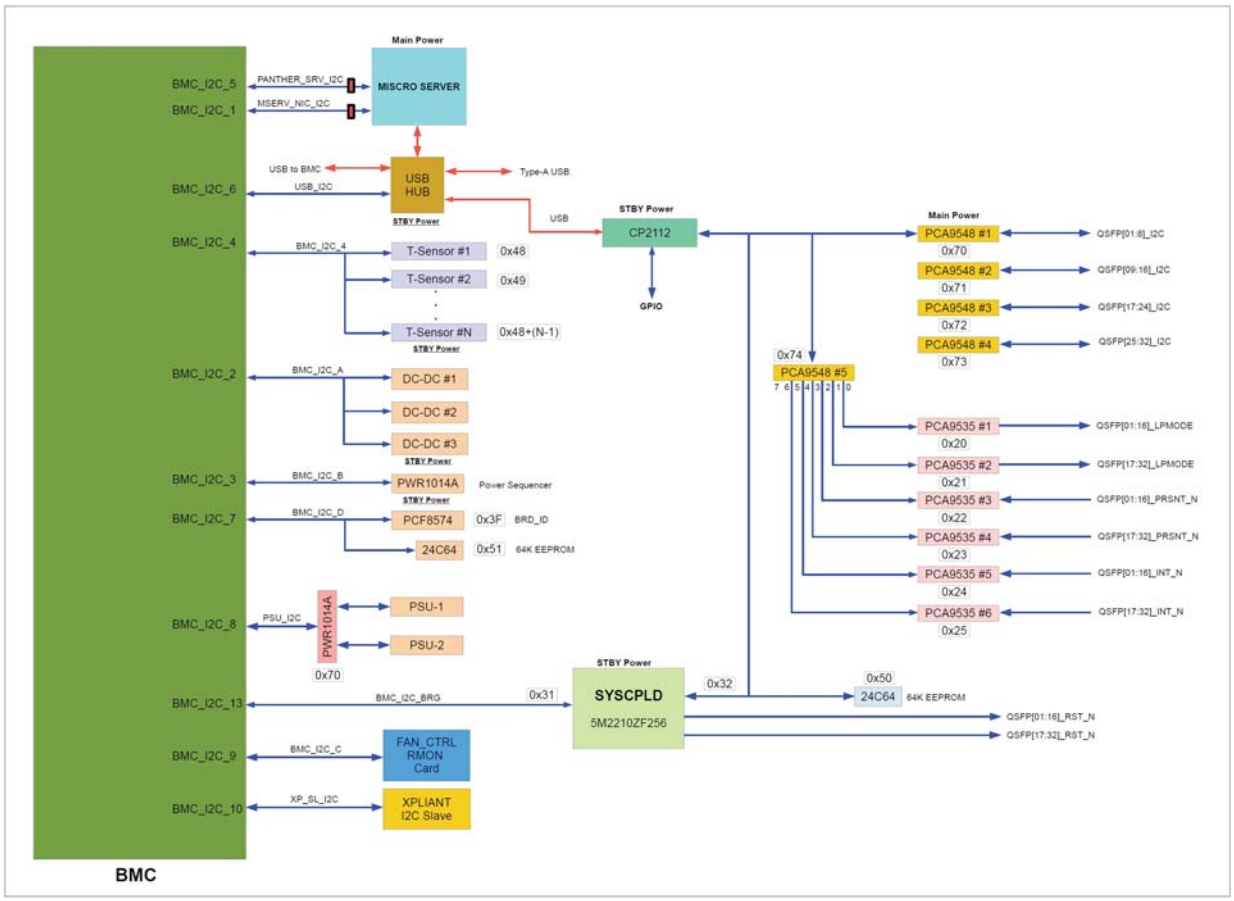


Figure 15 Wedge 100C I2C Diagram

4.6.1. I2C Address

BMC I2C Space							
BMC I2C	**I2C MUX (PCA9548)**	**I2C Mux Addr**	**Sub Channel**	**Dev #**	**Sub-Device**	**I2C Addr**	**Note**
BMC_I2C_1	N/A	N/A	Direct		uServer NIC I2C		uServer NIC I2C
BMC_I2C_2	N/A	N/A	Direct	#1	DC-DC #1	0x10	IR3581, 160A 0.9V ROV
	N/A	N/A	Direct	#2	DC-DC #2	0x11	IR3584. 50A 1.0V_ANALOG
	N/A	N/A	Direct	#3	DC-DC #3	0x12	IR3584, 50A 3.3V
BMC_I2C_3	N/A	N/A	Direct	#1	PWR1014A	0x40	Power sequencer and monitor
BMC_I2C_4	N/A	N/A	Direct	#1	TMP75 #1	0x48	Temperature sensor #1
	N/A	N/A	Direct	#2	TMP75 #2	0x49	Temperature sensor #2
	N/A	N/A	Direct	#3	TMP75 #3	0x4A	Temperature sensor #3
	N/A	N/A	Direct	#4	TMP75 #4	0x4B	Temperature sensor #4
	N/A	N/A	Direct	#5	TMP75 #4	0x4C	Temperature sensor #5
BMC_I2C_5	N/A	N/A	Direct	#1	uServer		
	N/A	N/A	Direct	#2			
BMC_I2C_6	N/A	N/A	Direct	#1	USB Hub	0x50	I2C bus to USB hub
BMC_I2C_7	N/A	N/A	Direct	#1	PCF8574	0x3F	I2C bus to USB hub
	N/A	N/A	Direct	#2	24C64 EEPROM	0x50	I2C bus to USB hub
BMC_I2C_8	PCA9548 (U5704)	0x70	CH0:	#1	PSU #2 MCU	0x59	PSU2 I2C address for PSU MCU
				#2	PSU #2	0x51	PSU2 I2C

					EEPROM		address for PSU EEPROM
			CH1:	#1	PSU #1 MCU	0x59	PSU1 I2C address for PSU MCU
				#2	PSU #1 EEPROM	0x51	PSU1 I2C address for PSU EEPROM
			CH2:	#1	BMC_PHY	0x48	on-board BMC PHY
			CH3:	#1	FP_PHY	0x49	front port BMC PHY
			CH[4:7]:				unused
BMC_I2C_9	N/A	N/A	Direct	#1	FAN Ctrl	0x33	I2C bus to fan_rmon card CPLD
	N/A	N/A	Direct	#2	Rackmon EEPROM	0x50	EEPROM on fan_rmon card
	N/A	N/A	Direct	#3	TMP75 #1	0x48	temperature sensor #1 on fan_rmon card
	N/A	N/A	Direct	#4	TMP75 #2	0x49	temperature sensor #2 on fan_rmon card
	N/A	N/A	Direct	#5	TMP75 #3	0x4A	temperature sensor #3 on fan_rmon card
BMC_I2C_10	N/A	N/A	Direct	#1	Xpliant Switch		Xpliant Slave I2C
BMC_I2C_13	N/A	N/A	Direct	#1	SYSCPLD	0x31	SYSCPLD I2C access interface
							SYSCPLD can also be accessed by COMe from MAIN_I2C bus, the I2C address is 0x32

Table 8 BMC I2C Space

CP2112 Main I2C space					
Device	**I2C Addr**	**Note**	**Sub-Device**	**I2C Addr**	**Note**
PCA9548 #1	0x70	CH0:	QSFP28 Port #1	0x50	QSFP28_PORT_1 I2C space
		CH1:	QSFP28 Port #0	0x50	QSFP28_PORT_0 I2C space
		CH2:	QSFP28 Port #3	0x50	QSFP28_PORT_3 I2C space
		CH3:	QSFP28 Port #2	0x50	QSFP28_PORT_2 I2C space
		CH4:	QSFP28 Port #5	0x50	QSFP28_PORT_5 I2C space
		CH5:	QSFP28 Port #4	0x50	QSFP28_PORT_4 I2C space
		CH6:	QSFP28 Port #7	0x50	QSFP28_PORT_7 I2C space
		CH7:	QSFP28 Port #6	0x50	QSFP28_PORT_6 I2C space
PCA9548 #2	0x71	CH0:	QSFP28 Port #9	0x50	QSFP28_PORT_9 I2C space
		CH1:	QSFP28 Port #8	0x50	QSFP28_PORT_8 I2C space
		CH2:	QSFP28 Port #11	0x50	QSFP28_PORT_11 I2C space
		CH3:	QSFP28 Port #10	0x50	QSFP28_PORT_10 I2C space
		CH4:	QSFP28 Port #13	0x50	QSFP28_PORT_13 I2C space
		CH5:	QSFP28 Port #12	0x50	QSFP28_PORT_12 I2C space
		CH6:	QSFP28 Port #15	0x50	QSFP28_PORT_15 I2C space
		CH7:	QSFP28 Port #14	0x50	QSFP28_PORT_14 I2C space
PCA9548 #3	0x72	CH0:	QSFP28 Port #17	0x50	QSFP28_PORT_17 I2C space
		CH1:	QSFP28 Port #16	0x50	QSFP28_PORT_16 I2C space
		CH2:	QSFP28 Port #19	0x50	QSFP28_PORT_19 I2C space
		CH3:	QSFP28 Port #18	0x50	QSFP28_PORT_18 I2C space
		CH4:	QSFP28 Port #21	0x50	QSFP28_PORT_21 I2C space
		CH5:	QSFP28 Port #20	0x50	QSFP28_PORT_20 I2C space
		CH6:	QSFP28 Port #23	0x50	QSFP28_PORT_23 I2C space
		CH7:	QSFP28 Port #22	0x50	QSFP28_PORT_22 I2C space
PCA9548 #4	0x73	CH0:	QSFP28 Port #25	0x50	QSFP28_PORT_25 I2C space
		CH1:	QSFP28 Port #24	0x50	QSFP28_PORT_24 I2C space
		CH2:	QSFP28 Port #27	0x50	QSFP28_PORT_27 I2C space
		CH3:	QSFP28 Port #26	0x50	QSFP28_PORT_26 I2C space
		CH4:	QSFP28 Port #29	0x50	QSFP28_PORT_29 I2C space
		CH5:	QSFP28 Port #28	0x50	QSFP28_PORT_28 I2C space
		CH6:	QSFP28 Port #31	0x50	QSFP28_PORT_31 I2C space
		CH7:	QSFP28 Port #30	0x50	QSFP28_PORT_30 I2C space
PCA9548 #5	0x74	CH0:	PCA9535 #1	0x20	QSFP28_LPMODE[0:15]
		CH1:	PCA9535 #2	0x21	QSFP28_LPMODE[16:31]
		CH2:	PCA9535 #3	0x22	QSFP28_PRSNT_N[0:15]
		CH3	PCA9535 #4	0x23	QSFP28_PRSNT_N[16:31]
		CH4:	PCA9535 #5	0x24	QSFP28_INT_N[0:15]

		CH5:	PCA9535 #6	0x25	QSFP28_INT_N[16:31]
		CH6:	PCA9535 #7	0x50	24C64 EEPROM
		CH7	unused		
SYSCPLD	0x32				SYSTEM CPLD I2C address is 0x32 in MAIN_I2C space

Table 9 COMe Main I2C Space

DEVICE	ADDR	I2C SIGNAL	IO	SIGNAL	QSFP PORT	CONNECTOR
U5701	0X20	P0EXP_SCL/SDA	IO0_0	LPMODE	QSFP1	**CONNECTOR 0 (J2600)**
			IO0_1	LPMODE	QSFP0	
			IO0_2	LPMODE	QSFP3	
			IO0_3	LPMODE	QSFP2	
			IO0_4	LPMODE	QSFP5	**CONNECTOR 1 (J2700)**
			IO0_5	LPMODE	QSFP4	
			IO0_6	LPMODE	QSFP7	
			IO0_7	LPMODE	QSFP6	
			IO1_0	LPMODE	QSFP9	**CONNECTOR 2 (J2800)**
			IO1_1	LPMODE	QSFP8	
			IO1_2	LPMODE	QSFP11	
			IO1_3	LPMODE	QSFP10	
			IO1_4	LPMODE	QSFP13	**CONNECTOR 3 (J2900)**
			IO1_5	LPMODE	QSFP12	
			IO1_6	LPMODE	QSFP15	
			IO1_7	LPMODE	QSFP14	
U5702	0X21	P1EXP_SCL/SDA	IO0_0	LPMODE	QSFP17	**CONNECTOR 4 (J3300)**
			IO0_1	LPMODE	QSFP16	
			IO0_2	LPMODE	QSFP19	
			IO0_3	LPMODE	QSFP18	
			IO0_4	LPMODE	QSFP21	**CONNECTOR 5 (J3200)**
			IO0_5	LPMODE	QSFP20	
			IO0_6	LPMODE	QSFP23	
			IO0_7	LPMODE	QSFP22	

			IO1_0	LPMODE	QSFP25	**CONNECTOR 6 (J3100)**
			IO1_1	LPMODE	QSFP24	
			IO1_2	LPMODE	QSFP27	
			IO1_3	LPMODE	QSFP26	
			IO1_4	LPMODE	QSFP29	**CONNECTOR7 (J2900)**
			IO1_5	LPMODE	QSFP28	
			IO1_6	LPMODE	QSFP31	
			IO1_7	LPMODE	QSFP30	
U5801	0X22	P2EXP_SCL/SDA	IO0_0	PRSNT	QSFP1	**CONNECTOR 0 (J2600)**
			IO0_1	PRSNT	QSFP0	
			IO0_2	PRSNT	QSFP3	
			IO0_3	PRSNT	QSFP2	
			IO0_4	PRSNT	QSFP5	**CONNECTOR 1 (J2700)**
			IO0_5	PRSNT	QSFP4	
			IO0_6	PRSNT	QSFP7	
			IO0_7	PRSNT	QSFP6	
			IO1_0	PRSNT	QSFP9	**CONNECTOR 2 (J2800)**
			IO1_1	PRSNT	QSFP8	
			IO1_2	PRSNT	QSFP11	
			IO1_3	PRSNT	QSFP10	
			IO1_4	PRSNT	QSFP13	**CONNECTOR 3 (J2900)**
			IO1_5	PRSNT	QSFP12	
			IO1_6	PRSNT	QSFP15	
			IO1_7	PRSNT	QSFP14	
U5802	0X23	P3EXP_SCL/SDA	IO0_0	PRSNT	QSFP17	**CONNECTOR 4 (J3300)**
			IO0_1	PRSNT	QSFP16	
			IO0_2	PRSNT	QSFP19	
			IO0_3	PRSNT	QSFP18	
			IO0_4	PRSNT	QSFP21	**CONNECTOR 5 (J3200)**
			IO0_5	PRSNT	QSFP20	
			IO0_6	PRSNT	QSFP23	
			IO0_7	PRSNT	QSFP22	
			IO1_0	PRSNT	QSFP25	**CONNECTOR 6**

			IO1_1	PRSNT	QSFP24	**(J3100)**
			IO1_2	PRSNT	QSFP27	
			IO1_3	PRSNT	QSFP26	
			IO1_4	PRSNT	QSFP29	**CONNECTOR 7(J3000)**
			IO1_5	PRSNT	QSFP28	
			IO1_6	PRSNT	QSFP31	
			IO1_7	PRSNT	QSFP30	
						.
U5803	0X24	P4EXP_SCL/SDA	IO0_0	RXLOSS	QSFP1	**CONNECTOR 0 (J2600)**
			IO0_1	RXLOSS	QSFP0	
			IO0_2	RXLOSS	QSFP3	
			IO0_3	RXLOSS	QSFP2	
			IO0_4	RXLOSS	QSFP5	**CONNECTOR 1 (J2700)**
			IO0_5	RXLOSS	QSFP4	
			IO0_6	RXLOSS	QSFP7	
			IO0_7	RXLOSS	QSFP6	
			IO1_0	RXLOSS	QSFP9	**CONNECTOR 2 (J2800)**
			IO1_1	RXLOSS	QSFP8	
			IO1_2	RXLOSS	QSFP11	
			IO1_3	RXLOSS	QSFP10	
			IO1_4	RXLOSS	QSFP13	**CONNECTOR 3 (J2900)**
			IO1_5	RXLOSS	QSFP12	
			IO1_6	RXLOSS	QSFP15	
			IO1_7	RXLOSS	QSFP14	
U5804	0X25	P5EXP_SCL/SDA	IO0_0	RXLOSS	QSFP17	**CONNECTOR 4 (J3300)**
			IO0_1	RXLOSS	QSFP16	
			IO0_2	RXLOSS	QSFP19	
			IO0_3	RXLOSS	QSFP18	
			IO0_4	RXLOSS	QSFP21	**CONNECTOR 5 (J3200)**
			IO0_5	RXLOSS	QSFP20	
			IO0_6	RXLOSS	QSFP23	
			IO0_7	**RXLOSS**	**QSFP22**	

			IO1_0	RXLOSS	QSFP25	CONNECTOR 6 (J3100)
			IO1_1	RXLOSS	QSFP24	
			IO1_2	RXLOSS	QSFP27	
			IO1_3	RXLOSS	QSFP26	
			IO1_4	RXLOSS	QSFP29	CONNECTOR 7(J3000)
			IO1_5	RXLOSS	QSFP28	
			IO1_6	RXLOSS	QSFP31	
			IO1_7	RXLOSS	QSFP30	

Table 10 QSFP28 Low speed signals

4.7. System CPLD

One non-volatile instant-on CPLD MAX-V 5M2210ZF256 is used in standby power domain for Wedge 100C system control. It supports the following features:

- Control the reset signals for system and different chips and modules
- Support multiple UART multiplexer and de-multiplexer function for easy debug.
- Provide system status to BMC and COMe module via I2C interface. An I2C slave agent is implemented inside cpld.
- BMC can field upgrade CPLD via dedicated GPIO interface
- PSU control and status interface

4.8. Fan Rackmon CPLD

Fan rackmon CPLD is on Fan card, it connects to BMC I2C bus 9

4.9. Fan Card Heartbeat

FAN card will send heartbeat signal to main board SYSCPLD to indicate the healthy status of fan trays. If any fatal scenario happen, such as all 5 fan-tray fail, then heartbeat signal will notify main board SYSCPLD and main board need to take prevention method, such as shutdown the main power within certain time.

4.10. CPLD upgrade

Both SYSCPLD and FAN_RACKMON CPLD can be online upgraded by BMC. BMC use the following GPIO to emulate CPLD JTAG signals to upgrade CPLD.

BMC GPIO	Pin	IO	CPLD JTAG	Note
GPIOJ4	T4	Out	FANCARD_TMS	FAN_RACKMON CPLD TMS input, BMC output
GPIOJ5	U2	Out	FANCARD_TCK	FAN_RACKMON CPLD TCK input, BMC output
GPIOJ6	T2	Out	FANCARD_TDI	FAN_RACKMON CPLD TDI input, BMC output
GPIOJ7	T1	In	FANCARD_TDO	FAN_RACKMON CPLD TDO output, BMC input
GPIOM0	V3	Out	FANCARD_UPD_N	FAN_RACKMON CPLD upgrade enable, active low. To enable fan_rackmon CPLD upgrade
GPIOM4	W3	Out	SYSCPLD_TMS	SYSTEM CPLD TMS input, BMC output
GPIOM6	AA1	Out	SYSCPLD_TCK	SYSTEM CPLD TCK input, BMC output
GPIOM5	Y2	Out	SYSCPLD_TDI	SYSTEM CPLD TDI input, BMC output
GPIOM7	V5	In	SYSCPLD_TDO	SYSTEM CPLD TDO output, BMC input
GPIOF2	A20	Out	SYSCPLD_UPD	SYSTEM CPLD upgrade enable, active High. To enable SYSTEM CPLD upgrade

Please note that CPLD upgrade enable signals have different polarity for SYSCPLD and FAN_RACKMON CPLD.

4.11. LED

QSFP28 data port can be configured as single 100G mode, or dual 50G mode, or four 10G mode. However, only two LEDs can be assigned to one QSFP28 port to indicate the port status. R/G/B tri-color LED is used to display more information, but it is difficult to display all four 10G port status if the QSFP28 is configured as 4x10G mode.

LED	Status	Note
OFF	Link is down	
Blue, Constant On	100G link up, no activity	
Blue, Blinking	100G TX/RX activity	
Green, Constant On		
Green, Blinking		
Red	Port has error	

Each QSFP28 port has 2 tri-color LED, totally 64 tri-color LED for 32 QSFP28 ports. Serial to parallel shift register 74LV164 can be used to implement these 64 tri-color LED, or 192 bit of LED. 24 piece of 74LV595 or 74LV164 are needed.

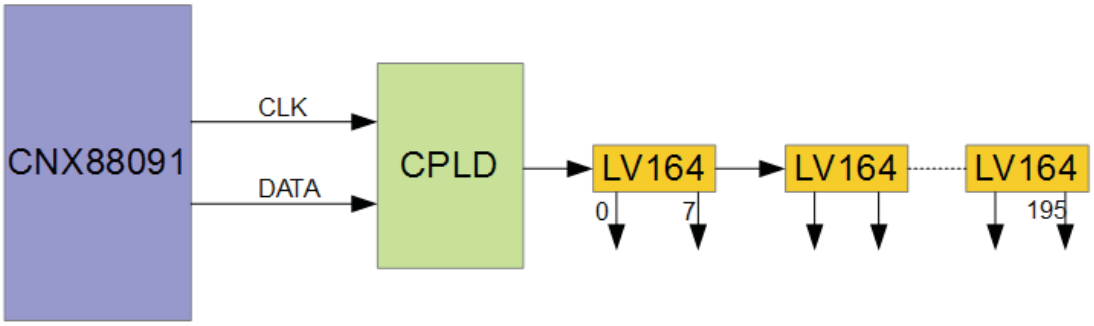


Figure 16 Wedge 100C QSFP port LED

4.12. On Board Power Design

Cavium CNX88091 0.9V core voltage 180A rail:

- IR3581 + 6xIR3556 six phase design
- Power stage IR3556
- Inductor

Cavium CNX88091 1.0V analog 50A rail:

- IR3584 + 2x IR3556 two phase design
- Power stage IR3556
- Inductor

Wedge 100C 3.3V main power 50A rail:

- IR3584 + 2x IR3556 two phase design
- Power stage IR3556
- Inductor

Voltage rails with small current can use TI TPS54339 (3A), TPS53318 (6A)

4.13. Voltage Rail control and Monitor

In order to ensure proper operation of all power rails at all times, Wedge 100C need to support the following voltage rail control and monitor functions

- The power up and power sequence of all voltage rails need to be controlled in sub-ms delay.
- All voltage rails need to be closely monitored, Under voltage threshold and over voltage threshold need to be specified by design and can be adjustable by software if needed.
- All voltage rails need to be measured in reasonable accuracy

Lattice semiconductor programmable power controller PWR1014A is recommended to implement all these three functions. Power control and status information can be accessed via i2c interface

Voltages are reported as part of the system enclosure status information. The power rails to be monitored are shown in Table 11.

Power domain	Power Rail	Voltage
Main Power	P3.3V	3.3V
	P0.9V	0.9V
	P1VA/1V PLL	1V
	P1.8V	1.8V
	P2.5V	2.5V
Standby power	P3.3V_STBY	3.3V
	P2.5V_STBY	2.5V
	P1.8V_STBY	1.8V
	P1.2V_STBY	1.2V
Input Power	Input 12V	12.5V

Table 11 Wedge 100C Monitored Power Rails

4.14. Power sequencer and monitor

Wedge 100C will use programmable power manager chip PWR1014A from lattice semiconductor. PWR1014A support the following features:

- Power rail sequence control up to 12 rails
- Monitor 10 voltage rails
- Perform voltage measurement on 10 voltage rails
- I2C interface

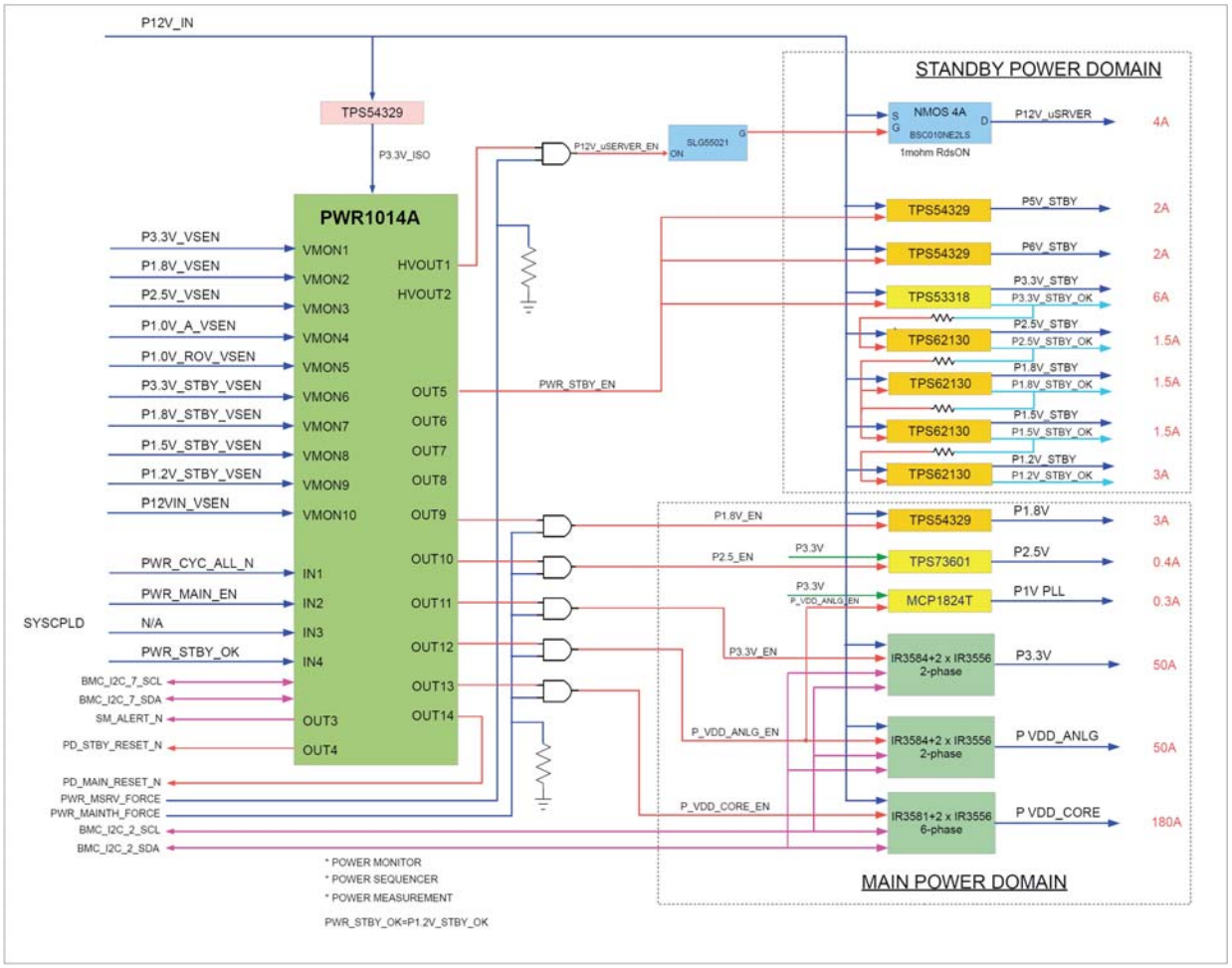


Table 12 Power sequencer and power circuit diagram

4.15. System reset

Wedge 100C system reset diagram is shown in the following diagram.

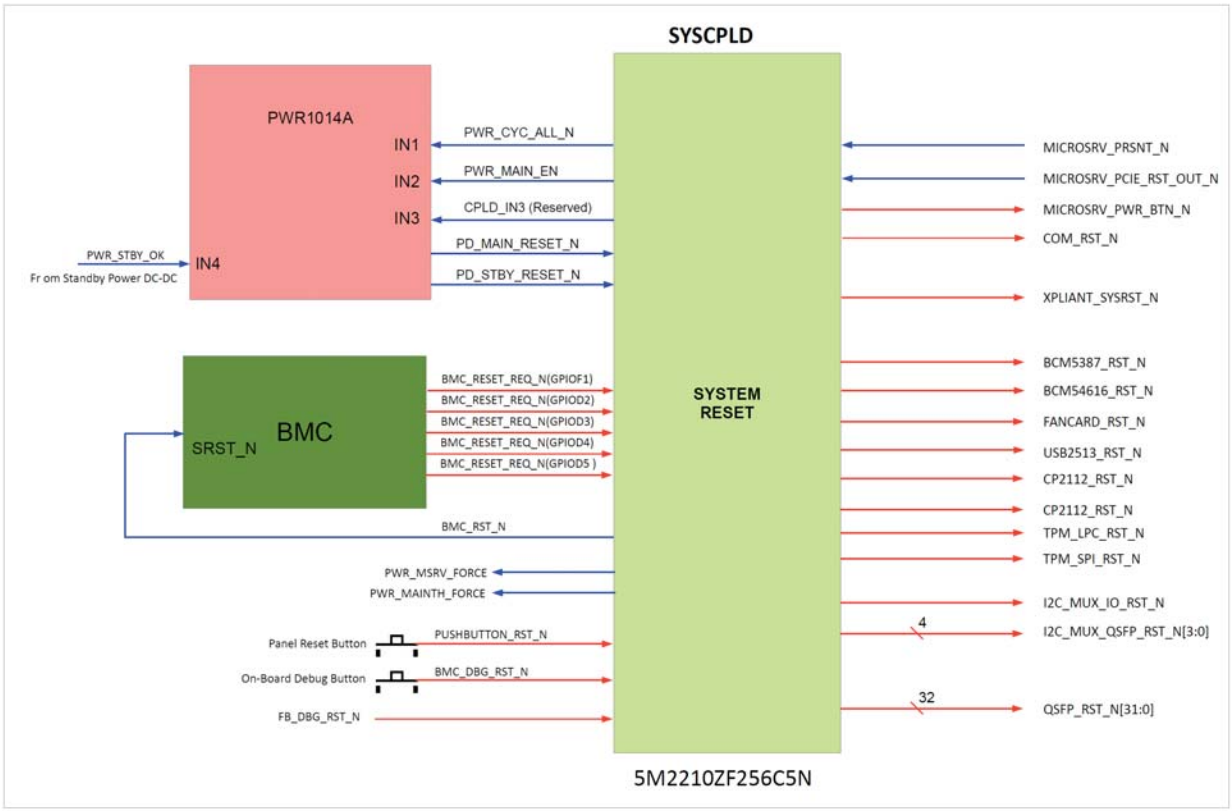


Figure 17 Wedge 100C reset architecture

5. Rack Monitor and fan control card

5.1. Block Diagram

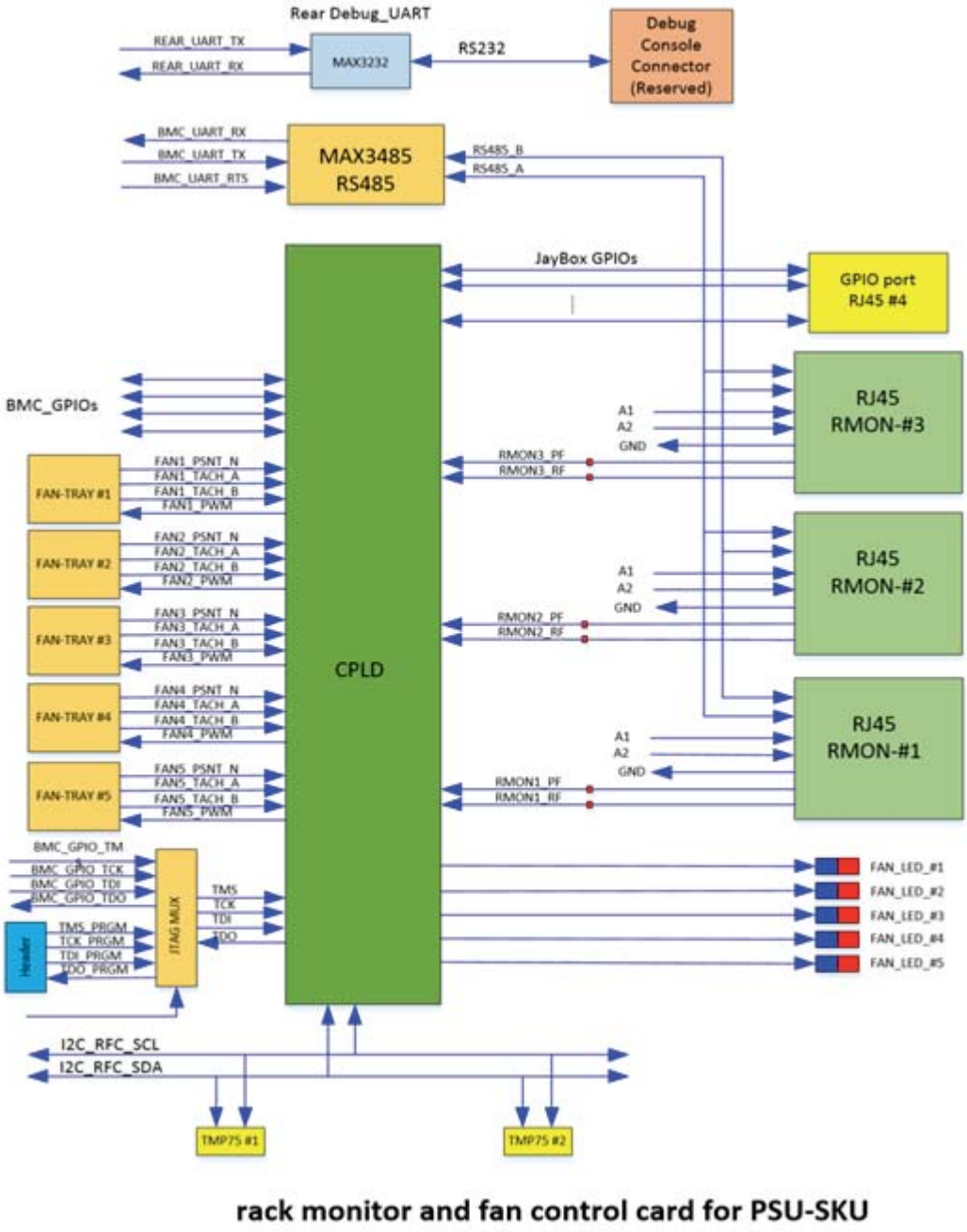


Figure 18 Rackmon and fan control card diagram (Standard SKU)

Rackmon and fan control card (RMF card) support the following features:

- Provide 3 rack monitor RJ45 connector for OCP V2 rack monitor. One RS485 UART among all 3 rackmon RJ45 ports connected to BMC, and PSU status of three racks
- Provide 1 RJ45 Connector for GPIO signals of JayBox
- 5 B/R bi-color LED to indicate the fan tray status of 5 CR fantray
- Control and status of 5 CR fantray.
- I2C interface to main board BMC

Power-Bar SKU will be used in OpenRack, and is powered by 12V power bus bar. In this scenario, a power pass-through card is needed to provide power bus bar function.

6. COM-E CPU Module

COM-E CPU module is used as control plane CPU in Wedge 100C.

6.1. COM-E CPU Module Feature List

Wedge 100C uses PCOM-B632VG COM-E CPU module based on Intel Atom Processor E3800 family (Code Name BayTrail) SoC, Main feature list of PCOM-B632VG is as following:

- Processor
  - Intel® AtomTM processor E3800 family, 22nm process technology
  - Cache up to 2MB (for Quad Core)
  - DPM (Defect Per Million devices) <50
  - Support Intel® VT-x technology
- BIOS
  - Phoenix BIOS
- Memory - Support up to 8GB DDR3L 1066/1333 SDRAM on one 204pin SODIMM
- Storage Devices
  - Two SATA 2.0
  - One Micro-SD slot
- Watchdog Timer
  - Programmable by embedded controller
- Expansion Interface
  - Supports up to four PCI Express lanes by LAN disable, four x 1 lanes can be configured to one x 4 lane (default 3x PCI-Express lanes)
  - SPI Interface
  - SM Bus interface
  - I2C interface
- I/O Interface
  - Audio - HDA controller integraded in SoC
  - Ethernet - Onboard Intel I210IT
  - Serial Port - Two series RX/TX supported from onboard EC (embedded controller)
  - USB
    - 6 ports USB2.0
    - 1 port USB3.0
  - Keyboard & Mouse - KB controller integraded in embedded controller
- Mechanic and Enviroment
  - Dimension - 95mm(L) x 95mm(W) x 2.0mm(H)

- Power Supply - DC 6V~16.8V
- Environment
  - Operation temperature: -40~80°C
  - Storage temperature: -40~80°C
  - Relative humidity : 5~95%, non-condensing
- MTBF
  - Over 180000hrs at 55°C

6.2. COM-E Block Diagram

The following figure illustrates the functional block diagram of the COM-E CPU card.

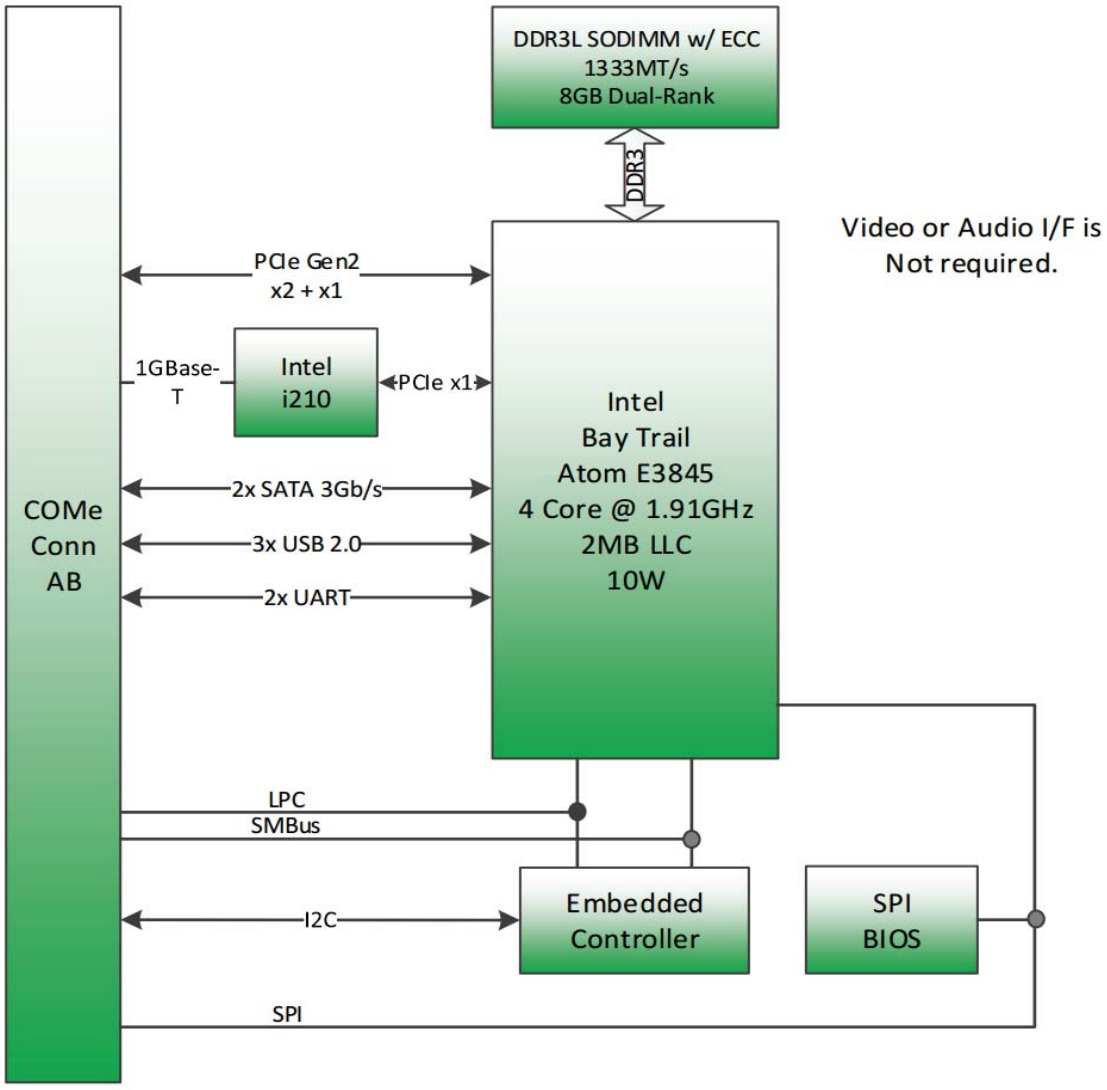


Figure 19: Portwell COM-E CPU Module Block Diagram

6.3. Pin Definition of COM-E Connector

COM-E CPU module has J5 and J6 two connectors, the signal definition of these two connectors are shown in the following tables:

J6					
Row A			**Row B**		
Pin No.	**Signal**	**Required?**	**Pin No.**	**Signal**	**Required?**
A1	GND	Required	**B1**	GND	Required
A2	GBE0_MDI3-	Required	**B2**	GBE0_ACT#	
A3	GBE0_MDI3+	Required	**B3**	LPC_FRAME#	Required
A4	GBE0_LINK100#		**B4**	LPC_AD0	Required
A5	GBE0_LINK1000#		**B5**	LPC_AD1	Required
A6	GBE0_MDI2-	Required	**B6**	LPC_AD2	Required
A7	GBE0_MDI2+	Required	**B7**	LPC_AD3	Required
A8	GBE0_LINK#		**B8**	LPC_DRQ0#	
A9	GBE0_MDI1-	Required	**B9**	LPC_DRQ1#	
A10	GBE0_MDI1+	Required	**B10**	LPC_PCLK	Required
A11	GND	Required	**B11**	GND	Required
A12	GBE0_MDI0-	Required	**B12**	PWRBTN#	Required
A13	GBE0_MDI0+	Required	**B13**	SMB_CLK	Required
A14	GBE0_CTREF	Required	**B14**	SMB_DAT	Required
A15	SUS_S3#	Required if the module supports S3	**B15**	SMB_ALERT#	Required
A16	SATA0_TX+	Required	**B16**	SATA1_TX+	
A17	SATA0_TX-	Required	**B17**	SATA1_TX-	
A18	SUS_S4#	Required if the module supports S4	**B18**	SUS_STAT#	Required
A19	SATA0_RX+	Required	**B19**	SATA1_RX+	
A20	SATA0_RX-	Required	**B20**	SATA1_RX-	
A21	GND	Required	**B21**	GND	Required
A22	SATA2_TX+		**B22**	SATA3_TX+	
A23	SATA2_TX-		**B23**	SATA3_TX-	
A24	SUS_S5#	Required if the	**B24**	PWROK	Required

		module supports S5			
A25	SATA2_RX+		**B25**	SATA3_RX+	
A26	SATA2_RX-		**B26**	SATA3_RX-	
A27	BATLOW#	Required	**B27**	WDT	Required
A28	ATA_ACT#		**B28**	HDA_SDIN2	
A29	HDA_SYNC		**B29**	HDA_SDIN1	
A30	HDA_RST#		**B30**	HDA_SDIN0	
A31	GND	Required	**B31**	GND	Required
A32	HDA_BITCLK		**B32**	SPKR	
A33	HDA_SDOUT		**B33**	I2C_CLK	Required
A34	BIOS_DIS0#	Required	**B34**	I2C_DAT	Required
A35	THRMTRIP#	Required	**B35**	THRM#	Required
A36	USB6-		**B36**	USB7-	
A37	USB6+		**B37**	USB7+	
A38	USB_6_7_OC#		**B38**	USB_4_5_OC#	
A39	USB4-		**B39**	USB5-	
A40	USB4+		**B40**	USB5+	
A41	GND	Required	**B41**	GND	Required
A42	USB2-		**B42**	USB3-	
A43	USB2+		**B43**	USB3+	
A44	USB_2_3_OC#		**B44**	USB_0_1_OC#	
A45	USB0-	Required	**B45**	USB1-	
A46	USB0+	Required	**B46**	USB1+	
A47	VCC_RTC	Required	**B47**	EXCD1_PERST#	
A48	EXCD0_PERST#		**B48**	EXCD1_CPPE#	
A49	EXCD0_CPPE#		**B49**	SYS_RST#	Required
A50	LPC_SERIRQ	Required	**B50**	CB_RESET#	Required
A51	GND	Required	**B51**	GND	Required
A52	PCIE_TX5+	NC	**B52**	PCIE_RX5+	
A53	PCIE_TX5-	NC	**B53**	PCIE_RX5-	
A54	GPI0	Required	**B54**	GPO1	
A55	PCIE_TX4+		**B55**	PCIE_RX4+	
A56	PCIE_TX4-		**B56**	PCIE_RX4-	
A57	GND		**B57**	GPO2	

A58	PCIE_TX3+	Preferred to have	**B58**	PCIE_RX3+	Preferred to have
A59	PCIE_TX3-	Preferred to have	**B59**	PCIE_RX3-	Preferred to have
A60	GND	Required	**B60**	GND	Required
A61	PCIE_TX2+	Preferred to have	**B61**	PCIE_RX2+	Preferred to have
A62	PCIE_TX2-	Preferred to have	**B62**	PCIE_RX2-	Preferred to have
A63	GPI1		**B63**	GPO3	
A64	PCIE_TX1+	Required	**B64**	PCIE_RX1+	Required
A65	PCIE_TX1-	Required	**B65**	PCIE_RX1-	Required
A66	GND	Required	**B66**	WAKE0#	
A67	GPI2		**B67**	WAKE1#	
A68	PCIE_TX0+	Required	**B68**	PCIE_RX0+	Required
A69	PCIE_TX0-	Required	**B69**	PCIE_RX0-	Required
A70	GND	Required	**B70**	GND	Required
A71	LVDS_A0+		**B71**	LVDS_B0+	
A72	LVDS_A0-		**B72**	LVDS_B0-	
A73	LVDS_A1+		**B73**	LVDS_B1+	
A74	LVDS_A1-		**B74**	LVDS_B1-	
A75	LVDS_A2+		**B75**	LVDS_B2+	
A76	LVDS_A2-		**B76**	LVDS_B2-	
A77	LVDS_VDDEN		**B77**	LVDS_B3+	
A78	LVDS_A3+		**B78**	LVDS_B3-	
A79	LVDS_A3-		**B79**	LVDS_BKLT_EN	
A80	GND	Required	**B80**	GND	Required
A81	LVDS_CLKA+		**B81**	LVDS_CLKB+	
A82	LVDS_CLKA-		**B82**	LVDS_CLKB-	
A83	LVDS_I2CCK		**B83**	LVDS_BKLT_CTRL	
A84	LVDS_I2CDAT		**B84**	VCC_5V_SBY	Required
A85	GPI3		**B85**	VCC_5V_SBY	Required
A86	NC		**B86**	VCC_5V_SBY	Required
A87	NC		**B87**	VCC_5V_SBY	Required
A88	PCIE0_CK_REF+	Required	**B88**	BIOS_DIS1#	Required
A89	PCIE0_CK_REF-	Required	**B89**	VGA_RED	
A90	GND	Required	**B90**	GND	Required

A91	SPI_POWER	Required	**B91**	VGA_GRN	
A92	SPI_MISO	Required	**B92**	VGA_BLU	
A93	GPO0	Required	**B93**	VGA_HSYNC	
A94	SPI_CLK	Required	**B94**	VGA_VSYNC	
A95	SPI_MOSI	Required	**B95**	VGA_DDC_CLK	
A96	NC		**B96**	VGA_DDC_DAT	
A97	TYPE10#	Required	**B97**	SPI_CS#	Required
A98	SER0_TX	Required	**B98**	NC	
A99	SER0_RX	Required	**B99**	NC	
A100	GND	Required	**B100**	GND	Required
A101	SER1_TX		**B101**	FAN_PWNOUT	
A102	SER1_RX		**B102**	FAN_TACHIN	
A103	LID#		**B103**	SLEEP#	
A104	VCC_12V	Required	**B104**	VCC_12V	Required
A105	VCC_12V	Required	**B105**	VCC_12V	Required
A106	VCC_12V	Required	**B106**	VCC_12V	Required
A107	VCC_12V	Required	**B107**	VCC_12V	Required
A108	VCC_12V	Required	**B108**	VCC_12V	Required
A109	VCC_12V	Required	**B109**	VCC_12V	Required
A110	GND	Required	**B110**	GND	Required

Table 13 COMe Pinout 1st connector

COM-E J5 Connector pin assignment is shown in the following table:

J5					
Row C			**Row D**		
Pin No.	**Signal**	**Required?**	**Pin No.**	**Signal**	**Required?**
C1	GND	Required	**D1**	GND	Required
C2	GND	Required	**D2**	GND	Required
C3	USB0_SSRX-		**D3**	USB0_SSTX-	
C4	USB0_SSRX+		**D4**	USB0_SSTX+	
C5	GND	Required	**D5**	GND	Required
C6	USB1_SSRX-		**D6**	USB1_SSTX-	
C7	USB1_SSRX+		**D7**	USB1_SSTX+	

C8	GND	Required	**D8**	GND	Required
C9	USB2_SSRX-		**D9**	USB2_SSTX-	
C10	USB2_SSRX+		**D10**	USB2_SSTX+	
C11	GND	Required	**D11**	GND	Required
C12	USB3_SSRX-		**D12**	USB3_SSTX-	
C13	USB3_SSRX+		**D13**	USB3_SSTX+	
C14	GND	Required	**D14**	GND	Required
C15	DP1_LANE6		**D15**	DP1_CTRLCLK_AUX	
C16	DP1_LANE6#		**D16**	DP1_CTRLDATA_AUX#	
C17	NC		**D17**	NC	
C18	NC		**D18**	NC	
C19	PCIE_RX6+		**D19**	PCIE_TX6+	
C20	PCIE_RX6-		**D20**	PCIE_TX6-	
C21	GND	Required	**D21**	GND	Required
C22	NC		**D22**	NC	
C23	NC		**D23**	NC	
C24	DP1_HDP		**D24**	NC	
C25	DP1_LANE4		**D25**	NC	
C26	DP1_LANE4#		**D26**	DP1_LANE0	
C27	NC		**D27**	DP1_LANE0#	
C28	NC		**D28**	NC	
C29	DP1_LANE5		**D29**	DP1_LANE1	
C30	DP1_LANE5#		**D30**	DP1_LANE1#	
C31	GND	Required	**D31**	GND	Required
C32	DP2_CTRLCLK_AUX		**D32**	DP1_LANE2	
C33	DP2_CTRLDATA_AUX#		**D33**	DP1_LANE2#	
C34	DP2_AUX_SEL		**D34**	DP1_AUX_SEL	
C35	NC		**D35**	NC	
C36	DP3_CTRLCLK_AUX		**D36**	DP1_LANE3	
C37	DP3_CTRLDATA_		**D37**	DP1_LANE3#	

	AUX#				
C38	DP3_AUX_SEL		**D38**	NC	
C39	DP3_LANE0		**D39**	DP2_LANE0	
C40	DP3_LANE0#		**D40**	DP2_LANE0#	
C41	GND	Required	**D41**	GND	Required
C42	DP3_LANE1		**D42**	DP2_LANE1	
C43	DP3_LANE1#		**D43**	DP2_LANE1#	
C44	DP3_HPD		**D44**	DP2_HPD	
C45	NC		**D45**	NC	
C46	DP3_LANE2		**D46**	DP2_LANE2	
C47	DP3_LANE2#		**D47**	DP2_LANE2#	
C48	NC		**D48**	NC	
C49	DP3_LANE3		**D49**	DP2_LANE3	
C50	DP3_LANE3#		**D50**	DP2_LANE3#	
C51	GND	Required	**D51**	GND	Required
C52	PEG_RX0+		**D52**	PEG_TX0+	
C53	PEG_RX0-		**D53**	PEG_TX0-	
C54	TYPE0#	Required	**D54**	PEG_LANE_RV#	
C55	PEG_RX1+		**D55**	PEG_TX1+	
C56	PEG_RX1-		**D56**	PEG_TX1-	
C57	TYPE1#	Required	**D57**	TYPE2#	Required
C58	PEG_RX2+		**D58**	PEG_TX2+	
C59	PEG_RX2-		**D59**	PEG_TX2-	
C60	GND	Required	**D60**	GND	Required
C61	PEG_RX3+		**D61**	PEG_TX3+	
C62	PEG_RX3-		**D62**	PEG_TX3-	
C63	NC		**D63**	NC	
C64	NC		**D64**	NC	
C65	PEG_RX4+		**D65**	PEG_TX4+	
C66	PEG_RX4-		**D66**	PEG_TX4-	
C67	NC		**D67**	GND	Required
C68	PEG_RX5+		**D68**	PEG_TX5+	
C69	PEG_RX5-		**D69**	PEG_TX5-	

C70	GND	Required	**D70**	GND	Required
C71	PEG_RX6+		**D71**	PEG_TX6+	
C72	PEG_RX6-		**D72**	PEG_TX6-	
C73	GND	Required	**D73**	GND	Required
C74	PEG_RX7+		**D74**	PEG_TX7+	
C75	PEG_RX7-		**D75**	PEG_TX7-	
C76	GND	Required	**D76**	GND	Required
C77	NC		**D77**	NC	
C78	PEG_RX8+		**D78**	PEG_TX8+	
C79	PEG_RX8-		**D79**	PEG_TX8-	
C80	GND	Required	**D80**	GND	Required
C81	PEG_RX9+		**D81**	PEG_TX9+	
C82	PEG_RX9-		**D82**	PEG_TX9-	
C83	NC		**D83**	NC	
C84	GND	Required	**D84**	GND	Required
C85	PEG_RX10+		**D85**	PEG_TX10+	
C86	PEG_RX10-		**D86**	PEG_TX10-	
C87	GND	Required	**D87**	GND	Required
C88	PEG_RX11+		**D88**	PEG_TX11+	
C89	PEG_RX11-		**D89**	PEG_TX11-	
C90	GND	Required	**D90**	GND	Required
C91	PEG_RX12+		**D91**	PEG_TX12+	
C92	PEG_RX12-		**D92**	PEG_TX12-	
C93	GND	Required	**D93**	GND	Required
C94	PEG_RX13+		**D94**	PEG_TX13+	
C95	PEG_RX13-		**D95**	PEG_TX13-	
C96	GND	Required	**D96**	GND	Required
C97	NC		**D97**	NC	
C98	PEG_RX14+		**D98**	PEG_TX14+	
C99	PEG_RX14-		**D99**	PEG_TX14-	
C100	GND	Required	**D100**	GND	Required
C101	PEG_RX15+		**D101**	PEG_TX15+	
C102	PEG_RX15-		**D102**	PEG_TX15-	

C103	GND	Required	**D103**	GND	Required
C104	VCC_12V	Required	**D104**	VCC_12V	Required
C105	VCC_12V	Required	**D105**	VCC_12V	Required
C106	VCC_12V	Required	**D106**	VCC_12V	Required
C107	VCC_12V	Required	**D107**	VCC_12V	Required
C108	VCC_12V	Required	**D108**	VCC_12V	Required
C109	VCC_12V	Required	**D109**	VCC_12V	Required
C110	GND	Required	**D110**	GND	Required

Table 14 COMe Pinout -2nd connector

6.4. PCB Stack-up

The PCB thickness of the Wedge 100C main board is about 120mil or 3mm. 22 layer PCB stackup is recommended. Low loss PCB material with HVLP copper roughness should be used.

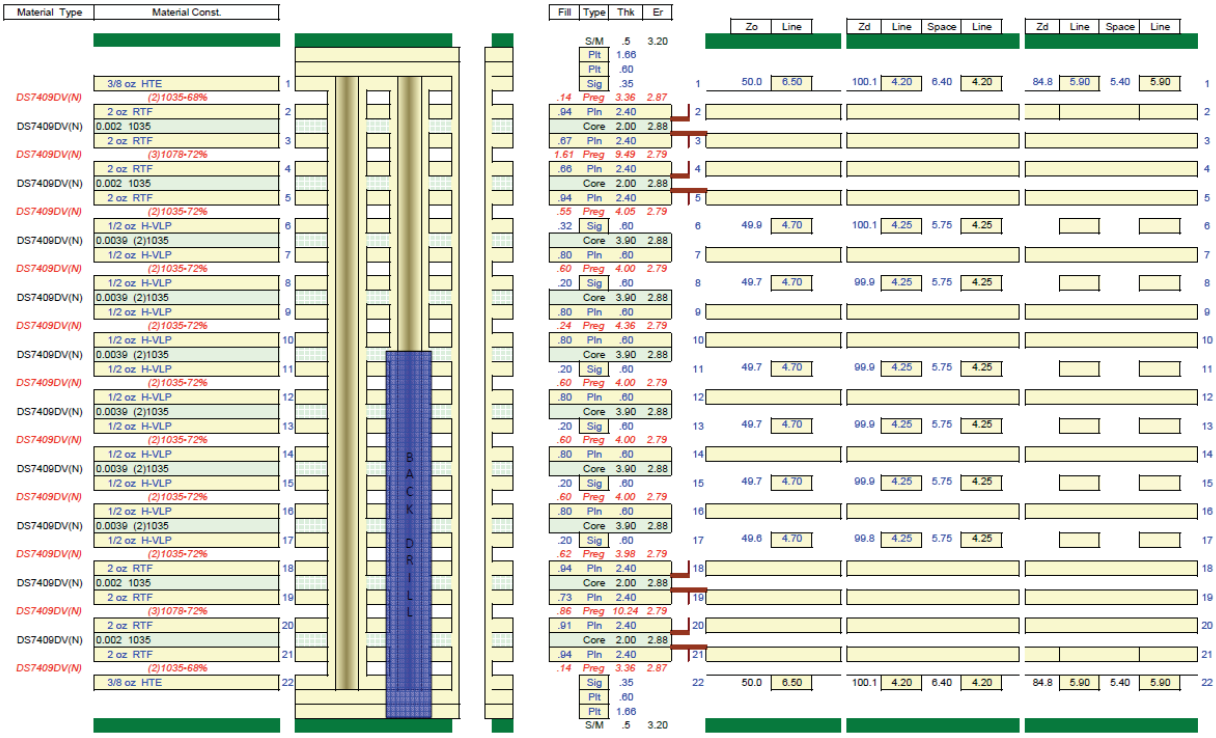


Figure 20: Wedge 100C DS7409DV(N) PCB Stackup

7. Wedge 100C Power

7.1. Power Budget

Board level power budget of wedge100C is estimated to be 436W, assuming all 32 QSFP ports have 3.5W QSFP28 optic module mounted. The following table shows the summary of calculation power as of now.

	qty	Unit Power	Power
COMe	1	30	30
Cavium CNX88091	1	200	200
QSFP28	32	3.5	112
Fantray	5	16.8	84
Other	1	10	10
Total Power			436

Table 15 Wedge100C power estimate

In Wedge 100C's typical application, 8 uplink ports will use QSFP28 optic, which could have 3.5W power consumption, and all other 24 ports are populated with passive cable, which has almost 0 power consumption. So typical power consumption will be about 350W, 84 W less than the estimate in Table 15.

8. Wedge 100C Functional

8.1. COM-E BIOS Feature List

The COM-Express module vendor shall be responsible for supplying and customizing the BIOS for the SOC. The requirements are outlined in this section.

- UEFI compatible
- Configuration and features
  - Disable unused devices
  - BIOS setup menu
  - SoC settings to allow tuning to achieve the optimal combination of performance and power consumption
- BIOS settings tool
- Default boot device priority
  - Network / PXE -> 1st off-module SATA -> Other removable devices
- PXE boot (UEFI Mode)
  - Supports PXE boot and provide the ability to modify the boot sequence. When PXE booting, the card first attempts to boot from the first Ethernet device (eth0).
  - PXE timeout timer set to 10 seconds
- Other boot options
  - Also supports booting from SATA and USB interfaces
  - Provides the capability to select boot options
- Remote BIOS update
  - Scenario 1: Sample / audit BIOS settings
  - Scenario 2: Update BIOS with pre-configured set of BIOS settings
  - Scenario 3: BIOS / firmware update with a new revision
  - Update from the operating system over the LAN
  - Can complete BIOS update or setup change with a single reboot (no PXE boot, no multiple reboots)
  - No user interaction (e.g., prompts)
  - BIOS updates and option changes do not take longer than five minutes to complete
  - Can be scripted and propagated to multiple machines
- Event log
  - Implement SMBIOS type 15 per SMBIOS specification Rev 2.6
  - Hold more than 500 event records (assuming the maximum event record length is 24 bytes, then the size will be larger than 12KB)
  - Each event record includes enhanced information identifying the error source device's vendor ID, card slot ID, and device ID
  - A system access interface and application software to retrieve and clear the event log from the BIOS

- Logged errors
  - CPU / memory errors
  - PCIe errors
  - SATA errors
  - POST errors
  - System reboot events
  - Sensor values exceeding warning or critical thresholds
- Error thresholds
  - Setting must be enabled for both correctable and uncorrectable errors.
  - Threshold for Memory Correctable ECC is TBD.
  - PCIe error threshold follows chipset vendor's suggestion.
- POST codes
  - To be provided on the serial console
  - To be provided on the LPC bus
- DMI
  - Model
  - Serial Number
  - Additional information requested by Facebook
- Processor
  - Atom processor
  - Execute-Disable Bit Capability
  - Active Processor Core Count
  - C-State Technology (C0, C1, C1E, and C6)
  - Intel® Virtualization Technology (VT)
  - Advanced Encryption standard New Instruction (AES-NI)
- Memory
  - Slot detection and Sizing
  - Memory Frequency
- AC Power Loss
  - Power On
  - Power Off
  - Last State
- LED
  - Port 80 LED
- Button
  - Power Button
  - ACPI MP 1.4
  - Platform PCI Routing
  - Sub-System ID
  - Onboard Device enable/disable
  - Spread Spectrum Clock
  - Clock disabled for unused slot/device
  - Popup Menu F11
  - PXE Boot F12
- Post/Setup Message
  - BIOS Date
  - BIOS Version
  - CPU String
  - CPU Speed

    - Hot keys (F2/DEL/F11/F12)
    - Memory Info
- Serial Console Redirection
    - POST
    - SETUP
    - DOS
- Flash
    - Supported Flash Parts
    - DOS Flash Utility
    - Linux Flash Utility
    - BIOS Recovery during BIOS post
    - non-BIOS region update
- Storage
    - SATA
    - AHCI Mode
- USB
    - Legacy USB Boot/Hot plug
    - USB OverCurrent
- BIOS Security
- SMBIOS
    - Type 0 : BIOS Information
    - Type 1 : System Information
    - Type 2 : Base Board Information
    - Type 3 : System Enclosure or Chassis
    - Type 4 : Processor Information
    - Type 7 : Cache Information
    - Type 8 : Port Connector Information
    - Type 10 : On Board Devices Information
    - Type 11 : OEM String
    - Type 13 : BIOS Language Information
    - Type 15: System Event Log
    - Type 16 : Physical Memory Array
    - Type 17 : Memory Device
    - Type 19 : Memory Array Mapped Address
    - Type 38 : IPMI device Information
    - Type 127 : End of Table
- SPD reading retry 3 times mechanism
- Event Logging
    - Single ECC Error
    - Multi-bit ECC Error
    - PCI-Express Error
    - NMI on Error
    - POST Error
    - Filter OEM POST Error for SMBIOS error log
    - OEM SMBIOS error log (only BIOS error)

Note: BIOS should map CCNX88091 device to above 4GB address space.

8.2. BMC Feature Support

The BMC on Wedge 100C support the following features:

- All SEL commands
- All sensor commands
- All SDR commands
- Power on/off/cycle / hardware reset / soft reset commands
- I2C access to Power Sequencer, and DC-DC convertor
- Inventory EEPROM access
- Fan-tray present status check, fan PWM control and speed status read
- Dual SPI boot
- On-board OOB switch MDIO interface access
- On-board PHY MDIO interface access
- CPLD online upgrade (disabled in MP)

9. Transceivers and cables

9.1. 100G optics

- QSFP28 CLR4 100G transceiver
- QSFP28 LR4/LR4-lite 100G transceiver
- QSFP28 CWDM4 100G transceiver
- QSFP28 OpenOptic 100G transceiver

9.2. 100G Cables

- QSFP28 100GE to QSFP28 100GE cable, 1M, 2M, 3M
- QSFP28 100GE to 2 QSFP28 50GE split cable, aka Y-cable, 1M, 2M, 3M
- QSFP28 100GE to 4 SFP28 25GE fanout cable, 1M, 2M, 3M