



Open Cloud Server (OCS) Programmable Server Adapter Mezzanine Specification

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Submitted by Netronome Systems Inc.

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Revision History

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1. Overview

This document defines physical and interface requirements for the programmable NIC mezzanine card that can be installed on an Open Cloud Server (OCS) server blade. This server adapter is programmable and provides CPU offload for Host-based SDN, virtual switch data path and tunneling protocols.

This specification does not cover the functionality of the programmable server adapters that will be developed per these physical requirements.

1.1. Block Diagram

The Netronome OCP mezzanine card is installed on the OCP Blade Server via a PCIe Gen3 8 interface to the central processing unit on the motherboard.

Figure 1 shows a block diagram of the interface:

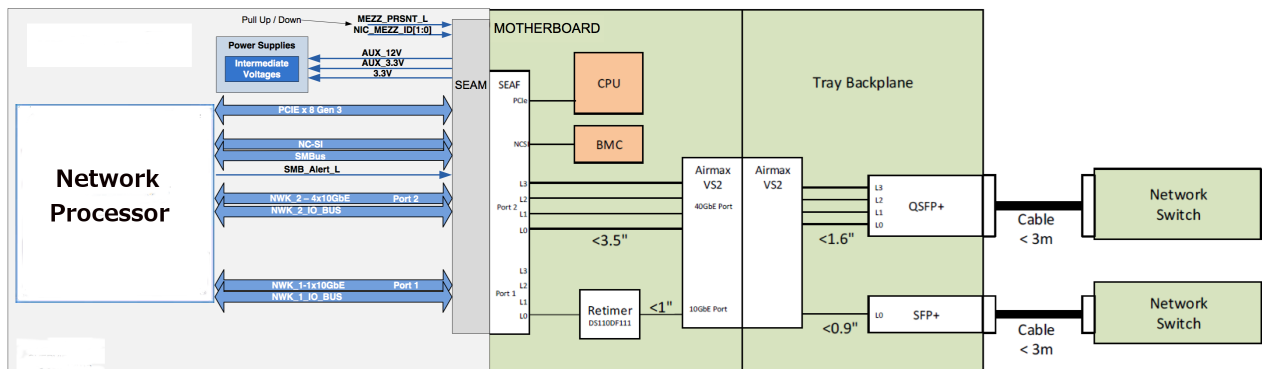


Figure 1: Block Diagram

2. Connectors and Pinouts

2.1. Board Connector

The Mezzanine card connects to the motherboard using the Samtec SEARAY solution. The Mezzanine card uses a Samtec SEAM connector and connects to the Samtec SEAF connector mounted on the motherboard.

The connector interfaces between the NIC mezzanine card and the motherboard use the Samtec SEARAY solution. The mezzanine card uses a Samtec SEAM (male) connector and interfaces to the motherboard through a SEAF (female) connector.

Table 1: Connector Part Numbers

Manufacturer	Mezzanine Card Connector	Motherboard Connector
Samtec	SEAM-20-03.5.S-08-2-A-K-TR	SEAF-20-06.5-S-08-2-A-K-TR

2.2. Signal Definitions

Table 2 details the signals used in the NIC mezzanine interface.

Table 2: Connector Signal Definitions

Bus type	I/O	Logic	Description
P3E_CPU1_LAN_RX_DP/N[7:0]	O	CML	PCIe Gen3 from the NIC mezzanine card to the CPU
P3E_CPU1_LAN_TX_DP/N[7:0]	I	CML	PCIe Gen3 from the CPU to the NIC mezzanine card
CLK_100M_NIC_PE_DP/N	I	CML	100MHz PCIe Clock
PCIE_RESET_N	I	3.3V	PCIe Reset
MEZZ_PRESENT_N	O	3.3V	Mezz Present – Should be GND on mezzanine card
NWK_1_TX[0]P/N	O	CML	Port 1 GbE Transmit from mezzanine card to motherboard
NWK_1_RX[0]P/N	I	CML	Port 1 GbE Receive from motherboard to mezzanine card
NWK_2_TX[3:0]P/N	O	CML	Port 2 GbE Transmit from mezzanine card to motherboard
NWK_2_RX[3:0]P/N	I	CML	Port 2 GbE Receive from motherboard to mezzanine card
NCSI_TXD[1:0]	O	LVTTL	Network Connectivity Status Indicator (NCSI) Transmit Data[1:0] from NIC to Baseboard Management Controller (BMC)
NCSI_RXD[1:0]	I	LVTTL	NCSI Transmit Data[1:0] from BMC to NIC
NCSI_CLK_IN	I	LVTTL	NCSI Input Clock
NCSI_CRS_DV	I	LVTTL	NCSI Receive Data Valid. Connects to Management Controller Transmit Enable
NCSI_RX_ER	I	LVTTL	NCSI Receive Error
NWK1_ACT_LED	O	3.3V	Port 1 Activity LED
NWK1_LINK_LED	O	3.3V	Port 1 Link LED
NWK2_ACT_LED	O	3.3V	Port 2 Activity LED

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NWK2_LINK_LED	O	3.3V	Port 2 Link LED
SMB_ALERT_N	O	3.3V	I2C Alert from NIC mezzanine card to BMC
NWK1_PRESENT_N	I	3.3V	Port 1 Cable Present Indicator
NWK1_I2C_SDA	I/O	3.3V	Port1 I2C Data to Cable
NWK1_I2C_CLK	O	3.3V	Port 1 I2C Clock to Cable
NWK2_PRESENT_N	I	3.3V	Port 2 Cable Present Indicator
NWK2_I2C_SDA	I/O	3.3V	Port 2 I2C Data to Cable
NWK2_I2C_SCL	O	3.3V	Port 2 I2C Clock to Cable
PCIE_WAKE_N	O	3.3V	PCIe Wake
SMB_SCL	I	3.3V	I2C to BMC
SMB_SDA	I/O	3.3V	I2C to BMC
NIC_MEZZ_ID[1:0]	O	3.3V	NIC Mezzanine ID. Connected to BMC on Motherboard. 1:1 - Netronome 40GbE/10GbE Smart Crypto NIC
P3V3	I	3.3V	3.3V Input Power
P3V3_AUX	I	3.3V	3.3V Aux Input Power
P12V_AUX	I	12V	12V Input Power
Ground			Ground pins

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2.3. Connector Pinout

Table 3 details the pinout for the 160 pin NIC mezzanine connector

Table 3: Connector Pinout

1	GND	PCIE_RESET_N	GND	PCIE_WAKE_N	NIC_MEZZ_ID0	SMB_ALERT_N	GND	CLK_100M_NIC_PE_DP	8
9	P3E_CPU1_LAN_TX_DP<0>	GND	P3E_CPU1_LAN_RX_DP<7>	GND	SMB_SCL	NWK2_PRESENT_N	GND	CLK_100M_NIC_PE_DN	16
17	P3E_CPU1_LAN_TX_DN<0>	GND	P3E_CPU1_LAN_RX_DN<7>	GND	SMB_SDA	GND	MEZZ_PRESENT_N	GND	24
25	GND	P3E_CPU1_LAN_TX_DP<1>	GND	P3E_CPU1_LAN_RX_DP<6>	GND	NCSI_TXD_0	GND	NWK_2_TX0P	32
33	GND	P3E_CPU1_LAN_TX_DN<1>	GND	P3E_CPU1_LAN_RX_DN<6>	GND	NCSI_TXD_1	GND	NWK_2_TX0N	40
41	P3E_CPU1_LAN_TX_DP<2>	GND	P3E_CPU1_LAN_RX_DP<5>	GND	NCSI_RXD_0	GND	NWK_2_TX1P	GND	48
49	P3E_CPU1_LAN_TX_DN<2>	GND	P3E_CPU1_LAN_RX_DN<5>	GND	NCSI_RXD_1	GND	NWK_2_TX1N	GND	56
57	GND	P3E_CPU1_LAN_TX_DP<3>	GND	P3E_CPU1_LAN_RX_DP<4>	GND	NCSI_TX_EN	GND	NWK_2_TX2P	64
65	GND	P3E_CPU1_LAN_TX_DN<3>	GND	P3E_CPU1_LAN_RX_DN<4>	GND	NCSI_CLK_IN	GND	NWK_2_TX2N	72
73	P3E_CPU1_LAN_TX_DP<4>	GND	P3E_CPU1_LAN_RX_DP<0>	GND	NCSI_CRD_DV	GND	NWK_2_TX3P	GND	80
81	P3E_CPU1_LAN_TX_DN<4>	GND	P3E_CPU1_LAN_RX_DN<0>	GND	NCSI_RX_ER	GND	NWK_2_TX3N	GND	88
89	GND	P3E_CPU1_LAN_TX_DP<5>	GND	P3E_CPU1_LAN_RX_DP<1>	GND	NWK_1_ACT_LED	GND	NWK_2_RX0P	96
97	GND	P3E_CPU1_LAN_TX_DN<5>	GND	P3E_CPU1_LAN_RX_DN<1>	GND	NWK_1_LINK_LED	GND	NWK_2_RX0N	104
105	P3E_CPU1_LAN_TX_DP<6>	GND	P3E_CPU1_LAN_RX_DP<2>	GND	NWK_2_ACT_LED	GND	NWK_2_RX1N	GND	112
113	P3E_CPU1_LAN_TX_DN<6>	GND	P3E_CPU1_LAN_RX_DN<2>	GND	NWK_2_LINK_LED	GND	NWK_2_RX1P	GND	120
121	GND	P3E_CPU1_LAN_TX_DP<7>	GND	P3E_CPU1_LAN_RX_DP<3>	GND	NWK_1_TX0P	GND	NWK_2_RX2N	128
129	NWK2_I2C_SDA	P3E_CPU1_LAN_TX_DN<7>	GND	P3E_CPU1_LAN_RX_DN<3>	GND	NWK_1_TX0N	GND	NWK_2_RX2P	136
137	NWK2_I2C_SCL	GND	NIC_MEZZ_ID1	GND	NWK_1_RX0P	GND	NWK_2_RX3N	GND	144
145	P12V_AUX	P3V3_AUX	P3V3	GND	NWK_1_RX0N	GND	NWK_2_RX3P	NWK1_I2C_SDA	152
153	P12V_AUX	P3V3_AUX	P3V3	P3V3	GND	NWK1_PRESENT_N	GND	NWK1_I2C_SCL	160

3. Power Requirements

The following table details the power for each of the power rails.

Table 4: Power Ratings

Power rails	Amps/pin (at 40°C)	Total number of pins	Power load capacity by connector pins (W)	Motherboard limited power budget (W)
12V_AUX	2A	2	43.2W	25.2W
3.3V_AUX	2A	2	11.88W	1.2375W
3.3V	2A	3	17.82W	9.9W
Total power budget per mezzanine card				25W

4. Mechanical

The following figure details the mechanical requirements for the Netronome OCP Mezzanine card

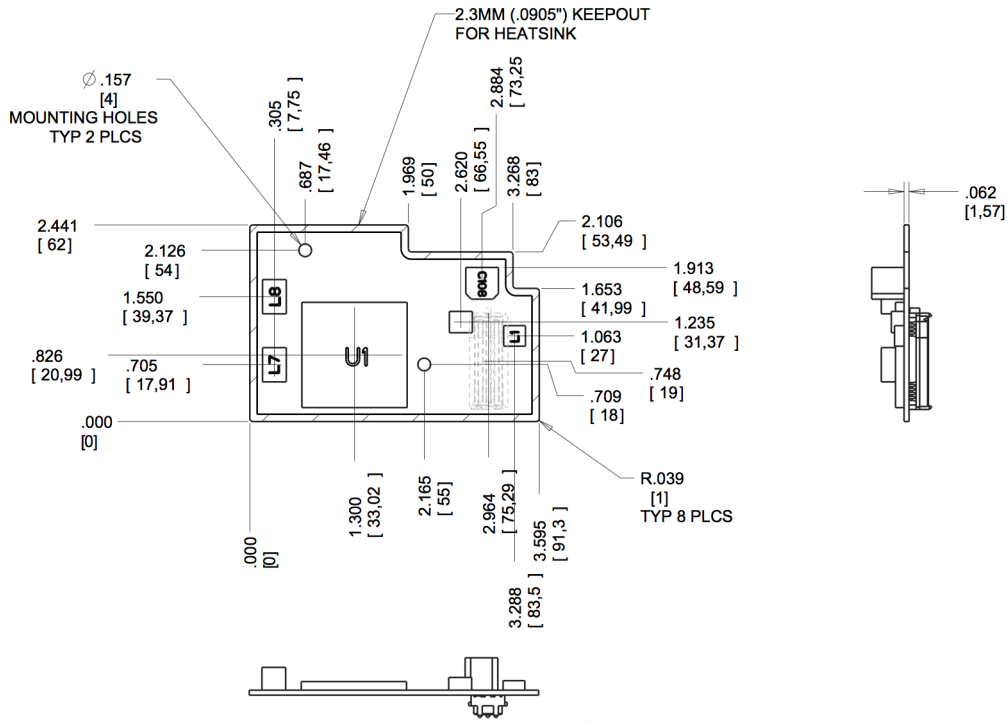


Figure 2: Mechanical Layout

5. Thermal Requirements

The mezzanine card is provided with an incoming airflow temperature of 70 degrees C and a flow rate of 0.61 m/s.