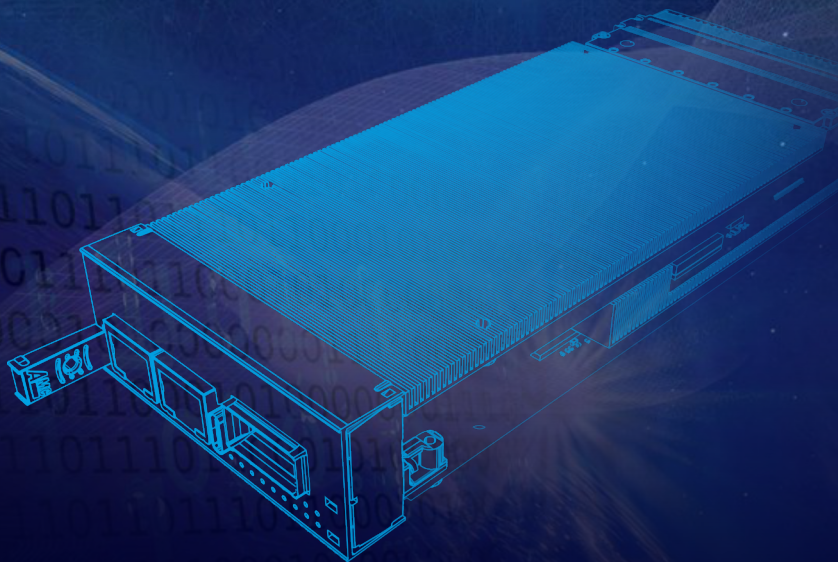




NAT-MCH-G4 Family

The **NAT-MCH-G4** MicroTCA Carrier Hub family comprises of a base module, a clock mezzanine, and various Hub modules for Fat Pipe connections. The double-width **NAT-MCH-S4** offers additional RTM support as assembly option.

Depending on the variant, the daughter cards provide up to 40GbE or PCIe Gen5 x8 links to the backplane. Various uplink options at the front panel offer a wide and flexible range of possible choices to connect the MCH to external networks.

Base Ethernet is provided by SFP(-DD), ix, or RJ45 interfaces at the front panel. Moreover, the **NAT-MCH-G4** features 1G / 2.5G / 10G FabricA connections to each AMC, as well as a 25G Update Fabric to a second **NAT-MCH-G4** in the MTCA system.

In combination with an optional clock module, the **NAT-MCH-G4** offers several options of switching and manipulating clock signals. The customer can choose between two variants: the **NAT-MCH-G4-CLKP** with two low jitter clock multiplexers for CLK1 and CLK2 (MLVDS) and CLK3 as PCIe Reference Clock (HCSL); or **NAT-MCH-G4-CLKT** with 3x Telecom Clock (MLVDS). GPS and an onboard OCXO are available as assembly option (precision timing option) for both variants

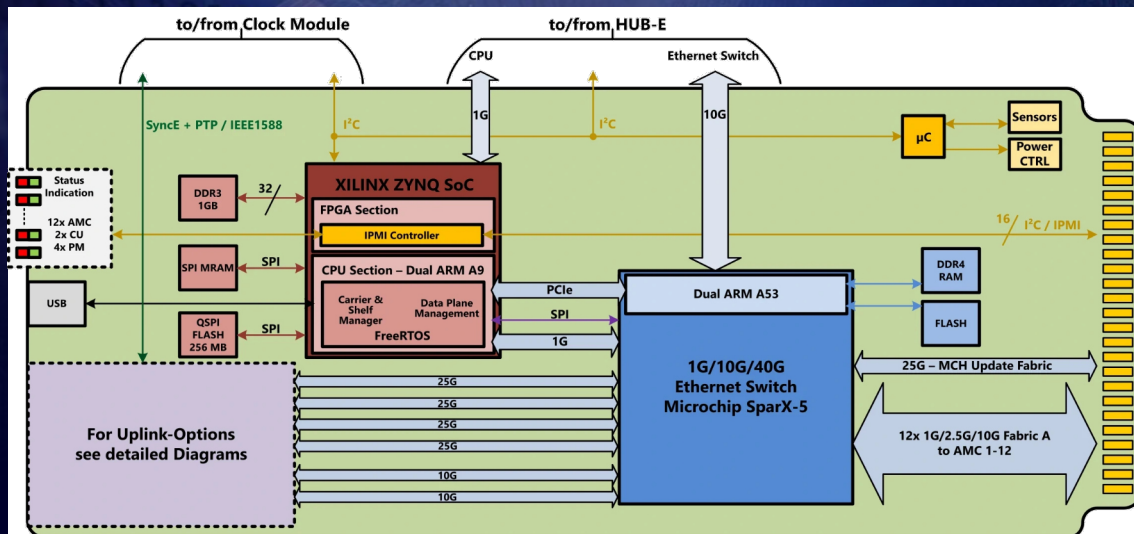
The **NAT-MCH-G4-HUB-EX** provides Fat Pipe Ethernet connections via a 10G or 40G infrastructure with up to 10GbE / 40GbE to each AMC and a front uplink with up to 2x 100G via QSFP-DD.

The single-width **NAT-MCH-G4-HUB-Px52** offers PCIe Gen4 x4 to all 12 AMCs (or x8 for up to six AMCs) as well as a PCIe Gen4 x4 uplink via QSFP at the front.

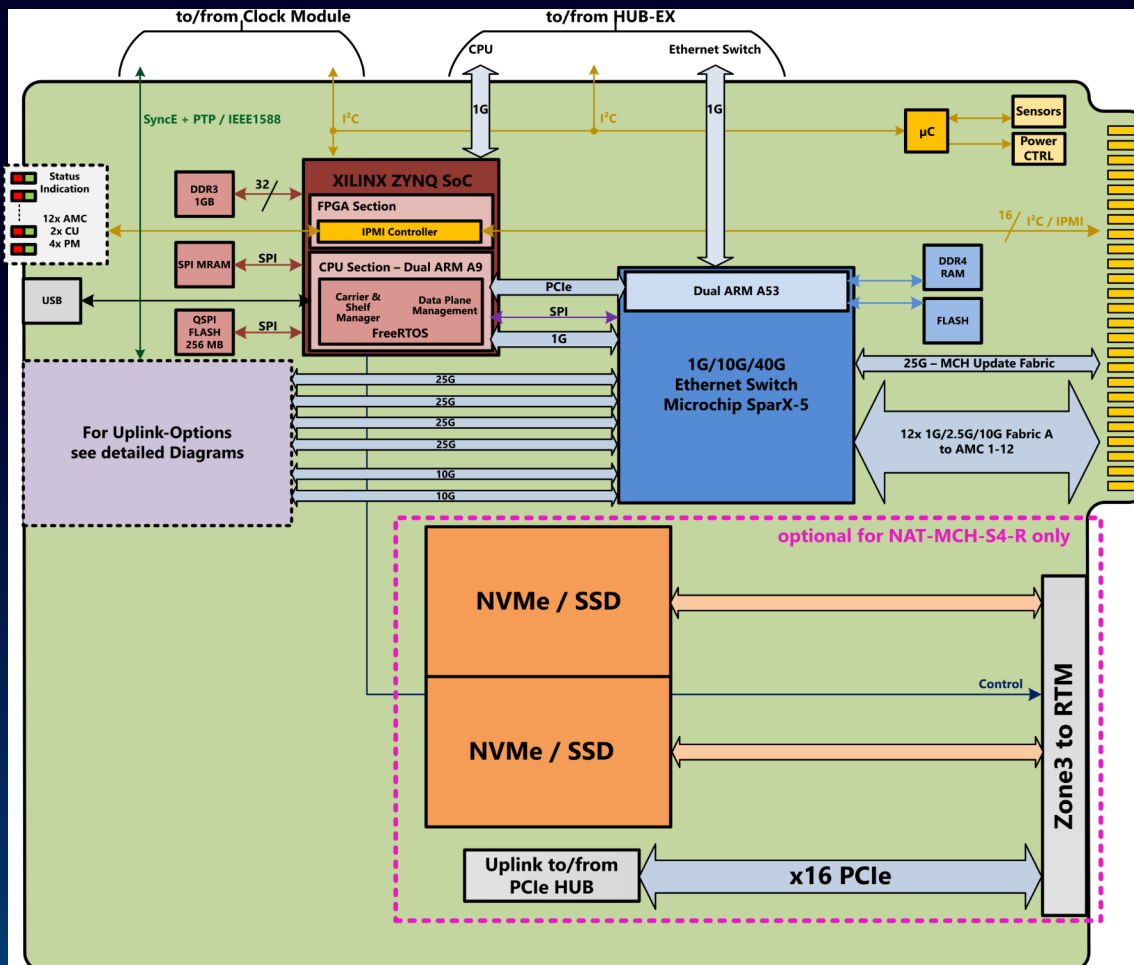
The double-width **NAT-MCH-G4-HUB-Px84** provides two QSFP-DD PCIe Gen4 x8 front uplinks; both interfaces can be combined to one PCIe Gen4 x16 uplink. In combination with the **NAT-MCH-S4-R**, the **NAT-MCH-G4-HUB-Px84** offers a PCIe Gen5 x16 connection to an optional RTM.

Base Board Variants

NAT-MCH-G4



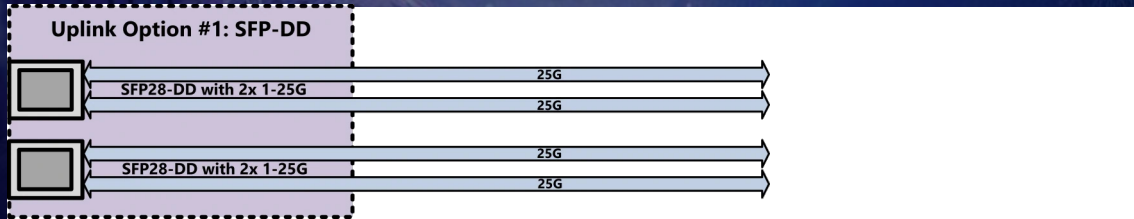
NAT-MCH-S4





Base Ethernet Uplink Options

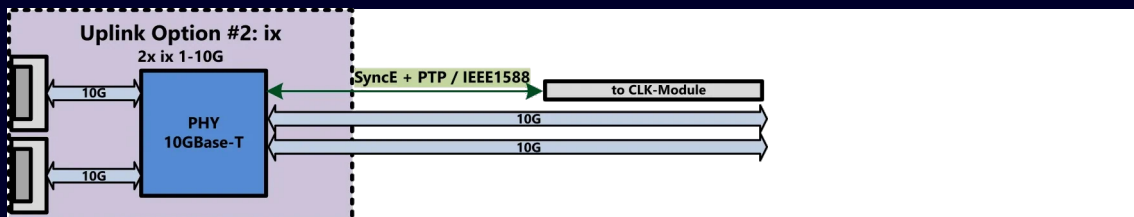
Option #1: SFP (-DD)



By featuring two rows of electrical pins instead of one, the SFP-DD (double density) cage and receptacle offer doubled port density and increased data transfer rates within a small form factor. Data rates up to 25G per port are supported, which result in 4x 25G in total. Please consider, that these ports cannot be combined to one port.

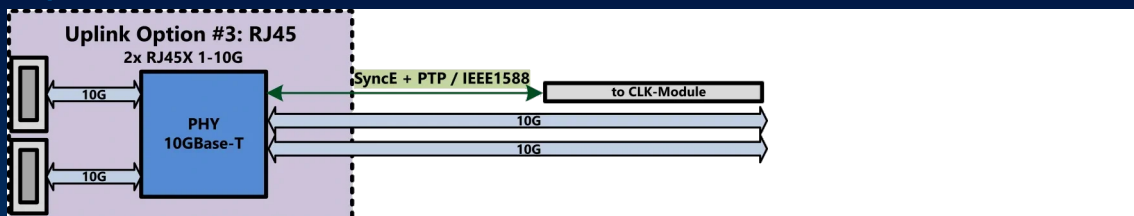
Nevertheless, the SFP-DD cages offer backwards compatibility to existing SFP receptables.

Option #2: ix



The ix connector is a robust alternative to the common RJ45 connector. It requires much less space, and at the same time ensures a more reliable connection by two metal hooks snapping into the socket. It supports transmission rates up to 10G.

Option #3: RJ45

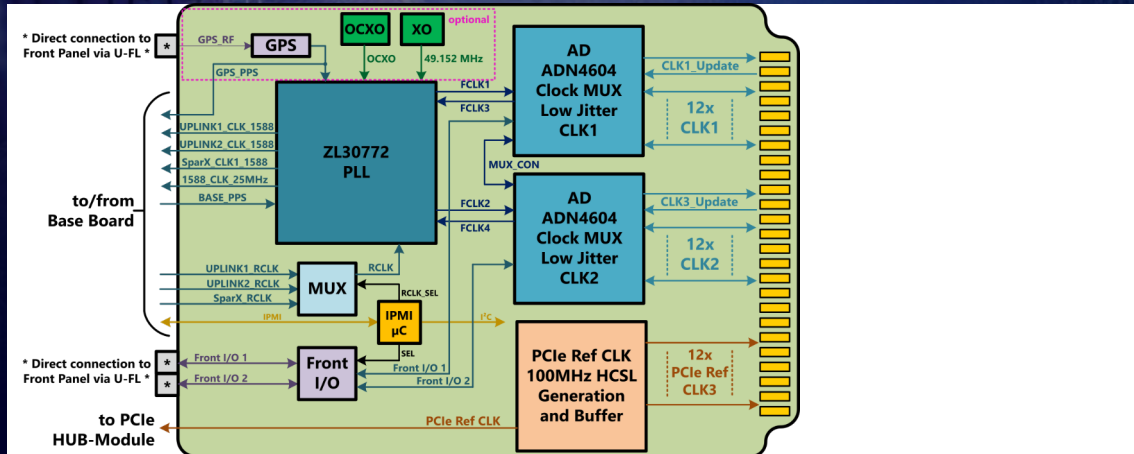


The RJ45 connector is a well-established Ethernet interface standard, supporting data rates up to 10G.



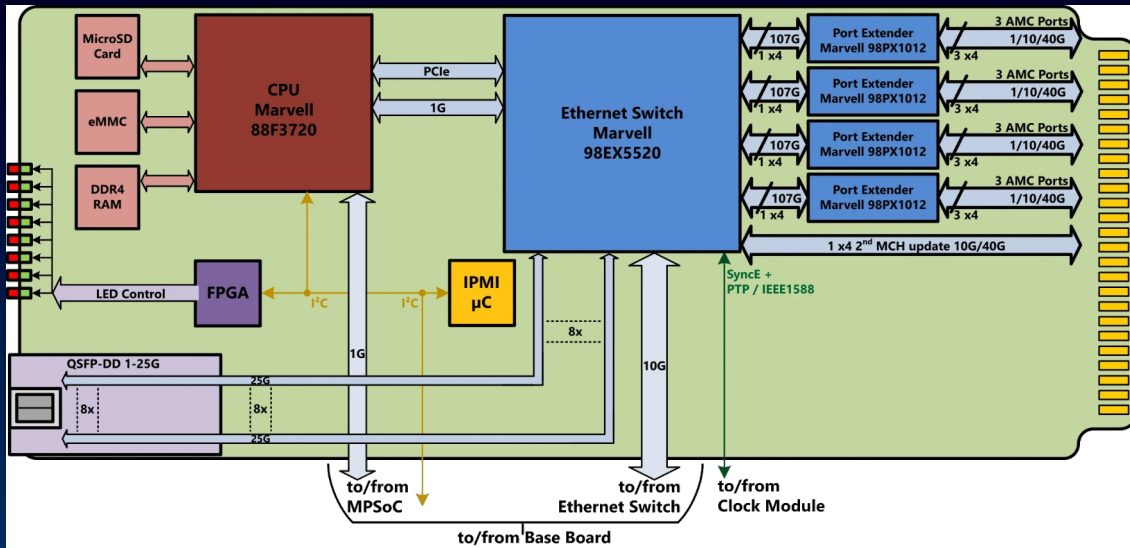
Clock Module

NAT-MCH-G4-CLKP



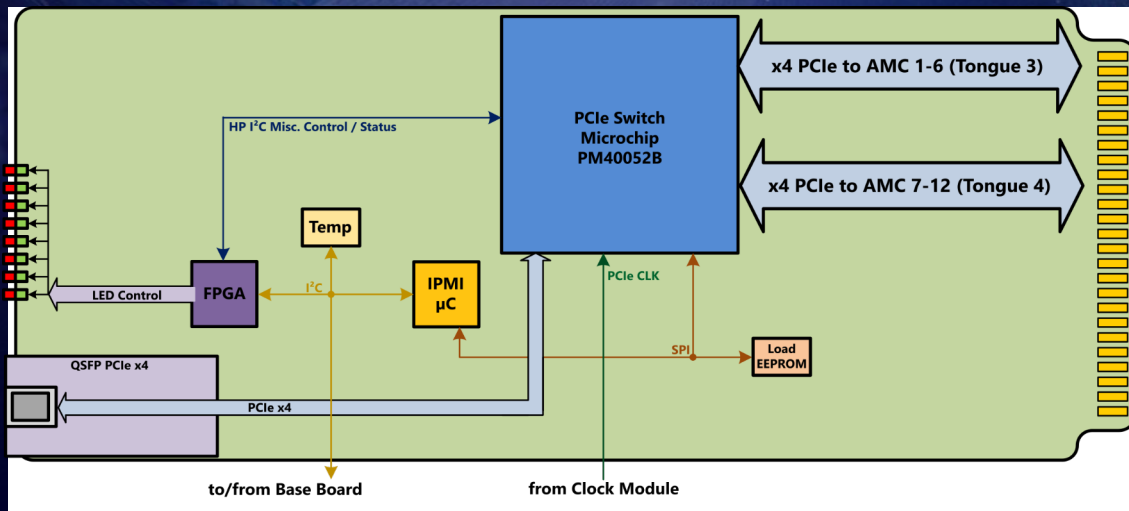
HUB Module Variants

NAT-MCH-G4-HUB-EX

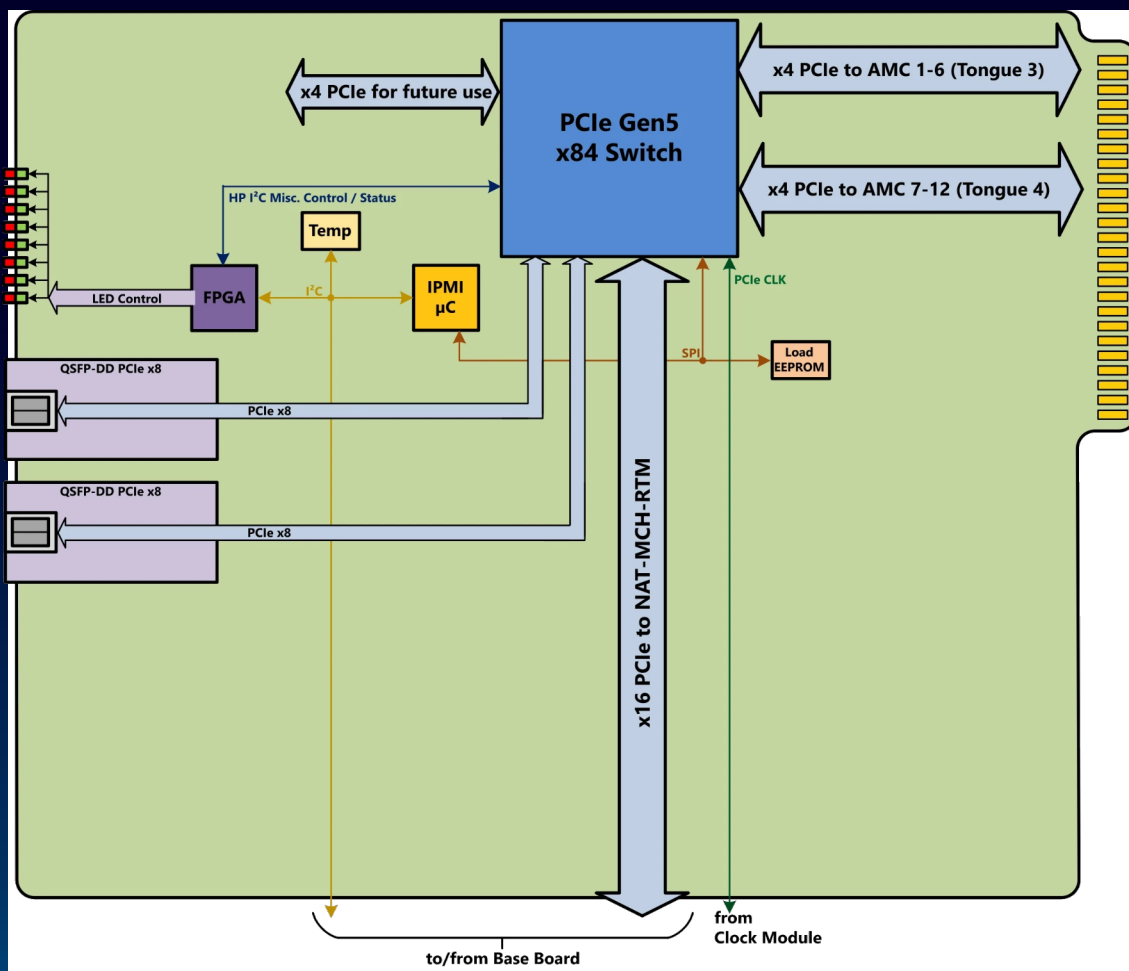




NAT-MCH-G4-HUB-Px52



NAT-MCH-G4-HUB-Px84



Key Features

NAT-MCH-G4

- Single-width, full-size MCH
- Xilinx Zynq MPSoC with FPGA / 2x ARM A9
- 1 GB DDR3 RAM
- 256 MB QSPI FLASH
- IPMI Functionality via FPGA Section
- Console via USB
- 16 LEDs reflecting AMC / CU / PM status
- Software / Firmware: FreeRTOS
- Compliance to MTCA.0, AMC.0, AMC.1, AMC.2, AMC.3, AMC.4, IPMI V1.5, HPM.1, CE, RoHS, REACH
- Microchip SparX-5 Base Ethernet Switch
- Uplink variants (assembly options):
 - 1-25G optical Base Ethernet via SFP-28-DD
 - 1-10G Base Ethernet via ix or RJ45
- Backplane:
 - Up to 12x 1GbE / 2.5GbE / 10GbE
 - 10G uplink to Fat Pipe Ethernet switch
 - 25G update fabric to 2nd NAT-MCH-G4

NAT-MCH-S4

- Double-width, full-size MCH
- Optional Zone3 connector for NAT-MCH-RTM
- Mounting space for NVMe / SSD memory devices

NAT-MCH-G4-CLKP

- CLK1 / CLK2 (MLVDS):
2x ADN4605 cross-point mux
- CLK3: PCIe Ref CLK (HCSL) on request
- PLL synthesizer for any frequency operation
- IEEE1588 and Synchronous Ethernet support
- CLK IN / OUT via SMA
- optional GPS IN via SMC
- CLK1 - CLK3 (MLVDS):
3x ADN4605 cross-point mux
- PLL synthesizer for any frequency operation
- IEEE1588 and Synchronous Ethernet support
- CLK IN / OUT via SMA
- optional GPS IN via SMC

NAT-MCH-G4-HUB-EX

- Dual A53 Marvell 88F3720 CPU
- Marvel 98EX5520 Ethernet Switch
- 1x Front Uplink via QSFP-DD with 8x 1-25G
 - 2 x4 ports with up to 100GbE
 - 8 x1 ports with up to 25GbE
- Backplane:
 - 12 x4 ports each 40GbE
 - 12 x4 ports each 10GbE (XAUI)
 - 4 x1 ports with 1-10G to each AMC
 - Any combination possible
- 10GbE / 40GbE update to 2nd NAT-MCH-G4 (no XAUI)

NAT-MCH-G4-HUB-Px52

- Microchip PFX PCIe x52 Gen4 Switch
- 1x Front panel uplink via
1x QSFP (PCIe Gen4 x4)
- Backplane PCIe Gen4 options:
 - 12x PCIe x4
 - 6x PCIe x8 if supported by backplane

NAT-MCH-G4-HUB-Px84

- Microchip PFX PCIe x84 Gen5 Switch
- 2x Front panel uplink
2x QSFP-DD (PCIe Gen4 x8)
- Backplane PCIe Gen5 options:
 - 12x PCIe x4
 - 6x PCIe x8 if supported by backplane
- PCIe Gen5 x16 to RTM via NAT-MCH-S4