Ultra Hardware Platform

Network Cabling Guide

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1. Overview

The Ultra Hardware Platform is composed of modules for compute, cache, and capacity. Compute modules contain the ethernet network ports and the configurations vary depending on the compute module.

Compute Module	High Speed Ports	Management Ports	IPMI Ports
Ultimate	6 x 100G QSFP28	2 x 1/10GBASE-T RJ45	1 x 1GBASE-T RJ45
Optimum	4 x 100G QSFP28	2 x 1/10GBASE-T RJ45	1 x 1GBASE-T RJ45
Momentum	4 x 100G QSFP28	2 x 1/10GBASE-T RJ45	1 x 1GBASE-T RJ45

2. High-speed port to switch connections

The Ultra Hardware Platform provides high speed 100G ports in the compute modules which can be connected to network switches in a variety of ways and speeds. Each high speed port supports 1/10/25/40/50/100 GbE speeds. Because the physical connection of the port remains the same QSFP form factor, a transceiver adapter may be required to step down to lower speeds to remain compatible with the switch side.

Transceivers and fiber cabling are purchased separately. Make sure the fiber cabling and connectors match the intended transceivers. The high-speed port transceiver and the switch port transceiver must also match.

Direct Attach Copper (DAC) cables are the most cost effective high-speed cables. They are limited in length and often used for in-rack connectivity. 100GbE DACs often range from 0.5 to 5 meters (1.6 to 16 feet).

Active Optical Cable (AOCs) can reach longer distances than DACs. However, if the AOC breaks, you must replace the whole cable instead of the individual component.

2.1. Connectivity to 100GbE switch ports

This is the recommended and most basic configuration between a compute module and a switch.

2.1.1. Transceivers

Use the following compatible options:

Type	Form factor	Connector	Max distance	Examples
100GbE SR4	QSFP28	MTP / MPO-12	100 Meters (OM4)70 Meters (OM3)MMF	NVIDIA MMA1B00-C100D Arista QSFP-100G-SR4
100GbE LR4	QSFP28	LC-LC	10 km SMF	NVIDIA MMA1L10-CR Arista QSFP-100G-LR4

2.1.2. DAC

Use the following compatible options:

Type	Connector	Cable	Max distance	Examples
DAC	QSFP28	Passive copper	5m (16ft)	NVIDIA MCP1600 Arista 100GBASE-CR4

2.1.3. AOC

Use the following compatible options:

Type	Connector	Cable	Max distance	Examples
AOC	QSFP28	OM4	100m (328ft)	NVIDIA MFA1A00 Arista AOC-Q-Q-100G-xM

2.2. Connectivity to 40GbE switch ports

40GbE switch ports use the QSFP+ standard instead of the QSFP28 standard.

2.2.1. Transceiver

Use the following compatible options:

Type	Form factor	Connector	Max distance	Examples
40GbE SR4	QSFP+	MTP / MPO-12	150 Meters (OM4)100 Meters (OM3)MMF	NVIDIA MMA1B00-B150D Arista 40GBASE-SR4
40GbE LR4	QSFP+	LC-LC	10 km SMF	NVIDIA MC2210511-LR4 Arista 40GBASE-LR4

2.2.2. DAC

Use the following compatible options:

Type	Connector	Cable	Max distance	Examples
DAC	QSFP+	Passive copper	5m (16ft)	NVIDIA MC2210128 Arista 40GBASE-CR4

2.2.3. AOC

Use the following compatible options:

Type	Connector	Cable	Max distance	Examples
AOC	QSFP+	OM4	100m (328ft)	NVIDIA MC2210310 Arista 40GBASE-AOC

3. High-speed port step-down options

In addition to 100GbE and 40GbE speeds that use the QSFP form factor, the Ultra Hardware Platform compute modules can support other speeds, such as 25GbE and 10GbE. To step down these speeds requires additional physical adapters. The tables below show options to step down speeds from the compute module ports.

IMPORTANT
Consult with your OpenDrives' account team to ensure that the stepped down speed will support the overall bandwidth required for your specific workflows.

3.1. 25GbE transceiver

This setup requires:

- QSFP28 to SFP28 adapter
- 25G optical transceiver or DAC cable

Ultra port → QSFP28 Adapter → SFP28 Transceiver → LC OM3/OM4 Multimode Cable → SFP28 Transceiver → 25G Switch

or

Ultra port → QSFP28 Adapter → 25G DAC cable → 25G Switch

3.1.1. QSFP28 to SFP28

Use the following compatible adapters:

Type	Connector	Examples
Adapter	QSFP28	NVIDIA MAM1Q00A-QSA28

3.1.2. Transceivers

Use the following compatible options:

Type	Form Factor	Connector	Max Distance	Examples
25GbE SR	SFP28	LC-LC	100 Meters (OM4)70 Meters (OM3)MMF	NVIDIA MMA2P00-AS Arista 25GBASE-SR
25GbE LR	SFP28	LC-LC	10 km SMF	NVIDIA MMA2L20-AR Arista 25GBASE-LR

3.1.3. DAC

Use the following compatible options:

Type	Connector	Cable	Max Distance	Examples
DAC	SFP28	Passive Copper	5m (16ft)	NVIDIA MCP2M00-A0 Arista 25GBASE-CR

3.2. 10GbE transceiver

This setup requires:

- QSFP+ to SFP+ adapter
- 10G optical transceiver or DAC cable

Ultra Port → QSFP+ Adapter → SFP+ Transceiver → LC OM3/OM4 Multimode Cable → SFP+ Transceiver → 10G Switch

or

Ultra Port → QSFP+ Adapter → 10GbE DAC cable → 10G Switch

3.2.1. QSFP+ to SFP+

Use the following compatible adapters:

Type	Connector	Examples
Adapter	QSFP+	NVIDIA MAM1Q00A-QSA

3.2.2. Transceivers

Use the following compatible options:

Type	Form Factor	Connector	Max Distance	Examples
10GbE SR	SFP+	LC-LC	400 Meters (OM4) 300 Meters (OM3)MMF	NVIDIA MFM1T02A-SR Arista 10GBASE-SR
10GbE LR	SFP+	LC-LC	10 km SMF	NVIDIA MFM1T02A-LR Arista 10GBASE-LR

3.2.3. DAC

Use the following compatible options:

Type	Form Factor	Connector	Max Distance	Examples
DAC	SFP+	Passive Copper	5m (16ft)	NVIDIA MC3309124-005FS P/N: SFPP-PC05

3.3. 10GBASE-T

We recommend using optical connectivity and cabling when possible. Optical connectivity uses less power and has lower latency over copper. However, in situations where optical connectivity is not possible, it can be converted to an RJ45 connection for 10GbE over CAT 6a or higher speed ethernet cable.

Ultra Port → QSFP+ Adapter → 10GBASE-T Transceiver → Ethernet Cable → 10G Copper Switch

3.3.1. QSFP+ to SFP+

Use the following compatible adapters:

Type	Connector	Examples
Adapter	QSFP+	NVIDIA MAM1Q00A-QSA

3.3.2. Transceivers

Use the following compatible transceivers:

Brand	Part
Cisco	SFP-10G-T-X
FS	SFP-10G-T

4. Management ports

Ultra Hardware Platform management ports are recommended for use as management, administration, or high availability heartbeat ports. However, they can access the network shares and filesystem data as well. To achieve connectivity at 10GbE speed, a CAT 6a, CAT 7, or higher rated ethernet cable must be used. These cables can operate up to a maximum distance of 100 meters (328 feet).