



QUANTUM

24 April 2023

QUANTUM MAESTRO

Getting Started Guide

Table of Contents

Introduction	4
Overview	4
Shipping Carton Contents	5
Features	6
Speed and Throughput	7
Ports, Power Supply Units, and Fan Units	7
Getting Started with MHO-140 - Single Site with Two Orchestrators	8
Part 1 - Installing the Hardware and Connecting Cables	8
Part 2 - Initial Configuration on each Orchestrator	12
Part 3 - Configuration of Security Groups	15
Part 1 - Creating a New Security Group	15
Part 2 - Configuring Gaia Settings on the New Security Group	16
Part 3 - Configuring a Security Gateway Object in SmartConsole	17
Part 4 - Monitoring the Security Group Members	17
Hardware Components	18
MHO-140 Front Panel	23
MHO-140 Rear Panel	24
Ports	25
Mounting the Quantum Maestro Orchestrator MHO-140 and MHO-170 in a Rack	29
Connecting Cables to Quantum Maestro Orchestrators	41
Splitting the Ports with Breakout Cables	41
Breakout Cables	41
MHO-175 Splitting Options	43
MHO-170 Splitting Options	46
MHO-140 Splitting Options	47
Single Site	48
Connecting Two Quantum Maestro Orchestrators for Redundancy	48
Diagram	48
Workflow	55
Connecting Cables to MHO-140	59
Connecting to the Management Ports with DAC or Fiber Cables	59
Connecting to the Uplink Ports with DAC or Fiber Cables	61
Connecting to the Uplink Ports with Breakout Cables	63

Connecting to the Downlink Ports with DAC or Fiber Cables	66
Quantum Maestro Orchestrator Ports and Gaia OS Interfaces	69

Introduction

In This Section:

Overview	4
Shipping Carton Contents	5
Features	6
Speed and Throughput	7
Ports, Power Supply Units, and Fan Units	7

Quantum Maestro Orchestrator is a scalable Network Security System built to secure the largest networks in the world by orchestrating multiple Check Point Security Appliances into a unified system.

The Quantum Maestro Orchestrator provides:

- Security of infinite scale
- Redundancy - Quantum Maestro Orchestrator automatically distributes traffic between the Security Appliances assigned to Security Groups
- Ability to connect more Security Appliances and use their resources easily in the existing Security Groups

Overview

Quantum Maestro Orchestrator 1U systems are ideal for leaf and spine data center network solutions that provide maximum flexibility, with port speeds from 1 Gbit/sec to 100 Gbit/sec per port, and port density that enables full rack connectivity to any server at any speed. The ports allow a variety of blocking ratios that suit all application requirements.

Quantum Maestro Orchestrator 1U systems enable the use of 1, 10, 40 and 100 GbE port speeds in a large scale without the need to change power infrastructure facilities.

Shipping Carton Contents

This section describes the contents of the shipping carton.

Table: Shipping Carton Contents

Item	Description
Appliance	Quantum Maestro Orchestrator
Rack Mounting Accessories	<ul style="list-style-type: none"> ▪ 2 static (fixed) rack mount rails ▪ 2 rack mount blades ▪ 2 rack mount ears ▪ 8 M6 standard cage nuts ▪ 8 M6 standard pan-head Phillips screws ▪ 4 flat head Phillips screws with a round patch (6-32x1/4", 100-Deg, Patch 360)
Cables and Adapters	<ul style="list-style-type: none"> ▪ 2 power cables (Type C13-C14) ▪ 2 cable retainers ▪ 1 DB9 to RJ45 serial console cable ▪ 1 DAC cable, 3m
Documentation	<ul style="list-style-type: none"> ▪ Quick Start Guide ▪ Port Mapping ▪ User license agreement

Notes:

- DB9 connectors are also known as DE9 connectors.
- Before installing your new Quantum Maestro Orchestrator, unpack it and check the parts list to make sure that all the parts are in the package.

Check the parts for visible damage that may have occurred during shipping.

Features

- Throughput and processing capacity:
 - MHO-175 - Throughput of up to 3200 Gbit/sec and processing capacity up to 4.76 Bpps
 - MHO-170 - Throughput of up to 3200 Gbit/sec and processing capacity up to 4.76 Bpps
 - MHO-140 - Throughput of up to 1280 Gbit/sec and processing capacity up to 2.97 Bpps
- Flat latency in the cut-through mode:
 - MHO-175 - 425 ns
 - MHO-170 - 300 ns
 - MHO-140 - 300 ns
- Speeds of 1, 10, 40, and 100 GbE
- Dynamically-shared, flexible packet buffering:
 - MHO-175 - 42 MB
 - MHO-170 - 16 MB
 - MHO-140 - 16 MB
- Lowest power, under 5 W per 100 GbE port
- Enhanced scalability
- 1+1 hot-swappable power supplies
- 4 N+1 hot-swap fans
- Color coded PSUs and fans

Speed and Throughput

The table below lists maximum throughput and interface speed for each Quantum Maestro Orchestrator model:

Orchestrator Model	10 GbE SFP28 Interfaces	40 / 100 GbE QSFP28 Interfaces	Maximal Throughput
MHO-175	128 (use QSFP to SFP breakout cables)	32	3.2 Tbit/sec
MHO-170	64 (use QSFP to SFP breakout cables)	32	3.2 Tbit/sec
MHO-140	Total 64 48 SFP+ 8 QSFP28 (use QSFP to SFP breakout cables)	8	1.28 Tbit/sec

Quantum Maestro Orchestrator supports different interfaces and speed rates when you use QSFP to SFP adapters, or hybrid cables. For more information, see ["Splitting the Ports with Breakout Cables" on page 41](#).

Ports, Power Supply Units, and Fan Units

Orchestrator Model	MGMT Ports	USB Ports	Console Ports	PSUs	Fans
MHO-175	1 on the front panel	1 on the front panel	1 on the front panel	2 units	4 units
MHO-170	1 on the front panel	1 on the front panel	1 on the front panel	2 units	4 units
MHO-140	2 on the rear panel	1 on the rear panel	1 on the rear panel	2 units	4 units

Getting Started with MHO-140 - Single Site with Two Orchestrators

Part 1 - Installing the Hardware and Connecting Cables

1. Mount the two Quantum Maestro Orchestrators MHO-140 in the racks on the site.
See "[Mounting the Quantum Maestro Orchestrator MHO-140 and MHO-170 in a Rack](#)" on page 29.
2. Install the Security Appliances for your Security Groups.

Procedure

- a. Install the applicable Expansion Line Cards (if required) in the appliances.
See [Installing and Removing Line Cards](#).
Maestro configuration supports only ports 10 Gbps or faster.
 - b. Mount appliances in their racks.
See the *Getting Started Guide* for your appliances in [sk96246](#).
 - c. Power on the Security Appliances.
3. Connect a DAC cable between the dedicated Synchronization ports **48** on the two Orchestrators.
For more information, see "[Port Mapping for the Quantum Maestro Orchestrator MHO-140](#)" on page 20.

- Connect the required cables between the Security Appliances and the applicable 10 Gbps Downlink ports 27 - 47 on each Orchestrator.

More information



Important:

- Maestro configuration supports only ports 10 Gbps or faster on Security Appliances.
- To connect Security Appliances to these 10 Gbps Downlink ports, use a Fiber cable or a DAC cable.
- To connect Fiber cables, you must use only the supported transceivers. See [sk92755 - Compatibility of transceivers for Check Point appliances](#).

See:

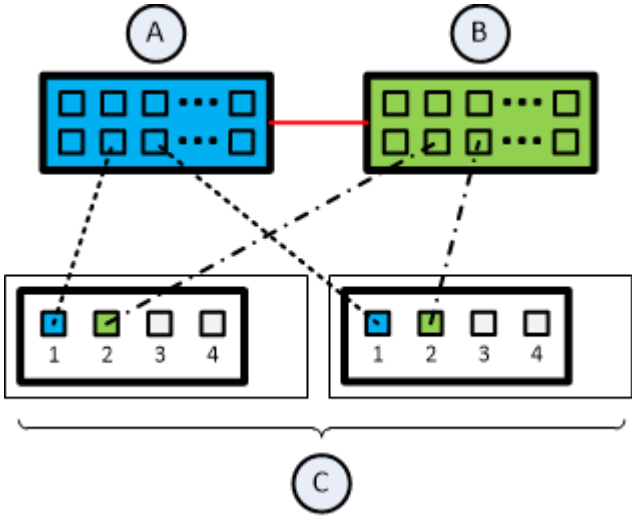
- ["Port Mapping for the Quantum Maestro Orchestrator MHO-140" on page 20.](#)
- ["Connecting Two Quantum Maestro Orchestrators for Redundancy" on page 48.](#)

Diagrams:

Connecting cables between Downlink ports on each Orchestrator and 2 ports on the Dual Port Card on each Security Appliance

Illustration	Instructions
<p>The diagram illustrates the connection between two Orchestrators (A and B) and two Security Appliances (C). Orchestrator A is represented by a blue box with a grid of ports, and Orchestrator B is a green box. A red line connects a port on A to a port on B. Below them are two Security Appliance boxes, each labeled 'C' and containing two ports labeled '1' and '2'. Dashed lines indicate connections from Orchestrator A to port 1 of the first Security Appliance and from Orchestrator B to port 2 of the second Security Appliance.</p>	<p>On each Security Appliance (C) in the Security Group:</p> <ol style="list-style-type: none"> Connect a cable from Port 1 on the Dual Port Card to a Downlink port on the first Orchestrator (A). Connect a cable from Port 2 on the Dual Port Card to a Downlink port on the second Orchestrator (B).

Connecting cables between Downlink ports on each Orchestrator and 1 out of 4 ports on the Quad Port Card on each Security Appliance

Illustration	Instructions
 <p>The diagram illustrates the connection between two orchestrators (A and B) and two security appliances (C). Orchestrator A is represented by a blue box with two rows of four ports each. Orchestrator B is represented by a green box with two rows of four ports each. A red cable connects a downlink port on Orchestrator A to Port 1 on the Quad Port Card of the first Security Appliance (C). A green cable connects a downlink port on Orchestrator B to Port 2 on the Quad Port Card of the second Security Appliance (C). The Quad Port Cards are shown as boxes with four ports labeled 1, 2, 3, and 4. The Security Appliances are grouped together under the label C.</p>	<p>On each Security Appliance (C) in the Security Group:</p> <ol style="list-style-type: none">Connect a cable from Port 1 on the Quad Port Card to a Downlink port on the first Orchestrator (A).Connect a cable from Port 2 on the Quad Port Card to a Downlink port on the second Orchestrator (B).

Connecting cables between Downlink ports on each Orchestrator and 2 out of 4 ports on the Quad Port Card on each Security Appliance

Illustration	Instructions
	<p>Important - In R80.20SP, this connection method is supported only with the R80.20SP Jumbo Hotfix Accumulator (Take 105 and above) installed on Orchestrators and Security Groups.</p> <p>On each Security Appliance (C) in the Security Group:</p> <ol style="list-style-type: none"> Connect a cable from Port 1 on the Quad Port Card to a Downlink port on the first Orchestrator (A). Connect a cable from Port 3 on the Quad Port Card to a Downlink port on the first Orchestrator (A). Connect a cable from Port 2 on the Quad Port Card to a Downlink port on the second Orchestrator (B). Connect a cable from Port 4 on the Quad Port Card to a Downlink port on the second Orchestrator (B).

Legend

Item	Description
A	First Orchestrator.
B	Second Orchestrator.
C	Security Appliances in Security Groups.
—	A DAC cable connected to the dedicated Synchronization ports on the Orchestrators.
-----	Cables that connect odd ports on the Quad Port Card to the first Orchestrator.
- - - - -	Cables that connect even ports on the Quad Port Card to the second Orchestrator.

- Connect the required cables between the applicable Uplink ports **5 - 26**, **49 - 55** on each Orchestrator and your switches.

More information



Important - To connect Fiber cables, you must use only the supported transceivers. See [sk92755 - Compatibility of transceivers for Check Point appliances](#).

See:

- "[Port Mapping for the Quantum Maestro Orchestrator MHO-140](#)" on page 20
- "[Connecting to the Uplink Ports with DAC or Fiber Cables](#)" on page 61
- "[Connecting to the Uplink Ports with Breakout Cables](#)" on page 63

Port Speed on a Switch	Port Type on the Orchestrator	Cable to Use
10 Gbps	SFP+ / SFP28 Ports 5 - 26	Fiber or DAC
40 Gbps	QSFP / QSFP28 Ports 49 - 55	Fiber, DAC, or Breakout
100 Gbps	QSFP / QSFP28 Ports 49 - 55	Fiber, DAC, or Breakout

- Power on each Orchestrator.

See "[Step 7: Initial Power On](#)" on page 40.

Part 2 - Initial Configuration on each Orchestrator



Note - It is important in which order you configure the Orchestrators. The first Orchestrator you configure becomes the "first" Orchestrator on this Site. It synchronizes the configuration to the "second" Orchestrator on this Site.

Procedure

- Connect the included Ethernet cable from your computer to the MGMT port labeled **0** on the rear panel of the Orchestrator #1.

See "[MHO-140 Rear Panel](#)" on page 24.

You use this MGMT port only to manage the Orchestrator.

2. On your computer, configure a static IP address (see the documentation for your operating system):
 - a. IP address - between 192.168.1.2 and 192.168.1.254
 - b. Subnet mask - 255.255.255.0
 - c. Default Gateway - empty
 - d. DNS Servers - empty
3. Open an SSH client and connect to this IP address - 192.168.1.1
4. Log in to Gaia Clish on the Orchestrator #1 with these default credentials:
 - Username - `admin`
 - Password - `admin`



Best Practice - Change the default password.

If the SSH connection is interrupted after the password change, log in again with the new password.

More information

See the Gaia Administration Guide for your Orchestrator version:

- [R81.20 Gaia Administration Guide](#)
- [R81.10 Gaia Administration Guide](#)
- [R80.20SP Quantum Maestro Gaia Administration Guide](#)

5. Activate the Orchestrator #1 - enter "y" when it asks you.

More information

This Orchestrator activation enables the Downlink ports and the Uplink ports.

For more information, see [sk171784 - Activation of a Quantum Maestro Orchestrator](#).

6. Configure the IPv4 settings on the MGMT port on the Orchestrator #1 as required in your network.

Procedure

- a. Configure the required IPv4 address and Mask Length:

```
set interface Mgmt1 ipv4-address <IPv4 Address> mask-length
<Length>
```

Example:

```
set interface Mgmt1 ipv4-address 192.168.10.22 mask-length 24
```

- b. Change the state of the MGMT port to "on":

```
set interface Mgmt1 state on
```

- c. Configure the required Default Gateway:

```
set static-route default nexthop gateway address <IPv4
Address> on
```

Example:

```
set static-route default nexthop gateway address 192.168.10.1
on
```

- d. Save the configuration:

```
save config
```

7. Connect the MGMT port of the Orchestrator #1 to your network.
8. Make sure the connection from a computer on your network to Orchestrator #1 works.

More information

With a web browser, connect to this URL:

```
https://<IPv4 Address you configured on the MGMT port>
```

Example:

```
https://192.168.10.22
```

Notes:



- There is no Gaia First Time Configuration Wizard on Orchestrators.
- You do **not** need to install a license on Orchestrators.

9. Repeat Steps 1 - 8 for the Orchestrator #2.

You must configure a different IPv4 address than that of the Orchestrator #1.

Part 3 - Configuration of Security Groups

Follow the **Getting Started Guide** section in the Maestro Administration Guide for your version:

- [R81.20 Quantum Maestro Administration Guide](#)
- [R81.10 Quantum Maestro Administration Guide](#)
- [R81 Quantum Maestro Administration Guide](#)
- [R80.30SP Quantum Maestro Administration Guide](#)
- [R80.20SP Quantum Maestro Administration Guide](#)

THIS INFORMATION WILL BE ADDED TO THE MAESTRO ADMIN GUIDE FOR EACH VERSION

Part 1 - Creating a New Security Group

1. Connect with a web browser to Gaia Portal on the "first" Orchestrator.

```
https://<IPv4 Address you configured on the Orchestrator MGMT port>
```

Example:

```
https://192.168.10.22
```

2. Log in.
3. From the left navigation panel, click **Orchestrator**.

More information

The **Topology** section contains the table that shows these sections (from left to right):

Pane	Description
Unassigned Gateways	All detected Security Appliances that are not part of configured Security Groups.
Topology	Configured Security Groups with their assigned Security Appliances and ports.
Unassigned Interfaces	All interfaces on Orchestrators that are not part of configured Security Groups.

4. In the middle pane **Topology**, at the top, right-click **Security Groups** and click **New Security Group**.
5. In the **Security Group <X> configuration** window, enter the required information, including the **First Time Wizard**, and click **OK**.
6. From the left pane **Unassigned Gateways**, drag and drop at least one Security Appliance to the Security Group's **Gateways** section.
7. From the right pane **Unassigned Interfaces**, drag and drop at least one Management port (**eth<X>-Mgmt<Y>**) to the Security Group's **Interfaces** section.

More information

See:

- ["Port Mapping for the Quantum Maestro Orchestrator MHO-140" on page 20](#)
- ["MHO-140 ports on the front panel and their default names in Gaia" on page 76](#)

8. From the right pane **Unassigned Interfaces**, drag and drop the required Uplink ports to the Security Group's **Interfaces** section.
9. At the bottom of this page, click **Apply**.
10. Wait for the Orchestrator to create the new Security Group.

This process takes approximately 10 minutes, and it automatically reboots the assigned Security Appliances.

11. Connect a cable between the assigned Management port (`eth<X>-Mgmt<Y>`) on the Orchestrator front panel and your switch.

More information

See:

- ["Port Mapping for the Quantum Maestro Orchestrator MHO-140" on page 20](#)
- ["Connecting to the Management Ports with DAC or Fiber Cables" on page 59](#)

Part 2 - Configuring Gaia Settings on the New Security Group

1. Connect with a web browser to Gaia Portal on the Security Group (through the assigned Management port `eth<X>-Mgmt<Y>`).

```
https://<IPv4 Address of Security Group>
```

Example:

```
https://192.168.10.66
```

2. Log in.
3. Configure the applicable interfaces and other settings.

More information

See the Gaia Administration Guide for your version:

- [R81.20 Gaia Administration Guide](#)
- [R81.10 Gaia Administration Guide](#)
- [R81 Gaia Administration Guide](#)
- [R80.30SP Quantum Maestro Gaia Administration Guide](#)
- [R80.20SP Quantum Maestro Gaia Administration Guide](#)

Part 3 - Configuring a Security Gateway Object in SmartConsole

1. Connect with SmartConsole to the applicable Security Management Server / Domain Management Server that must manage this Security Group.
2. Create a new Security Gateway and configure the required settings.
3. Configure the applicable rules in the Access Control Policy.
4. Configure the applicable rules in the Threat Prevention Policy.
5. Install the Access Control Policy on this Security Gateway object.
6. Install the Threat Prevention Policy on this Security Gateway object.

Part 4 - Monitoring the Security Group Members

1. Connect to the command line on the Security Group with an SSH client to:

```
<IPv4 Address of Security Group>
```

2. Run this command:

```
asg monitor
```

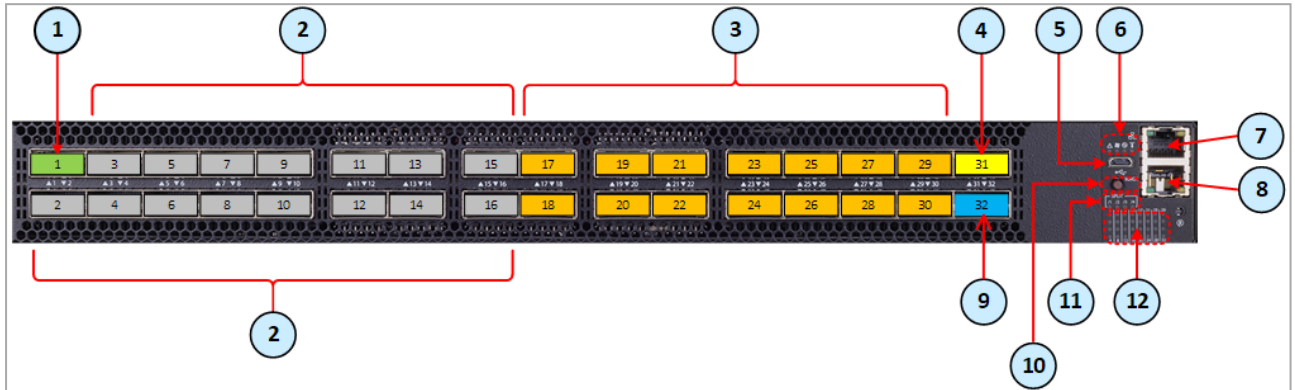
3. Wait for each Security Group Members to show its state as "ACTIVE".

This can take 6-7 minutes.

Hardware Components

This section provides a description of hardware components of Quantum Maestro Orchestrators.

Port Mapping for the Quantum Maestro Orchestrator MHO-175



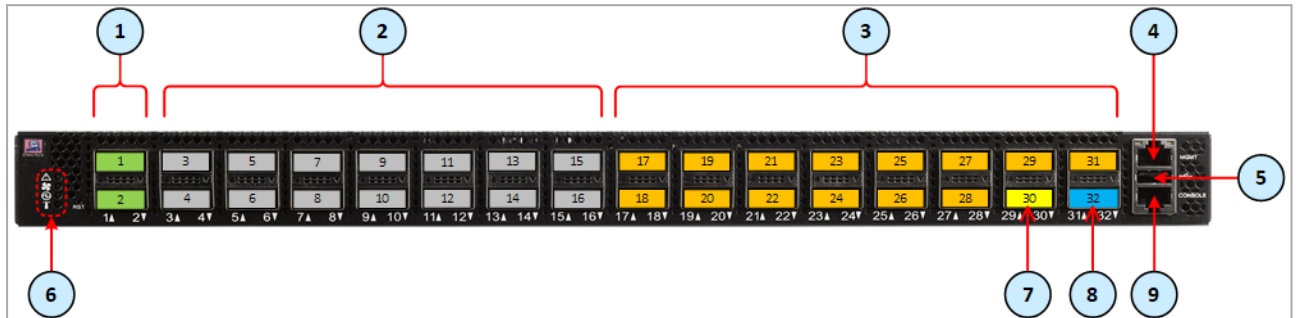
Legend

Item	Description	Item	Description
1	Port 1 is the Management port for Security Groups (leads to the Check Point Management Server)	7	Management port (Mgmt1) for the Gaia OS on the Orchestrator
2	Ports 2 - 16 are the Uplink ports 40 Gbps / 100 Gbps (lead to external and internal networks)	8	RJ45 port for Console connection
3	Ports 17 - 30 are the Downlink ports (lead to Security Appliances)	9	Port 32 is the Synchronization port on the same Site (leads to the peer Orchestrator on the same Site)
4	Port 31 is the Synchronization port in Dual Site (leads to the peer Orchestrator on another Site) In the Split mode, the 4th split is Sync and other splits are Downlinks	10	Button to select indication states for the splitting control LEDs
5	Micro USB 2.0 port	11	Splitting control LEDs that show the indication state for Port LEDs: <ul style="list-style-type: none"> ■ State of which port to show (without a split cable). ■ State of which split port to show (in 1-to-2 split, or 1-to-4 split).

Legend (continued)

Item	Description	Item	Description
6	System Health LEDs	12	Port LEDs that show the status of all ports (including the split ports)

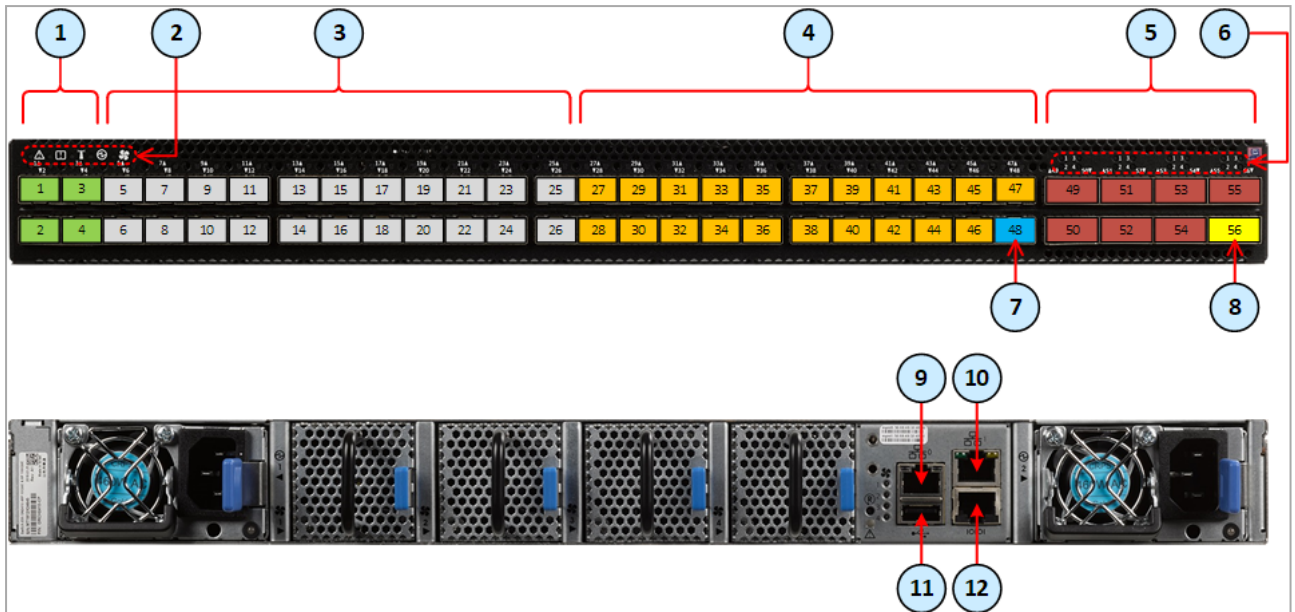
Port Mapping for the Quantum Maestro Orchestrator MHO-170



Legend

Item	Description	Item	Description
1	Ports 1 - 2 are the Management port for Security Groups (lead to the Check Point Management Server)	6	System Health LEDs
2	Ports 3 - 16 are the Uplink ports 40 Gbps / 100 Gbps (lead to external and internal networks)	7	Port 30 is the Synchronization port in Dual Site (leads to the peer Orchestrator on another Site)
3	Ports 17 - 29, and 31 are the Downlink ports (lead to Security Appliances)	8	Port 32 is the Synchronization port on the same Site (leads to the peer Orchestrator on the same Site)
4	Management port (Mgmt1) for the Gaia OS on the Orchestrator	9	RJ45 port for Console connection
5	USB 2.0 port		

Port Mapping for the Quantum Maestro Orchestrator MHO-140



Legend

Item	Description	Item	Description
1	Ports 1 - 4 are the Management port for Security Groups (lead to the Check Point Management Server)	7	Port 48 is the Synchronization port on the same Site (leads to the peer Orchestrator on the same Site)
2	System Health LEDs	8	Port 56 is the Synchronization port in Dual Site (leads to the peer Orchestrator on another Site)
3	Ports 5 - 26 are the Uplink ports 1 Gbps / 10 Gbps (lead to external and internal networks)	9	Management port (Mgmt1) for the Gaia OS on the Orchestrator
4	Ports 27 - 47 are the Downlink ports (lead to Security Appliances)	10	Management port (Mgmt2) for the Gaia OS on the Orchestrator
5	Ports 49 - 55 are the Uplink ports 40 Gbps / 100 Gbps (lead to external and internal networks)	11	USB 2.0 port
6	LEDs that show the state of the split ports when connecting Breakout cables	12	RJ45 port for Console connection

Changing the default type of an Orchestrator port

1. Connect to the command line on the first Orchestrator in your environment.
2. Log in to Gaia Clish.
3. If you connected a breakout cable to a port, then configure the applicable QSFP mode:

```
set maestro port <Port ID> qsfp-mode {1G | 10G | 4x10G | 40G | 100G}
```



Important:

- "<Port ID>" specifies the port to configure.
The format is three numbers separated with a slash:
<Orchestrator ID>/<Port Label on Front Panel>/<Port Split ID>
- On MHO-175 ports, you can configure only these modes:
 - 4x10G, 40G, or 100G
- On MHO-170 ports, you can configure only these modes:
 - Ports with odd <Port Label> numbers (1, 3, 5, and so on) - 4x10G, 40G, or 100G
 - Ports with even <Port Label> numbers (2, 4, 6, and so on) - 40G or 100G
- On MHO-140 ports, you can configure only these port modes:
 - Ports with the <Port Label> from 1 to 48 - 1G or 10G
 - Ports with the <Port Label> from 49, 51, 53, and 55 - 4x10G, 40G, or 100G
 - Ports with the <Port Label> from 50, 52, 54, and 56 - 40G or 100G

4. Configure the port type:

```
set maestro port <Port ID> type {downlink | uplink | management | site_sync}
```



Important:

- On MHO-175, you can configure only these port types:
 - Port 1 only as `management` or as `downlink`
 - Ports 2 and higher only as `uplink`, `downlink`, `site_sync`, or `ssm_sync` (for intra-site sync redundancy)
- On MHO-170, you can configure only these port types:
 - Port 1 and Port 2 only as `management` or as `downlink`
 - Ports 3 and higher only as `uplink`, `downlink`, `site_sync`, or `ssm_sync` (for intra-site sync redundancy)
- On MHO-140, you can configure only these port types:
 - Ports 1 - 4 only as `management` or as `downlink`
 - Ports 5 and higher only as `uplink`, `downlink`, `site_sync`, or `ssm_sync` (for intra-site sync redundancy)
- You cannot change the type of the dedicated Internal Synchronization port:
 - MHO-175 - Port 32
 - MHO-170 - Port 32
 - MHO-140 - Port 48

5. Save the configuration:

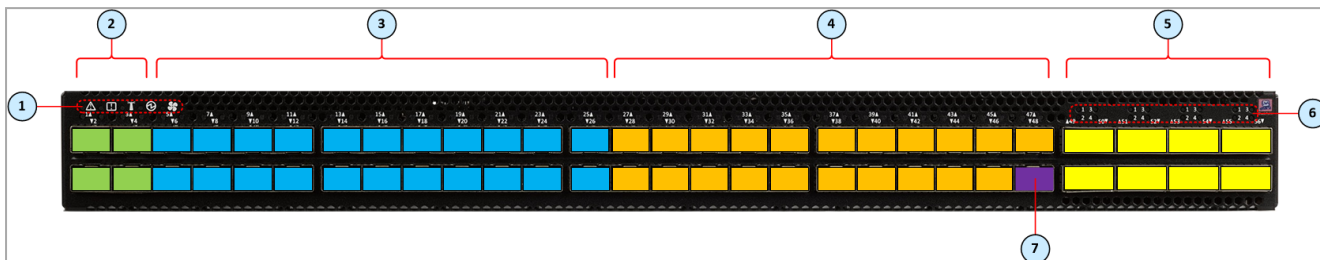
```
save config
```

6. Examine the port configuration:

```
show maestro port <Port ID> qsfp-mode
```

```
show maestro port <Port ID> type
```

MHO-140 Front Panel



Important - This section describes the default configuration. It is possible to change the port type (Management, Uplink, and Downlink) in the Gaia Operating System on the Quantum Maestro Orchestrator. See the [Maestro Administration Guide for your version](#) > Chapter *Configuring Security Groups* > Section *Configuration Procedure* > Section *Configuring Security Groups in Gaia Clish* > Section *Configuring the Port Settings*.

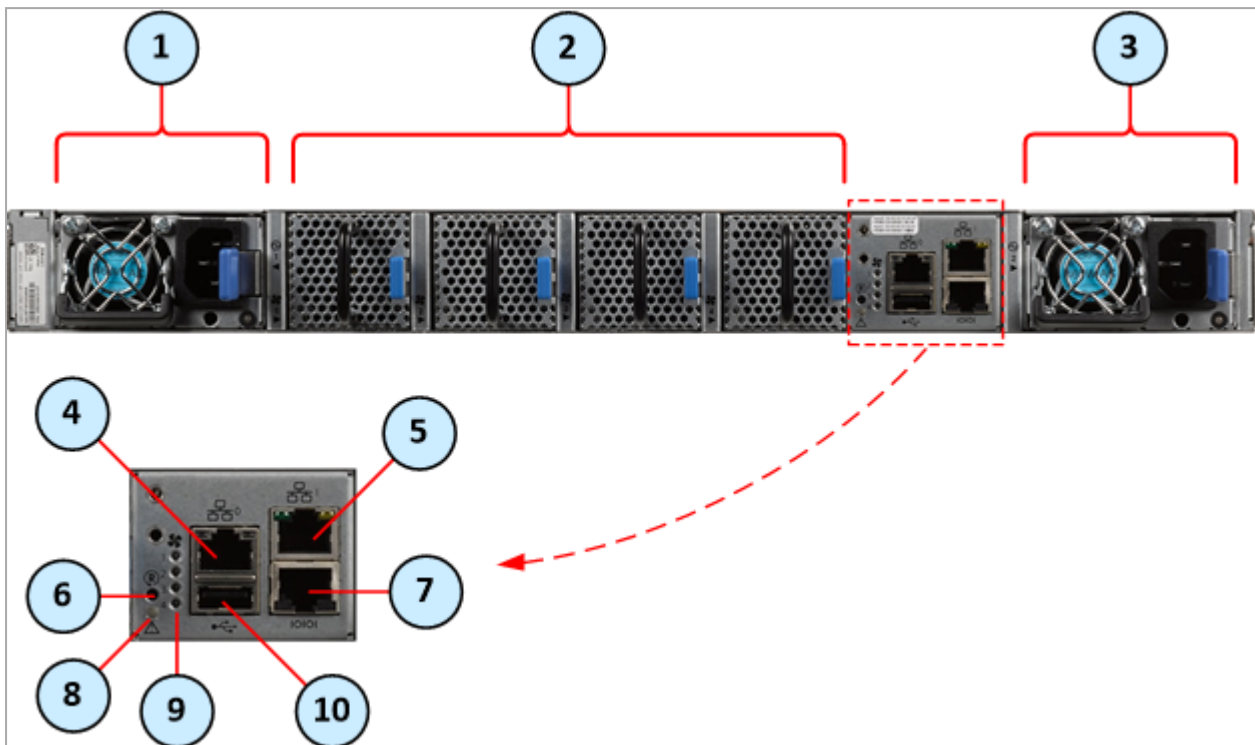
Item	Description
1	LEDs. See LEDs .
2	Ports from 1 to 4 (colored green), through which you manage the Security Groups. To these ports you connect: <ul style="list-style-type: none"> Check Point Management Servers. Clients, from which you connect to the Gaia Operating System (Gaia Portal and Gaia Clish) on the Security Appliances connected to the Downlink ports (4).
3	1 Gbps / 10 Gbps Uplink ports 5 to 26 (colored blue). To these ports you connect your external traffic and internal traffic networks. You use DAC or Fiber cables (with transceivers).
4	Downlink ports 27 to 47 (colored orange). To these ports you connect your Check Point Security Appliances. You use DAC or Fiber cables (with transceivers).
5	40 Gbps / 100 Gbps Uplink ports 49 to 56 (colored yellow). To these ports you connect your external traffic and internal traffic networks. You use DAC or Fiber cables (with transceivers).
6	LEDs that show the state of the split interfaces when you connect with Breakout cables to the 40 / 100 GbE Uplink ports (5).
7	Synchronization port 48 (colored purple). You connect a DAC cable between ports 48 on two Quantum Maestro Orchestrators MHO-140 for redundancy on the same site.

Notes:



- It is possible to connect DAC or Fiber cable (with transceivers) to each port (from 1 to 56).
- It is possible to connect Breakout cables only to the top ports 49, 51, 53, and 55. In this case, the bottom ports 50, 52, 54, and 56 are disabled. See ["MHO-140 Splitting Options" on page 47](#).

MHO-140 Rear Panel



Item	Description
1	First Power Supply Unit. See Replacing Power Supply Units .
2	Fan Units 1, 2, 3 and 4 (from left to right). See Replacing Fan Units .
3	Second Power Supply Unit. See Replacing Power Supply Units .
4	RJ45 port labeled 0 , through which you configure the Gaia Operating System on the Quantum Maestro Orchestrator (Gaia Portal and Gaia Clish).
5	RJ45 port labeled 1 , through which it is also possible to configure the Gaia Operating System on the Quantum Maestro Orchestrator (Gaia Portal and Gaia Clish).
6	Reset button labeled R . See Reset Button .
7	RJ45 port with the label CONSOLE . See "Console Port" on page 28 . To this port you connect a client, from which you connect to the Gaia Operating System on the Quantum Maestro Orchestrator (in Gaia Clish).
8	System Status LED .
9	Fan Status LED .
10	USB 2.0 port. See "USB Port" on page 27 .

For more information about the RJ45 ports labeled **0** and **1**, see ["MGMT Ports" on page 25](#).

Ports

This section described different hardware ports.

MGMT Ports

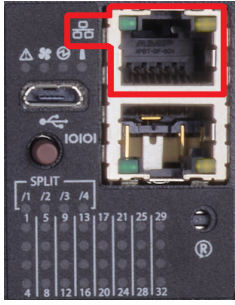

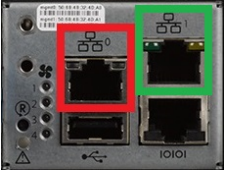
The RJ45 Ethernet ports with the label **MGMT** or  provide access to the Gaia OS on the Quantum Maestro Orchestrator.

By default, this port is configured with these settings:

- IP address 192.168.1.1 and Net Mask 255.255.255.0
- Auto-negotiation capabilities (100 MbE to 1 GbE)

Notes:

- For more information, see the:
 - [Quantum Maestro Quick Start Guide for MHO-175 and MHO-140.](#)
 - [Quantum Maestro Quick Start Guide for MHO-170 and MHO-140.](#)
- In MHO-140, the second **MGMT** port is not configured with an IP address.
- To change the default IP address:
 1. Connect to the Quantum Maestro Orchestrator over the RJ45 console port.
 2. Log in to Gaia Clish.
 3. Configure the applicable IPv4 settings on the interface `Mgmt1`.
In MHO-140, the interface `Mgmt2` is optional.
- Make sure to use only FCC-compliant Ethernet cables.

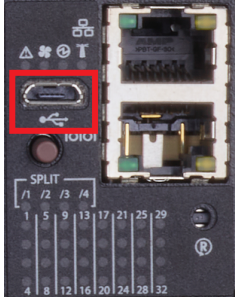

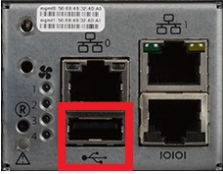
Orchestrator Model	Location of the MGMT Port	
	On the front panel	On the rear panel
MHO-175		N / A
MHO-170		N / A
MHO-140	N / A	

USB Port

The USB interface is USB 2.0 compliant (USB 1.0 is not supported).

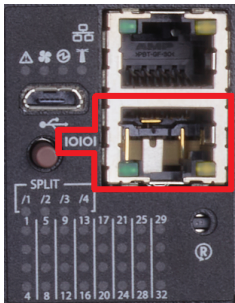

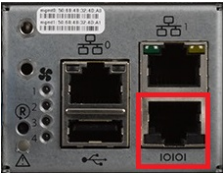
It is possible to connect to this interface an external USB storage device for software upgrade or file management.

Do not use excessive force, when inserting or removing the USB storage device to and from the connector.

Orchestrator Model	Location of the USB Port	
	On the front panel	On the rear panel
MHO-175		N / A
MHO-170		N / A
MHO-140	N / A	

Console Port

The port with the label **IOIOI** or **CONSOLE** is an RJ45 console port that provides access to the Gaia OS on the Quantum Maestro Orchestrator.

Orchestrator Model	Location of the RS232 (Console) Port	
	On the front panel	On the rear panel
MHO-175		N / A
MHO-170		N / A
MHO-140	N / A	

You use this port for initial configuration and debugging.

Use a Terminal application, such as PuTTY, SecureCRT, MobaXterm, and so on.

Use these settings to connect a PC to the RJ45 console port:

Parameter	Setting
Baud Rate	9600
Data bits	8
Stop bits	1
Parity	None
Flow Control	None

Mounting the Quantum Maestro Orchestrator MHO-140 and MHO-170 in a Rack

This section provides the information necessary to mount the Quantum Maestro Orchestrator MHO-140 or MHO-170 in a rack.

Installation and Initialization

Installation and initialization of the Quantum Maestro Orchestrator requires attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment.



Important:

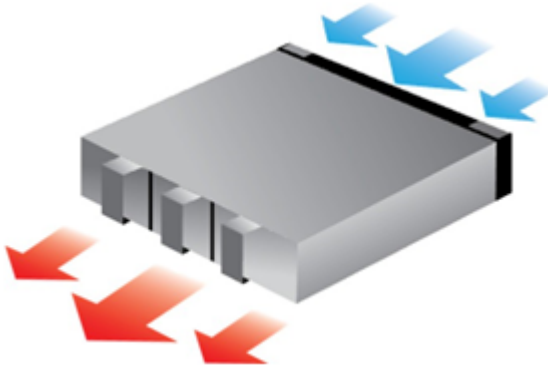
- The rack mounting holes conform to the EIA-310 standard for racks with length 50-60 cm (19.7-23.6 inches).
Take precautions to guarantee proper ventilation to maintain good airflow at ambient temperature.
- Unless otherwise specified, Check Point products are designed to work in an environmentally controlled data center with low levels of gaseous and dust (particulate) contamination.

The installation procedure for the Quantum Maestro Orchestrator involves these phases:

Phase	Instructions
1	Make sure that none of the shipping carton contents is missing or damaged. See "Shipping Carton Contents" on page 5 .
2	Follow the Safety Warnings .
3	Pay attention to the airflow consideration within the Quantum Maestro Orchestrator and rack. See "Airflow in MHO-170 and MHO-140" on the next page .
4	Mount the Quantum Maestro Orchestrator into a rack enclosure. See "Static Rail Kit for MHO-170 and MHO-140" on the next page .
5	Power on the Quantum Maestro Orchestrator. See "Step 7: Initial Power On" on page 40 .

Airflow in MHO-170 and MHO-140

The fan units in the Quantum Maestro Orchestrator generate the airflow from the front panel (intake) to the rear panel:



Important:

- All systems in the same rack should be planned with the same airflow direction.
- All fan units in the same rack need to have the same air flow direction. A mismatch in the air flow affects the heat dissipation in the rack.

Static Rail Kit for MHO-170 and MHO-140

The Quantum Maestro Orchestrators are sold with the static rail kit.

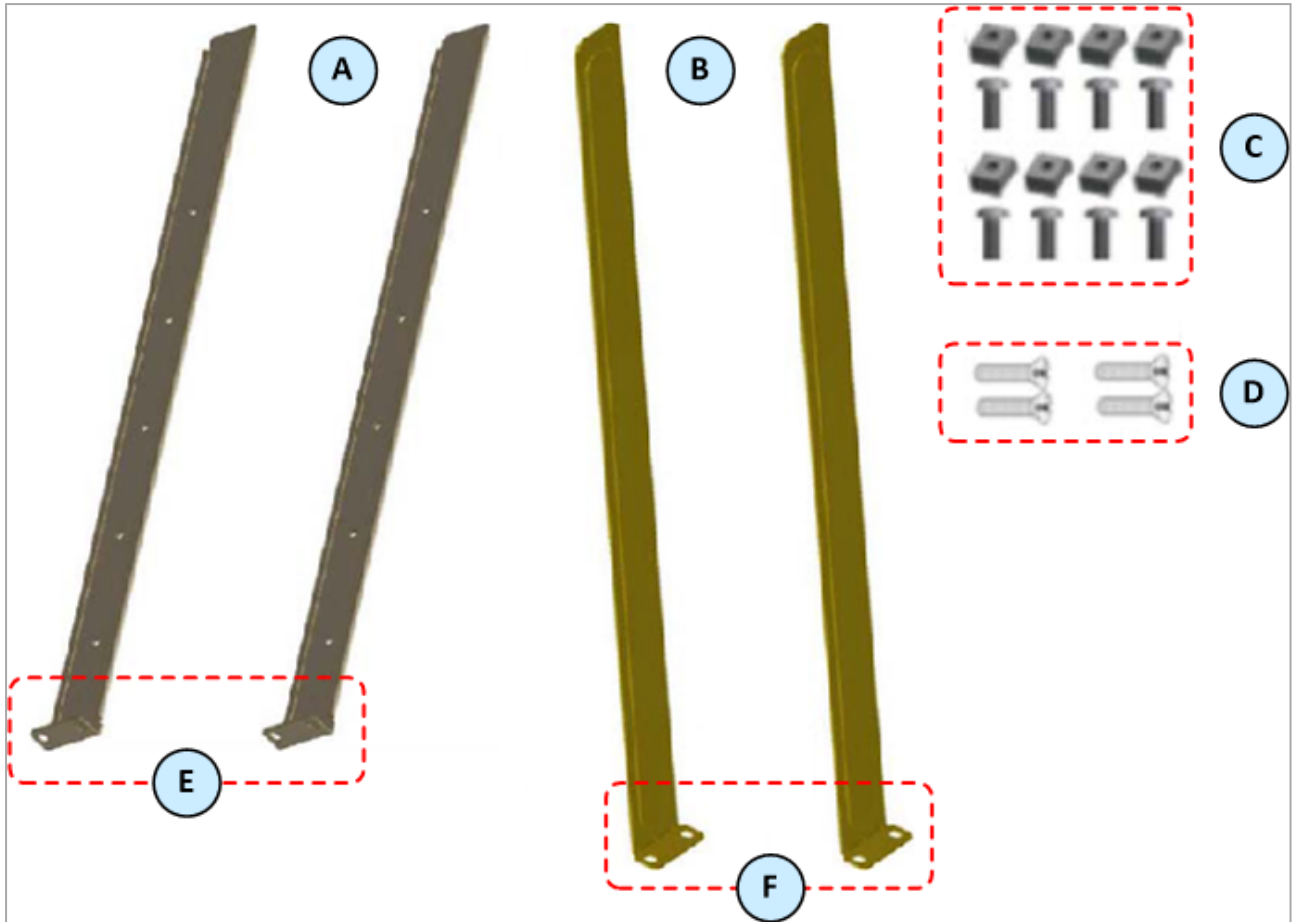


Important - At least two people are required to mount the Quantum Maestro Orchestrator safely in the rack.

Installation Rail Kit:

Rack Size and Rack Depth Range	Comments
60 to 80 cm (23.6 - 31.5 inches)	When installed in the rack before shipping
61 to 86.3 cm (24 - 34 inches)	When installed in the rack at the customer site

Parts in the static rail kit:



Legend

Item	Description
A	2 x Rack mount rails
B	2 x Rack mount blades that slide into the rack mount rails (A)
C	8 x M6 standard cage nuts, and 8 x M6 standard Phillips pan-head screws
D	4 x Phillips flat-head screws with a round patch, Head 100 Degree, Type I, Size 6-32, Length 1/4 inch
E	Rack mount rail ears
F	Rack mount blade ears

Notes:

- You use the Phillips flat head screws (**D**) to secure the rack mount rails (**A**) to the Quantum Maestro Orchestrator.

You must use at least two of these screws on each side.

- You use the cage nuts and Phillips pan-head screws (**C**) to secure the rack mount rail ears (**E**) to the rack.
- You use the cage nuts and Phillips pan-head screws (**C**) to secure the rack mount blade ears (**F**) to the rack.

Before you mount the Quantum Maestro Orchestrator to the rack, plan the way you wish to place it:

Pay attention to the airflow within the rack cooling, connector, and cabling options.

While you plan how to place the Quantum Maestro Orchestrator, review these points:

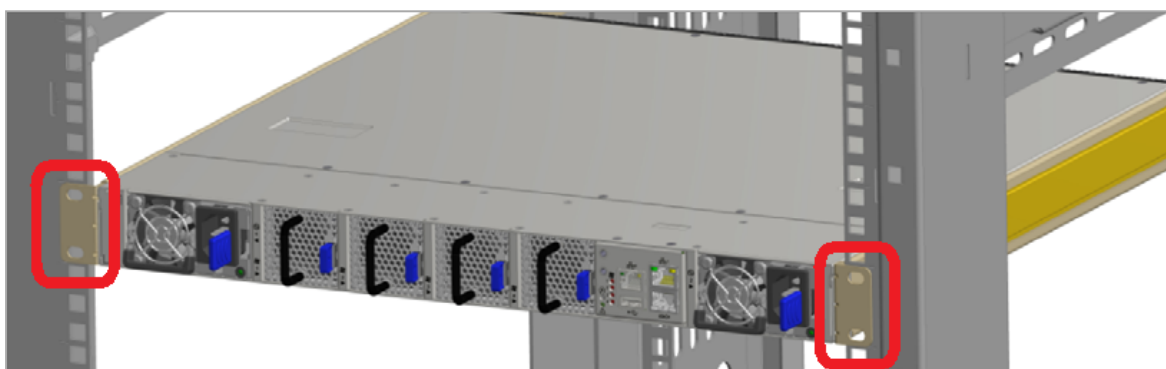
- Make sure the Quantum Maestro Orchestrator air flow is compatible with your installation selection.

It is important to keep the airflow within the rack in the same direction.

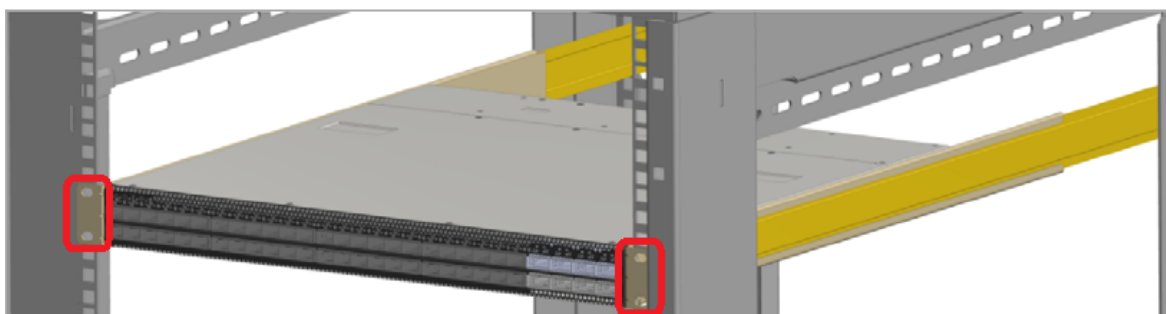
- Note that the part of the Quantum Maestro Orchestrator, to which you choose to attach the rails, determines the Quantum Maestro Orchestrator's adjustable side.

The Quantum Maestro Orchestrator's part, to which the blades are attached, should be adjacent to the cabinet.

Installation Option 1 - Attaching the mount rail ears (E) near the rear panel



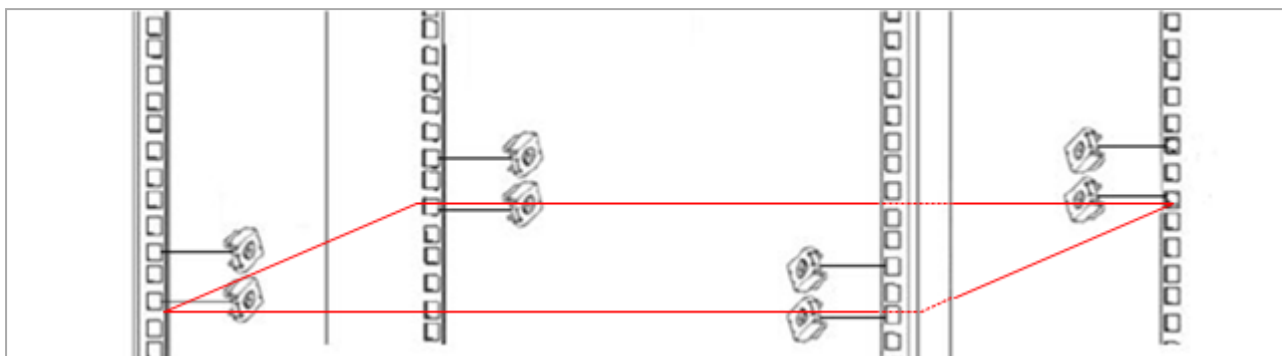
Installation Option 2 - Attaching the mount rail ears (E) near the front panel



- In case there are cables that cannot bend within the rack, or in case more space is needed for cable bending radius, it is possible to recess the connector side or the rear panel side by 8.9 cm (3.5 inches), by optional placement of the Quantum Maestro Orchestrator's rails.
- If you mount the rack blades as depicted in *Installation Option 2* above, it lets you slide the PSUs and Fan Units in and out easier.

Step 1: Installing the Cage Nuts

Install eight cage nuts (C) in the desired 1U slots of the rack.



Notes:


- The red frame on the image denotes the Quantum Maestro Orchestrator inside the rack.
- Install four cage nuts on each side of the Quantum Maestro Orchestrator.
- Each rack 1U (unit) consists of three holes.

Install the cage nuts vertically, so that its ears engage the top and bottom holes only.

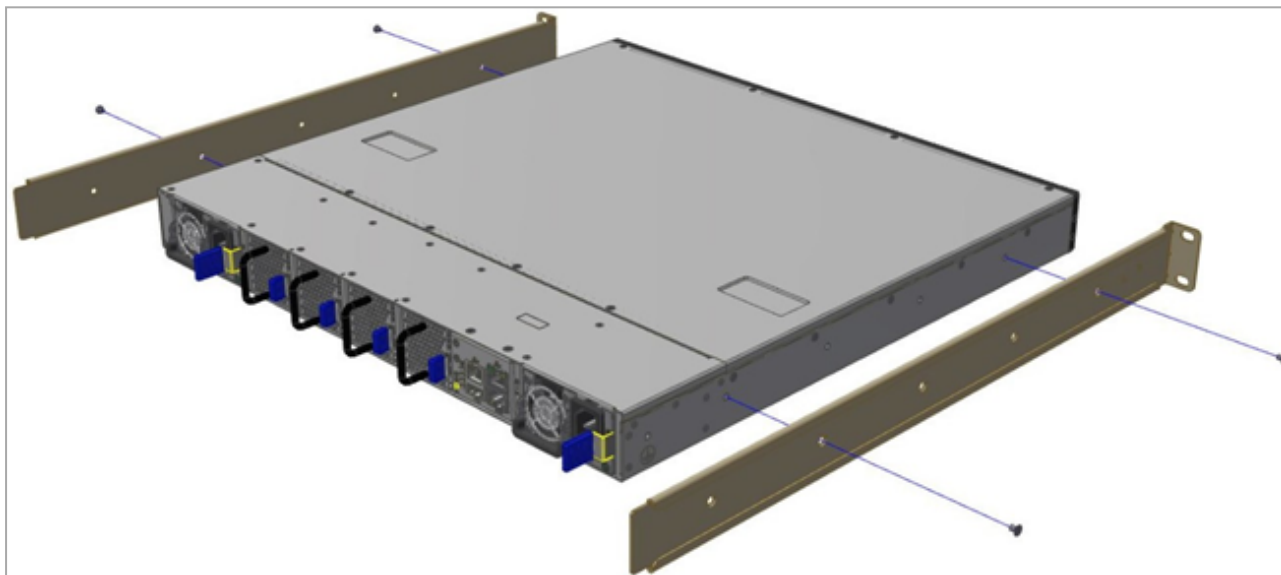
Example:



Step 2: Attaching the Rack Mount Rails

Step	Instructions
1	Attach the left and right rack mount rails (A) to the left and right sides of the Quantum Maestro Orchestrator.
2	Use the Phillips flat-head screws (D) to secure each rack mount rail (A) to each side of the Quantum Maestro Orchestrator.  Important - You must use at least two of these screws on each side.
3	Tighten the screws with a torque of 1.5 ± 0.2 Nm.

Example (the mount rail ears are near the front panel):

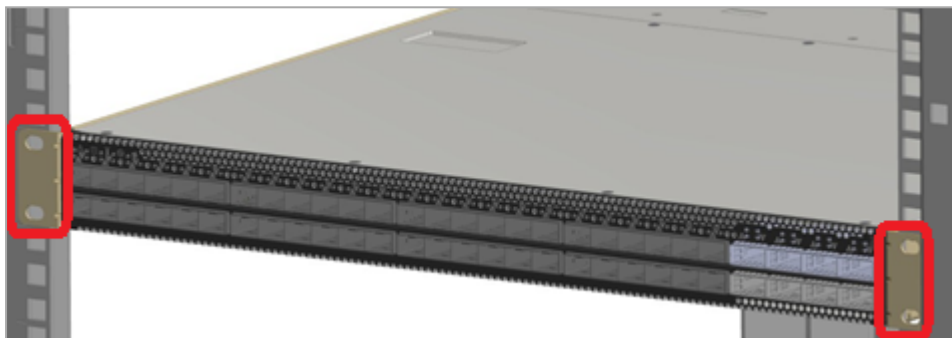


Step 3: Attaching the Rack Mount Rails to the Rack

While your installation partner is supporting the Quantum Maestro Orchestrator, perform these steps:

Step	Instructions
1	Mount the Quantum Maestro Orchestrator into the rack enclosure.
2	Attach the mount rail ears (E) to the rack's posts at the level of the designated cage nuts.
3	Secure the mount rail ears (E) to the rack's posts with four Phillips pan-head screws (C) in the designated cage nuts.
4	Do not tighten the screws yet.

Example:

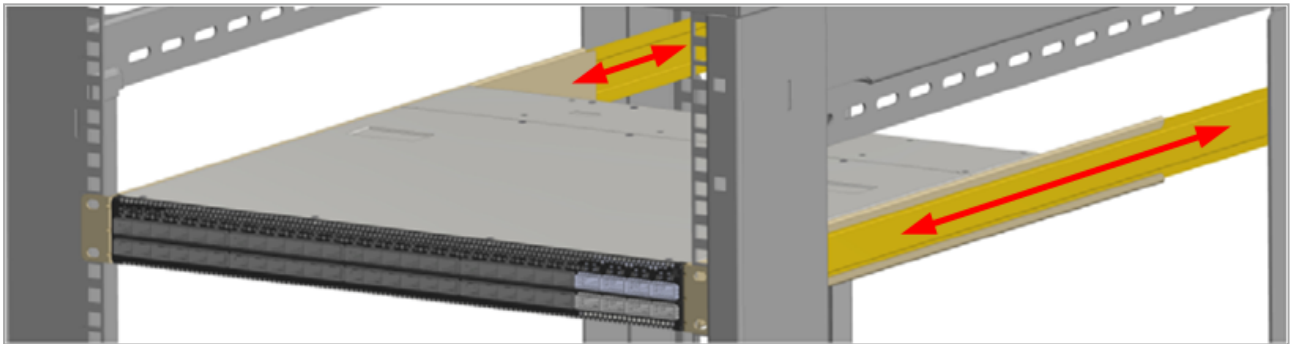


Step 4: Sliding the Blades in the Rails

While your installation partner is supporting the Quantum Maestro Orchestrator, perform these steps:

Step	Instructions
1	Slide each rack mount blade (B) into the corresponding rack mount rail (A). Note - Make sure the mount blade ears (F) face the rack's posts correctly.
2	Slide the rack mount blades (B) inside the rack mount rails (A) to fit your rack's depth.
3	Attach the mount blade ears (F) to the rack's posts.
4	Use the four Phillips pan head screws (C) to secure each mount blade ear (F) to each side of the rack.
5	Do not tighten the screws yet.

Example:



Step 5: Tightening the Screws

While your installation partner is supporting the Quantum Maestro Orchestrator, tighten the eight Phillips pan-head screws (**C**) you inserted in the previous steps.

To tighten the screws, use a torque of 4.5 ± 0.5 Nm.

Step 6: Cable Installation

It is possible to insert or remove all network cables while the Quantum Maestro Orchestrator is powered on.

To insert a cable, press the connector into the port receptacle until the connector is firmly seated. The LED indicator, corresponding to each data port, light up when the physical connection is established. When a logical connection is made, the relevant port LED lights up.

To remove a cable, disengage the locks and slowly pull the connector away from the port receptacle. The LED indicator for that port turns off, when the cable is unplugged.

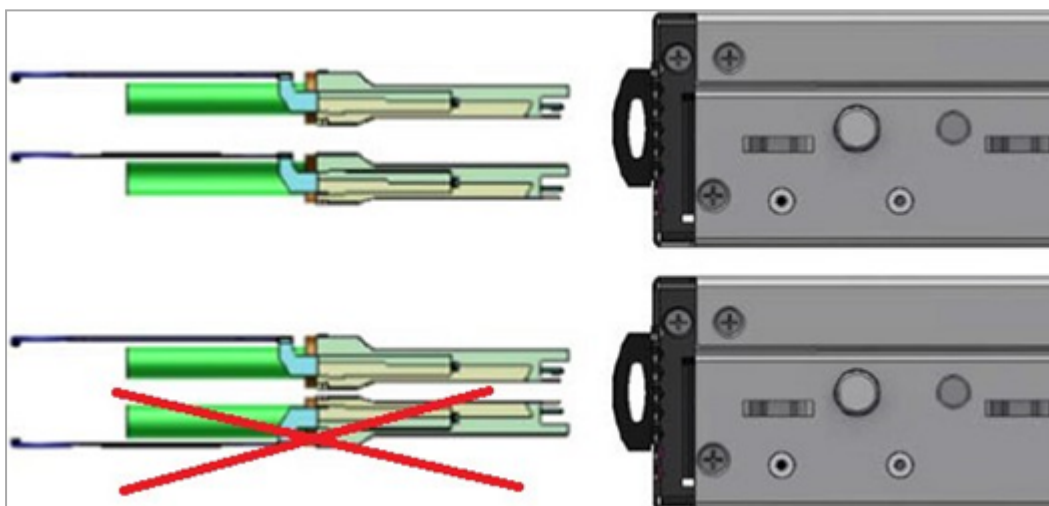


Note - For more information about Port LEDs, see [Port LEDs](#).

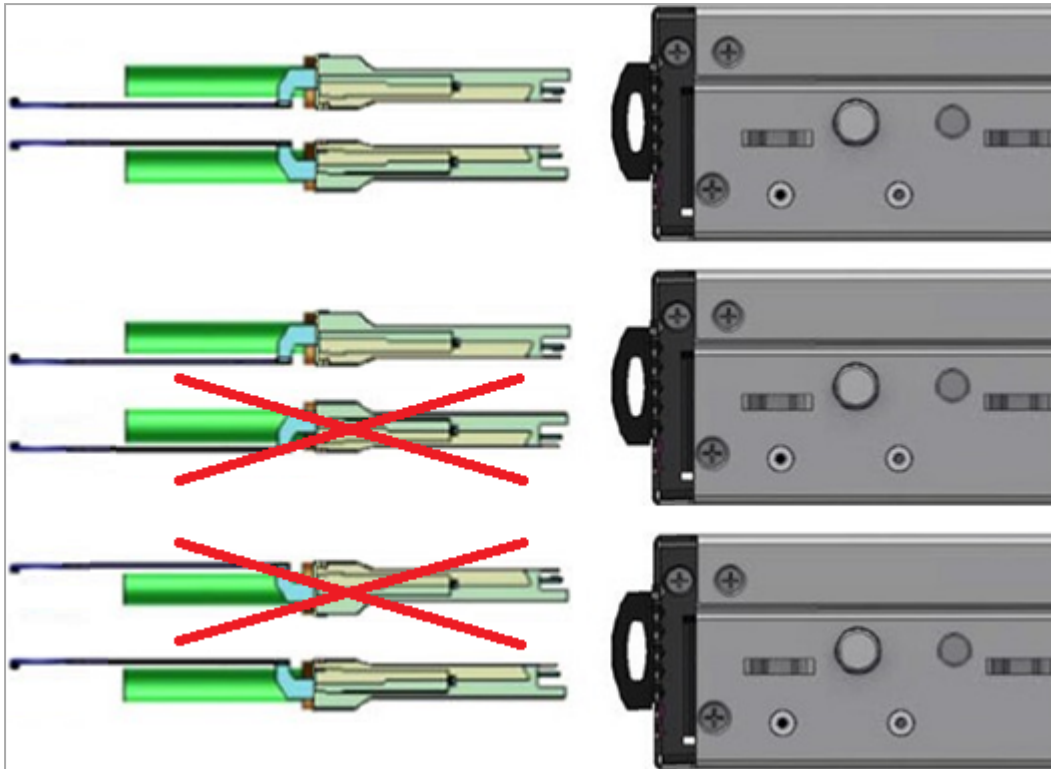
Do not force the cable into the cage with more than 40 Newtons (4 kilogram-force / 9.0 pound-force). Greater insertion force may damage the cable, or the cage.

The MHO-170 and MHO-140 include ports of different types. The two images below for cable orientation do not apply to the SFP28 ports.

MHO-170 Cable Orientation



MHO-140 Cable Orientation

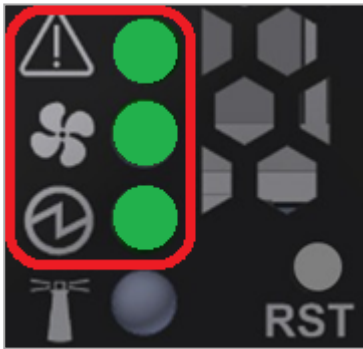

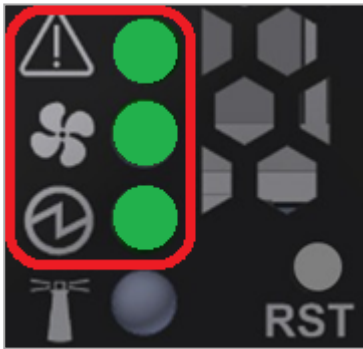

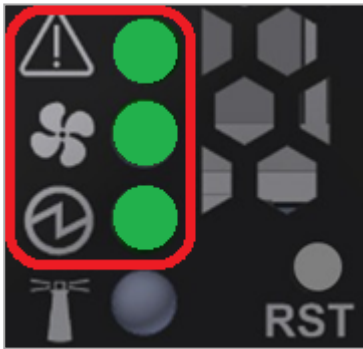



Step 7: Initial Power On

The power cords should be standard 3-wire AC power cords including a safety ground and rated for 15A or higher.

Check all boards, power supplies, and fan tray modules for proper insertion before plugging in a power cable.

The Quantum Maestro Orchestrator powers on automatically, when an AC power is applied.

Step	Instructions						
1	Plug in the first power cable to the first PSU.						
2	Plug in the second power cable to the second PSU.						
3	Wait for the System Status LED to turn green (see System Status LED). It can take up to five minutes to power on the Quantum Maestro Orchestrator. If after five minutes the System Status LED is lit in red color, unplug the power cords and contact Check Point Support .						
4	Check the status of the Quantum Maestro Orchestrator LEDs (see LED Notifications). All of the LEDs must show status lights that are consistent with normal operation (initially flashes, and then lights in a steady color). <table border="1" data-bbox="343 936 1460 1563"> <thead> <tr> <th>Orchestrator Model</th> <th>Expected State of System LEDs Five Minutes After Power On</th> </tr> </thead> <tbody> <tr> <td>MHO-170</td> <td></td> </tr> <tr> <td>MHO-140</td> <td></td> </tr> </tbody> </table>	Orchestrator Model	Expected State of System LEDs Five Minutes After Power On	MHO-170		MHO-140	
Orchestrator Model	Expected State of System LEDs Five Minutes After Power On						
MHO-170							
MHO-140							



Important:

- After you insert a power cable and confirm the **System Status LED** is lit in steady green color, make sure that the **Fan Status LED** is also lit in steady green color.
- If the **Fan Status LED** is not green (see [Fan Status LED](#)):
 1. Unplug the power cable.
 2. Make sure that the mating connector of the fan unit is free of any dirt and obstacles.
 3. Make sure that the fan unit is inserted properly.
 If no obstacles were found, and the problem persists, contact [Check Point Support](#).

Connecting Cables to Quantum Maestro Orchestrators

This section describes how to connect cables to Quantum Maestro Orchestrators.

It is possible to deploy Quantum Maestro Orchestrators in these ways:

- On a single site (see ["Single Site" on page 48](#)).
- On two different sites (see [Dual Site](#)).

It possible to use breakout cables to split the supported 100 / 40 GbE port into four 10 GbE ports (see ["Splitting the Ports with Breakout Cables" below](#)).

Splitting the Ports with Breakout Cables

In This Section:

Breakout Cables	41
MHO-175 Splitting Options	43
MHO-170 Splitting Options	46
MHO-140 Splitting Options	47

Breakout Cables

Quantum Maestro Orchestrators have 100 / 40 GbE ports.

With a breakout cable, it is possible to split the supported 100 / 40 GbE port into four 10 GbE ports.

Insert the splitter cables to convert each applicable QSFP28 100 GbE port into four SFP28 10 GbE ports.



Important - The breakout cable that splits 100 GbE port into four 25 GbE ports is **not** supported.

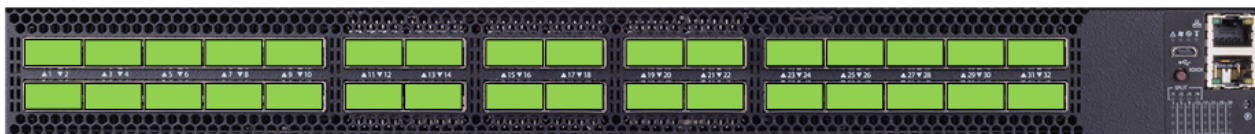
Example of a breakout cable:



MHO-175 Splitting Options

Explanations

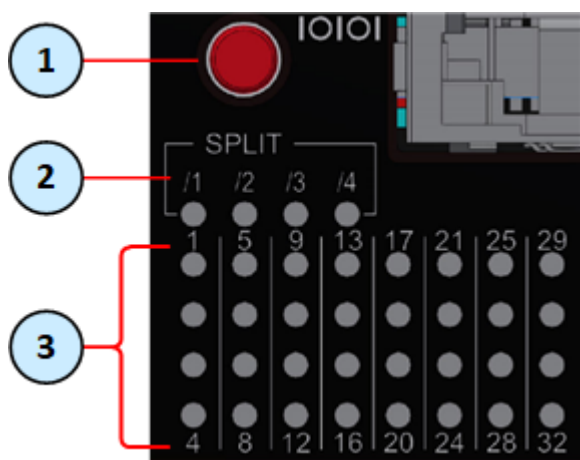
It is possible to split each of the QSFP28 ports 1 to 32 (colored green) into four SFP28 ports.



In MHO-175, all port LEDs are located on the right side.

There are 32 LEDs that correspond to the 32 physical ports.

You can connect 1-to-4 breakout cables to physical ports and get a maximum of 128 logical ports.



Item	Description
1	Button to select the LED indication mode.
2	LEDs that show the selected LED indication mode.
3	LEDs that show the port states.

After you connect a breakout cable to a physical port, you get *four* additional interfaces starting from the original interface name. You assign these interfaces to Security Groups.

Example - When you connect a breakout cable to the top port 8 (interface "eth1-29"), you get:

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
8	eth1-29	Port 1/8/1
	eth1-30	Port 1/8/2
	eth1-31	Port 1/8/3
	eth1-32	Port 1/8/4








Note - For more information about the ports and interface names in Gaia, see ["Quantum Maestro Orchestrator Ports and Gaia OS Interfaces" on page 69](#).

To see the state of split ports, it is necessary to use the control button to select the LED indication mode.

The control button (item 1) selects one of the five available LED indication modes in a cycle.

The four LEDs in the section **SPLIT /1 /2 /3 /4** (item 2) show the current LED indication mode.

The port LEDs (item 3) show the port state - link (up or down) and traffic (flowing or not).

Indication Mode	LEDs in the section "SPLIT"	Description
0	All LEDs are off 	Port LEDs show the state of physical ports. Use this indication mode when no breakout cables are connected.
/1	Only the first LED from the left is lit (/1) 	Port LEDs show the state of the first split port of the physical port. Example: If you connect a breakout cable to port 8 (interface <code>eth1-29</code>), then in this LED indication mode /1, the port LED 8 shows the state of the interface <code>eth1-29</code> (Port 1/8/1).
/2	Only the second LED from the left is lit (/2) 	Port LEDs show the state of the second split port of the physical port. Example: If you connect a breakout cable to port 8 (interface <code>eth1-29</code>), then in this LED indication mode /2, the port LED 8 shows the state of the interface <code>eth1-30</code> (Port 1/8/2).
/3	Only the third LED from the left is lit (/3) 	Port LEDs show the state of the third split port of the physical port. Example: If you connect a breakout cable to port 8 (interface <code>eth1-29</code>), then in this LED indication mode /3, the port LED 8 shows the state of the interface <code>eth1-31</code> (Port 1/8/3).
/4	Only the fourth LED from the left is lit (/4) 	Port LEDs show the state of the fourth split port of the physical port. Example: If you connect a breakout cable to port 8 (interface <code>eth1-29</code>), then in this LED indication mode /4, the port LED 8 shows the state of the interface <code>eth1-32</code> (Port 1/8/4).

**Important:**

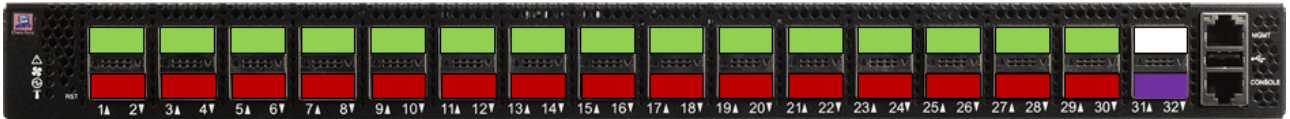
- After you connect a breakout cable to port 31, the Dual Site External Synchronization works on the 4th split of this port:
 - On the first Orchestrator - Port 1/31/4
 - On the second Orchestrator - Port 2/31/4
- After you connect a breakout cable to port 32, the Single Site Internal Synchronization works on the 4th split of this port:
 - On the first Orchestrator - Port 1/32/4
 - On the second Orchestrator - Port 2/32/4

MHO-170 Splitting Options

Explanations

It is possible to split only the **top** QSFP28 odd ports 1 to 29 (colored green) into four SFP28 ports, each.

When the top odd ports 1 to 29 (colored green) are in split mode, the corresponding bottom QSFP28 even ports 2 to 30 are **disabled** (colored red).



Important - It is not supported to connect a breakout cable to Port **31** because it disables the dedicated synchronization Port **32**.

After you connect breakout cables to the top ports, you get *four* additional interfaces starting from the original interface name. You assign these interfaces to Security Groups.

Example - When you connect a breakout cable to the top port 15 (interface "eth1-29"), you get:

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
15	eth1-29	Port 1/15/1
	eth1-30	Port 1/15/2
	eth1-31	Port 1/15/3
	eth1-32	Port 1/15/4



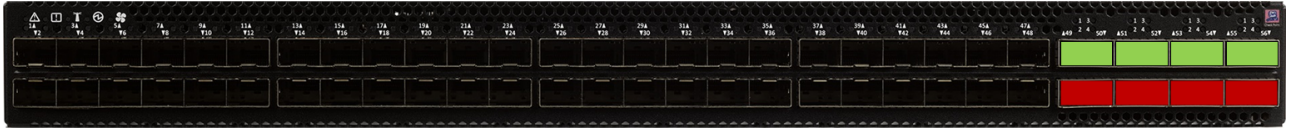
Note - For more information about the ports and interface names in Gaia, see "[Quantum Maestro Orchestrator Ports and Gaia OS Interfaces](#)" on page 69.

MHO-140 Splitting Options

Explanations

It is possible to split only the top QSFP28 ports 49, 51, 53, and 55 (colored green) into four SFP28 ports, each.

When the top ports (colored green) are in a split mode, the corresponding bottom QSFP28 ports 50, 52, 54, and 56 are **disabled** (colored red).



After you connect breakout cables to the supported top ports, you get *four* additional interfaces starting from the original interface name. You assign these interfaces to Security Groups.

Example - When you connect a breakout cable to the top port 49 (`eth1-49`), you get:

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
49	eth1-49	Port 1/49/1
	eth1-50	Port 1/49/2
	eth1-51	Port 1/49/3
	eth1-52	Port 1/49/4



Note - For more information about the ports and interface names in Gaia, see ["Quantum Maestro Orchestrator Ports and Gaia OS Interfaces" on page 69](#).

Single Site

This section describes how to connect cables to Quantum Maestro Orchestrators on the same site.

Connecting Two Quantum Maestro Orchestrators for Redundancy

In This Section:

This section describes the connection of two Quantum Maestro Orchestrators for Redundancy **on the same site**.



Best Practice - For redundancy, install and connect two Quantum Maestro Orchestrators on the same site.

Diagram



Important - It is possible to connect only two Quantum Maestro Orchestrators of the same model (see [MBS-5038](#)).

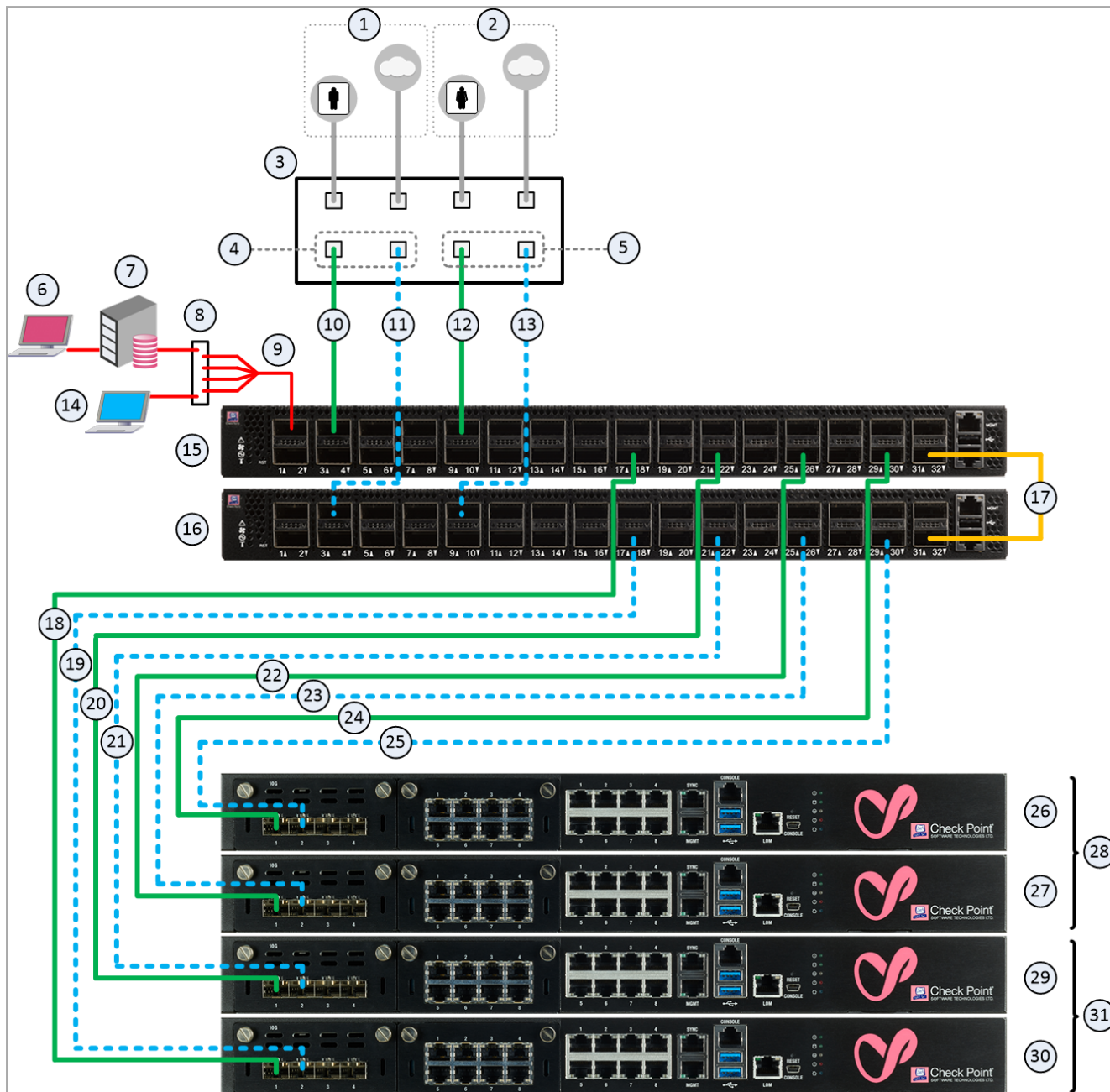


Best Practice - Connect cables to the same Uplink and Downlink ports on the two Quantum Maestro Orchestrators (for example, if you connected to an Uplink port 4 on one Quantum Maestro Orchestrator, then you must connect to an Uplink port 4 on the other Quantum Maestro Orchestrator).

Notes:

- This logical diagram is based on MHO-170, but applies equally to all Quantum Maestro Orchestrator models.
- This logical diagram shows two example Security Groups that contain two Security Appliances and two Uplink ports each.

Example for MHO-170:



Explanations

Table: Explanations

Item	Description
1	Network 1 connected to ports on the Networking Device (3).
2	Network 2 connected to ports on the Networking Device (3).
3	Networking Device (router or switch) that connects your Network 1 and Network 2 to the Quantum Maestro Orchestrators (15 and 16) with Bond interfaces (Link Aggregation).

Table: Explanations (continued)


Item	Description
4	<p>Bond interface that connects Network 1 to the Quantum Maestro Orchestrators (15 and 16).</p> <p>This Bond interface provides a redundant Uplink connection for the traffic inspected by the Security Appliances (29 and 30) in the applicable Security Group (31).</p>
5	<p>Bond interface that connects Network 2 to the Quantum Maestro Orchestrators (15 and 16).</p> <p>This Bond interface provides a redundant Uplink connection for the traffic inspected by the Security Appliances (26 and 27) in the applicable Security Group (28).</p>
6	SmartConsole Client that connects to the Management Server (7).
7	Management Server that manages Security Groups configured on the Quantum Maestro Orchestrators (15 and 16).
8	Layer 2 switch.
9	<p>A Breakout cable connected to the Management port 1. See "Splitting the Ports with Breakout Cables" on page 41.</p> <p> Note - You assign this Management port (or these split interfaces) to the applicable Security Groups. Shared Management feature allows to assign the same Management port (interface <code>ethX-MgmtY</code>) on a Quantum Maestro Orchestrator to different Security Groups. The assigned Management port has a different IP address and a different MAC address in each Security Group, to which this port is assigned.</p>
10	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a first slave of the first Bond (4) on the Networking Device (3) to the first Quantum Maestro Orchestrator (15).
11	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a second slave of the first Bond (4) on the Networking Device (3) to the second Quantum Maestro Orchestrator (16).
12	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a first slave of the second Bond (5) on the Networking Device (3) to the first Quantum Maestro Orchestrator (15).
13	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a second slave of the second Bond (5) on the Networking Device (3) to the second Quantum Maestro Orchestrator (16).
14	<p>Client you can use to configure the Gaia Operating System on the Security Appliances in Security Groups.</p> <p>You connect:</p> <ul style="list-style-type: none"> ▪ Over SSH to the command line (Gaia Clish) of Security Groups. ▪ With a web browser to the Gaia Portal of Security Groups.

Table: Explanations (continued)


Item	Description
15	First Quantum Maestro Orchestrator: <ul style="list-style-type: none"> ▪ Connects Network 1 and Network 2 to the Security Appliances (26, 27, 29, and 30). ▪ Distributes the traffic between the Security Appliances in the Security Groups.
16	Second Quantum Maestro Orchestrator: <ul style="list-style-type: none"> ▪ Connects Network 1 and Network 2 to the Security Appliances (26, 27, 29, and 30). ▪ Distributes the traffic between the Security Appliances in the Security Groups.
17	A DAC that connects the dedicated Synchronization ports on the Quantum Maestro Orchestrators (15 and 16). <p>Important:</p>  <ul style="list-style-type: none"> ▪ This connection is only used to synchronize the configuration of Security Groups between the Quantum Maestro Orchestrators. ▪ MHO-175 and MHO-170 require a 100 GbE DAC or 40 GbE DAC cable. ▪ MHO-140 requires a 10 GbE DAC cable.
18	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a Downlink port on the <i>first</i> Quantum Maestro Orchestrator (15) to the Security Appliance (30).
19	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a Downlink port on the <i>second</i> Quantum Maestro Orchestrator (16) to the Security Appliance (30).
20	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a Downlink port on the <i>first</i> Quantum Maestro Orchestrator (15) to the Security Appliance (29).
21	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a Downlink port on the <i>second</i> Quantum Maestro Orchestrator (16) to the Security Appliance (29).
22	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a Downlink port on the <i>first</i> Quantum Maestro Orchestrator (15) to the Security Appliance (27).
23	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a Downlink port on the <i>second</i> Quantum Maestro Orchestrator (16) to the Security Appliance (27).
24	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a Downlink port on the <i>first</i> Quantum Maestro Orchestrator (15) to the Security Appliance (26).
25	A DAC cable, Fiber cable (with transceivers), or Breakout cable that connects a Downlink port on the <i>second</i> Quantum Maestro Orchestrator (16) to the Security Appliance (26).
26	Security Appliance 2 in the Security Group 2 (28).
27	Security Appliance 1 in the Security Group 2 (28).
28	All Security Appliances assigned to the Security Group 2.
29	Security Appliance 2 in the Security Group 1 (31).

Table: Explanations (continued)

Item	Description
30	Security Appliance 1 in the Security Group 1 (31).
31	All Security Appliances assigned to the Security Group 1.

Notes:

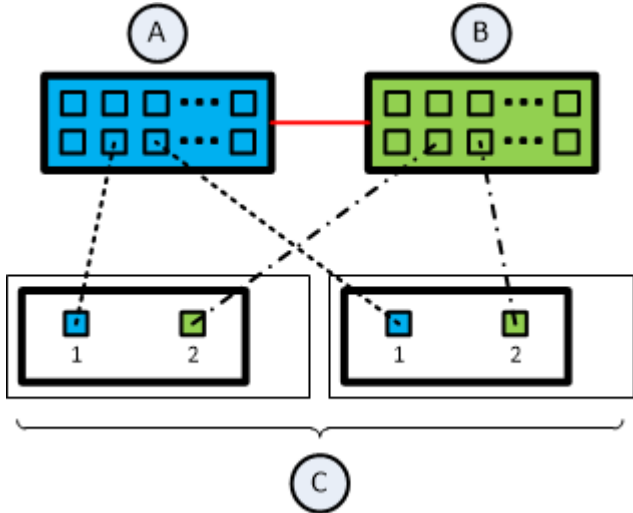
- Both Quantum Maestro Orchestrators work together (Active / Active).
- Cables colored red show management traffic flow.
- Cables colored green (solid lines) show connections to the first Quantum Maestro Orchestrator (**15**).
- Cables colored blue (dash lines) show connections to the second Quantum Maestro Orchestrator (**16**).
- When you assign a Security Appliance to a Security Group, the Quantum Maestro Orchestrators determine the applicable Downlink ports automatically.
- The Quantum Maestro Orchestrators create Link Aggregation for the applicable Downlink ports automatically.
- Security Group 1 contains:
 - Applicable Uplink ports, to which the cables **10** and **11** are connected.
 - Security Appliances **30** and **29**.
 - Applicable management port (or split interface), to which the Management Server **7** is connected.
- Security Group 2 contains:
 - Applicable Uplink ports, to which the cables **12** and **13** are connected.
 - Security Appliances **27** and **26**.
 - Applicable management port (or split interface), to which the Management Server **7** is connected.

Important:

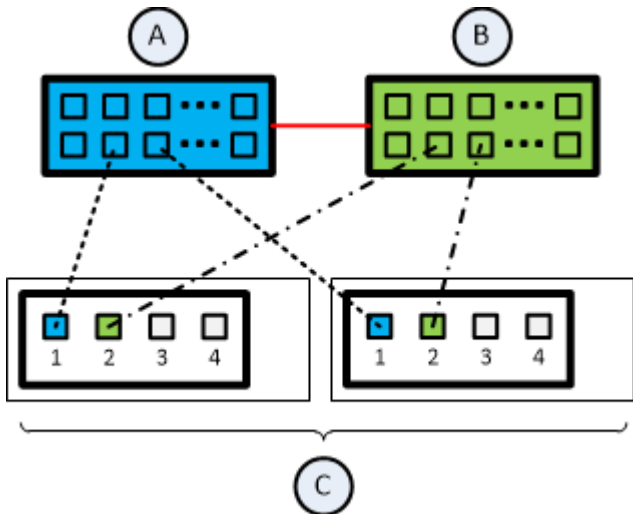
- See the [Release Notes for your version](#) for the list of the required Check Point cards on the Security Appliances.
- You must connect the same number of cables from each Quantum Maestro Orchestrator to all Security Appliances in the same Security Group. Otherwise, the Quantum Maestro Orchestrators are not able to distribute the traffic equally between the Security Appliances in the same Security Group.
- It is possible to connect a maximum of two Downlink ports from each Quantum Maestro Orchestrator to each Security Appliance.

Connecting cables between the Quantum Maestro Orchestrators and Security Appliances

Connecting cables between Downlink ports on each Quantum Maestro Orchestrator and 2 ports on the Dual Port Card on each Security Appliance

Illustration	Instructions
 <p>The diagram illustrates the connection between two Quantum Maestro Orchestrators (A and B) and two Security Appliances (C). Orchestrator A is shown in blue and Orchestrator B in green. Each Security Appliance (C) contains a Dual Port Card with two ports labeled 1 and 2. A red cable connects a downlink port on Orchestrator A to port 1 of the first Security Appliance. Another red cable connects a downlink port on Orchestrator B to port 2 of the second Security Appliance. Dashed lines indicate the mapping of downlink ports from both orchestrators to both ports on both security appliances.</p>	<p>On each Security Appliance (C) in the Security Group:</p> <ol style="list-style-type: none"> 1. Connect a cable from Port 1 on the Dual Port Card to a Downlink port on the first Orchestrator (A). 2. Connect a cable from Port 2 on the Dual Port Card to a Downlink port on the second Orchestrator (B).

Connecting cables between Downlink ports on each Quantum Maestro Orchestrator and 1 out of 4 ports on the Quad Port Card on each Security Appliance

Illustration	Instructions
 <p>The diagram illustrates the connection between two Quantum Maestro Orchestrators (A and B) and two Security Appliances (C). Orchestrator A is shown in blue and Orchestrator B in green. Each Security Appliance (C) contains a Quad Port Card with four ports labeled 1, 2, 3, and 4. A red cable connects a downlink port on Orchestrator A to port 1 of the first Security Appliance. Another red cable connects a downlink port on Orchestrator B to port 2 of the second Security Appliance. Dashed lines indicate the mapping of downlink ports from both orchestrators to ports 1 and 2 on both security appliances.</p>	<p>On each Security Appliance (C) in the Security Group:</p> <ol style="list-style-type: none"> 1. Connect a cable from Port 1 on the Quad Port Card to a Downlink port on the first Orchestrator (A). 2. Connect a cable from Port 2 on the Quad Port Card to a Downlink port on the second Orchestrator (B).

Connecting cables between Downlink ports on each Quantum Maestro Orchestrator and 2 out of 4 ports on the Quad Port Card on each Security Appliance

Illustration	Instructions
<p>The diagram illustrates the connection between two Quantum Maestro Orchestrators (A and B) and two Security Appliances (C). Orchestrator A is shown in blue and Orchestrator B in green. Each Security Appliance (C) has a Quad Port Card with four ports labeled 1, 2, 3, and 4. A red line represents a DAC cable connecting the dedicated Synchronization ports on Orchestrators A and B. Dashed lines indicate the connections from the Quad Port Card to the Downlink ports on the Orchestrators: Port 1 and Port 3 connect to Orchestrator A, while Port 2 and Port 4 connect to Orchestrator B.</p>	<p>Important - In R80.20SP, this connection method is supported only with the R80.20SP Jumbo Hotfix Accumulator (Take 105 and above) installed on Orchestrators and Security Groups.</p> <p>On each Security Appliance (C) in the Security Group:</p> <ol style="list-style-type: none"> 1. Connect a cable from Port 1 on the Quad Port Card to a Downlink port on the first Orchestrator (A). 2. Connect a cable from Port 3 on the Quad Port Card to a Downlink port on the first Orchestrator (A). 3. Connect a cable from Port 2 on the Quad Port Card to a Downlink port on the second Orchestrator (B). 4. Connect a cable from Port 4 on the Quad Port Card to a Downlink port on the second Orchestrator (B).

Legend

Item	Description
A	First Orchestrator.
B	Second Orchestrator.
C	Security Appliances in Security Groups.
—	A DAC cable connected to the dedicated Synchronization ports on the Orchestrators.
- - - - -	Cables that connect odd ports on the Quad Port Card to the first Orchestrator.
- . - . -	Cables that connect even ports on the Quad Port Card to the second Orchestrator.



Best Practice for Security Appliances 23000 series:

Install the expansion cards in this order:

1. Expansion Slot 3
2. Expansion Slot 4
3. Expansion Slot 5
4. Expansion Slot 1
5. Expansion Slot 2

Use Slots 1 and 2 only after all other slots are populated.

Overview of the expansion slots on the [front panel](#):

LCD	Slot 4	Slot 5	Storage Devices
Slot 1	Slot 2	Slot 3	Appliance Ports

Workflow

Table: Workflow

Step	Device	Instructions
1	On the Networking Device (3)	<p>Perform these steps (refer to the device vendor documentation):</p> <ol style="list-style-type: none"> 1. Configure a first Bond interface (4) on two slave ports. This Bond interface connects Network 1 to the Quantum Maestro Orchestrators. Configure the applicable settings, so that the traffic from and to Network 1 passes only on this Bond interface. 2. Configure a second Bond interface (5) on two slave ports. This Bond interface connects Network 2 to the Quantum Maestro Orchestrators. Configure the applicable settings, so that the traffic from and to Network 2 passes only on this Bond interface. 3. With a cable (10), connect the first slave interface of the first Bond (4) interface to an Uplink port (in our example, Port 3) on the <i>first</i> Quantum Maestro Orchestrator (15). 4. With a cable (11), connect the second slave interface of the first Bond (4) interface to an Uplink port (in our example, Port 3) on the <i>second</i> Quantum Maestro Orchestrator (16). 5. With cable (12), connect the first slave interface of the second Bond interface (5) to an Uplink port (in our example, Port 9) on the <i>first</i> Quantum Maestro Orchestrator (15). 6. With cable (13), connect the second slave interface of the second Bond interface (5) to an Uplink port (in our example, Port 9) on the <i>second</i> Quantum Maestro Orchestrator (16).


Table: Workflow (continued)

Step	Device	Instructions
2	On the first Quantum Maestro Orchestrator (15)	<p>Perform these steps:</p> <ol style="list-style-type: none"> 1. With cable (18), connect a Downlink port (in our example, Port 18) to the applicable port on the first Security Appliance (30) in the Security Group 1 (31). 2. With cable (20), connect a Downlink port (in our example, Port 22) to the applicable port on the second Security Appliance (29) in the Security Group 1 (31). 3. With cable (22), connect a Downlink port (in our example, Port 26) to the applicable port on the first Security Appliance (27) in the Security Group 2 (28). 4. With cable (24), connect a Downlink port (in our example, Port 30) to the applicable port on the second Security Appliance (26) in the Security Group 2 (28). <p>See these sections:</p> <ul style="list-style-type: none"> ▪ "Connecting cables between Downlink ports on each Quantum Maestro Orchestrator and 2 ports on the Dual Port Card on each Security Appliance" on page 53 ▪ "Connecting cables between Downlink ports on each Quantum Maestro Orchestrator and 1 out of 4 ports on the Quad Port Card on each Security Appliance" on page 53
3	On the second Quantum Maestro Orchestrator (16)	<p>Perform these steps:</p> <ol style="list-style-type: none"> 1. With cable (19), connect a Downlink port (in our example, Port 18) to the applicable port on the first Security Appliance (30) in the Security Group 1 (31). 2. With cable (21), connect a Downlink port (in our example, Port 22) to the applicable port on the second Security Appliance (29) in the Security Group 1 (31). 3. With cable (23), connect a Downlink port (in our example, Port 26) to the applicable port on the first Security Appliance (27) in the Security Group 2 (28). 4. With cable (25), connect a Downlink port (in our example, Port 30) to the applicable port on the second Security Appliance (26) in the Security Group 2 (28). <p>See these sections:</p> <ul style="list-style-type: none"> ▪ "Connecting cables between Downlink ports on each Quantum Maestro Orchestrator and 2 ports on the Dual Port Card on each Security Appliance" on page 53 ▪ "Connecting cables between Downlink ports on each Quantum Maestro Orchestrator and 1 out of 4 ports on the Quad Port Card on each Security Appliance" on page 53
4	On both Quantum Maestro Orchestrators (15 and 16)	<p>Connect a DAC cable (17) between the dedicated synchronization port (in our example, Port 32) on the first Quantum Maestro Orchestrator (15) and the dedicated synchronization port (in our example, Port 32) on the second Quantum Maestro Orchestrator (16).</p>

Table: Workflow (continued)

Step	Device	Instructions
5	On the first Quantum Maestro Orchestrator (15)	<p>With cable (9), connect the Management Server to the Management port (in our example, Port 1). In our example, we used a Breakout cable because we have two Security Groups. For more information that applies to MHO-175, see:</p> <ul style="list-style-type: none"> ▪ Connecting to the Management Port with DAC or Fiber Cables ▪ Connecting to the Management Port with Breakout Cables <p>For more information that applies to MHO-170, see:</p> <ul style="list-style-type: none"> ▪ Connecting to the Management Ports with DAC or Fiber Cables ▪ Connecting to the Management Ports with Breakout Cables <p>For more information that applies to MHO-140, see:</p> <ul style="list-style-type: none"> ▪ "Connecting to the Management Ports with DAC or Fiber Cables" on page 59

Table: Workflow (continued)

Step	Device	Instructions
6	One of the two Quantum Maestro Orchestrators (15 or 16)	<p>Perform these steps:</p> <ol style="list-style-type: none"> 1. Connect to the Gaia Operating System on the Quantum Maestro Orchestrator. You connect through a dedicated port: <ul style="list-style-type: none"> ▪ In MHO-175 and MHO-170 - the MGMT port on the front panel (top right corner). ▪ In MHO-140 - one of the ports  on the rear panel. 2. Create the Security Group 1. Assign these: <ul style="list-style-type: none"> ▪ The two Security Appliances 30 and 29 ▪ The two applicable Uplink ports (in our example, Port 1/3/1 and Port 2/3/1) ▪ The applicable management port (or split interface) on the Quantum Maestro Orchestrator (in our example, the split Port 1/1/1) <p>See the Maestro Administration Guide for your version > Chapter <i>Configuring Security Groups</i>.</p> 3. Configure the Bond interfaces in the Security Group 1: <ol style="list-style-type: none"> a. Connect to the Gaia Operating System on the Security Group 1. b. Configure a Bond interface on the applicable two slave Uplink ports (in our example, Port 1/3/1 and Port 2/3/1). This Bond interface provides a redundant Uplink connection for the traffic inspected by the Security Appliances (30 and 29). <p>See the Maestro Administration Guide for your version > Chapter <i>Configuring Security Groups</i> > Chapter <i>Configuring Security Groups</i> > Section <i>Configuring Gaia Settings of a Security Group</i>. For information about the configuration of Bond interfaces, see the Gaia Administration Guide for your version.</p> 4. Repeat Steps 2 and 3 to create and configure the Security Group 2: Assign these: <ul style="list-style-type: none"> ▪ The two Security Appliances 27 and 26 ▪ The two applicable Uplink ports (in our example, Port 1/9/1 and Port 2/9/1) ▪ The applicable management port (or split interface) on the Quantum Maestro Orchestrator (in our example, the split Port 1/1/2)

Connecting Cables to MHO-140

In This Section:

Notes:



- The different diagrams below show connections to different ports on the Quantum Maestro Orchestrators.
- It is possible to connect to the Quantum Maestro Orchestrator ports with a DAC cable, Fiber cable (with transceivers), or Breakout cable.
- The sections below provide a high-level description.

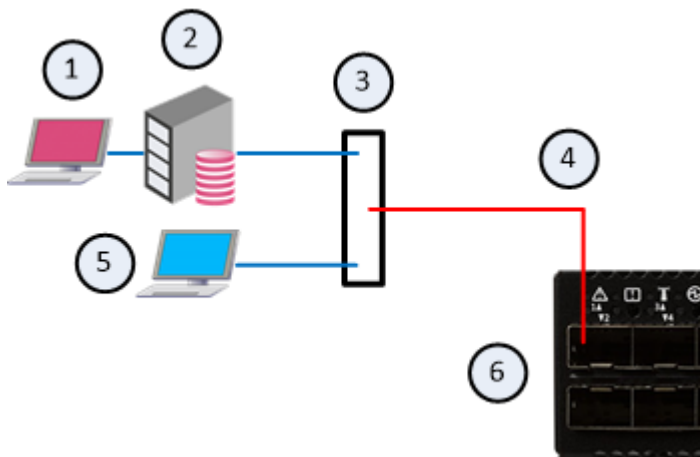
Connecting to the Management Ports with DAC or Fiber Cables




Important - When you connect two Quantum Maestro Orchestrators for redundancy, the Check Point Management Server connects only to one of the Quantum Maestro Orchestrators.

Example:

Note - The default Management ports are Ports 1-4. This diagram shows the connection to the Management port 1. The same applies to the Management ports 2, 3 and 4.

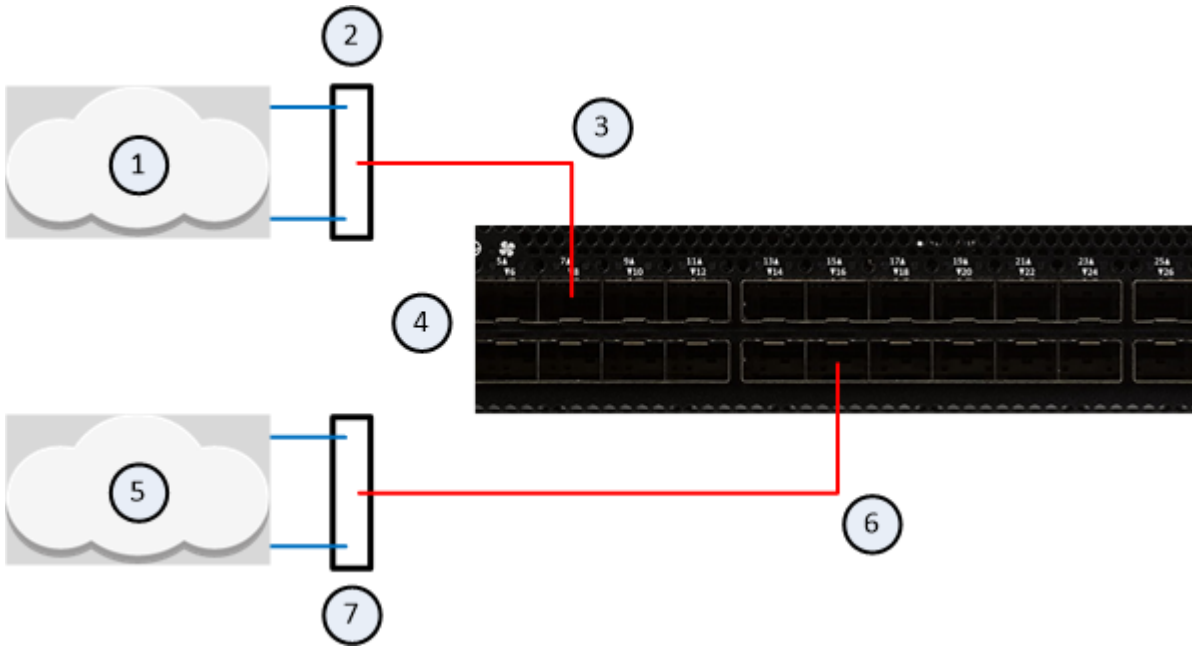


Explanations

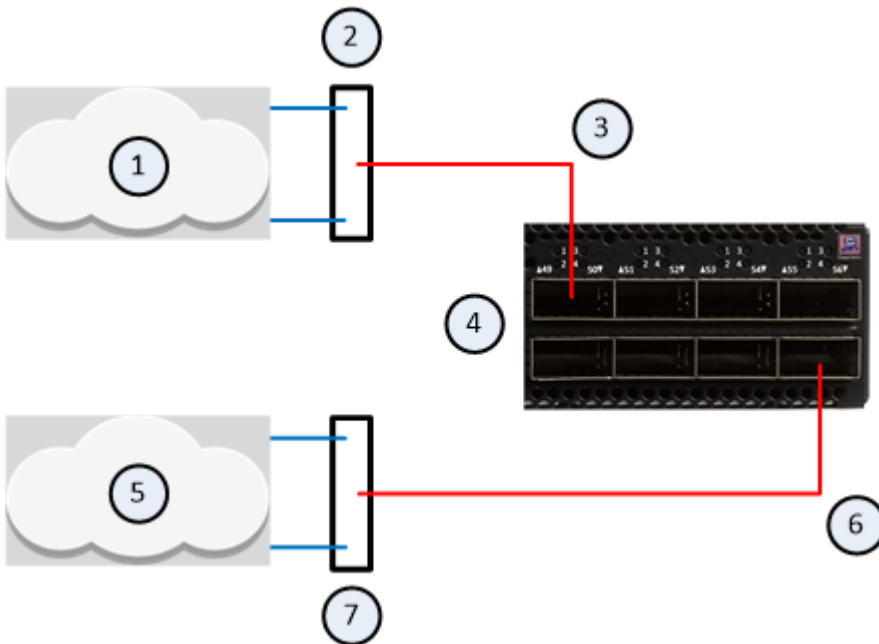
Item	Description
1	SmartConsole Client for the Check Point Management Server (2).
2	Check Point Management Server.
3	Layer 2 switch.
4	<p>A DAC cable or Fiber cable (with transceivers) connected to the Management port 1.</p> <p> Note - You assign this Management port to the applicable Security Groups. Shared Management feature allows to assign the same Management port (interface <code>ethX-Mgmt Y</code>) on a Quantum Maestro Orchestrator to different Security Groups. The assigned Management port has a different IP address and a different MAC address in each Security Group, to which this port is assigned.</p>
5	<p>Client you can use to configure the Gaia Operating System on the Security Appliances in Security Groups, which you manage through Port 1 with the Management Server (2). You connect:</p> <ul style="list-style-type: none"> ▪ Over SSH to the command line (Gaia Clish) of a Security Group. ▪ With a web browser to the Gaia Portal of a Security Group.
6	The first Quantum Maestro Orchestrator.

Connecting to the Uplink Ports with DAC or Fiber Cables

Example of a connection to default Uplink ports 5 to 26:



Example of a connection to default Uplink ports 49 to 56:



Explanations

Item	Description
1	Production network 1 that communicates with production network 2 (5) through a Security Group configured on the Quantum Maestro Orchestrator.
2	Layer 2 switch.
3	A DAC or Fiber cable (with transceivers) connected to an Uplink port (in our example, Ports 7 and 49).
4	One of Quantum Maestro Orchestrators.
5	Production network 2 that communicates with production network 1 (1) through a Security Group configured on the Quantum Maestro Orchestrator.
6	A DAC or Fiber cable (with transceivers) connected to an Uplink port (in our example, Ports 16 and 56).
7	Layer 2 switch.

Notes:



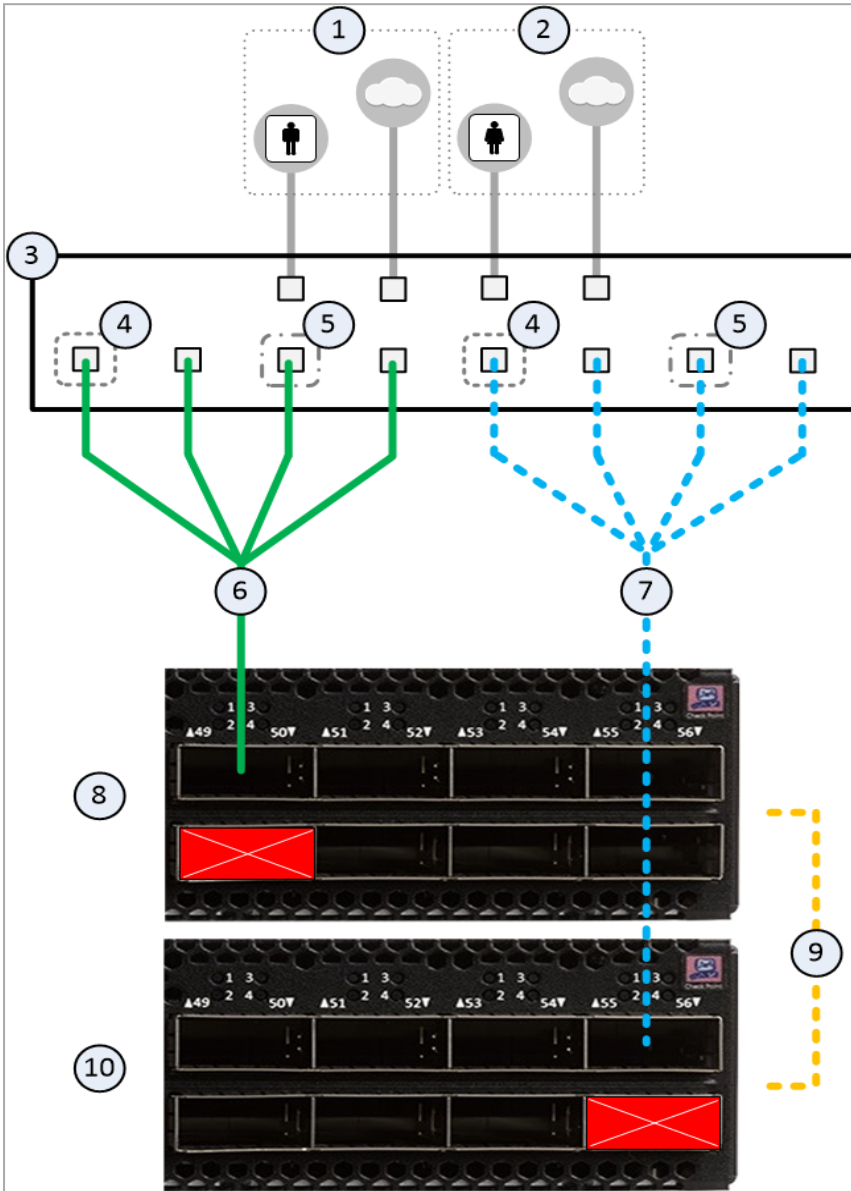
- You assign the Uplink ports to the applicable Security Group.
- It is possible to configure some of the Downlink ports as additional Uplink ports.
See the [Maestro Administration Guide for your version](#) > Chapter *Configuring Security Groups* > Section *Configuration Procedure* > Section *Configuring Security Groups in Gaia Clish* > Section *Configuring the Port Settings*.

Connecting to the Uplink Ports with Breakout Cables




Important - It is possible to connect breakout cables only to the top ports **49**, **51**, **53**, and **55**. When the specific top ports are in a split mode, the corresponding bottom ports are disabled.

Example:



Explanations

Item	Description
1	Network 1 connected to ports on the Networking Device (3).
2	Network 2 connected to ports on the Networking Device (3).
3	Networking Device (router or switch) that connects your Network 1 and Network 2 to the Quantum Maestro Orchestrators (6 and 8) with Bond interfaces (Link Aggregation).
4	Bond interface that connects Network 1 to the Quantum Maestro Orchestrators (8 and 10). This Bond interface provides a redundant Uplink connection for the traffic inspected by the Security Appliances in the applicable Security Group (31).
5	Bond interface that connects Network 2 to the Quantum Maestro Orchestrators (8 and 10). This Bond interface provides a redundant Uplink connection for the traffic inspected by the Security Appliances in the applicable Security Group (30).
6	<p>A Breakout cable connected to an Uplink port (in our example, Port 49) on the first Quantum Maestro Orchestrator (8).</p> <p>See "Breakout Cables" on page 41.</p> <p>Notes:</p> <ul style="list-style-type: none"> ▪ This cable splits the Uplink port into four interfaces. You assign the new interfaces to the applicable Security Groups. ▪ This connection disables the bottom Uplink port (in our example, Port 50).
7	<p>A Breakout cable connected to an Uplink port (in our example, Port 55) on the second Quantum Maestro Orchestrator (10).</p> <p>See "Breakout Cables" on page 41.</p> <p>Notes:</p> <ul style="list-style-type: none"> ▪ This cable splits the Uplink port into four interfaces. You assign the new interfaces to the applicable Security Groups. ▪ This connection disables the bottom Uplink port (in our example, Port 56).
8	First Quantum Maestro Orchestrator.
9	<p>A 10 GbE DAC cable connected to the dedicated Synchronization ports 48 on the Quantum Maestro Orchestrators.</p> <p> Important - This connection is only used to synchronize the configuration of Security Groups between the Quantum Maestro Orchestrators.</p>
10	Second Quantum Maestro Orchestrator.

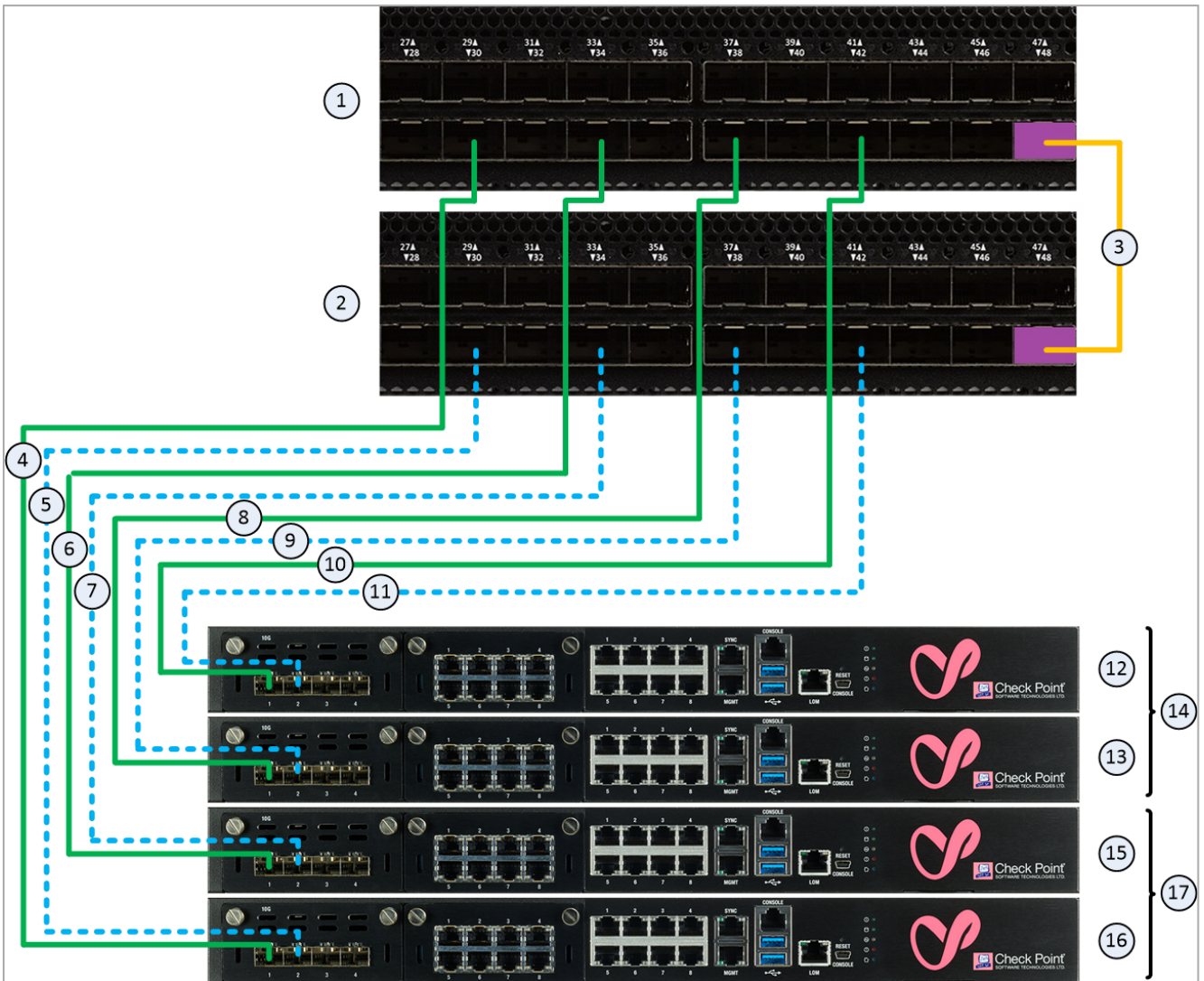
**Notes:**

- Cables colored green (solid lines) show connections to the first Quantum Maestro Orchestrator (**10**).
- Cables colored blue (dash lines) show connections to the second Quantum Maestro Orchestrator (**12**).
- It is possible to configure some of the Downlink ports as additional Uplink ports.

See the [Maestro Administration Guide for your version](#) > Chapter *Configuring Security Groups* > Section *Configuration Procedure* > Section *Configuring Security Groups in Gaia Clish* > Section *Configuring the Port Settings*.

Connecting to the Downlink Ports with DAC or Fiber Cables

Example of a connection to default Downlink ports 27 to 47:



Explanations

Table: Explanations


Item	Description
1	The first Quantum Maestro Orchestrator.
2	The second Quantum Maestro Orchestrator.
3	A 10 GbE DAC cable connected to the dedicated Synchronization ports on the Quantum Maestro Orchestrators.  Important - This connection is only used to synchronize the configuration of Security Groups between the Quantum Maestro Orchestrators.
4	A DAC cable or Fiber cable (with transceivers) connected to a Downlink port (in our example, Port 30) on the <i>first</i> Quantum Maestro Orchestrator (1) and to the applicable port on the Expansion Line Card on the Security Appliance 16 .
5	A DAC cable or Fiber cable (with transceivers) connected to a Downlink port (in our example, Port 30) on the <i>second</i> Quantum Maestro Orchestrator (2) and to the applicable port on the Expansion Line Card on the Security Appliance 16 .
6	A DAC cable or Fiber cable (with transceivers) connected to a Downlink port (in our example, Port 34) on the <i>first</i> Quantum Maestro Orchestrator (1) and to the applicable port on the Expansion Line Card on the Security Appliance 15 .
7	A DAC cable or Fiber cable (with transceivers) connected to a Downlink port (in our example, Port 34) on the <i>second</i> Quantum Maestro Orchestrator (2) and to the applicable port on the Expansion Line Card on the Security Appliance 15 .
8	A DAC cable or Fiber cable (with transceivers) connected to a Downlink port (in our example, Port 38) on the <i>first</i> Quantum Maestro Orchestrator (1) and to the applicable port on the Expansion Line Card on the Security Appliance 13 .
9	A DAC cable or Fiber cable (with transceivers) connected to a Downlink port (in our example, Port 38) on the <i>second</i> Quantum Maestro Orchestrator (2) and to the applicable port on the Expansion Line Card on the Security Appliance 13 .
10	A DAC cable or Fiber cable (with transceivers) connected to a Downlink port (in our example, Port 42) on the <i>first</i> Quantum Maestro Orchestrator (1) and to the applicable port on the Expansion Line Card on the Security Appliance 12 .
11	A DAC cable or Fiber cable (with transceivers) connected to a Downlink port (in our example, Port 42) on the <i>second</i> Quantum Maestro Orchestrator (2) and to the applicable port on the Expansion Line Card on the Security Appliance 12 .
12	A Security Appliance that is assigned to the Security Group 2 (14).
13	A Security Appliance that is assigned to the Security Group 2 (14).
14	All Security Appliances assigned to the Security Group 2.

Table: Explanations (continued)

Item	Description
15	A Security Appliance that is assigned to the Security Group 1 (17).
16	A Security Appliance that is assigned to the Security Group 1 (17).
17	All Security Appliances assigned to the Security Group 1.

Notes:

- Port 48 (colored purple) is the dedicated synchronization port to connect two MHO-140 for redundancy on the same site.
- It is possible to configure some of the Uplink ports as additional Downlink ports.
See the [Maestro Administration Guide for your version](#) > Chapter *Configuring Security Groups* > Section *Configuration Procedure* > Section *Configuring Security Groups in Gaia Clish* > Section *Configuring the Port Settings*.
- The Quantum Maestro Orchestrators create Link Aggregation for the applicable Downlink ports automatically.
- See these sections:
 - ["Connecting cables between Downlink ports on each Quantum Maestro Orchestrator and 2 ports on the Dual Port Card on each Security Appliance" on page 53](#)
 - ["Connecting cables between Downlink ports on each Quantum Maestro Orchestrator and 1 out of 4 ports on the Quad Port Card on each Security Appliance" on page 53](#)

Quantum Maestro Orchestrator Ports and Gaia OS Interfaces

The tables below show how the Gaia Operating System on the Quantum Maestro Orchestrator assigns the interface names to the ports on the Quantum Maestro Orchestrator's front panel (the default configuration).



Important - The Gaia Operating System on the Quantum Maestro Orchestrator does not let you configure the network settings for the Uplink or Downlink ports. You configure all the applicable network settings for the Uplink ports in the Gaia Operating System of the applicable Security Group (for example, IP addresses, Bond interfaces). There are no network settings for the Downlink ports.

MHO-175 ports on the front panel and their default names in Gaia**First MHO-175 Quantum Maestro Orchestrator**

Table: First MHO-175 ports and interfaces

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS		Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
1	eth1-Mgmt1	Port 1/1/1		17	dl65	Port 1/17/1
2	eth1-05	Port 1/2/1		18	dl69	Port 1/18/1
3	eth1-09	Port 1/3/1		19	dl73	Port 1/19/1
4	eth1-13	Port 1/4/1		20	dl77	Port 1/20/1
5	eth1-17	Port 1/5/1		21	dl81	Port 1/21/1
6	eth1-21	Port 1/6/1		22	dl85	Port 1/22/1
7	eth1-25	Port 1/7/1		23	dl89	Port 1/23/1
8	eth1-29	Port 1/8/1		24	dl93	Port 1/24/1
9	eth1-33	Port 1/9/1		25	dl97	Port 1/25/1
10	eth1-37	Port 1/10/1		26	dl101	Port 1/26/1
11	eth1-41	Port 1/11/1		27	dl105	Port 1/27/1
12	eth1-45	Port 1/12/1		28	dl109	Port 1/28/1
13	eth1-49	Port 1/13/1		29	dl113	Port 1/29/1
14	eth1-53	Port 1/14/1		30	dl117	Port 1/30/1
15	eth1-57	Port 1/15/1		31	dl121	Port 1/31/1
16	eth1-61	Port 1/16/1		32	eth1-Sync	Port 1/32/1

Second MHO-175 Quantum Maestro Orchestrator

Table: Second MHO-175 ports and interfaces

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS		Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
1	eth2-Mgmt1	Port 2/1/1		17	dl65	Port 2/17/1
2	eth2-05	Port 2/2/1		18	dl69	Port 2/18/1
3	eth2-09	Port 2/3/1		19	dl73	Port 2/19/1
4	eth2-13	Port 2/4/1		20	dl77	Port 2/20/1
5	eth2-17	Port 2/5/1		21	dl81	Port 2/21/1
6	eth2-21	Port 2/6/1		22	dl85	Port 2/22/1
7	eth2-25	Port 2/7/1		23	dl89	Port 2/23/1
8	eth2-29	Port 2/8/1		24	dl93	Port 2/24/1
9	eth2-33	Port 2/9/1		25	dl97	Port 2/25/1
10	eth2-37	Port 2/10/1		26	dl101	Port 2/26/1
11	eth2-41	Port 2/11/1		27	dl105	Port 2/27/1
12	eth2-45	Port 2/12/1		28	dl109	Port 2/28/1
13	eth2-49	Port 2/13/1		29	dl113	Port 2/29/1
14	eth2-53	Port 2/14/1		30	dl117	Port 2/30/1
15	eth2-57	Port 2/15/1		31	dl121	Port 2/31/1
16	eth2-61	Port 2/16/1		32	eth2-Sync	Port 2/32/1

Notes

- When you connect two Quantum Maestro Orchestrators MHO-175 for redundancy, Gaia OS shows:
 - `eth1-XX` and `Port 1/X/X` for the first Quantum Maestro Orchestrator.
 - `eth2-XX` and `Port 2/X/X` for the second Quantum Maestro Orchestrator.
- The tables above show the default configuration *before* you connect breakout cables.

After you connect breakout cables to the upper ports, you get *four* additional interfaces starting from the original interface name.
- It is possible to configure Port 1 only as `management` or as `downlink`.

MHO-170 ports on the front panel and their default names in Gaia**First MHO-170 Quantum Maestro Orchestrator**

Table: First MHO-170 ports and interfaces

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS		Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
1	eth1-Mgmt1	Port 1/1/1		17	dl33	Port 1/17/1
2	eth1-Mgmt3	Port 1/2/1		18	dl35	Port 1/18/1
3	eth1-05	Port 1/3/1		19	dl37	Port 1/19/1
4	eth1-07	Port 1/4/1		20	dl39	Port 1/20/1
5	eth1-09	Port 1/5/1		21	dl41	Port 1/21/1
6	eth1-11	Port 1/6/1		22	dl43	Port 1/22/1
7	eth1-13	Port 1/7/1		23	dl45	Port 1/23/1
8	eth1-15	Port 1/8/1		24	dl47	Port 1/24/1
9	eth1-17	Port 1/9/1		25	dl49	Port 1/25/1
10	eth1-19	Port 1/10/1		26	dl51	Port 1/26/1
11	eth1-21	Port 1/11/1		27	dl53	Port 1/27/1
12	eth1-23	Port 1/12/1		28	dl55	Port 1/28/1
13	eth1-25	Port 1/13/1		29	dl57	Port 1/29/1
14	eth1-27	Port 1/14/1		30	dl59	Port 1/30/1
15	eth1-29	Port 1/15/1		31	dl61	Port 1/31/1
16	eth1-31	Port 1/16/1		32	eth1-Sync	Port 1/32/1

Second MHO-170 Quantum Maestro Orchestrator

Table: Second MHO-170 ports and interfaces

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS		Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
1	eth2-Mgmt1	Port 2/1/1		17	dl33	Port 2/17/1
2	eth2-Mgmt3	Port 2/2/1		18	dl35	Port 2/18/1
3	eth2-05	Port 2/3/1		19	dl37	Port 2/19/1
4	eth2-07	Port 2/4/1		20	dl39	Port 2/20/1
5	eth2-09	Port 2/5/1		21	dl41	Port 2/21/1
6	eth2-11	Port 2/6/1		22	dl43	Port 2/22/1
7	eth2-13	Port 2/7/1		23	dl45	Port 2/23/1
8	eth2-15	Port 2/8/1		24	dl47	Port 2/24/1
9	eth2-17	Port 2/9/1		25	dl49	Port 2/25/1
10	eth2-19	Port 2/10/1		26	dl51	Port 2/26/1
11	eth2-21	Port 2/11/1		27	dl53	Port 2/27/1
12	eth2-23	Port 2/12/1		28	dl55	Port 2/28/1
13	eth2-25	Port 2/13/1		29	dl57	Port 2/29/1
14	eth2-27	Port 2/14/1		30	dl59	Port 2/30/1
15	eth2-29	Port 2/15/1		31	dl61	Port 2/31/1
16	eth2-31	Port 2/16/1		32	eth2-Sync	Port 2/32/1

Notes

- When you connect two Quantum Maestro Orchestrators MHO-170 for redundancy, Gaia OS shows:
 - `eth1-XX` and `Port 1/X/X` for the first Quantum Maestro Orchestrator.
 - `eth2-XX` and `Port 2/X/X` for the second Quantum Maestro Orchestrator.
- The tables above show the default configuration *before* you connect breakout cables.

After you connect breakout cables to the upper ports, you get *four* additional interfaces starting from the original interface name.
- It is possible to configure Port 1 and Port 2 only as `management` or as `downlink`.

MHO-140 ports on the front panel and their default names in Gaia**First MHO-140 Quantum Maestro Orchestrator**

Table: First MHO-140 ports and interfaces

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS		Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
1	eth1-Mgmt1	Port 1/1/1		29	dl29	Port 1/29/1
2	eth1-Mgmt2	Port 1/2/1		30	dl30	Port 1/30/1
3	eth1-Mgmt3	Port 1/3/1		31	dl31	Port 1/31/1
4	eth1-Mgmt4	Port 1/4/1		32	dl32	Port 1/32/1
5	eth1-05	Port 1/5/1		33	dl33	Port 1/33/1
6	eth1-06	Port 1/6/1		34	dl34	Port 1/34/1
7	eth1-07	Port 1/7/1		35	dl35	Port 1/35/1
8	eth1-08	Port 1/8/1		36	dl36	Port 1/36/1
9	eth1-09	Port 1/9/1		37	dl37	Port 1/37/1
10	eth1-10	Port 1/10/1		38	dl38	Port 1/38/1
11	eth1-11	Port 1/11/1		39	dl39	Port 1/39/1
12	eth1-12	Port 1/12/1		40	dl40	Port 1/40/1
13	eth1-13	Port 1/13/1		41	dl41	Port 1/41/1
14	eth1-14	Port 1/14/1		42	dl42	Port 1/42/1
15	eth1-15	Port 1/15/1		43	dl43	Port 1/43/1
16	eth1-16	Port 1/16/1		44	dl44	Port 1/44/1
17	eth1-17	Port 1/17/1		45	dl45	Port 1/45/1
18	eth1-18	Port 1/18/1		46	dl46	Port 1/46/1
19	eth1-19	Port 1/19/1		47	dl47	Port 1/47/1
20	eth1-20	Port 1/20/1		48	eth1-Sync	Port 1/48/1
21	eth1-21	Port 1/21/1		49	eth1-49	Port 1/49/1
22	eth1-22	Port 1/22/1		50	eth1-51	Port 1/50/1

Table: First MHO-140 ports and interfaces (continued)

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS		Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
23	eth1-23	Port 1/23/1		51	eth1-53	Port 1/53/1
24	eth1-24	Port 1/24/1		52	eth1-55	Port 1/52/1
25	eth1-25	Port 1/25/1		53	eth1-57	Port 1/57/1
26	eth1-26	Port 1/26/1		54	eth1-59	Port 1/54/1
27	dl27	Port 1/27/1		55	eth1-61	Port 1/61/1
28	dl28	Port 1/28/1		56	eth1-63	Port 1/63/1

Second MHO-140 Quantum Maestro Orchestrator

Table: Second MHO-140 ports and interfaces

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS		Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
1	eth2-Mgmt1	Port 2/1/1		29	dl29	Port 2/29/1
2	eth2-Mgmt2	Port 2/2/1		30	dl30	Port 2/30/1
3	eth2-Mgmt3	Port 2/3/1		31	dl31	Port 2/31/1
4	eth2-Mgmt4	Port 2/4/1		32	dl32	Port 2/32/1
5	eth2-05	Port 2/5/1		33	dl33	Port 2/33/1
6	eth2-06	Port 2/6/1		34	dl34	Port 2/34/1
7	eth2-07	Port 2/7/1		35	dl35	Port 2/35/1
8	eth2-08	Port 2/8/1		36	dl36	Port 2/36/1
9	eth2-09	Port 2/9/1		37	dl37	Port 2/37/1
10	eth2-10	Port 2/10/1		38	dl38	Port 2/38/1
11	eth2-11	Port 2/11/1		39	dl39	Port 2/39/1
12	eth2-12	Port 2/12/1		40	dl40	Port 2/40/1
13	eth2-13	Port 2/13/1		41	dl41	Port 2/41/1
14	eth2-14	Port 2/14/1		42	dl42	Port 2/42/1
15	eth2-15	Port 2/15/1		43	dl43	Port 2/43/1
16	eth2-16	Port 2/16/1		44	dl44	Port 2/44/1
17	eth2-17	Port 2/17/1		45	dl45	Port 2/45/1
18	eth2-18	Port 2/18/1		46	dl46	Port 2/46/1
19	eth2-19	Port 2/19/1		47	dl47	Port 2/47/1
20	eth2-20	Port 2/20/1		48	eth2-Sync	Port 2/48/1
21	eth2-21	Port 2/21/1		49	eth2-49	Port 2/49/1
22	eth2-22	Port 2/22/1		50	eth2-51	Port 2/50/1

Table: Second MHO-140 ports and interfaces (continued)

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS		Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
23	eth2-23	Port 2/23/1		51	eth2-53	Port 2/53/1
24	eth2-24	Port 2/24/1		52	eth2-55	Port 2/52/1
25	eth2-25	Port 2/25/1		53	eth2-57	Port 2/57/1
26	eth2-26	Port 2/26/1		54	eth2-59	Port 2/54/1
27	dl27	Port 2/27/1		55	eth2-61	Port 2/61/1
28	dl28	Port 2/28/1		56	eth2-63	Port 2/63/1

Notes

- When you connect two Quantum Maestro Orchestrators MHO-140 for redundancy, Gaia OS shows:

- eth1-XX and Port 1/X/X for the first Quantum Maestro Orchestrator.
- eth2-XX and Port 2/X/X for the second Quantum Maestro Orchestrator.

- The tables above show the default configuration *before* you connect breakout cables.

After you connect breakout cables to the upper ports, you get *four* additional interfaces starting from the original interface name.

- It is possible to configure Ports 1 - 4 only as `management` or as `downlink`.