Front panel components

1. Air vents
2. Power indicator/wink
3. Status LEDs
4. System label pull-out tab
5. VGA port
6. USB connectors (2)
7. Control Panel
8. Hard drives, 1-4 from left to right (for internal storage configuration only)

Status LED states

Reference
- Light blue: Reference present
- Red: Reference not present

Ethernet network
- Light blue: Normal operation
- Yellow: NIC 1 connection failure
- Dark blue: NIC 2 connection failure
- Red: Both connections have failed

SDI I/O card
- Light blue: SDI I/O card up and idle
- Yellow: Firmware update in progress
- Green (blink): One or more channel recording
- Dark blue (blink): One or more channel playing
- Red: SDI I/O card failure

Reference indicator
- Blue: Reference present
- Yellow: Reference not present

Ethernet network indicator
- Blue: Normal operation
- Yellow: NIC 1 connection failure
- Dark blue: NIC 2 connection failure
- Red: Both connections have failed

SDI I/O card indicator
- Blue: SDI I/O card up and idle
- Yellow: Firmware update in progress
- Green (blink): One or more channel recording
- Dark blue (blink): One or more channel playing
- Red: SDI I/O card failure

Rear panel components

1. Redundant, hot-swappable power supplies (0, 1 from left to right)
2. DSUB connector (for GPIO, RS-422, reference, AES audio, and LTC)
3. SDI I/O cards (1, 2 from left to right; board 0, board 1 in software)
4. 1 Gb Eth ports (1, 2 from left to right; eth0 and eth1 in software)
   - Internal storage configuration: use for system management and file transfers.
   - Shared storage configuration: use for connection to Spectrum video server. Port 1 corresponds to SDI I/O card 1, and port 2 to SDI I/O card 2.
5. VGA port
6. RS-232 serial (for Service only)
7. USB ports (for Service only)
8. BMC (for Service only)
9. 1 Gb Eth ports for transport stream ingest (3, 4, 5, 6 from left to right; eth2, eth3, eth4, eth5)
   a. Optional 10 Gb I/O module - optical SFP for SMPTE 2022-6 (from left to right: ixeth1, ixeth0)
   b. Optional 10 Gb I/O module - copper for SMPTE 2022-6 (from left to right: ixeth0, ixeth1)
Spectrum X SDI I/O connectors: standard channel

1. External IN 1 Channel A
2. External IN 2/OUT (if OUT, Primary) Channel A
3. OUT (Secondary or HD/SD-branded*) Channel A
4. OUT (Primary or HD/SD-branded) Channel A
5. External IN 1 Channel B
6. External IN 2/OUT (if OUT, Primary) Channel B
7. OUT (Secondary or HD/SD-branded) Channel B
8. OUT (Primary or HD/SD-branded) Channel B

* "HD/SD-branded" refers to Independent Branding mode.

Spectrum X SDI I/O connectors: enhanced channel

1. External IN 1/Key 1
2. External IN 2/Fill 1
3. External IN 3/OUT (if OUT, Secondary or HD/SD-branded**)
4. OUT (Primary or HD/SD-branded)
5. External IN 4/Key 2
6. External IN 5/Fill 2
7. External IN 6/OUT (if OUT, Clean Secondary**) 
8. OUT (Clean Primary/Secondary or HD/SD-branded)

* "HD/SD-branded" refers to Independent Branding mode.
** "Clean Primary/Secondary" refers to video output with no graphics or overlays.

Spectrum X SDI I/O connectors: UHD channel

SDI card 1
1. 2. 5. 6: IN 1
3. 4. 7. 8: OUT, Primary

SDI card 2
1. 2. 5. 6: IN 2
3. 4. 7. 8: OUT, Secondary or HD/SD branded*

* "HD/SD-branded" refers to Independent Branding mode.

NOTE: For input of non-UHD content, use I/O 2

UHD links
Input: A, B, C, D = I/O connectors 2, 6, 1, 5
Output: A, B, C, D = I/O connectors 4, 8, 3, 7

SDI card 1 (left-hand side when facing rear panel)

<table>
<thead>
<tr>
<th>Configuration</th>
<th>I/O 1</th>
<th>I/O 2</th>
<th>I/O 3</th>
<th>I/O 4</th>
<th>I/O 5</th>
<th>I/O 6</th>
<th>I/O 7</th>
<th>I/O 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHD Channel (UC) 1</td>
<td>External Input 1 (C)</td>
<td>External Input 1 (A)</td>
<td>Out, Primary (C)</td>
<td>Out, Primary (A)</td>
<td>External Input 1 (D)</td>
<td>External Input 1 (B)</td>
<td>Out, Primary (D)</td>
<td>Out, Primary (B)</td>
</tr>
</tbody>
</table>

SDI card 2 (right-hand side when facing rear panel)

<table>
<thead>
<tr>
<th>Configuration</th>
<th>I/O 1</th>
<th>I/O 2</th>
<th>I/O 3</th>
<th>I/O 4</th>
<th>I/O 5</th>
<th>I/O 6</th>
<th>I/O 7</th>
<th>I/O 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHD Channel (UC) 1</td>
<td>External Input 2 (C)</td>
<td>External Input 2 (A)</td>
<td>Out, Secondary (C)</td>
<td>Out, Secondary (A)</td>
<td>External Input 2 (D)</td>
<td>External Input 2 (B)</td>
<td>Out, Secondary (D)</td>
<td>Out, Secondary (B)</td>
</tr>
</tbody>
</table>
Quick start steps for Spectrum X in internal storage configuration

For detailed installation steps, refer to the Spectrum System Installation Guide.

Caution: Electrostatic discharge can damage components. Observe normal ESD (Electrostatic Discharge) procedures when handling Spectrum X components.

File system configurations

<table>
<thead>
<tr>
<th># Drives</th>
<th>RAID set</th>
<th>Capacity per drive</th>
<th>Storage capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 SAS</td>
<td>3 + 1</td>
<td>6 TB</td>
<td>18 TB</td>
</tr>
<tr>
<td>4 SAS</td>
<td>3 + 1</td>
<td>4 TB</td>
<td>12 TB</td>
</tr>
<tr>
<td>4 SAS</td>
<td>3 + 1</td>
<td>2 TB</td>
<td>6 TB</td>
</tr>
</tbody>
</table>

1. Rack mount the system

For complete rack mounting instructions, refer to the instructions provided with the rack mounting kit, or in the Spectrum System Installation Guide.

2. Install the drives

1. Unpack the drives.
2. Press the green release button on the drive carrier to open the lever.
3. Insert the drive carrier into the bay, sliding the drive until it contacts the backplane.
4. Close the drive carrier release handle to lock the drive into place.

Note: When installing a drive, ensure that the adjacent drive is fully installed. Inserting a drive carrier and attempting to lock its handle next to a partially installed carrier can damage the partially installed carrier’s shield spring and make it unusable.

To maintain proper system cooling, all externally accessible drive bays must be populated with a drive carrier.

3. Install the bezel

1. Align the bezel in front of the chassis so that the Harmonic logo appears at the top left corner.
2. Connect the USB cable inside the bezel to the right-hand USB port on the Spectrum X front panel.
3. Keeping the corners aligned, press the bezel straight onto the chassis.
4. Hand-tighten the two captive thumb screws to secure the bezel in place.

GPIO and RS-422 connector pinout

The breakout cable provided for the 60 pin DSUB connector on Spectrum X includes a GPIO connector, six RS-422 connectors, a Reference In connector, and four MFIO connectors, which can be configured for LTC and/or AES audio when you attach players in SystemManager. For full connector details and pinouts, see the Spectrum System Installation Guide.
To manage the Spectrum X, you can use either SystemManager or Spectrum Management, which runs directly on the Spectrum X. If using Spectrum Management, refer to the Spectrum release notes for log in details. If using SystemManager, refer to the SystemManager Installation Guide for installation details.

**4. Install SystemManager (optional)**

To connect to an automation system (optional):

All automation systems differ in their methods of interfacing with the Spectrum X. The following diagram shows one example. Refer to your automation system’s installation guide for interconnection details.

Note: Use 850nm MMF SR transceivers with LC fiber-optic connectors. Either 62.5um or 50um MMF fiber may be used. If using 62.5um, the maximum length supported is 30 meters.

**6. Connect to your 2022-6 network (optional)**

Important: Connect the 10 Gb I/O module directly to the 10 Gb switch dedicated to 2022-6 traffic. Do not connect the 10 Gb I/O module to any switch other than the one that is dedicated to 2022-6 traffic.

**7. Connect to an automation system (optional)**

All automation systems differ in their methods of interfacing with the Spectrum X. The following diagram shows one example. Refer to your automation system’s installation guide for interconnection details.

Note that Spectrum X uses GPIO pin assignments or RS-422 to control graphics automation. For details on using the breakout cable for GPIO and RS-422, refer to the “Breakout cable” section in the SystemManager User Guide.

**8. Connect reference video**

Important: Failure to connect reference video may result in errors.

Use the breakout cable to connect reference video to at least one SDI I/O card on the Spectrum X. On a Spectrum X with two SDI I/O cards, one card passes reference to the other. You may connect a different type of reference (525 or 625) to each SDI I/O card. However, note that each player attached to a given SDI I/O card must be configured for the same reference.

If using the 10 Gb I/O module, you can also use PTP reference. For configuration details, see “Configuring network settings for the 10 Gb I/O modules” in the SystemManager User Guide.

**9. Connect audio and video I/O**

Refer to the rear panel diagrams of the Spectrum X SDI I/O card in this guide for reference when connecting audio and video I/O.

**10. Connect to an EAS (optional)**

Refer to the Spectrum System Installation Guide for instructions on connecting Spectrum X to an Emergency Alert System (EAS).

**11. Connect AC power and power up**

Refer to the Spectrum System Installation Guide for instructions on connecting AC power and powering up the system.

**Important**: Check with your network administrator before connecting to your Ethernet network.

Use only a CAT 6 Ethernet cable, or better, for connecting to the Spectrum X.

Do not connect NICs used for transport stream ingest to the same VLAN used for system management.

The following diagram shows one example. For detailed instructions, see the Spectrum System Installation Guide.