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 indicator: 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

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>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>

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; if only one card is installed, it is 1 regardless of slot)
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. For models with one SDI I/O card, use port 1.
5. VGA port
6. RS-232 serial (for Service only)
7. USB ports (for Service only)
8. BMC (for Service only)
**GPIO and RS-422 connector pinout**

The breakout cable provided for the 60 pin DB-9 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.

---

### GPIO and RS-422 connector pinout

<table>
<thead>
<tr>
<th>GPIO connector</th>
<th>RS-422 #1: for VDCP, channel A</th>
<th>RS-422 #2: for VDCP, channel B</th>
<th>RS-422 #3: Oxtel and EAS, &quot;Serial 0&quot; in SystemManager</th>
<th>RS-422 #4: Oxtel and EAS, &quot;Serial 1&quot; in SystemManager</th>
<th>RS-422 #5: Oxtel and EAS, &quot;Serial 2&quot; in SystemManager</th>
<th>RS-422 #6: Oxtel and EAS, &quot;Serial 3&quot; in SystemManager</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GP00</td>
<td>1</td>
<td>GP00</td>
<td>1</td>
<td>GP00</td>
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<tr>
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<td>GP01</td>
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<td>9</td>
<td>GND 40</td>
<td>9</td>
<td>GND 40</td>
<td>9</td>
<td>GND 40</td>
<td>9</td>
</tr>
</tbody>
</table>

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### 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.

#### Standard Channel Mode Configurations

<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>Standard Channel (SC) 1</td>
<td>External Input 1 (Channel A)</td>
<td>Out, Primary (Channel A)</td>
<td>Out, Secondary (Channel A)</td>
<td>Out, Primary (Channel A)</td>
<td>External Input 1 (Channel B)</td>
<td>Out, Primary (Channel B)</td>
<td>Out, Secondary (Channel B)</td>
<td>Out, Primary (Channel B)</td>
</tr>
<tr>
<td>Standard Channel (SC) 2</td>
<td>External Input 1 (Channel A)</td>
<td>External Input 2 (Channel A)</td>
<td>Out, Secondary (Channel A)</td>
<td>Out, Primary (Channel A)</td>
<td>External Input 1 (Channel B)</td>
<td>External Input 2 (Channel B)</td>
<td>Out, Secondary (Channel B)</td>
<td>Out, Primary (Channel B)</td>
</tr>
</tbody>
</table>

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### 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.

#### Enhanced Channel Mode Configurations

<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>Enhanced Channel (EC) 1</td>
<td>External Input 1/Key 1</td>
<td>External Input 2/Fill 1</td>
<td>Out, Secondary</td>
<td>Out, Primary</td>
<td>External Input 4/Key 2</td>
<td>External Input 5/Fill 2</td>
<td>Out, Clean Primary</td>
<td></td>
</tr>
<tr>
<td>Enhanced Channel (EC) 2</td>
<td>External Input 1/Key 1</td>
<td>External Input 2/Fill 1</td>
<td>Out, Secondary</td>
<td>Out, Primary</td>
<td>External Input 4/Key 2</td>
<td>External Input 5/Fill 2</td>
<td>Out, Clean Primary</td>
<td></td>
</tr>
<tr>
<td>Enhanced Channel (EC) 3</td>
<td>External Input 1/Key 1</td>
<td>External Input 2/Fill 1</td>
<td>External Input 3</td>
<td>Out, Primary</td>
<td>External Input 4/Key 2</td>
<td>External Input 5/Fill 2</td>
<td>Out, Secondary</td>
<td></td>
</tr>
</tbody>
</table>

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Harmonic Technical Support: +888 673 4896 (Americas), +65 6542 0050 (Asia Pacific), + 44 1252 555 450 (EMEA), +7 495 926 4608 (Russia, CIS), +81 3 5565 6737 (Japan), +86 10 6569 5580 (China, mainland)
Quick start steps for Spectrum X in internal storage configuration

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

1. Rack mount the system

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

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

2. 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.
   - The USB cable will form a loop that fits inside the metal panel of the bezel.
4. Hand-tighten the two captive thumb screws to secure the bezel in place.

3. Install the SystemManager (optional)

To configure, operate, and monitor the Spectrum X, you may use either SystemManager or the Spectrum Management application running on the Spectrum X. Note, at this time, Spectrum Management manages only the device on which it’s running.

If using Spectrum Management, continue to the next step. After installing the system, refer to the Spectrum release notes for login details. If using SystemManager, refer to the Harmonic SystemManager Installation Guide for installation details.

4. Connect to your Gigabit Ethernet network

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

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

1. Ensure that an Ethernet switch with Gigabit uplink capability has been installed in your equipment rack.
2. If using SystemManager, attach an Ethernet cable to the NIC 1 port on the SystemManager Platform, or an open LAN port on your client PC. Attach the other end of the Ethernet cable to the Ethernet switch.
   - **Note:** Do not use the NIC 2 port on the SystemManager Platform unless you have configured SystemManager as a client.

   If using Spectrum Management, attach one end of an Ethernet cable to an open LAN port on your client computer, and attach the other end to the Ethernet switch.
3. Attach an Ethernet cable to one Gigabit Ethernet port on the Spectrum X, and then attach the other end to an open port on the Ethernet switch.
   - The Spectrum X uses DHCP to obtain an IP address, or an IP address can be assigned to it statically.
4. Attach an Ethernet cable to the Ethernet switch, and then attach the other end to the LAN port on your client computer used for file transfers.
   - The Spectrum X supports file transfers using FTP, SAMBA, and AFP protocols.
5. Attach an Ethernet cable to the remaining Gigabit Ethernet port on the Spectrum X, and then connect to your Gigabit Ethernet network.

### Spectrum X Rear Panel

- **Gigabit Ethernet Switch**
- **Client computer for file transfers**
- **SystemManager Platform Rear Panel**
- **NIC 1**
- **LAN**
- **Use only CAT 6 Eth cable or better**

**Important:** Use only CAT 6 Ethernet cable, or better, for connecting to the Spectrum X.
5. Connect to an automation system (optional)

All automation systems differ in their array of control connectors and their methods of interfacing with the Spectrum X. The following steps provide 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 Spectrum System Installation Guide.

1. Locate the breakout cable supplied with the Spectrum X.
2. Attach the 60 pin connector of the breakout cable to the DSUB 60 connector on the Spectrum X.
3. Attach two DB-9 connectors from the breakout cable to customer-supplied DB-9 Male to Male extension cables. These will be used for playout. Then connect the other ends of the extension cable to Play ports of the automation system chassis.
4. Attach the GPIO connector on the breakout cable to a DB-9 splitter cable. Connect the DB-9 connections to the graphics control ports on the automation system.

6. Connect reference video

Make sure to always connect reference video to at least one SDI I/O card on the Spectrum X. If your Spectrum X includes two SDI I/O cards, one card passes reference through 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.

1. Connect the breakout cable to the DSUB connector on one of the Spectrum X SDI I/O cards.
2. Connect the Reference connector on the breakout cable to reference video.
3. If required, configure VITC lines using SystemManager. For details, refer to “Changing MediaDirector Clock Reference VITC Lines” in the Harmonic SystemManager User Guide.

7. 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.

8. Connect to an EAS (optional)

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

9. Connect AC power

1. If you are connecting to an automation system, make sure the power switch on the automation system is off. Attach an AC cord to the AC connector on the automation system.
2. The Spectrum X does not have any power switches. To take full advantage of the dual redundant power supplies, ensure that separate, isolated power sources are available. Connect AC cords to the two AC connectors on the Spectrum X.
3. If using SystemManager, make sure that the power switch for the SystemManager Platform or client PC is off, and that the power switch for the Keyboard/Monitor Tray is off as well. Attach an AC cord to the AC connector on your SystemManager Platform or client PC as well as your SystemManager Keyboard/Monitor Tray.
4. Connect an AC cord to the AC connector on the Ethernet switch (or hub).

10. Power up the system

1. Apply power to the Ethernet hub or switch.
2. If using SystemManager, apply power to the SystemManager Platform and Keyboard/Monitor Tray, or client PC.
3. If using SystemManager, log on to the SystemManager Platform with the user name: administrator, and the password: omneon. Both entries are case sensitive.

Note: If an error message appears indicating that a network connection is missing, click OK and continue with the power-up sequence.

If you have installed SystemManager on a client PC, log on to your client PC.
4. Apply power to the Spectrum X by connecting the AC cords to the separate power sources.
5. Apply power to the (optional) automation system.

If using Spectrum Management, refer to the Spectrum Release Notes for log in details.