Harmonic MediaGrid ContentBridge

Release 5.0

Installation Guide
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Documentation conventions

In Harmonic documents, special symbols and fonts call your attention to important information.

⚠️ **DANGER:** The Danger symbol indicates information that, if ignored, can cause physical harm to you.

⚠️ **CAUTION:** The Caution symbol indicates information that, if ignored, can adversely affect the performance of your Harmonic product, or that can make a procedure needlessly difficult.

🔺 **NOTE:** The Note symbol indicates especially important information you need, or it may provide additional information that applies in only some carefully delineated circumstances.

🔺 **IMPORTANT:** The Important symbol indicates information that should stand out when you are reading product details and procedural information.

ℹ️ **TIP:** The Tip symbol indicates parenthetical information that is not necessary for performing a given procedure, but which, if followed, makes the procedure easier, smoother, or more efficient.

In addition to these symbols, this guide may use the following text conventions:

<table>
<thead>
<tr>
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<th>Explanation</th>
</tr>
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<tbody>
<tr>
<td>Typed Command</td>
<td>Indicates the text that you type in at the keyboard prompt.</td>
</tr>
<tr>
<td>Ctrl, Ctrl + Shift</td>
<td>A key or key sequence to press.</td>
</tr>
<tr>
<td><a href="http://www.harmonicinc.com">http://www.harmonicinc.com</a></td>
<td>The italics in blue text to indicate Cross-references, and hyperlinked cross-references in online documents.</td>
</tr>
<tr>
<td>Bold</td>
<td>Indicates a button to click, or a menu item to select.</td>
</tr>
<tr>
<td>Screen Output</td>
<td>The text that is displayed on a computer screen.</td>
</tr>
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<td>Emphasis</td>
<td>The italics text used for emphasis and document references.</td>
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Chapter 1

ContentBridge 4000 hardware

The Harmonic MediaGrid ContentBridge 4000 provides access to Harmonic MediaGrid for those client platforms that do not have the FSD installed or do not use the Harmonic MediaGrid API.

- Bezel components
- Front panel components
- Rear panel components

Bezel components

The bezel on the ContentBridge 4000 consists of a power indicator, air vents, and status LEDs.

![Bezel components diagram](image)

Figure 1-1: Bezel components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Power Indicator</td>
<td>A bright blue power indicator is provided across the top of the front panel. This indicator also provides a “wink” function, which allows you to identify a unit from the SystemManager application.</td>
</tr>
<tr>
<td>2. Air vents</td>
<td>Allows airflow through the unit. For optimum airflow, do not obstruct the air vents.</td>
</tr>
<tr>
<td>3. Status LEDs</td>
<td>An array of four status LEDs is provided on the front panel.</td>
</tr>
</tbody>
</table>
Bezel status LED indicators

The status indicators on the ContentBridge 4000 bezel provide information about network connectivity and disk drive status.

<table>
<thead>
<tr>
<th>LED</th>
<th>Color/State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 GbE NIC</td>
<td>White</td>
<td>Both ports are working normally.</td>
</tr>
<tr>
<td></td>
<td>Yellow</td>
<td>10 GbE port 2 is non-functional.</td>
</tr>
<tr>
<td></td>
<td>Magenta</td>
<td>10 GbE port 3 is non-functional.</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>Both 10 GbE connections have failed.</td>
</tr>
<tr>
<td>HA Pair Indicator</td>
<td>Currently unused</td>
<td></td>
</tr>
<tr>
<td>Solid State Drive Indicators 0 and 1</td>
<td>White</td>
<td>Drive is online.</td>
</tr>
<tr>
<td></td>
<td>Yellow</td>
<td>Drive replacement warning.</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>A drive failure has occurred.</td>
</tr>
</tbody>
</table>

Front panel components

Find important information about the components on the front panel of the ContentBridge 4000.

<table>
<thead>
<tr>
<th>Indicator, Button, or Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. System label pull-out tab</td>
<td>Use to apply a product number and/or serial number label.</td>
</tr>
</tbody>
</table>
### Front panel components

<table>
<thead>
<tr>
<th>Indicator, Button, or Connector</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2. LCD panel                   | Displays system ID, status information, and system error messages.  
  - Blue indicates normal system operation.  
  - Amber indicates a system error; an error code is also displayed, followed by descriptive text. |
| 3. LCD menu buttons            | Allow you to navigate the LCD panel menu. |
| 4. USB connector (2)           | Use to connect the front bezel. |
| 5. Control panel               | Contains system status LEDs, hard reset button, and other system controls. |
| 6. Solid-state drive 0         | The High Bandwidth ContentBridge 4000 uses two solid-state drives. |
| 7. Solid-state drive 1         | The High Bandwidth ContentBridge 4000 uses two solid-state drives. |

### Control panel buttons and LED indicators

Some control panel buttons on the ContentBridge 4000 are recessed and require a tool to use them.

![Control panel buttons and indicators](Figure 1-4: Control panel buttons and indicators)

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. System ID button with integrated LED</td>
<td>The identification button can be used to locate a particular system within a rack. When this button is pressed, the ID LEDs on the front panel and on the back edge of the server board (viewable from the rear panel) flash until the button is pressed again.</td>
</tr>
<tr>
<td>2. Non-maskable interrupt (NMI) button (recessed, tool required for use)</td>
<td>The NMI button can be used to put the server into a halt state when diagnosing an issue. To prevent an accidental system halt, the physical button is located behind the Control Panel and is only accessible with the use of a small tipped tool.</td>
</tr>
<tr>
<td>3. NIC 0 Activity LED</td>
<td>When a network link is detected, the LED will turn on solid. The LED blinks when data is being sent or received over the network.</td>
</tr>
<tr>
<td>4. NIC 1 Activity LED</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 1: ContentBridge 4000 hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. System cold reset button (recessed, tool required for use)</td>
<td>When pressed, this button initializes a hard system reset. To prevent an accidental reset, the physical button is located behind the Control Panel and is only accessible with the use of a small tipped tool.</td>
</tr>
<tr>
<td>6. System status LED</td>
<td>Shows the current health of the server system. A second system status LED is located on the back edge of the server board and is viewable from the rear panel. Both LEDs will show the same state.</td>
</tr>
<tr>
<td>7. Drive activity LED</td>
<td>Indicates drive activity.</td>
</tr>
<tr>
<td>8. Power/Sleep button with integrated LED</td>
<td>Toggles the power on and off. The power-on indicator lights green when the system power is on. When the power-on indicator is off, this indicates that no power is supplied to the system.</td>
</tr>
</tbody>
</table>

Table 1-1: System status LED indicators

<table>
<thead>
<tr>
<th>Color</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Solid</td>
<td>System is off.</td>
</tr>
<tr>
<td>Green</td>
<td>Solid</td>
<td>System is on and operating normally.</td>
</tr>
<tr>
<td></td>
<td>Blink</td>
<td>Non-critical warning: The system is operating in a redundant or degraded state but still functional. A loss of redundancy may have occurred, such as a power supply unit or fan.</td>
</tr>
<tr>
<td>Amber</td>
<td>Blink</td>
<td>Non-fatal warning: The system is likely to fail, but is still working. A critical threshold may have been crossed, such as temperature or voltage, or a disk drive failure has occurred.</td>
</tr>
<tr>
<td></td>
<td>Solid</td>
<td>Fatal alarm: The system has failed or shut down.</td>
</tr>
</tbody>
</table>

Drive LED indicators

Learn the LED patterns for both the Status and Activity indicators on the ContentBridge 4000.

Drive status (amber)

Drive activity (green)

Figure 1-5: ContentBridge 4000 drive LED indicators

**IMPORTANT:** If replacing a drive, do not turn off power. As soon as the new drive is inserted, the system will begin replicating the data from the other drives.
### Indicator

<table>
<thead>
<tr>
<th>Indicator</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Off</td>
<td>No access and no fault.</td>
</tr>
<tr>
<td></td>
<td>Solid (amber)</td>
<td>Drive fault has occurred.</td>
</tr>
<tr>
<td></td>
<td>Blink (amber)</td>
<td>RAID rebuilt in progress.</td>
</tr>
<tr>
<td>Activity</td>
<td>Off</td>
<td>Power on with no drive activity, drive spun down or drive spinning up.</td>
</tr>
<tr>
<td></td>
<td>Blinks on (green) when processing a command</td>
<td>Power on with drive activity.</td>
</tr>
</tbody>
</table>

### Rear panel components

Learn how each port on the rear panel of the ContentBridge 4000 is used.

#### Component

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Power supply 1</td>
<td>Dual redundant power supplies provide power to the system.</td>
</tr>
<tr>
<td>2. Power supply 2</td>
<td>Dual redundant power supplies provide power to the system.</td>
</tr>
<tr>
<td>3. 10 GbE port 3</td>
<td>Use to connect to the network switch.</td>
</tr>
<tr>
<td>4. 10 GbE port 2</td>
<td>Use to connect to the network switch.</td>
</tr>
<tr>
<td>5. Video connector (VGA port)</td>
<td>Use to connect a monitor to the system (for maintenance only).</td>
</tr>
<tr>
<td>6. RJ-45 serial port</td>
<td>Serial cable is not provided.</td>
</tr>
<tr>
<td>7. USB ports (3)</td>
<td>Used for maintenance purposes only.</td>
</tr>
<tr>
<td>8. Diagnostic LEDs</td>
<td>For Service only. LEDs are located on the back edge of the server board.</td>
</tr>
</tbody>
</table>
### Component Description

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. System status LED</td>
<td>Located on the back edge of the server board, this LED matches the state of the System Status LED on the front Control Panel.</td>
</tr>
<tr>
<td>10. System ID LED</td>
<td>Located on the back edge of the server board, this LED matches the state of the System ID LED on the front Control Panel. When that button is pushed, this LED flashes blue until the button is pressed again.</td>
</tr>
</tbody>
</table>

### 1 Gigabit Ethernet NIC Indicators

The onboard 1 GbE ports on the ContentBridge 4000 have two LED indicators, one for link and the other for activity.

![Link indicator](image.png) ![Activity indicator](image.png)

- When the link and activity indicators are off, the Ethernet NIC is not connected to the network.
- When the link indicator is green, the Ethernet NIC is connected to a valid link partner on the network.
- When the link indicator is amber, the Ethernet NIC is connected to a valid network link at 10/100 Mbps.
- When the activity indicator is blinking amber, network data is being sent or received.

### 10 Gigabit Ethernet NIC Indicator

Ethernet ports 2 and 3 on the ContentBridge 4000 have a single LED indicator.

![10 Gigabit Ethernet Indicator](image.png)

**NOTE:** During setup, the indicator does not light until you have completed the Configuration Assistant for the ContentBridge.

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady on</td>
<td>NIC is connected to a valid network link.</td>
</tr>
<tr>
<td>Blinking</td>
<td>NIC is connected and data is being sent or received.</td>
</tr>
<tr>
<td>Green</td>
<td>Link speed is 10 Gbps.</td>
</tr>
<tr>
<td>Yellow</td>
<td>Link speed is 1 Gbps.</td>
</tr>
</tbody>
</table>
Power supply LED indicator

Each power supply module on the ContentBridge 4000 has a single LED indicator.

![Power Supply Status Indicator]

⚠️ **CAUTION:** When correcting a power supply mismatch, replace only the power supply with the flashing indicator. Swapping the opposite power supply to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must power down the system.

⚠️ **CAUTION:** AC power supplies support both 220 V and 110 V input voltages. When two identical power supplies receive different input voltages, they can output different wattages, and trigger a mismatch.

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>AC power is not connected.</td>
</tr>
<tr>
<td>Steady green</td>
<td>A valid power source is connected to the power supply and the power supply is operational.</td>
</tr>
<tr>
<td>Blinks green (1Hz)</td>
<td>AC power is connected but operating in a cold redundant state due to low system power load.</td>
</tr>
<tr>
<td>Blinks green (2Hz)</td>
<td>Power supply firmware is updating.</td>
</tr>
</tbody>
</table>
| Blinks amber           | Power supply is operational, but experiencing a warning event.             
                        | ⚠️ **CAUTION:** If two power supplies are used, they must be of the same type and have the same maximum output power. |
| Steady amber           | A power supply failure has occurred, causing it to shut down.              |
Chapter 2
System installation with the ContentBridge 4000

Review step-by-step installation instructions for a Harmonic MediaGrid system with the ContentBridge 4000.

- Site preparation
- Hardware Installation overview
- Software Installation overview

Site preparation
Review environmental, power, and site requirements before installing your system.

Environmental
Harmonic MediaGrid equipment is designed to operate in a clean, air-conditioned control room environment. Care must be taken to avoid temperature and humidity extremes.

Power
When connecting equipment, care must be taken to avoid power lines that are subject to noise and voltage spikes. Do not install units on a power circuit that is common to such equipment as air conditioners and refrigeration units. For optimum protection, AC noise filters and surge protectors are recommended if unstable power conditions are present.

Site
Harmonic MediaGrid equipment is designed for rack mounting. Be sure to read racking precautions before you begin unpacking system components.

Be aware of the weight of the ContentServer and ContentStore so that you may safely move and lift devices.

- An unpopulated ContentStore 5840 weighs approximately 46 kg (101 lb), and 131 kg (288 lb) with all disk drives installed.
- A fully populated ContentServer 4000 weighs approximately 47 kg (104 lb).
- A fully populated ContentStore 4240 weighs approximately 29 kg (64 lb).
- A fully populated ContentServer 3000 and ContentStore 3160 each weighs approximately 34 kg (75 lb).
Required components

Both a client computer and SystemManager platform are required for installation.

See the Harmonic MediaGrid Release Notes for your particular client platform for the latest supported client operating systems.

A SystemManager platform including keyboard, monitor and mouse, is also required. The latest version of the SystemManager application should be installed. See the Release Notes accompanying this release for the exact version required. See the Harmonic SystemManager Installation Guide for more information.

Unpacking the system

Inspect each shipping container for signs of damage. Contact your local Harmonic representative and the carrier immediately if you suspect any damage has occurred during shipping.

Check the contents of each box against the packing list to ensure that all parts are included. If any items are missing, contact your local Harmonic representative immediately.

A rack mounting kit is provided with each Harmonic MediaGrid component, which provides the items needed to mount each component on a rack. Mounting instructions are also included.

The type, quantity and length of the cables depends on the customer site and will likely differ for each separate installation.

IMPORTANT: CX4 cables have a limit of 15 meters. The cables must be factory terminated and ordered in appropriate lengths to meet specifications.

Hardware Installation overview

Before you begin, ensure that the site is properly prepared, with adequate power, ventilation and rack space.

IMPORTANT: Make sure to leave a space for the SystemManager keyboard/monitor tray. It is recommended that you mount the keyboard monitor and tray 71.12 cm (28.0 in.) off the floor. This height is ideal for using the platform while seated or standing.

1. Read all rack mounting precautions.
2. Rack the devices from the bottom of the rack in the following order:
   a. ContentServer and ContentStore units
   b. SystemManager unit
   c. ContentBridge units, followed by ContentDirector units
   d. Network switches

   Refer to the network switch product manual for rack mounting instructions.
3. Connect the network cables, SAS cables, and power cables.

Rack mounting the ContentBridge 4000

The ContentBridge 4000 ships with the Intel AXXVRAIL Mounting Rail Kit.

NOTE: The figures in this section show a two-rack unit server; however, the same rack rails are used for the ContentBridge 4000.

1. Pull the blue release button (component F) to remove inner member (D) from the slides.
Chapter 2: System installation with the ContentBridge 4000

2. Install the slides to the rack.
   a. Align the brackets to desired vertical position on the rack.
   b. Using the screws provided, fasten the rear brackets to the rear rack posts. Use two screws for each bracket.
   c. Fasten the front brackets to the front rack posts. Use one screw for each bracket and place it in the topmost hole. Leave the other holes open for the chassis.

   Figure 2-2: Fastening slides to front rack posts
   d. Move the ball retainer to the front of the rack.
3. Install the inner member (component D in the "AXXVRAIL Mounting Railside-mount" diagram) to the chassis.
   a. Align inner member key holes to the standoffs on the chassis.
   b. Move the inner member in the direction shown in the example below.

![Figure 2-3: Installing inner member to chassis](image)

4. Install the chassis to the fixed slides by pulling the release button in the inner member to release the lock and allow the chassis to close.

![Figure 2-4: Installing chassis to fixed slides](image)
5. Pull the blue release button in the inner member to release the lock and allow the chassis to slide into the rack.

6. Install the bottom-most screw at the front to secure the chassis to the rack.

**Installing the bezel**

Align the bezel in front of the chassis so that the Harmonic logo appears on the top left corner.

1. Connect the USB cable inside the bezel to the right-hand USB port on the front panel. (The other USB port is covered.)

2. Keeping the corners aligned, press the bezel straight onto the chassis.

   **Result:** The USB cable will form a loop that fits inside the metal panel of the bezel.

3. Hand-tighten the two captive thumb screws to secure the bezel in place.

   **Example:**
Connecting the ContentBridge to the network switch

Follow these instructions for systems with a single High Bandwidth ContentBridge.

- **NOTE:** The ContentBridge 4000 can be on either the Public VLAN or the client VLAN.
- **NOTE:** Both 10 GbE ports on the ContentBridge 4000 must be on the same VLAN and subnet.

1. Connect 10 Gigabit Ethernet port 2 on first ContentBridge to the first available port on switch module A.
2. Connect 10 Gigabit Ethernet port 3 on first ContentBridge to the first available port on switch module B.
3. Connect BMC.
4. Continue connecting any remaining ContentBridge nodes in the same manner.

Software Installation overview

Before you begin the ContentBridge 4000, verify that you have all the information you will need.

- **NOTE:** You must configure both 10Gb interfaces and you must configure a primary DNS server.

**Network information**
- For each public 10Gb interface:
  - IP address
  - Network prefix (for example 24, 27, 16)
  - Gateway IP address
- Primary DNS server IP address
- Secondary DNS server IP address (optional)

**Host information**
- Hostname (the first part of the FQDN)
- Domain Suffix (the rest of the FQDN)

**BMC information**
- IP address

**Time information**
- Timezone
- NTP Servers FQDN or IP address (at least 1 is required)

**Harmonic MediaGrid information**
- ContentDirector DNS name or IP address
- Filesystem name
Chapter 2: System installation with the ContentBridge 4000

- mount options (optional)

Authentication mechanism: Active Directory, Local User Authentication, or Administrative Shares (AS)

- Active Directory Authentication
  - AD Controller FQDN
  - AD secondary controller FQDN (optional)
  - Realm
  - Workgroup
  - Username of AD Administrator
  - Password of AD Administrator (used once, not stored)

- Local User Authentication
  - Password (ignored this release, not stored)
  - Remaining steps of LUA setup will be done manually after completion of EM Configuration.

- Administrative Shares
  - Which shares to enable, MGSUPER or MGADMIN (1 or both)

Initial configuration

Complete the initial ContentBridge 4000 configuration.

1. On the ContentBridge 4000, connect a monitor to the VGA port and a keyboard to a USB port.

2. Power up the ContentBridge 4000.

   Result: A login screen appears.

   MediaGrid CLB-4000 Initial Setup
   Log in as setup/setup to set initial IP address, network prefix, and
gateway.
localhost login:

3. Enter the login setup and the password setup.

4. At each prompt, set up the initial IP addressing for the ContentBridge.

   IP address (e.g. 192.0.2.12):
   Network prefix (e.g. 24, 27, 16):
   Gateway address (e.g. 192.0.2.1):

5. Enter y to confirm your IP addresses or n to re-enter them.

   Result: When the IP address configuration is complete, a message directs you to the Embedded Management configuration page at http://[IP address]

Configuring ContentBridge 4000 with Embedded Management

Use the Configuration application available from Harmonic MediaGrid Embedded Management to configure ContentBridge 4000.

1. Visit Harmonic MediaGrid Embedded Management at http://[IP address].
2. Enter the login admin and the password MediaGridR0cks.
4. Under System Settings enter configuration information for the Host, Ethernet Interfaces, BMC Interface, NTP and Access Configuration, and save your changes.
Chapter 2: System installation with the ContentBridge 4000

Configure System Settings

Host

- Host Name
- Domain Suffix

Ethernet Interfaces

- Interface 1:
  - Name: ens0
  - MTU
  - IP Address

- Interface 2:
  - Name: ens1
  - MTU
  - IP Address

Subnet Mask & Gateway

- Subnet Mask
- Default Gateway

DNS

- DNS Server 1
- DNS Server 2

BMC Interface

NTP

Access Configuration
Accessing the ContentBridge 4000 through built-in accounts

Several components of the ContentBridge 4000 system have built-in accounts that are used to access the ContentBridge 4000 through different means.

Table 2-1: Built-in accounts and passwords

<table>
<thead>
<tr>
<th>Component</th>
<th>Access Method</th>
<th>Username</th>
<th>Default Password</th>
<th>How to Change</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux</td>
<td>console</td>
<td>setup</td>
<td>setup</td>
<td>n/a</td>
<td>Used for Initial Setup. Account is locked by setup-once.</td>
</tr>
<tr>
<td>EM and Linux</td>
<td>http port 80, ssh</td>
<td>admin</td>
<td>MediaGridR0cks</td>
<td>EM GUI, /usr/bin/passwd</td>
<td>EM privileged account and ssh enabled wheel account (replacement for ovnuser).</td>
</tr>
<tr>
<td>EM</td>
<td>http port 80</td>
<td>user</td>
<td>user</td>
<td>EM GUI</td>
<td>EM unprivileged user account</td>
</tr>
<tr>
<td>MediaGrid</td>
<td>omfs</td>
<td>omneon</td>
<td>usm</td>
<td>mdscore config file + gateway config file</td>
<td>Default &quot;god user&quot; account used to mount omfs in native mode. Username and password can be changed in config files.</td>
</tr>
<tr>
<td>Component</td>
<td>Access Method</td>
<td>Username</td>
<td>Default Password</td>
<td>How to Change</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>----------</td>
<td>------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>MediaGrid</td>
<td>omfs</td>
<td>mgadmin</td>
<td>1234</td>
<td>mdscore config file</td>
<td>Default privileged account built into mdscore. Username and password can be changed in config file.</td>
</tr>
<tr>
<td>BMC</td>
<td>http to BMC IP</td>
<td>root</td>
<td>omneon</td>
<td>BMC web console</td>
<td>IP address, prefix, gateway, password set in Initial Configuration. ssh access to SMASH CLI</td>
</tr>
<tr>
<td>Intel ASC</td>
<td>https port 9393/asc</td>
<td>admin</td>
<td>Harmonic1234</td>
<td>ASC web console</td>
<td>Internal to ASC.</td>
</tr>
</tbody>
</table>
Joining a ContentBridge to Harmonic MediaGrid with Local User Authentication

For Harmonic MediaGrid ContentBridge software version 5.0 and later, a ContentBridge configured for Local User Authentication (LUA) authenticates using the omauthremote utility over ssh to any ContentDirector.

To create passwordless SSH access from the ContentBridge to any Harmonic MediaGrid ContentDirector, you will set up the first, then the second ContentDirector units, and then set up the ContentBridge. You can then optionally configure `omauthremote.conf` for primary and secondary authentication servers.

**NOTE:** For redundancy authentication, omauthremote is configured to use a primary and a secondary ContentDirector. By default these are `<clusternamex>-1` and `<clusternamex>-2`. Initial Configuration sets up configuration files on the ContentBridge for LUA. After Initial Configuration completes, this procedure completes the setup of Local User Authentication.

- Creating Passwordless SSH Access from the ContentBridge to multiple Harmonic MediaGrid ContentDirector units
- Setting up the second ContentDirector unit
- Setting up the ContentBridge
- Configuring `omauthremote.conf`

Creating Passwordless SSH Access from the ContentBridge to multiple Harmonic MediaGrid ContentDirector units

Set up the first ContentDirector unit. Then you can set up the second unit, and the ContentBridge. Then, optionally configure `omauthremote.conf` for primary and secondary authentication servers.

**Before you begin**

Setting up the first ContentDirector requires:

- Harmonic MediaGrid Server version 4.2. or later (4.2.0.2 or later).
- Harmonic MediaGrid ContentBridge software version 5.0 or later, with Harmonic ContentBridge 4000 and Harmonic ContentBridge 2010F hardware models.

1. Log in to the first ContentDirector as root and create a service account named `omauthchk`.

   ```bash
   useradd -g wheel -n omauthchk -K UID_MIN=400 -K UID_MAX=499
   passwd omauthchk
   ```
Chapter 3: Joining a ContentBridge to Harmonic MediaGrid with Local User Authentication

2. Enable the service account in `/etc/sudoers` on the first ContentDirector `visudo` and add the following:

   ```
   # Enable service account for LUA with CLB-4000
   omauthchk ALL=(ALL) NOPASSWD: /usr/bin/omntlm_auth
   Defaults:omauthchk !requiretty
   ```

3. Log in to the first ContentDirector using the `omauthchk` service account.

4. From the `omauthchk` home directory, make an `.ssh` subdirectory, if needed, then verify permissions and enter the `.ssh` directory. For example:

   ```
   mkdir -p .ssh
   chmod 700 .ssh
   cd .ssh
   ```

5. In the `.ssh` directory, generate private and public authentication keys, then press Enter twice to set up passwordless access. Use the key names `id_omauthchk` and `id_omauthchk.pub`:

   ```
   ssh-keygen -f id_omauthchk
   ```

6. Append the public key to the authorized_keys file as follows:

   ```
   chmod 644 authorized_keys (if present)
   cat id_omauthchk.pub >> authorized_keys
   chmod 444 authorized_keys
   ```

What to do next

Now you can set up the second ContentDirector unit, and the ContentBridge. Then, optionally configure `omauthremote.conf` for primary and secondary authentication servers.

Setting up the second ContentDirector unit

Set up the second ContentDirector.

1. Log in to the second ContentDirector as root and create a service account named `omauthchk`.

   ```
   useradd -g wheel -n omauthchk -K UID_MIN=400 -K UID_MAX=499
   passwd omauthchk
   ```

2. Enable the service account in `/etc/sudoers` on the second ContentDirector `visudo` and add the following:

   ```
   # Enable service account for LUA with CLB-4000
   omauthchk ALL=(ALL) NOPASSWD: /usr/bin/omntlm_auth
   Defaults:omauthchk !requiretty
   ```

3. Log in to the ContentDirector using the `omauthchk` service account.

4. From the `omauthchk` home directory, make an `.ssh` subdirectory, if needed, then verify permissions and enter the `.ssh` directory. For example:

   ```
   mkdir -p .ssh
   chmod 700 .ssh
   cd .ssh
   ```
5. In the .ssh directory, copy the public key from the first ContentDirector:

```
scp <first ContentDirector>:.ssh/id_omauthchk.pub
```

6. Append the public key to the authorized_keys file as follows:

```
chmod 644 authorized_keys (if present)
cat id_omauthchk.pub >> authorized_keys
chmod 444 authorized_keys
```

---

**Setting up the ContentBridge**

Set up the ContentBridge.

1. Log in to the ContentBridge as root.

2. From /opt/omclb/conf, connect interactively to each public IP address of each of the ContentDirector units using SSH, as follows:

```
ssh -l omauthchk <first public IP of first ContentDirector> /bin/hostname
ssh -l omauthchk <second public IP of first ContentDirector> /bin/hostname
ssh -l omauthchk <first public IP of second ContentDirector> /bin/hostname
ssh -l omauthchk <second public IP of second ContentDirector> /bin/hostname
```

3. Securely copy the private key from the first ContentDirector as follows:

```
scp omauthchk@<first ContentDirector>:.ssh/id_omauthchk /opt/omclb/conf/
id_omauthchk
```

4. Verify passwordless SSH access, as follows:

```
ssh -l omauthchk -i /opt/omclb/conf/id_omauthchk <first ContentDirector> /bin/hostname
ssh -l omauthchk -i /opt/omclb/conf/id_omauthchk <second ContentDirector> /bin/hostname
```

---

**Configuring omauthremote.conf**

Configure omauthremote.conf if you want authentication redundancy.

**Before you begin**

When setting up DNS entries for access to Harmonic MediaGrid, Harmonic recommends the following:

- Create a DNS entry for the Harmonic MediaGrid cluster with the public IP addresses of all ContentDirector units.
- Create a DNS entry for each ContentDirector with the public IP addresses of the ContentDirector.
- Name each ContentDirector using <clusternname>-1, <clusternname>-2, etc. This is the default when using Configuration Assistant.
- Use the DNS entry for the Harmonic MediaGrid cluster as the ContentDirector field of the Access Configuration step of Initial Configuration.
Chapter 3: Joining a ContentBridge to Harmonic MediaGrid with Local User Authentication

- Initial Configuration sets up configuration files for Local User Access based on this recommendation.

1. Check the contents of `/etc/omauthremote.conf` and modify as needed for the site.
   Initial setup configures `<clustername>-1` as the primary authentication server and `<clustername>-2` as the secondary. If necessary, modify `/etc/omauthremote.conf` to match the site.

2. Verify that you have correctly configured access to the primary ContentDirector as follows:

   ```bash
echo "." | /opt/omclb/sbin/omauthremote
```

   The expected result is:

   ```bash
omauth_ntlm: OK
```
Appendix A

Harmonic Technical Assistance Center contact information

A list of phone numbers, e-mail addresses, and important links for the Harmonic Technical Assistance Center (TAC).

Table A-1: Harmonic Technical Assistance Center phone numbers and email addresses

<table>
<thead>
<tr>
<th>Region</th>
<th>Telephone Technical Support</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>888.673.4896 (888.MPEG.TWO)</td>
<td><a href="mailto:support@harmonicinc.com">support@harmonicinc.com</a></td>
</tr>
<tr>
<td></td>
<td>408.490.6477</td>
<td></td>
</tr>
<tr>
<td>Europe, the Middle East and Africa (EMEA)</td>
<td>+44.1252.555.450</td>
<td><a href="mailto:emeasupport@harmonicinc.com">emeasupport@harmonicinc.com</a></td>
</tr>
<tr>
<td>India</td>
<td>+91.120.498.3199</td>
<td><a href="mailto:apacsupport@harmonicinc.com">apacsupport@harmonicinc.com</a></td>
</tr>
<tr>
<td>Russia</td>
<td>+7.495.926.4608</td>
<td><a href="mailto:rusupport@harmonicinc.com">rusupport@harmonicinc.com</a></td>
</tr>
<tr>
<td>China</td>
<td>+86.10.6569.5580</td>
<td><a href="mailto:chinasupport@harmonicinc.com">chinasupport@harmonicinc.com</a></td>
</tr>
<tr>
<td>Japan</td>
<td>+81.3.5614.0524</td>
<td><a href="mailto:japansupport@harmonicinc.com">japansupport@harmonicinc.com</a></td>
</tr>
<tr>
<td>Asia Pacific (APAC) – Other Territories</td>
<td>+852.3184.0045 +65.6542.0050</td>
<td><a href="mailto:apacsupport@harmonicinc.com">apacsupport@harmonicinc.com</a></td>
</tr>
</tbody>
</table>

Report an issue online
https://www.harmonicinc.com/service-support/support/

Harmonic support website
http://www.harmonicinc.com/content/technical-support

Software download location for Cable Edge products
ftp://ftp.harmonicinc.com

Contact Harmonic Technical Publications
techdocs@harmonicinc.com

- Harmonic corporate contact information
Harmonic corporate contact information

Phone numbers and addresses for the corporate office.

Harmonic corporate address

4300 North First Street
San Jose, CA 95134
U.S.A.

Harmonic corporate telephone numbers

Tel. 1.800.788.1330 (from the U.S. and Canada)
Tel. +1.408.542.2500 (outside the U.S. and Canada)
Fax. +1.408.542.2511
**Appendix B**

**Safety and regulatory compliance information**

**Legal disclaimer:** Information in this document is provided in connection with Harmonic products. Unless otherwise agreed in writing Harmonic products are not designed nor intended for any application in which the failure of the product could cause personal injury or death.

**NOTE:** The information in this appendix may apply to purchased products only.

- Important safety instructions
- Safety symbols & safety, warning & caution instructions
- Symboles de sécurité de sécurité, d'avertissement et Attention Instructions
- Sicherheit Symbole und Sicherheit, Achtung & Vorsicht Anleitung
- Preparing the site
- Disassembling an end-of-life product
- Safety rules (English)
- Règles de sécurité
- EU manufacturer’s Declaration of Conformity
- Electromagnetic compatibility notices – Class A
- Product regulatory compliance
- Product regulatory compliance markings
- Product environmental compliance
- Compliance with country specific environmental, safety and EMC standards

**Important safety instructions**

Review important safety guidelines for operators and service personnel.

Specific warnings and cautions are found throughout the guide where they apply, but may not appear here. Please read and follow the important safety information, noting especially those instructions related to risk of fire, electric shock or injury to persons. You must adhere to the guidelines in this document to ensure and maintain compliance with existing product certifications and approvals. In this document, we use “product,” “equipment,” and “unit” interchangeably.

This equipment generates, uses, and can radiate radio frequency energy. It may cause harmful interference to radio communications if it is not installed and used in accordance with the instructions in this manual. Operation of this equipment in a residential area is likely to cause harmful interference. If this occurs, the user will be required to correct the interference at his or her own expense.
Appendix B: Safety and regulatory compliance information

In event of conflict between the information in this document and information provided with the product or on our website for a particular product, this product documentation takes precedence.

- Safety symbols (English)
- Symboles de sécurité (français)
- Sicherheit symbole (Deutsch)

Safety symbols & safety, warning & caution instructions

Understand the meaning of different safety symbols.

To avoid personal injury or property damage, before you begin installing or replacing the product, read, observe, and adhere to all the following safety instructions and information. Harmonic products and/or product packaging may be marked with the safety symbols used throughout this document, when it is necessary to alert operators, users, and service providers to pertinent safety instructions in the manuals.

<table>
<thead>
<tr>
<th>Mark</th>
<th>Notes</th>
</tr>
</thead>
</table>
| ![Warning](image) | **Installing or replacing the product unit warning**  
- Only trained and qualified service personnel should be allowed to install, replace, or service this unit (refer AS/NZS 3260 Clause 1.2.14.3 Service Personnel).  
- Read the installation instructions before connecting the system to the power source.  
- When installing or replacing the unit, always make the ground connection first and disconnect it last.  
- Installation of the unit must comply with local and national electrical codes.  
- This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of special tool, lock and key or other means of security.  
- Use only specified replacement parts.  
- Do not use this unit in or near water. Disconnect all AC power before installing any options or servicing the unit unless instructed to do so by this manual. |

| ![Warning](image) | **Rack mount warning**  
To prevent bodily injury when mounting or servicing this unit in a rack, special precautions must be taken to ensure your safety and stability of system:  
- Conform to local occupational health and safety requirements when moving and lifting the equipment.  
- Ensure that mounting of the unit by mechanical loading tools should not induce hazardous conditions.  
- To avoid risk of potential electric shock, a proper safety ground must be implemented for the rack and each piece of equipment installed on it. |
<table>
<thead>
<tr>
<th>Mark</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **Chassis warning** | • Before connecting or disconnecting ground or power wires to the chassis, ensure that power is removed from the DC circuit.  
• To prevent personal injury or damage to the chassis, lift the unit only by using handles that are an integral part of the chassis, or by holding the chassis underneath its lower edge.  
• Any instructions in this guide that require opening the chassis or removing a board should be performed by qualified service personnel only.  
• Slots and openings in the chassis are provided for ventilation. Do not block them. Leave the back of the frame clear for air exhaust cooling and to allow room for cabling - a minimum of 6 inches (15.24 cm) of clearance is recommended. |
| **Electric shock warning** | • This unit might have more than one power cord. To reduce the risk of electric shock, disconnect the two power supply cords before servicing the unit.  
• Before working on a chassis or working near power supplies, unplug the power cord on AC units.  
• Do not work on the system or connect or disconnect cables during periods of lightning activity.  
• This unit is grounded through the power cord grounding conductor. To avoid electric shock, plug the power cord into a properly wired receptacle before connecting the product input or outputs.  
• Route power cords and other cables so that they are not likely to be damaged. Disconnect power input to unit before cleaning. Do not use liquid or aerosol cleaners; use only a damp cloth to clean chassis.  
• Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on. Do not insert anything into either of the system's two power supply cavities with power connected.  
• Never install an AC power module and a DC power module in the same chassis.  
• Do not wear hand jewelry or watch when troubleshooting high current circuits, such as the power supplies.  
• To avoid fire hazard, use only the specified correct type voltage and current ratings as referenced in the appropriate parts list for this unit. Always refer fuse replacement to qualified service personnel.  
• This unit relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors).  
• To avoid electrocution ensure that the rack has been correctly grounded before switching on the unit. When removing the unit remove the grounding connection only after the unit is switched off and unplugged. |
Appendix B: Safety and regulatory compliance information

<table>
<thead>
<tr>
<th>Mark</th>
<th>Notes</th>
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</thead>
</table>
| Caution | **Electrostatic Discharge (ESD) caution**  
- Follow static precaution at all times when handling this unit.  
- Always wear an ESD-preventive wrist or ankle strap when handling electronic components. Connect one end of the strap to an ESD jack or an unpainted metal component on the system.  
- Handle cards by the faceplates and edges only; avoid touching the printed circuit board and connector pins.  
- Place any removed component on an antistatic surface or in a static shielding bag.  
- Avoid contact between the cards and clothing.  
- Periodically check the resistance value of the antistatic strap. Recommended value is between 1 and 10 mega-ohms (Mohms). |
| Warning | **Laser radiation warning**  
Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Never operate a unit with a broken fibre or with a separated fiber connector. |
| Warning | **Lithium battery handling safety instructions**  
- CALIFORNIA PERCHLORATE ADVISORY: Some lithium batteries may contain perchlorate material. The following advisory is provided: "Perchlorate Material - special handling may apply, see: http://www.dtsc.ca.gov/hazardouswaste/perchlorate/ for information." |
| Caution |  
- Risk of explosion if battery is replaced incorrectly or with an incorrect type.  
- Dispose of used batteries according to the manufacturer's instructions.  
- There are no user-serviceable batteries inside Harmonic products. Refer to Harmonic qualified personnel only to service the replaceable batteries. |

**Symboles de sécurité de sécurité, d'avertissement et Attention Instructions**

Comprendre la signification des différents symboles de sécurité .

Pour éviter des blessures ou des dommages matériels, avant de commencer l'installation ou le remplacement du produit, lire, observer, et de respecter toutes les instructions et informations de sécurité suivantes. Produits harmoniques et / ou l'emballage du produit peuvent être marqués avec les symboles
Symboles de sécurité de sécurité, d'avertissement et Attention Instructions

de sécurité utilisés dans le présent document, lorsque cela est nécessaire pour alerter les opérateurs, les utilisateurs et les fournisseurs de services de consignes de sécurité pertinentes dans les manuels.

<table>
<thead>
<tr>
<th>Mark</th>
<th>Notes</th>
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</table>
| ![Avertissement](image) | **Installation ou remplacement de l'unité de produit avertissement**  
- Il est vivement recommandé de confier l'installation, le remplacement et la maintenance de ces équipements à des personnels qualifiés et expérimentés. (voir AS / NZS 3260 article 1.2.14.3 du personnel de service).  
- Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.  
- Lors de l'installation ou le remplacement de l'appareil, la mise à la terre doit toujours être connectée en premier et déconnectée en dernier.  
- L'équipement doit être installé conformément aux normes électriques nationales et locales.  
- Cet appareil est à installer dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité.  
- Utilisez uniquement des pièces de rechange spécifiées.  
- Ne pas utiliser ce produit dans l'eau ni à proximité de l'eau. Débrancher toutes les prises d'alimentation secteur avant d'installer des options ou d'effectuer l'entretien de l'unité, à moins d'instructions contraires dans le présent manuel. |
| ![Avertissement](image) | **Rack monture avertissement**  
Pour éviter les blessures corporelles lors du montage ou l'entretien de cet appareil dans un rack, des précautions particulières doivent être prises pour assurer votre sécurité et la stabilité du système:  
- Conformez-vous aux exigences de médecine du travail et de sécurité lorsque vous déplacez et soulevez le matériel.  
- Assurez-vous que le montage de l'appareil par des outils de chargement mécaniques ne doit pas induire des conditions dangereuses.  
- Pour éviter tout risque d'électrocution, le rack et chaque élément de l'équipement installé dans le rack doivent être correctement reliés à la terre. |
| ![Avertissement](image) | **Châssis avertissement**  
- Avant de connecter ou de déconnecter les câbles d'alimentation (pôles et terre) du châssis, vérifiez que le circuit de courant continu est hors tension.  
- Pour éviter toute blessure ou des dommages au châssis, soulevez l'unité uniquement par les poignées du châssis lui-même ou en portant celui-ci par le bord inférieur.  
- Toutes les opérations du présent guide nécessitant l'ouverture du châssis ou le retrait d'une carte doivent être uniquement effectuées par du personnel d'entretien qualifié.  
- Le châssis est muni de fentes et d'ouvertures d'aération. Ne pas les bloquer. Dégager l'arrière du cadre pour permettre le refroidissement de l'évacuation d'air et laisser de la place au câblage; un dégagement d'au moins 15.24 cm (6 po) est recommandé. |
<table>
<thead>
<tr>
<th>Mark</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Avertissement</td>
<td><strong>Choc électrique avertissement</strong></td>
</tr>
<tr>
<td></td>
<td>• Il est possible que cette unité soit munie de plusieurs cordons d'alimentation. Pour éviter les risques d'électrocution, débrancher les deux cordons d'alimentation avant de réparer l'unité.</td>
</tr>
<tr>
<td></td>
<td>• Avant de travailler sur un châssis ou à proximité d'une alimentation électrique, débrancher le cordon d'alimentation des unités en courant alternatif.</td>
</tr>
<tr>
<td></td>
<td>• Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage.</td>
</tr>
<tr>
<td></td>
<td>• Ce unité est mis à la terre par le conducteur de protection intégré au cordon d'alimentation. Pour éviter les chocs électriques, brancher le cordon d'alimentation dans une prise correctement cable avant de raccorder les entrées ou sorties du unité.</td>
</tr>
<tr>
<td></td>
<td>• Installer les cordons d'alimentation et autres cables de sorte qu'ils ne risquent pas d'être endommagés. Couper l'alimentation avant nettoyage. Ne pas utiliser de nettoyant liquide ou en aérosol; utiliser seulement un linge humide.</td>
</tr>
<tr>
<td></td>
<td>• Des courants électriques dangereux circulent dans cet appareil. Afin d'éviter les lessures, ne pas toucher les connexions et composants exposés lorsque l'appareil est sous tension. Ne rien insérer dans l'une ou l'autre des cavités des prises de courant du système lorsque l'appareil est sous tension.</td>
</tr>
<tr>
<td></td>
<td>• N'installez jamais un module d'alimentation AC et un module d'alimentation DC dans le même châssis.</td>
</tr>
<tr>
<td></td>
<td>• Ne pas porter de bijoux aux mains ni de montre durant le dépannage des circuits à haute tension, comme les transformateurs.</td>
</tr>
<tr>
<td></td>
<td>• Pour prévenir les risques d'incendie, n'utiliser que le type, la tension et le courant nominal spécifiés dans la nomenclature des pièces de ce unité. Toujours confier le remplacement des fusibles à du personnel d'entretien qualifié.</td>
</tr>
<tr>
<td></td>
<td>• Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifier qu'un fusible ou qu'un disjoncteur de 120 V alt., 15 A U.S. maximum (240 V alt., 10 A international) est utilisé sur les conducteurs de phase (conducteurs de charge).</td>
</tr>
<tr>
<td></td>
<td>• Pour éviter l'électrocution, assurez-vous que le rack a bien été mis à la terre avant de mettre l'unité en marche. Lors du retrait de l'unité, retirer le raccordement de terre seulement après avoir mis l'unité à l'arrêt et l'avoir débranchée.</td>
</tr>
</tbody>
</table>
Sicherheit Symbole und Sicherheit, Achtung & Vorsicht Anleitung

Verstehen Sie die Bedeutung der verschiedenen Sicherheitssymbole.

Um Verletzungen oder Sachschäden zu vermeiden, bevor Sie mit der Installation oder Austausch des Produkts zu beginnen, zu lesen, zu beobachten, und sich an all den folgenden Sicherheitshinweise und Informationen. Harmonic Produkte und / oder Produktverpackungen können mit den Sicherheitssymbole

<table>
<thead>
<tr>
<th>Mark</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>Attention</td>
<td>Les décharges électrostatiques (ESD) attention</td>
</tr>
<tr>
<td></td>
<td>• Respecter systématiquement les precautions relatives aux charges</td>
</tr>
<tr>
<td></td>
<td>électrostatiques durant la manipulation de cet unité.</td>
</tr>
<tr>
<td></td>
<td>• Portez toujours un poignet ou la cheville bracelet antistatique</td>
</tr>
<tr>
<td></td>
<td>préventive lors de la manipulation des composants électroniques.</td>
</tr>
<tr>
<td></td>
<td>Branchez une extrémité de la sangle à une prise ESD ou d'un</td>
</tr>
<tr>
<td></td>
<td>composant métallique non peinte sur le système.</td>
</tr>
<tr>
<td></td>
<td>• Manipulez les cartes en les faces avant et les bords seulement;</td>
</tr>
<tr>
<td></td>
<td>éviter de toucher la carte de circuit imprimé et les broches du</td>
</tr>
<tr>
<td></td>
<td>connecteur.</td>
</tr>
<tr>
<td></td>
<td>• Placer un composant retiré sur une surface antistatique ou dans</td>
</tr>
<tr>
<td></td>
<td>un sac de protection statique.</td>
</tr>
<tr>
<td></td>
<td>• Éviter tout contact entre les cartes et les vêtements.</td>
</tr>
<tr>
<td></td>
<td>• Vérifier périodiquement la valeur de résistance de la sangle</td>
</tr>
<tr>
<td></td>
<td>antistatique. Valeur recommandée est comprise entre 1 et 10</td>
</tr>
<tr>
<td></td>
<td>méga-ohms (Mohms).</td>
</tr>
<tr>
<td>Avertissement</td>
<td>Rayonnement laser attention</td>
</tr>
<tr>
<td></td>
<td>Rayonnement laser invisible peut être émis à partir de fibres ou</td>
</tr>
<tr>
<td></td>
<td>les connecteurs débranchés. Ne pas regarder en faisceaux ou</td>
</tr>
<tr>
<td></td>
<td>regarder directement avec des instruments optiques. Ne jamais</td>
</tr>
<tr>
<td></td>
<td>faire fonctionner une unité en cas de bris d'une fibre ou de</td>
</tr>
<tr>
<td></td>
<td>séparation d'un connecteur de fibre.</td>
</tr>
<tr>
<td>Avertissement</td>
<td>Batterie au lithium manipulation instructions de sécurité</td>
</tr>
<tr>
<td></td>
<td>• Perchlorate pour la Californie Consultatif: Certaines batteries</td>
</tr>
<tr>
<td></td>
<td>au lithium, peuvent contenir du perchlorate. le texte qui suit</td>
</tr>
<tr>
<td></td>
<td>consultatif est prévu: &quot;Présence de perchlorate - une</td>
</tr>
<tr>
<td></td>
<td>manipulation spéciale peut s'appliquer, voir:</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.dtsc.ca.gov/hazardouswaste/perchlorate/">http://www.dtsc.ca.gov/hazardouswaste/perchlorate/</a> for information.&quot;</td>
</tr>
<tr>
<td>Attention</td>
<td>• Il y a danger d'explosion si la batterie est remplacée de</td>
</tr>
<tr>
<td></td>
<td>manière incorrecte ou par une batterie de type incorrect.</td>
</tr>
<tr>
<td></td>
<td>• Mettre au rebut les batteries usagées conformément aux instructions</td>
</tr>
<tr>
<td></td>
<td>du fabricant.</td>
</tr>
<tr>
<td></td>
<td>• Les batteries des produits Harmonic ne peuvent pas être</td>
</tr>
<tr>
<td></td>
<td>réparées ni entretenues par l'utilisateur. Ne confier l'entretien</td>
</tr>
<tr>
<td></td>
<td>des batteries remplaçables qu'à du personnel compétent de</td>
</tr>
<tr>
<td></td>
<td>Harmonic.</td>
</tr>
</tbody>
</table>

Sicherheit Symbole und Sicherheit, Achtung & Vorsicht Anleitung

Verstehen Sie die Bedeutung der verschiedenen Sicherheitssymbole.

Um Verletzungen oder Sachschäden zu vermeiden, bevor Sie mit der Installation oder Austausch des Produkts zu beginnen, zu lesen, zu beobachten, und sich an all den folgenden Sicherheitshinweise und Informationen. Harmonic Produkte und / oder Produktverpackungen können mit den Sicherheitssymbole
in diesem Dokument verwendet werden, markiert, wenn es notwendig ist für die Betreiber, Anwender und Dienstleister, um relevante Sicherheitsanweisungen in den Handbüchern zu alarmieren.

<table>
<thead>
<tr>
<th>Mark</th>
<th>Notes</th>
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</thead>
</table>
| ![Warnung](image) | **Installation oder den Austausch des Produkts Einheit Warnung**  
  - Das Installieren, Ersetzen oder Bedienen dieser Ausrüstung sollte nur geschultem, qualifiziertem Personal gestattet warden (siehe AS / NZS 3260 Clause 1.2.14.3 Servicepersonal)  
  - Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließen.  
  - Der Erdanschluß muß bei der Installation der Einheit immer zuerst hergestellt und zuletzt abgetrennt werden.  
  - Die Installation der Geräte muss den Sicherheitsstandards entsprechen.  
  - Verwenden Sie nur die angegebenen Ersatzteile  
| ![Warnung](image) | **Rack-Montage-Warnung**  
  Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt:  
  - Entsprechen den lokalen Arbeitsschutzanforderungen beim Bewegen und Heben der Ausrüstung.  
  - Stellen Sie sicher, dass die Montage des Gerätes durch mechanische Belastung Werkzeuge sollten nicht gefährlichen Bedingungen zu induzieren.  
  - Um das Risiko von möglichen elektrischen Schlag zu vermeiden, muss mit einer angemessenen Erdung für Rack und jedes Gerät installiert ist implementiert werden. |
<table>
<thead>
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<th>Mark</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Warnung | **Chassis Warnung**  
- Gleichstrom-Unterbrechung Bevor Sie Erdungs- oder Stromkabel an das Chassis anschließen oder von ihm abtrennen, ist sicherzustellen, daß der Gleichstrom-Stromkreis unterbrochen ist.  
- Um Verletzungen und Beschädigung des Chassis zu vermeiden, sollten Sie das Chassis nicht an den Henkeln auf den Elementen (wie z.B. Stromanschlüsse, Kühlungen oder Karten) heben oder kippen; oder indem Sie es unterhalb der Unterkante packen.  
- Alle Hinweise in diesem Handbuch, die das Öffnen benötigen Sie das Gehäuse oder das Entfernen eines Board sollte nur von qualifiziertem Fachpersonal durchgeführt werden.  
- Für Schlitzte und Öffnungen im Chassis vorgesehen. Blockieren Sie sie nicht. Lassen Sie die Rückseite des Rahmens frei für Abluftkühlung und um Platz für die Verkabelung ermöglichen - ein Minimum von 6 Zoll (15,24 cm) Abstand wird empfohlen. |
Warnung

Elektroschock-Warnung

- Diese Einheit hat möglicherweise mehr als ein Netzkabel. Zur Verringerung der Stromschlaggefahr trennen Sie beide Netzgerätekabel ab, bevor Sie die Einheit warten.
- Vor der Arbeit an einem Chassis für Arbeiten in der Nähe Stromversorgung, ziehen Sie das Netzkabel mit Netzeinheiten.
- Arbeiten Sie nicht am System und schließen Sie keine Kabel an bzw. trennen Sie keine ab, wenn es gewittert.
- Dieses Gerät ist über das Netzkabel Erdungsleiter geerdet. Um einen Stromschlag zu vermeiden, stecken Sie das Netzkabel in eine Steckdose richtig verdrahtet, bevor Sie das Produkt Eingang oder Ausgänge.
- Verlegen Sie Netzkabel und andere Kabel, so dass sie wahrscheinlich nicht beschädigt werden. Trennen Eingangsleistung Einheit vor der Reinigung. Verwenden Sie keine flüssigen oder Aerosolreiniger; nur mit einem feuchten Tuch zu reinigen Chassis.
- Ein Wechselstromsmodul und ein Gleichstrommodul dürfen niemals in demselben Chassis installiert werden.
- Tragen Sie keine Hand Schmuck oder schauen Sie bei der Fehlersuche hohen Stromkreise, wie beispielsweise die Stromversorgung.
- Um die Brandgefahr zu vermeiden, verwenden Sie nur den genannten richtige Art von Spannung und Strom Ratings als in der entsprechenden Stückliste für diese Einheit verwiesen. Beziehen sich immer auf Austausch der Sicherung von qualifiziertem Fachpersonal.
- Dieses Produkt ist darauf angewiesen, daß im Gebäude ein Kurzschluß- bzw. Überstromschutz installiert ist. Stellen Sie sicher, daß eine Sicherung oder ein Unterbrecher von nicht mehr als 240 V Wechselstrom, 10 A (bzw. in den USA 120 V Wechselstrom, 15 A) an den Phasenleitern (allen Stromführenden Leitern) verwendet wird.
- Um einen Stromschlag zu vermeiden, sicherzustellen, dass die Zahnstange wurde korrekt vor dem Einschalten des Gerätes geerdet. Beim Entfernen der Einheit entfernen Sie die Masseverbindung nur, nachdem das Gerät ausgeschaltet ist und der Netzstecker gezogen.
**Preparing the site**

Make the equipment site ready for installation and use.

**NOTE:** Only trained and qualified service personnel (as defined in IEC 60950 and AS/NZS 3260) should install, replace, or service the equipment. Install the system in accordance with the U.S. National Electric Code if you are in the United States.
1. Preparing & choosing a site for installation.
   ◦ To ensure normal system operation, plan your site configuration and prepare the site before installation.
   ◦ Install the unit in a restricted access area.
   ◦ Choose a site with a dry, clean, well-ventilated and air-conditioned area.
   ◦ Choose a site that maintains an ambient temperature of 32 to 104oF (0 to 40oC).

2. Creating a safe environment.
   ◦ Connect AC-powered systems to grounded power outlets or as per local regulations.
   ◦ Do not move or ship equipment unless it is correctly packed in its original wrapping and shipping containers.
   ◦ Only allow Harmonic trained personnel to undertake equipment service and maintenance. Do not permit unqualified personnel to operate the unit.
   ◦ Wear ear protection when working near an NSG Pro platform for a longer period of time.

3. Rack mounting the unit.
   ◦ Install the system in an open rack whenever possible. If installation in an enclosed rack is unavoidable, ensure that the rack has adequate ventilation.
   ◦ Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips). This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
   ◦ When mounting this unit in the partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
   ◦ If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
   ◦ The rack must be anchored to an immovable support to prevent it from tipping when the unit is mounted on it. The rack must be installed according to the rack manufacturer’s instructions.
   ◦ Disconnect all power and external cables before lifting the unit. Depending on the weight of the unit, more than one person might be required to lift it.

4. Power considerations

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| AC power | ◦ Adding to the system a UPS (Uninterrupted Power Supply) and an AVR (Automated Voltage Regulator) is highly recommended.  
  ◦ Installing the main power supply by a qualified electrician, according to power authority regulations. Make sure all powering are wired with an earth leakage, according to local regulations.  
  ◦ It is recommended to install the encoder within 1.5m (approximately 5 feet) from an easily accessible grounded AC outlet.  
  ◦ When the encoder is rack-mounted, ensure that the rack is correctly grounded. |
| DC power | ◦ Ensure a suitable over-current device is in-line between the equipment and the power source.  
  ◦ Connect DC-input power supplies only to a DC power source that complies with the safety extra-low voltage (SELV) requirements in the UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, AS/NZS 60950-1, EN/IEC 60825-1, 21 CFR 1040, EN 60950-1, and IEC 60950-1 standards. |
Option | Description
--- | ---
◦ | Ensure that power is removed from the DC circuit before installing or removing power supplies.

5. Handling Fiber Channel cables
◦ Always read and comply with the handling instructions on the shipping container.
◦ Follow all ESD precautions and approved fiber cleaning procedures.
◦ The fiber is made of a very pure, expensive glass and should be treated with great care. Handle fibers only in areas that are very clean and do not contain sharp objects.
◦ Wear finger cots or gloves as dirt and oils can damage the fiber and contaminate connectors.
◦ Do not allow kinks or knots to develop in the fiber. If tangles occur, carefully work out the tangles avoiding pulling or bending the fibre beyond its bend radius.
◦ Always use the correct tools for stripping and cleaving the fiber. It will save time and reduce breakage caused by scratches.
◦ If you must secure a bundle of fiber cables together, avoid plastic and metal tie wraps; secure with Velcro instead.

6. Disposing of the unit
◦ Dispose of the unit and its components (including batteries) as specified by all national laws and regulations.

Disassembling an end-of-life product

Review guidance on responsible product disposal and recycling of a product.

For disassembly instructions, please call the technical support in order to remove components requiring selective treatment, as defined by the EU WEEE Directive (2012/19/EU). See Harmonic Technical Assistance Center contact information on page 29.

1. Disassemble equipment at a dedicated area only, gather the needed tools for disassembly.

2. Remove covers, housing, etc.

3. Remove and separate sub-assemblies (i.e. cables, metals, displays, fans, etc.).

4. Separate hazardous materials from the remainder of the material.
   a. Sort hazardous materials into their different types (i.e., batteries, hazardous liquids, hazardous solids, fiberglass, etc.).
   b. Proceed with hazardous waste management processes only.

5. Identify re-usable materials/sub-assemblies and separate these from the rest of the material.

6. Identify and separate recyclable materials as per below examples:
   a. Scrap material to be sent to smelter(s).
   b. E-waste such as displays, CPU’s, cables and wires, hard drives, keyboards, etc.
   c. Metals such as steel, brass, and aluminum.
   d. Plastics such as fan casings, housings, covers, etc.
   e. Fiber optics and plastic tubing not containing electrical or data wiring.
Safety rules (English)

Observe the rules for safe product disposal and recycling.

Recycler personnel are to wear personal protective equipment including proper eye protection, proper hand protection, and proper breathing protection if needed.

Recycler personnel shall be experienced with using the proper tools required for disassembling equipment. Untrained personnel shall not disassemble Harmonic products. Unfamiliarity with tools can cause damage and injury.

Règles de sécurité

Respecter les règles d’élimination du produit en toute sécurité et le recyclage.

Le personnel du recycleur doit porter de l'équipement de protection individuelle, y compris des lunettes, des gants et un masque de protection appropriés au besoin.

Le personnel du recycleur doit avoir de l’expérience des outils de démontage de l'appareil. Les produits Harmonic ne doivent pas être démontés par du personnel non qualifié. Une mauvaise connaissance des outils peut causer des dommages et des blessures.

EU manufacturer’s Declaration of Conformity

Learn more about Harmonic product regulatory compliance.

This equipment is in compliance with the essential requirements and other provisions of Directives 73/23/EEC and 89/336/EEC as amended by Directive 93/68/EEC.

NOTE: For specifics, about which standards have been applied, refer to the Declaration of Conformity of the product on Harmonic website at Product Regulatory Compliance or contact Harmonic Compliance Team at regulatory.compliance@harmonicinc.com.

Electromagnetic compatibility notices – Class A

Learn more about Harmonic product electromagnetic compatibility.

1. FCC verification statement (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.
Connections between the Harmonic equipment and other equipment must be made in a manner that is consistent with maintaining compliance with FCC radio frequency emission limits. Modifications to this equipment not expressly approved by Harmonic may void the authority granted to the user by the FCC to operate this equipment and you may be required to correct any interference to radio or television communications at your own expense.

2. ICES–003 statement (Canada)
   
   **English:** This Class A digital apparatus complies with Canadian ICES-003.
   
   **French:** Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

3. CE Declaration of Conformity (European Union)

   This product has been tested in accordance too, and complies with the Low Voltage Directive (2014/35/EU) and EMC Directive (2014/30/EU). The product has been marked with the CE Mark to illustrate its compliance.

4. VCCI Class A warning (Japan)

   この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

   English translation of the notice above: This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) from Information Technology Equipment. If this equipment is used in a domestic environment, it may cause radio interference. When such trouble occurs, the user may be required to take corrective actions.

5. BSMI EMC notice (Taiwan)

   警告使用者：
   這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策

   English translation of the notice above: This is a Class A Information Product, when used in residential environment, it may cause radio frequency interference, under such circumstances, the user may be requested to take appropriate counter measures.

6. Class A warning (Korea)

   주의 A급 기기 이 기기는 업무용으로 전자파 적합 등록을 한 기기이 오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.
English translation of the notice above: This is a Class A device and is registered for EMC requirements for industrial use. The seller or buyer should be aware of this. If this was sold or purchased by mistake, it should be replaced with a residential-use type.

7. Class A statement (China)

中华人民共和国“A类”警告声明

声明

此为A级产品。在民用环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户采取必要的措施。

English translation of the notice above: When labeled with the CCC marking, the product meets the applicable safety and EMC requirements for China. This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

8. Class A warning – CISPR 22 (AS/NZS)

**Warning (English)** This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

**Attention (French)** Il s’agit d’un produit de classe A. Dans un environnement local, ce produit peut entraîner des perturbations radioélectriques, auquel cas l’utilisateur devra éventuellement prendre des mesures adéquates.

### Product regulatory compliance

Harmonic products are typically tested to the latest safety and electromagnetic compatibility (EMC) specifications and test methods, and are marked with one or more of the following regulatory/certification markings. Some of the certification markings will vary depending on what certifier was used to obtain a certification.

Please visit Harmonic [Product Regulatory Compliance](#) page to view information on applied safety & EMC standards and regulatory marks on Harmonic products. You can also email us at [regulatory.compliance@harmonicinc.com](mailto:regulatory.compliance@harmonicinc.com) for assistance on regulatory compliance for Harmonic products.
Product regulatory compliance markings
Understand the meaning of different product regulatory compliance markings.

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Testing standard/specification</th>
<th>Certification type</th>
<th>Regulatory mark name</th>
<th>Product marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA/Canada</td>
<td>FCC CFR 47 Part 15, Class A ICES-003: Issue 6, 2016; Class A</td>
<td>EMC</td>
<td>FCC Class A Statement</td>
<td><img src="fcc-class-a.png" alt="FCC Class A Statement" /></td>
</tr>
<tr>
<td>Germany</td>
<td>EN 60950-1; EN60825-1 (for laser)</td>
<td>Safety</td>
<td>GS</td>
<td><img src="gs-mark.png" alt="GS Mark" /></td>
</tr>
<tr>
<td>Mexico</td>
<td>NOM-019-SCFI-1998</td>
<td>Safety</td>
<td>NOM</td>
<td><img src="nom-mark.png" alt="NOM Mark" /></td>
</tr>
</tbody>
</table>
### Appendix B: Safety and regulatory compliance information

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Testing standard/specification</th>
<th>Certification type</th>
<th>Regulatory mark name</th>
<th>Product marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taiwan</td>
<td>BSMI standard CNS15663 CNS 14336-1:2010; CNS 13438:2006; Class A</td>
<td>Safety and EMC</td>
<td>BSMI Certification (RPC) Number &amp; Class A Warning</td>
<td><img src="image" alt="BSMI Certification" /></td>
</tr>
<tr>
<td>Japan</td>
<td>VCCI V-3/2015.04; CISPR 22:2008, Class A</td>
<td>EMC</td>
<td>VCCI</td>
<td><img src="image" alt="VCCI" /></td>
</tr>
<tr>
<td>Australia and New Zealand</td>
<td>AS/NZS CISPR22:2009 +A1:2010; Class A</td>
<td>Safety</td>
<td>C-Tick</td>
<td><img src="image" alt="C-Tick" /></td>
</tr>
<tr>
<td>Korea</td>
<td>KN32 Class A and KN 35</td>
<td>EMC</td>
<td>KC</td>
<td><img src="image" alt="KC" /></td>
</tr>
<tr>
<td>Russia</td>
<td>TR CU 004/2011 TR CU 020/2011</td>
<td>Safety and EMC</td>
<td>EAC</td>
<td><img src="image" alt="EAC" /></td>
</tr>
<tr>
<td>China</td>
<td>GB4943.1-2011 GB9254-2008 GB17625.1-2012</td>
<td>Safety and EMC</td>
<td>CCC</td>
<td><img src="image" alt="CCC" /></td>
</tr>
</tbody>
</table>
Product environmental compliance

Harmonic manufactures high quality and innovative IT and telecommunications equipment, video delivery infrastructure solutions and services for its customers worldwide.

Harmonic is committed to providing our customers with safe and environmentally friendly products that are compliant with all relevant regulations, customer specifications, and environmental legislation, including the directives described below.

EU RoHS


In July 2006, the European Union’s (EU) Directive (2002/95/EC) on the Restriction of the use of certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment (EEE) went into effect, and in July, 2011, the European Union’s RoHS Recast Directive (2011/65/EU) also known as RoHS II entered into force.

Harmonic understands the environmental risks associated with the substances covered by the RoHS Directive and has committed to eliminating or reducing the use of these, as well as other environmentally sensitive substances in our products. Harmonic also continues to comply with the requirements under RoHS II.

For more information, please visit EU RoHS directive page at official EU website.


Restricted substance statement

Harmonic products contain less than the permitted limits for the six restricted substances except where exemptions published in the RoHS2 Directive are applicable. This statement is based on vendor-supplied analysis or material certifications, and/or lab test results of the component raw materials used in the manufacture of Harmonic products.

Table B-1: Restricted substances

<table>
<thead>
<tr>
<th>Restricted substance</th>
<th>Permitted limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (Cd)</td>
<td>&lt; 0.01%[^1]</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>&lt; 0.1%</td>
</tr>
<tr>
<td>Chromium (VI) (Cr (VI))</td>
<td>&lt; 0.1%</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>&lt; 0.1%</td>
</tr>
<tr>
<td>Polybrominated biphenyls (PBBs)</td>
<td>&lt; 0.1%</td>
</tr>
<tr>
<td>Polybrominated diphenyl ether (PBDE)</td>
<td>&lt; 0.1%</td>
</tr>
</tbody>
</table>

[^1]: Homogeneous material definition as per the EU Directive.
EU REACH


Harmonic supports the basic aim of REACH in improving the protection of human health and environment through the better and earlier identification of intrinsic properties of chemical substances. Harmonic products are considered “articles” under REACH; therefore, we are required to provide recipients of our products with information on Substance of Very High Concern (SVHC) present in concentration above 0.1% (w/w).

Substances in our products are not intended to be released under normal or reasonably foreseeable conditions of use; therefore, the registration requirement in REACH Article 7(1) does not apply to our products.

For more information, please visit REACH regulation page at official EU website.

http://ec.europa.eu/environment/chemicals/reach/reach_en.htm

China RoHS

Review China’s Restriction of Hazardous Substances Directive.

China’s regulation on restriction of the use of certain hazardous substances commonly (China RoHS), is applicable to all Electronic and Information Products (EIPs) and parts sold in China after March 01, 2007. China RoHS regulation restricts the use of the same six substances as the European Union’s ROHS, but has requirements for product labeling and regulated substance information disclosure.

Harmonic complies with China RoHS Phase I for labeling and information disclosure requirements and continues to monitor new developments in China RoHS Phase II towards substance restriction and certification program.

For more information, please visit China RoHS regulation page at official US export website.

http://www.export.gov/china/doingbizinchina/

China RoHS Disclosure report

Below table shows the presence of hazardous substances, or elements in Harmonic products, if the part is present.

This table shows those components where hazardous substances may be found in Harmonic products based on, among other things, material content information provided by third party suppliers. These components may or may not be part of the product.

The Environmental Protective Use Period (EPUP) for Harmonic products is 20 years unless displayed otherwise on the product. The EPUP period is valid only when the products are operated or stored as per the conditions specified in the product manual.
<table>
<thead>
<tr>
<th>部件名称 (Part name)</th>
<th>有毒有害物质或元素 (Hazardous substance)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>铅 (PB)</td>
</tr>
<tr>
<td>印刷线路板 (Printed circuit assemblies)</td>
<td>X</td>
</tr>
<tr>
<td>机械组件 (Mechanical subassemblies)</td>
<td>X</td>
</tr>
<tr>
<td>光学组件 (Optical subassemblies)</td>
<td>X</td>
</tr>
<tr>
<td>电源 (Power supplies)</td>
<td>X</td>
</tr>
<tr>
<td>缆线 / 线束 (Cables, harnesses)</td>
<td>X</td>
</tr>
<tr>
<td>屏幕 / 显示器 (Screens, monitors)</td>
<td>X</td>
</tr>
<tr>
<td>金属零件 (Metal parts)</td>
<td>X</td>
</tr>
<tr>
<td>塑料 / 发泡材料 (Plastics, foams)</td>
<td>O</td>
</tr>
<tr>
<td>电池 (Batteries)</td>
<td>O</td>
</tr>
</tbody>
</table>

O：表示在该部件的所有均质材料中，此类有毒有害物质的含量均小于SJ/T11363-2006标准所规定的限量。
O: Indicates the content of the toxic and hazardous substances at the homogeneous material level of the parts is below the limit defined in SJ/T11363 2006 standard.

X：表示至少在该部件的某一均质材料中，此类有毒有害物质的含量超出SJ/T11363-2006标准规定的限量。
X: Indicates that the content of the toxic and hazardous substances in at least one of the homogeneous materials of the parts is above the limit defined in SJ/T11363 2006 standard.
Taiwan BSMI RoHS

Review Taiwan’s Restriction of Hazardous Substances Directive.

<table>
<thead>
<tr>
<th>Unit</th>
<th>銅 (Pb)</th>
<th>水銀 (Hg)</th>
<th>鉛 (Cd)</th>
<th>六價鉻 (Cr\textsuperscript{6+})</th>
<th>多溴聯苯 (PBB)</th>
<th>多溴二苯醚 (PBDE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>風扇</td>
<td>–</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>金屬件</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>(鐵件、螺絲)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>機箱、機殼</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>電源線</td>
<td>–</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>其他部件</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>(塑件、包材類、線材)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

備考1. “超出0.1 wt%”及“超出0.01 wt%”係指限用物質之百分比含量超出百分比含量基準值。
Note 1: “Exceeding 0.1 wt%” and “exceeding 0.01 wt%” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2. “O”係指該項限用物質之百分比含量未超出百分比含量基準值。
Note 2: “O” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3. “–”係指該項限用物質為排除項目。
Note 3: The “–” indicates that the restricted substance corresponds to the exemption.
Other RoHS and REACH type regulations

Harmonic will comply with RoHS and REACH type regulations evolving in other countries, if they become relevant to our products or in markets where we sell our products.

Waste Electrical and Electronic Equipment (WEEE)


European Parliament and the Council of the European Union’s WEEE Directive (2002/96/EC) came into force on August, 2005 and, were more recently amended in July, 2012. This directive encourages the reuse, recycling, and recovery of WEEE and to improve the environmental performance of all operators involved in the life cycle of electrical and electronic equipment, especially those dealing with WEEE. Harmonic ensures that all requirements for registration, reporting, design and data tracking are complied with to meet the objectives of the WEEE directive.

For more information, please visit WEEE directive page at official EU website: http://ec.europa.eu/environment/waste/weee/legis_en.htm

Battery directive

Review the European Union legislation on waste batteries.

In September 2006, the European Union’s Directive 2006/66/EC (Battery Directive) came into force with an aim to prohibit the sale of batteries and accumulators containing hazardous substances and to set rules and promote collection, treatment, recycling and disposal of waste batteries and accumulators. This directive applies to spent batteries collected together with WEEE and requires their removal and separate collection. Once removed from WEEE, spent batteries are governed by the Battery Directive. Harmonic uses lithium batteries in its products and our responsibility under the Battery Directive is taken care of under our WEEE Take-Back program.

For more information, please visit Batteries and Accumulators directive page at official EU website.

http://ec.europa.eu/environment/waste/batteries/

Harmonic is committed to manufacturing environmentally safe products for the community, and will make reasonable efforts and required adjustments to its practices, if necessary, to comply with various environmental directives and industry initiatives on the elimination of hazardous substances, labeling, marking, certification and registration as required in markets where we sell our products.

Download Harmonic Environmental Compliance Statement at the following location:

http://www.harmonicinc.com/content/green-policy

WEEE Take-Back Request Program

In order to assist EU member states to preserve, protect and improve the quality of the environment, protect human health and utilize natural resources prudently and rationally, Harmonic strives to recycle in compliance with the WEEE Directive any of its products that cannot be re-used.

Harmonic's customers should:

- Not discard equipment in household or office garbage
- Arrange proper recycling of unneeded equipment. For the take-back of Harmonic equipment, customers must:
  - Collect the information required to complete Harmonic’s WEEE Take-Back Request form
Appendix B: Safety and regulatory compliance information

- Complete and submit the online WEEE Take-Back Request form. Please note that forms must be fully completed in order to prevent process delays
- Receive instant online confirmation indicating the reference number
- Receive the End of Life (EOL) asset return authorization number and instruction for EOL asset return
- Not ship EOL product to Harmonic without a Harmonic-provided EOL asset return authorization number

The crossed-out wheeled bin symbol on a Harmonic-branded commercial product indicates that the product should not be disposed of along with municipal waste, but invites our customers to return the product to us under Harmonic’s WEEE Take-Back program for product disposal.

Harmonic will pay for the cost of shipping and will provide a Certificate of Recycling or a Certificate of Destruction upon request. For more information on collection, reuse and recycling or to initiate the WEEE take-back process, please complete the form at http://www.harmonicinc.com/webform/weee-takeback-request or contact Harmonic Technical Assistance Center (TAC) or email RMA team at rma.emea@harmonicinc.com.

Compliance with country specific environmental, safety and EMC standards

In addition to above listed standards and compliance regulations, Harmonic products may also be compliant with other country specific environmental, safety and EMC requirements.

Please contact Harmonic Compliance Team at regulatory.compliance@harmonicinc.com or your local sales representative for more information about compliance with particular country or standard.