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Every reasonable attempt has been made to comply with all licensing requirements for all components used in the system. Any oversight is unintentional and will be remedied if brought to the attention of Harmonic at support@harmonicinc.com.

Documentation Conventions

This guide may use some special symbols and fonts to call your attention to important information. The following symbols appear throughout this guide:

DANGER: The Danger symbol calls your attention to information that, if ignored, can cause physical harm to you.

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

LASER DANGER: The Laser symbol and the Danger alert call your attention to information about the lasers in this product that, if ignored, can cause physical harm to you.

NOTE: The Note symbol calls your attention to additional information that you will benefit from heeding. It may be used to call attention to an especially important piece of information you need, or it may provide additional information that applies in only some carefully delineated circumstances.

IMPORTANT: The Important symbol calls your attention to information that should stand out when you are reading product details and procedural information.

TIP: The Tip symbol calls your attention to parenthetical information that is not necessary for performing a given procedure, but which, if followed, might make the procedure or its subsequent steps easier, smoother, or more efficient.

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

<table>
<thead>
<tr>
<th>Convention</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typed Command</td>
<td>Indicates the text that you type in at the keyboard prompt.</td>
</tr>
<tr>
<td>&lt;Ctrl&gt;, &lt;Ctrl&gt;+&lt;Shift&gt;</td>
<td>A key or key sequence to press.</td>
</tr>
<tr>
<td>Links</td>
<td>The <em>italics in blue</em> 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>ScreenOutput</td>
<td>The text that is displayed on a computer screen.</td>
</tr>
<tr>
<td>Emphasis</td>
<td>The <em>italics</em> text used for emphasis and document references.</td>
</tr>
</tbody>
</table>

NOTE: You require Adobe Reader or Adobe Acrobat version 6.0 or later to open the PDF files. You can download Adobe Reader free of charge from www.adobe.com.
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Introduction

Blackout Management for ProStream 9000 enables the user to determine the video sent to viewers based on characteristics such as geography, or blackout zone. Two options for the process are shown schematically in the following figures:

Figure 1–1: Asynchronous – No SCTE-35 at the source. Blackout event is generated asynchronously by the BMS.
Terminology

**BMS**

Blackout Management System or ESAM server, also called POIS

This system receives Blackout information over ESNI from the content providers. The BMS will have the following information:
- Blackout schedule for each program and blackout zone
- Database of all the Virtual IRDs (VIRD)
- Database of all the Main and Alternate feeds

The BMS communicates with the LSS and LSP using the ESAM-IO3 protocol.

**POIS**

Placement Opportunity Information System

The POIS is a system or process that identifies and provides descriptions of placement opportunities for media (such as the availability to insert ads). It may contain requirements and attributes that can include which platforms may be used, ownership rights, and policies that are used to coordinate the placement of media. The POIS system is described in SCTE 130-5.
Terminology

**ProStream LSP**  
**Linear Stream Processor**  
The LSP is the Harmonic ProStream located in the Central Headend. The LSP supports synchronous (from incoming SCTE35-2013) and asynchronous signaling (from the BMS), and based on it generates SCTE35-2013 for each program that is streaming to the IP Network. The protocol between BMS to the LSP is the standard ESAM-IO3 protocol.

**ProStream LSS**  
**Linear Stream Switcher**  
The LSS is the Harmonic ProStream located at the edge of the network and is responsible for switching to and from alternative feeds, based on BMS commands. The LSS manages multiple Blackout zones for each input program, meaning, multiple VIRDs for each input program. The LSS holds a database of all the VIRDs. The LSS communicates with the BMS via the standard ESAM-IO3 protocol.

**VIRD**  
**Virtual IRD**  
A VIRD represents a single program at the output of the LSS, for a specific Blackout zone, and replaces a physical IRD that is feeding the legacy QAM plant today.

**ESAM-IO3**  
**A protocol specifying the APIs for processing real-time signals (e.g., SCTE35 and others) and real-time manifest generation.**

It also supports asynchronous signal processing for live streams and URI based content (ex. file reference). ESAM herein functions as two interfaces that are used either for signal processing and stream conditioning or for manifest conditioning.

The first interface allows a signal acquisition system (e.g., transcoder, fragmenter, etc.) to submit signals to a signal processing system and receive stream conditioning data and directives, while the second interface allows submission of a confirmed signal and receipt of manifest manipulation instructions. A given device may be comprised of one or more signal acquisition systems.

**SCTE-35**  
**A standard that describes the inline insertion of cue tones in MPEG Transport Streams.**

The full standard name is “Digital Program Insertion Cueing Message for Cable”. SCTE-35 is used to signal a local ad insertion opportunity or local TV programs in the transport stream.
Blackout Components

Blackout with ProStream includes the following components:

**Blackout Management System (BMS)**

The BMS uses blackout information that is either received from the content provider in ESNI-protocol form, or is loaded manually.

The BMS will have the following information:

- Blackout schedule for each program and blackout zone
- Database of all the primary and alternate feeds
- Blackout zones identified by Acquisition Point Identifier

**Linear Stream Processor (LSP)**

The Harmonic ProStream at the central headend acts as the LSP. It supports synchronous (from incoming SCTE-35) and asynchronous signaling (from the BMS), and then generated SCTE-35 information for each program that is streaming to the IP network. The ESAM IO3 protocol will be used between BMS and the LSP.

In an asynchronous system, no SCTE35 signaling in the incoming stream from content providers for blackout but only for DPI (splicing), so LSP generates and injects the SCTE-35 (DPI) stream based on the message *(Signal Processing Notification)* it receives from BMS.

**Linear Stream Switcher (LSS)**

The ProStream located at the edge of the network acts as the LSS. It is responsible for switching to and from alternate feeds based on BMS commands. The LSS manages multiple blackout zones for each input program in the form of multiple Virtual Integrated Receiver/Decoders (VIRDs) for each input program. The LSS communicates with the BMS over ESAM.

- LSS reacts upon receiving an SCTE-35 event and notifies BMS. BMS replies with a command for LSS - do nothing or switch.
- LSS is responsible for switching to/from Network or alternate feed, per VIRD and based on BMS commands.
- LSS has a database of all VIRDS

**DPI PID**

Digital Program Insertion

DPI refers to a specific technology which allows an MPEG Transport Stream to be spliced into a currently flowing MPEG Transport Stream seamlessly and with little or no artifacts. The controlling signaling used to initiate an MPEG is referred to as an SCTE-35 message. (For more detailed information on MPEG Transport Stream and SCTE-35, see Wikipedia.)

**Time Signal Message (Type 6)**

Indicates a Blackout event.

**Splice Insert Message (Type 5)**

Indicates and Ad Insertion event.
LSS can manage up to 100 blackout zones (VIRDS) for each input program.

**NOTE:** A VIRD represents a single program at the output of the LSS for a specific blackout zone, and replaces the physical IRD that currently feeds legacy QAM plants.

**Interfaces and Flow**

**Asynchronous System**

The LSP receives `SignalProcessingNotification` asynchronously from the BMS using the ESAM-IO3 protocol.

Based on this notification, the LSP generates an SCTE-35 message and sends it to the LSS using a Time Signal message (type 6).

The LSS receives the SCTE-35 message from the LSP and notifies the BMS using the ESAM-IO3 protocol.

The BMS replies to the LSS with a command to switch the feed for each VIRD to or from the Network or alternate feed, or to do nothing.

The LSS switches the feed per VIRD based on the BMS commands.

**Synchronous System**

The LSP receives the synchronous incoming stream that contains the SCTE35-2013 signal for Blackout from the content provider.

The LSP sends `SignalProcessingEvent` via the ESAM IO3 protocol to the BMS.

The BMS confirms the validity of the signal and returns information via `SignalProcessingNotification`, allowing the LSP to identify and update the start or end times of a signal region. The call may also return relevant information, such as signal region duration.

The LSP sends the SCTE-35 message to the LSS, using a Time Signal Message (Type 6).
Blackout Configuration Prerequisite

Network Time Protocol (NTP) must be enabled at the platform level of each ProStream involved in blackout operations. NTP ensures that all devices used are synchronized with Coordinated Universal Time (UTC).

To set ProStream time according to the NTP server:

Once you set the time according to the NTP server, you cannot set the ProStream time manually.

1. Select Administration > Date & Time page:

2. To synchronize the ProStream time with the UTC time, check Enable NTP Sync.
3. In Server IP, enter the IP address of the NTP server.

Configuring Blackout

The blackout configuration procedure for the LSP and LSS involves changes at the Platform and Service levels.

Configuring LSP

Configuring a blackout on the LSP requires that the ESAM Server be set up for the main as well as each alternate service. POIS can also be set up.

NOTE: If POIS is not set up for LSP, then only ESAM messages sent to the device HTTP server URI (/blackout) will affect the blackout.

To configure ESAM:

1. In Platform > ESAM Server, click New.
2. Configure the following
   a. Name (the default is BMS)
   b. IP Address
   c. TCP Port
   d. URI (the default is /BlackoutNotify)
3. In Configuration > Logical Output, select a program.
4. From the drop-down menu, select Properties.
5. Select the ESAM section.
6. Select LSP.
7. Configure the following:
   a. **ESAM Server** - open the BMS Server list and select the required server that manages the blackout system. The list is populated with the ESAM servers configured in Platform > ESAM.
   b. **Acquisition Point Identifier** - enter the unique identifier of the program. This identifier is unique for each blackout zone.

**NOTE:** Acquisition Point Identifier is required for each alternate service.

   c. **Timestamp Descriptor** - check this option to include a timestamp descriptor.
   d. **Input DPI PID** - select the input PID that carries the DPI PID.
   e. **Stamp Splice Time** - check the box in order to enable.
   f. **Splice Insert** - select the option required for SCTE35 operations for the service:

**NOTE:** SCTE35 - Splice Insert - Type 5 - Used for Ad Insertion.

- Always pass - Always pass to the output, bypassing the ESAM server
- Always discard - Do not pass to output
- POIS (Fallback: Discard) - Send to the POIS server, but upon failure do not pass to output
- POIS (Fallback: Pass) - Send to the POIS server, but upon failure pass to output
g. **Time Signal** - select the operation required for SCTE35 operations for the service:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always pass</td>
<td>Always pass to the output, bypassing the ESAM server</td>
</tr>
<tr>
<td>Always discard</td>
<td>Do not pass to output</td>
</tr>
<tr>
<td>POIS (Fallback: Discard)</td>
<td>Send to the POIS server, but upon failure do not pass to output</td>
</tr>
<tr>
<td>POIS (Fallback: Pass)</td>
<td>Send to the POIS server, but upon failure pass to output</td>
</tr>
</tbody>
</table>

h. Click OK.

**NOTE:** Enabling LSP for Service out also causes the following descriptors to be added: PMT 0xF0 Content identifies descriptor, which carries Acquisition Point Identifier, and ES 0x52, Stream identifier descriptor, which carries Component ID for remuxing on LSS.

In the following figure, both LSP and LSS service level configurations are shown:
Configuring LSS

Configuring blackout on the LSS requires that POIS and ESAM are set up for the main and each alternate service.

To configure ESAM:
1. In Platform > ESAM Server click New.
2. Enter the following:
   a. Name (the default is BMS)
   b. IP Address
   c. TCP Port
   d. URI (the default is /BlackoutNotify)
3. In Configuration > Logical Output, select a program.
4. From the drop-down menu, select Properties.
5. Select the ESAM section.
6. Select LSS.
7. Configure the Acquisition Point Identifier - enter the unique acquisition point identifier for the program. This identifier is unique for each service.

   NOTE: Acquisition Point Identifier is required for each alternate service.

   a. Zone Identifier - enter the identifier of the blackout zone of the program. The zone identifier and Acquisition Point Identifier together create a unique program identifier.
   b. Input DPI PID - select the input PID that carries the DPI PID.

   NOTE: LSS must have a reference DPI PID.

c. Stamp Splice Time - check the box in order to enable.

d. Splice Insert - select the option required for SCTE35 operations for the service:
   POIS (Fallback: Discard)
   POIS (Fallback: Pass)

e. Time Signal - select the operation required for SCTE35 operations for the service:
   POIS (Fallback: Discard)
   POIS (Fallback: Pass)

8. Click OK.

Emergency Switch to Main

There are two Emergency Switch options and they can be found in the GUI under: Platform > ESAM > Emergency Switch.

Option 1 - A setting in the Emergency Switch window that can be activated automatically; Activate this by selecting the check box after “Automatic switch to main on ESAM failure” and click Apply.

Option 2 - A button named Emergency switch to main; Click this button to directly switch all services to main.

DNS Server

Up to four DNS IP addresses can be entered.

To add a DNS server:
1. In Administration > Remote Servers > DNS, click Add.
2. Enter the IP address of the server.
3. Select the following:
   a. Server port
   b. Retries
   c. Timeout
4. Enter the Domain name.
Chapter 3
Alarms and Log Example

Alarms

The following alarms are relevant for the Blackout feature and are grouped per Source Object:

Table 3–1: Output Stream

<table>
<thead>
<tr>
<th>ID</th>
<th>Alarm Message</th>
<th>Recovery Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>307</td>
<td>Can not match with alternate</td>
<td>Check the stream identifier and ES type of both PIDs.</td>
</tr>
</tbody>
</table>

Table 3–2: Output Service

<table>
<thead>
<tr>
<th>ID</th>
<th>Alarm Message</th>
<th>Recovery Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>67</td>
<td>Could Not Allocate Switch Engine</td>
<td>Reduce the overall number of configured SPS and/or Spliceable services.</td>
</tr>
<tr>
<td>97</td>
<td>License Missing Blackout VIRD</td>
<td>Install the missing license or contact Harmonic's Technical Assistance Center.</td>
</tr>
<tr>
<td>121</td>
<td>Alternate is missing for switching</td>
<td>Check the Alternative source at the LSP side. Check the Alternate AcquisitionPointIdentify.</td>
</tr>
<tr>
<td>123</td>
<td>PIDs matching failed can not switch</td>
<td>Check the compatibility of the Video PID of the Alternate with the Video PID of Main (ES Type).</td>
</tr>
</tbody>
</table>

Table 3–3: ESAM

<table>
<thead>
<tr>
<th>ID</th>
<th>Alarm Message</th>
<th>Recovery Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>POIS connection failed</td>
<td>Failed to connect to the ESAM server. Check the server’s IP address and accessibility.</td>
</tr>
</tbody>
</table>
Appendix A
Contacting the Technical Assistance Center

Harmonic Global Service and Support has many Technical Assistance Centers (TAC) located globally, but virtually co-located where our customers can obtain technical assistance or request on-site visits from the Regional Field Service Management team. The TAC operates a Follow-The-Sun support model to provide Global Technical Support anytime, anywhere, through a single case management and virtual telephone system. Depending on time of day, anywhere in the world, we will receive and address your calls or emails in one of our global support centers. The Follow-the-Sun model greatly benefits our customers by providing continuous problem resolution and escalation of issues around the clock.

Report an issue online at:
http://harmonicinc.com/webform/report-issue-online

Table A–1: Technical Support Phone Numbers and Email Addresses

<table>
<thead>
<tr>
<th>Region</th>
<th>Telephone Technical Support</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>888.673.4896 (888.MPEG.TWO) or +1.408.490.6477</td>
<td><a href="mailto:support@harmonicinc.com">support@harmonicinc.com</a></td>
</tr>
<tr>
<td>Europe, Middle East, and Africa</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>Mainland 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>+81.3.5565.6737</td>
<td><a href="mailto:japansupport@harmonicinc.com">japansupport@harmonicinc.com</a></td>
</tr>
<tr>
<td>Asia Pacific – Other Territories</td>
<td>+852.3184.0045 or 65.6542.0050</td>
<td><a href="mailto:apacsupport@harmonicinc.com">apacsupport@harmonicinc.com</a></td>
</tr>
</tbody>
</table>

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

The Harmonic Inc. software download locations are:

<table>
<thead>
<tr>
<th>All Harmonic software except Cable Edge software</th>
<th><a href="https://harmonic.force.com/SWAccess/SWDownloadLogin">https://harmonic.force.com/SWAccess/SWDownloadLogin</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Edge software</td>
<td>ftp://ftp.harmonicinc.com</td>
</tr>
</tbody>
</table>
The Harmonic Inc. corporate address is:

Harmonic Inc.
4300 North First St.
San Jose, CA 95134, U.S.A.
Attn: Customer Support

The corporate telephone numbers for Harmonic Inc. are:
Tel. 1.800.788.1330 (inside the U.S.)
Tel. +1.408.542.2500 (outside the U.S.)
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

This section provides 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.

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 & Translated Safety, Warning & Caution Instructions
(English)

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>Installing or Replacing the Product Unit Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- 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).</td>
</tr>
<tr>
<td></td>
<td>- Read the installation instructions before connecting the system to the power source.</td>
</tr>
<tr>
<td></td>
<td>- When installing or replacing the unit, always make the ground connection first and disconnect it last.</td>
</tr>
<tr>
<td></td>
<td>- Installation of the unit must comply with local and national electrical codes.</td>
</tr>
<tr>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td>- Use only specified replacement parts.</td>
</tr>
<tr>
<td></td>
<td>- 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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mark</th>
<th>Rack Mount Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- 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:</td>
</tr>
<tr>
<td></td>
<td>- Conform to local occupational health and safety requirements when moving and lifting the equipment.</td>
</tr>
<tr>
<td></td>
<td>- Ensure that mounting of the unit by mechanical loading tools should not induce hazardous conditions.</td>
</tr>
<tr>
<td></td>
<td>- 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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mark</th>
<th>Chassis Warning</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>- Before connecting or disconnecting ground or power wires to the chassis, ensure that power is removed from the DC circuit.</td>
</tr>
<tr>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td>- Any instructions in this guide that require opening the chassis or removing a board should be performed by qualified service personnel only.</td>
</tr>
<tr>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td>Mark</td>
<td>Electric Shock Warning</td>
</tr>
<tr>
<td>------</td>
<td>------------------------</td>
</tr>
</tbody>
</table>
| ![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. |

<table>
<thead>
<tr>
<th>Mark</th>
<th>Electrostatic Discharge (ESD) Caution</th>
</tr>
</thead>
</table>
| ![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). |
### Symboles de sécurité et traduits de sécurité, d'avertissement et Attention Instructions (français)

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 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>
</tr>
</thead>
</table>
| ![Laser Radiation Warning](image) | **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. |
| ![Battery Handling Safety Instructions](image) | **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: [www.dtsc.ca.gov/hazardous_waste/perchlorate/](http://www.dtsc.ca.gov/hazardous_waste/perchlorate/) for information". |
| ![Caution](image) | - 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 |

**Mark**

- **Laser Radiation Warning**
- **Battery Handling Safety Instructions**
- **Caution**
<table>
<thead>
<tr>
<th>Mark</th>
<th>Notes</th>
</tr>
</thead>
</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. |
## Symboles de sécurité et traduits de sécurité, d’avertissement et Attention Instructions (français)

<table>
<thead>
<tr>
<th>Mark</th>
<th>Choc électrique Avertissement</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Symbole de sécurité" /></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>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>
### Les décharges électrostatiques (ESD) Attention
- Respecter systématiquement les precautions relatives aux charges électrostatiques durant la manipulation de cet unité.
- Portez toujours un poignet ou la cheville bracelet antistatique préventive lors de la manipulation des composants électroniques. Branchez une extrémité de la sangle à une prise ESD ou d’un composant métallique non peinte sur le système.
- Manipulez les cartes en les faces avant et les bords seulement; éviter de toucher la carte de circuit imprimé et les broches du connecteur.
- Placer un composant retiré sur une surface antistatique ou dans un sac de protection statique.
- Éviter tout contact entre les cartes et les vêtements.
- Vérifier périodiquement la valeur de résistance de la sangle antistatique. Valeur recommandée est comprise entre 1 et 10 mégao-ohms (Mohms).

### Rayonnement laser Attention
- Rayonnement laser invisible peut être émis à partir de fibres ou les connecteurs débranchés. Ne pas regarder en faisceaux ou regarder directement avec des instruments optiques. Ne jamais faire fonctionner une unité en cas de bris d’une fibre ou de séparation d’un connecteur de fibre.

### Batterie au lithium Manipulation instructions de sécurité
- Perchlorate pour la Californie Consultatif: Certaines batteries au lithium, peuvent contenir du perchlorate. le texte qui suit consultatif est prévu: "Présence de perchlorate - une manipulation spéciale peut s’appliquer, voir: www.dtsc.ca.gov/hazardous_waste/perchlorate/ for information".

### Il y a danger d’explosion si la batterie est remplacée de manière incorrecte ou par une batterie de type incorrect.
- Mettre au rebut les batteries usagées conformément aux instructions du fabricant.
- Les batteries des produits Harmonic ne peuvent pas être réparées ni entretenues par l’utilisateur. Ne confier l’entretien des batteries remplaçables qu’à du personnel compétent de Harmonic.
## Sicherheit Symbole und übersetzt Sicherheit, Achtung & Vorsicht Anleitung (Deutsch)

<table>
<thead>
<tr>
<th>Mark</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Warnung" /></td>
<td><strong>Installation oder den Austausch des Produkts Einheit Warnung</strong></td>
</tr>
<tr>
<td><strong>Warnung</strong></td>
<td>- Das Installieren, Ersetzen oder Bedienen dieser Ausrüstung sollte nur geschultem, qualifiziertem Personal gestattet werden (siehe AS / NZS 3260 Clause 1.2.14.3 Servicepersonal).</td>
</tr>
<tr>
<td></td>
<td>- Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließen.</td>
</tr>
<tr>
<td></td>
<td>- Der Erdanschluß muß bei der Installation der Einheit immer zuerst hergestellt und zuletzt abgetrennt werden.</td>
</tr>
<tr>
<td></td>
<td>- Die Installation der Geräte muss den Sicherheitsstandards entsprechen.</td>
</tr>
<tr>
<td></td>
<td>- Verwenden Sie nur die angegebenen Ersatzteile.</td>
</tr>
<tr>
<td><img src="image" alt="Warnung" /></td>
<td><strong>Rack-Montage-Warnung</strong></td>
</tr>
<tr>
<td><strong>Warnung</strong></td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td>- Entsprechen den lokalen Arbeitsschutzanforderungen beim Bewegen und Heben der Ausrüstung.</td>
</tr>
<tr>
<td></td>
<td>- Stellen Sie sicher, daß die Montage des Gerätes durch mechanische Belastung Werkzeuge sollten nicht gefährlichen Bedingungen zu induzieren.</td>
</tr>
<tr>
<td></td>
<td>- Um das Risiko von möglichen elektrischen Schlag zu vermeiden, muss mit einer angemessenen Erdung für Rack und jedes Gerät installiert ist implementiert werden.</td>
</tr>
<tr>
<td><img src="image" alt="Warnung" /></td>
<td><strong>Chassis Warnung</strong></td>
</tr>
<tr>
<td><strong>Warnung</strong></td>
<td>- Gleichstrom-Unterbrechung Bevor Sie Erdungs- oder Stromkabel an das Chassis anschließen oder von ihm abtrennen, ist sicherzustellen, daß der Gleichstrom-Stromkreis unterbrochen ist.</td>
</tr>
<tr>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td>- Alle Hinweise in diesem Handbuch, die das Öffnen benötigen Sie das Gehäuse oder das Entfernen eines Board sollte nur von qualifiziertem Fachpersonal durchgeführt werden.</td>
</tr>
</tbody>
</table>
### 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.
- 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 und der Netzstecker gezogen.
### Site Preparation Instructions

**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.

<table>
<thead>
<tr>
<th><strong>Mark</strong></th>
<th><strong>Notes</strong></th>
</tr>
</thead>
</table>
| ![Vorsicht](image) | **Elektrostatische Entladung (ESD) Vorsicht**  
- Folgen Sie statische vorsorglich zu jeder Zeit beim Umgang mit diesem Gerät.  
- Hand Karten nur durch die Faceplates und Kanten; Berühren Sie die bedruckte Leiterplatte und Steckerstifte.  
- Legen Sie alle entfernten Komponenten auf eine antistatische Oberfläche oder in einem Statik-Beutel.  
- Kontakt zwischen den Karten und Kleidung vermeiden.  
- Den Widerstandswert der gegen statische Gurt in regelmäßigen Abständen überprüfen. Empfohlener Wert ist zwischen 1 und 10 Mega-Ohm (MΩ). |
| ![Warnung](image) | **Laserstrahlungen Warnung.**  
| ![Warnung](image) | **Lithium-Batterie Handhabung Sicherheitshinweise**  
| ![Vorsicht](image) | **Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr**  
- Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.  
- Es gibt keine zu wartenden Akkus im Harmonic Produkte. Siehe Harmonic qualifiziertes Personal, um die austauschbare Batterien Service. |
2. Creating a Safe Environment
   - Choose a site with a dry, clean, well-ventilated and air-conditioned area.
   - Choose a site that maintains an ambient temperature of 32 to 104°F (0 to 40°C).

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
   a. 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.
   b. DC Power
      - Ensure a suitable overcurrent 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.
      - 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.

Product End-of-Life Disassembly Instructions

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 Contacting the Technical Assistance Center.

Product Disassembly Process
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)
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 (French)
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**

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**

a. **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.

b. **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.

c. **CE Declaration of Conformity (European Union)**

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

e. 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.

f. Class A Warning (Korea)

주의 A급 기기 이 기기는 업무용으로 전자파 적합 등록을 한 기기이
오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약
절차 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.

g. Class A Statement (China)

中华人民共和国“A类”警告声明

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.

h. 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 for assistance on regulatory compliance for Harmonic products.

Product Regulatory Compliance Markings

Table B–1: 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 Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA/Canada</td>
<td>FCC CFR 47 Part 15, Class A, ICES-003: Issue 5, 2012; Class A</td>
<td>EMC</td>
<td>FCC Class A Statement</td>
<td></td>
</tr>
</tbody>
</table>

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 operations.
### Table B–1: 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 Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>EN 60950-1; EN 60825-1 (for laser)</td>
<td>Safety</td>
<td>GS</td>
<td><img src="https://example.com/gs.png" alt="GS" /></td>
</tr>
<tr>
<td>Mexico</td>
<td>NOM-019-SCFI-1998</td>
<td>Safety</td>
<td>NOM</td>
<td><img src="https://example.com/nom.png" alt="NOM" /></td>
</tr>
<tr>
<td>Taiwan</td>
<td>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="https://example.com/bsmi.png" alt="BSMI" /></td>
</tr>
<tr>
<td>Japan</td>
<td>VCCI V-3/2013.04; CISPR 22:2008, Class A</td>
<td>EMC</td>
<td>VCCI</td>
<td><img src="https://example.com/vcci.png" 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="https://example.com/c-tick.png" alt="C-Tick" /></td>
</tr>
<tr>
<td>Korea</td>
<td>KN22 Class A and KN 24</td>
<td>EMC</td>
<td>KC</td>
<td><img src="https://example.com/kc.png" alt="KC" /></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–2:Restricted Substances

<table>
<thead>
<tr>
<th>Restricted Substance</th>
<th>Permitted Limit*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (Cd)</td>
<td>≤ 0.01%</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>≤ 0.1%</td>
</tr>
<tr>
<td>Chromium (VI) (Cr (VI))</td>
<td>≤ 0.1%</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>≤ 0.1%</td>
</tr>
</tbody>
</table>
Appendix B Safety and Regulatory Compliance

Information

Product Environmental Compliance

EU REACH

REACH (Registration, Evaluation, Authorization and restriction of Chemicals) (EC 1907/2006) is a European Union’s regulation on chemicals and their safe use which came into force in June, 2007. 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

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/

<table>
<thead>
<tr>
<th>Restricted Substance</th>
<th>Permitted Limit*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polybrominated biphenyls (PBBs)</td>
<td>≤ 0.1%</td>
</tr>
<tr>
<td>Polybrominated diphenyl ether (PBDE)</td>
<td>≤ 0.1%</td>
</tr>
</tbody>
</table>

*Homogeneous material definition as per the EU Directive.
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.

除非特殊注明，哈雷公司产品的环保使用期限均为 20 年。该环保使用期限的有效条件为：必须遵循该产品使用手册的规定，对该产品进行使用或存储。

The Environmental Protective Use Period for Harmonic products is 20 years unless displayed otherwise on the product. The EPLP 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/T 11363 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/T 11363 2006 standard.
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.


Battery Directive

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’s Environmental Compliance Statement at the following location:


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

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
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](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 additional 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.