Imagine COMMUNICATIONS™

Installation Guide

# Selenio™ *BNP*2xr Installation Guide

**January-2016**

**Revision A**

*Selenio™ BNP 2xr Installation Guide,*
Document part number: 250-0378-01 Rev. A
Printed 2/20/16

# Publication Information



# Notice

This publication is designed to assist in the use of the product as it exists on the date of publication of this manual, and may not reflect the product at the current time or an unknown time in the future. This publication does not in any way warrant description accuracy or guarantee the use for the product to which it refers. Imagine Communications reserves the right, without notice to make such changes in equipment, design, specifications, components, or documentation as progress may warrant to improve the performance of the product.

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# Patents

The products described herein are covered by one or more U.S. and foreign patents pending.
U.S. Patents: 6,996,129; 7,046,677; 7,818,355; 8,180,920. Other US and foreign patents pending.

# Contact Information

Imagine Communications has office locations around the world. For domestic and international location and contact information see: http://www.imaginecommunications.com/contact-us/

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# Document Change History

BNP 3xr Installation Guide document history

| Part Number | Release Date | Document Changes |
|---|---|---|
| 250-0378-01 Rev A | 01/30/2016 | Re-brand of content and doc components, for compliance with Imagine Communication requirements. |
| 250-0305-01 Rev A | 11/20/2014 | New standalone doc format (previously part of the 2xr User Guide). |

# Table of Contents

CHAPTER 1

# Introduction

The Selenio™Broadcast Network Processor (BNP) products deliver the industry's highest density digital video solution for grooming, statistical multiplexing, transrating, digital program insertion (DPI). Based on its proprietary flexible, scalable and modular platform, the BNP simplifies and expedites deployments of advanced video services, simplifies operation and management, and reduces operational and capital costs.

Figure 1. BNP 2xr


Receiving input through its Gigabit Ethernet or ASI interfaces, the BNP can statistically multiplex while performing grooming and digital ad and overlay insertion.

The BNP can receive both standard definition (SD) and high definition (HD) program services, and can concurrently groom and insert digital ads within the same box while providing program-level encryption.

The BNP is fully MPEG compliant and interoperable with leading cable industry equipment.

The BNP makes configuration more intuitive and simple by providing a Java-based graphical user interface that can be accessed through a standard Web browser. Configuration can be performed through SNMP using any standard network management application. The SNMP MIBs are readily available from the BNP home page.

This BNP Element Manager User Guide describes the BNP system hardware and provides guidelines for physical installation, initial configuration, and basic troubleshooting.

## Document Organization

This guide is organized as follows:

- Chapter 1, *Introduction* – (this chapter) describes the contents and conventions used in the *BNP Element Manager User Guide*.
- Chapter 2, *Overview* – provides a hardware description of the BNP2xr features and components.
- Chapter 3, *Installation* – describes the initial steps and requirements for installing the BNP2xr
- Chapter 4, *Troubleshooting* – provides information about LED indicators and component replacement.
- Chapter 5, *Field-replaceable Units* – list the FRUs for the BNP 2xr, and provides information about handling and replacements.

- Chapter 6, *Specifications* – includes information about regulatory, environmental, electrical, and mechanical compliances.
- Appendix A, *Localized Cautions and Warnings* – lists all of this guide's *Caution* and *Warning* statements in French and German.
- Appendix B, *Conformity and Safety Information* – provides regulatory compliance information for the BNP.
- The glossary and index can be used to quickly reference information.

# Document Audience

This guide is intended for system administrators who are responsible for installation and maintenance of the BNP2xr at Telco and Cable Headends. Users of this guide should be familiar with general video and networking terminology and should be accustomed to basic network hardware installation.

Most importantly, the user must be familiar with the basics and principles of broadcast network processing.

# Related Documentation

- *Selenio™ Broadcast Network Processor Element Manager User Guide*
- *Selenio™ Broadcast Network Processor Release Notes*

# Document Conventions

Table 1 provides an easy way to recognize information of particular importance in this manual.

Table 1. Document Conventions

| When you see: | It means: |
|---|---|
|  | **Notes** point out information that may not be part of the text but provide tips and other helpful advice. |

Table 1. Document Conventions (Continued)

| When you see: | It means: |
|---|---|
|  | **Cautions** let you know that an action may have undesirable consequences if the instructions are not followed correctly. Cautions also indicate that failure to follow guidelines could cause damage to equipment or loss of data. |
| | Les symboles "**ATTENTION**", représentés par l'icône de gauche, indiquent qu'une action peut avoir des conséquences indésirables si les instructions ne sont pas suivies correctement.<br>Les symboles " ATTENTION " indiquent également que le fait de ne pas suivre les instructions peut causer des dommages à l'équipement ou résulter en une perte de données. |
| | Das links abgebildete Symbol **Vorsicht** weist darauf hin, dass ein Vorgang unerwünschte Konsequenzen haben kann, falls die Anweisungen nicht korrekt befolgt werden.<br>Das Symbol Vorsicht weist außerdem darauf hin, dass Geräte beschädigt oder Daten verloren gehen können, wenn die Anweisungen nicht befolgt werden. |
|  | **Warnings** indicate that failure to take the necessary precautions or to follow guidelines could cause harm to equipment and personnel. |
| | Les symboles " **AVERTISSEMENT** ", représentés par l'icône de gauche, indiquent que le fait de ne pas prendre les précautions nécessaires ou de ne pas suivre les instructions peut endommager l'équipement ou provoquer des blessures. |
| | Das links abgebildete Symbol **Warnung** weist darauf hin, dass Geräte beschädigt oder Personen verletzt werden können, wenn die notwendigen Vorsichtsmaßnahmen nicht eingehalten oder die Anweisungen nicht befolgt werden. |

# Graphics

In some cases the line art and screen-shots shown in this manual may differ slightly from what appears on the actual product.

All efforts have been made to ensure that the latest images are used. In all cases, the functionality described is current at the time of writing.

CHAPTER 2

# Overview

This chapter describes the physical characteristics of the Selenio™Broadcast Network Processor (BNP). Before installing, configuring, or replacing any component of the BNP, please be sure that you understand the chassis and its components.

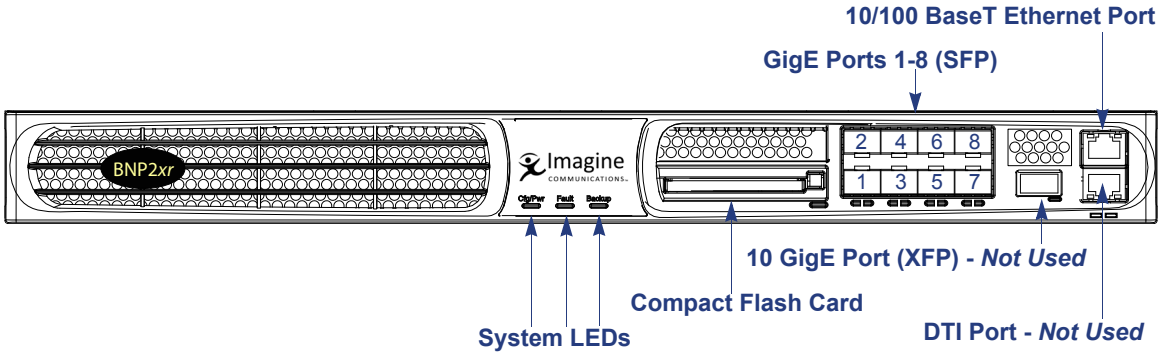
## In This Chapter:



## BNP 2xr Front Panel

Figure 2 shows the front view of the BNP 2xr with the bezel in place. When the front bezel is removed, the RS-232 serial port is visible, as shown in Figure 3.

Figure 2. Front panel (with bezel)



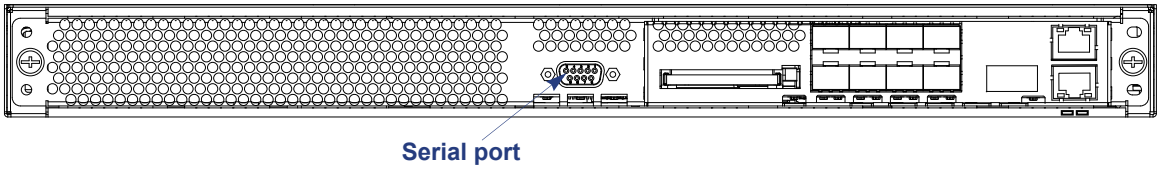

**Note:** *The 10 GigE (XFP) and DTI ports are currently not used.*

Each BNP 2xr has eight GigE ports. These ports can be used for input and output (full-duplex) of video over IP data streams. The ports, LEDs, and compact flash card are located on the Gigabit Ethernet Processor-2 (GBP2) module on the front within the chassis enclosure.

For instructions on removing and replacing the GBP2 module, see "Replacing a GBP2 Module" on page 32.

The RS-232 serial port, highlighted in Figure 3, is used only by field service personnel. Under normal circumstances you will not need to access this port.

Figure 3. Front panel (without bezel)




## LED Indicators

The primary Light Emitting Diodes (LEDs) visible on the front of the BNP 2xr chassis are shown in Figure 4. These LEDs indicate the general health of the BNP 2xr. Note that the LEDs differ slightly when the SEP 48 is installed in a Redundancy Docking Station (RDS). See the *Selenio BNP User Guide* for more details.

Figure 4. LEDs

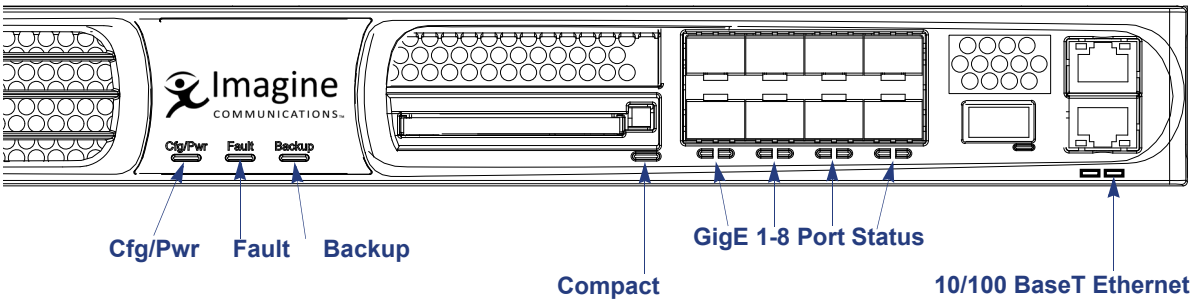



Table 2 describes the patterns used by the LED indicators.

Table 2. LED indicators

| LED | Color | Indication |
|---|---|---|
| CFG/PWR | Off | No power to chassis |
| | Solid Green | Power is OK |
| | Solid Red | Chassis is powering up and configuration load is in progress |
| Fault | Solid Green | System main process is in wrong state |
| | Blinking Green | System status is OK |
| | Blinking Red/Orange | Hardware fault or alarm |
| Backup | Solid Green | Active or primary chassis |
| | Solid Red/Orange | Standby chassis |
| Compact flash[a] | Blinking Green | FPGA configuration load in progress |
| | Solid Green | Compact flash card is OK |
| | Blinking Red | Compact flash card not installed |
| | Solid Red | Compact flash card error is present |
| GigE 1-8 | Solid Green | SFP installed |

Table 2. LED indicators (Continued)

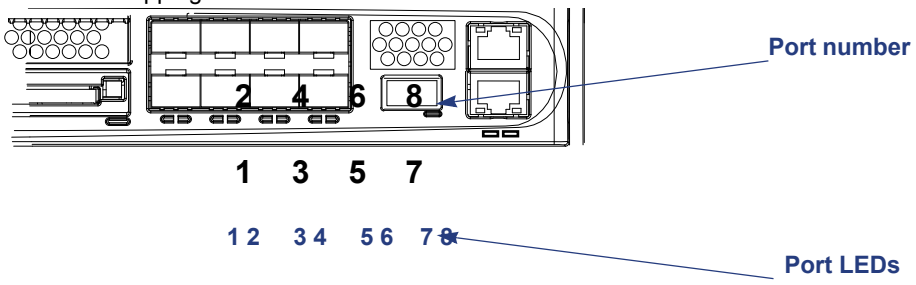
| LED | Color | Indication |
|---|---|---|
| 10/100 BaseT | Solid Green | Autonegotiated link status |
| | Blinking Yellow | Activity |
| AC/DC Power On Indicator (Rear Panel Figure 6) | Solid Green | AC/DC Power is on |
| | Off | No input AC/DC Power |
| On-Board DC Power Status (Figure 9) | Solid Green | On-board DC power OK |
| | Solid Yellow | On-board DC power fault |

a. The compact flash card is necessary for BNP functionality.

## Port Mapping

Figure 5 shows the SFP port location mapping scheme. These port numbers correspond with the port LEDs described in "LED Indicators," above.

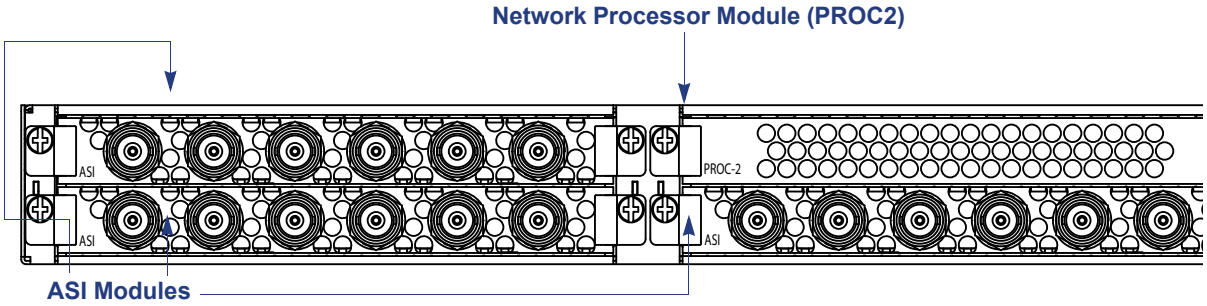
Figure 5. Port mapping and LED indicators




# BNP 2xr Rear Panel

Figure 6 shows the rear view of the BNP2xr with one network processor (PROC2) and three ASI modules installed. The BNP2xr can be configured with different combinations of modules, depending on the result you require.

Figure 6. Rear panel




### Configuration Options for PROC2 Combinations

There are a maximum of four modules in each BNP 2xr chassis. At least one processor module card must be used in the minimum hardware configuration.

The right side of the chassis holds the power supply, including the power connector and fan. The power supply fan is not replaceable, except as part of the power supply. For details about replacing the modules and power supply, see Chapter 5, "Field-replaceable Units."

# BNP 2xr Internal Components

The BNP 2xr consists of three main sections:

- One network interface module—called the Gigabit Ethernet Processor (GBP2) module.
- Two to four network processing modules—called PROC2 modules.
- The power supply assembly.

See also Figure 13, "Top view of chassis, with FRUs visible," on page 27 to see a block diagram of the component layout.

CHAPTER 3

# Installation

This chapter provides the information necessary to install the Selenio™Broadcast Network Processor (BNP) 2xr into a rack. Read this entire chapter before beginning, and perform the installation in the order described.

After completing this physical installation, you can use guidelines from the *System Configuration* chapter of the *Selenio BNP User Guide* to perform the software configuration for your system.

## In This Chapter:



## Before You Begin

The BNP 2xr ships fully assembled, with cables and packaging appropriate for your installation. At the installation site, you must provide some additional tools and materials to complete the installation as described in this chapter.

Topics in this section:



### Required Equipment

Be sure that you have the required items listed below before you begin the installation of the BNP 2xr. You will need:

- Populated BNP 2xr chassis, including:
  - 1 GBP2 module
  - Up to three PROC2 modules

  - AC or DC power supply
  - ASI modules if ordered
- Compact flash card
- AC power cord, included if AC power supply is used
- DC connector cables, if DC power supply is used
- Front and rear rack mount brackets, included
- Rack mount bracket screws, included.
- Two (2) M4 grounding nuts, included
- Eight (8) rack mount screws
- Phillips and slotted screwdrivers
- 1 ring lug for grounding
- Ethernet cable long enough to directly connect the BNP 2xr and the management workstation

## Site Cabling

**Note:** *The BNP 2xr is intended for local (intra-building) connections only and is not designed or evaluated for direct connections to the public telecommunications/cable distribution system. Cable and Ethernet connections should be made in accordance with the National Electrical Code (NEC).*

As a preliminary measure, you should ensure that at least one of the following conditions are met:

- Cable runs are located in the same building as this unit;
- Any copper cables that run through air between buildings are less than 42m (140ft);
- Cable runs between buildings are in underground conduit, where a continuous metallic cable shield or a continuous metallic conduit containing the cable is bonded to each building grounding electrode system.

## Electrostatic Precautions

**Warning!** |*Whenever computer components are handled (especially during installation), the equipment can be damaged by the buildup of static electricity. Take precautions before touching any internal components or boards by wearing an ESD wrist strap or working on an antistatic mat. Always hold system modules by the edges and avoid touching any electronic circuitry on the cards.*

**Caution:**


See also "Handling Computer Components" on page 44 and "Electrostatic Advisory" on page 44 for the localized version of the above advisories.

# Rack Mounting the BNP 2xr

**Caution:** *Please install the BNP 2xr so as to be easily accessible and as close to a power socket outlet as possible.*

See also "Power Socket Proximity" on page 41 for the localized version of the above caution.

The BNP 2xr is mounted into a standard 19-inch rack using rack mount brackets for both the front and rear of the system.

When choosing the location for the BNP within a rack, make sure that the BNP 2xr will be placed within the rack evenly, and that the installation will not cause uneven mechanical loading and weight distribution.

Do not mount the BNP 2xr into any rack that obstructs clean air flow either in the front or the rear. Generally, an aisle of at least 15 inches is the minimum distance to ensure proper air flow.

**Caution:** *Install this equipment only in an operations site that is humidity- and temperature-controlled, to ensure compliance with requirements for ambient operational conditions specified in Table 3 and Table 15, "Environmental Ranges," on page 39.*

See also "Operations Environment" on page 40 for the localized version of the above caution.

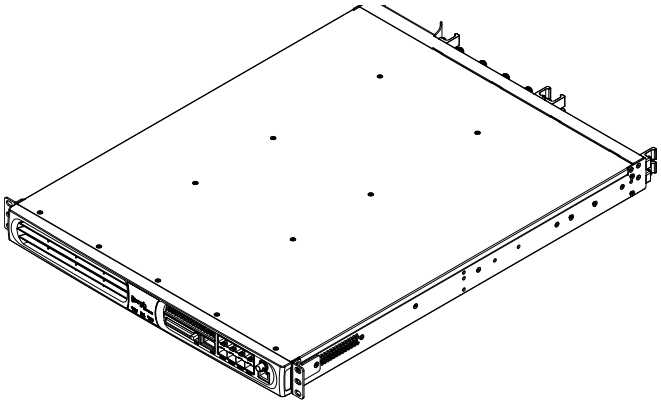
Table 3. Environmental Requirements

| Condition | Limits |
|---|---|
| Storage Temperature | -40° to 70° C (-40° to 158° F) |
| Ambient Operating Temperature | 0° to 40° C (32° to 104° F) |
| Ambient Humidity | 5% to 95% (non-condensing) |

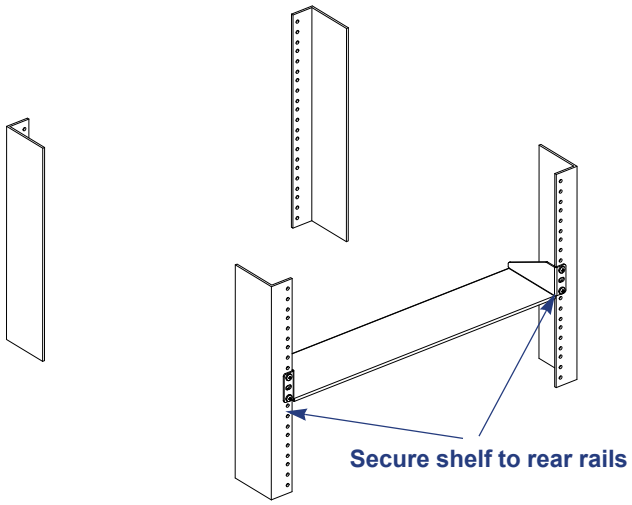
## Installing the BNP 2xr into a Rack

Use steps in this section to position and secure the BNP 2xr into the operations rack.

1. Using the provided screws, attach the front rack mount bracket to one side of the chassis, and repeat on the other side of the chassis.



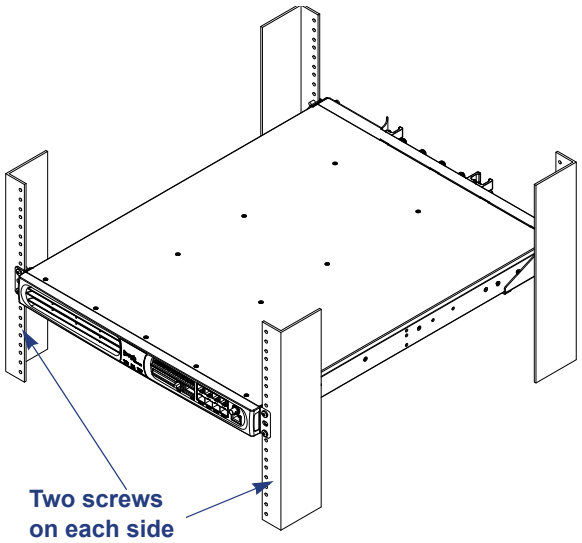
2. Install the chassis rear rack shelf to the rear mounting rails of the rack, using two screws on each side




3. Install the BNP chassis in the rack.

   The rear edge of the chassis will rest on the rear rack shelf.

   Secure the front of the chassis to the rack, using two screws on each side.



# Grounding the BNP 2xr

**Warning!** *The BNP 2xr must be properly grounded to ensure safe operation. Before you connect power or turn on the BNP 2xr, ground the chassis. This section provides one method of grounding. There may be others: check your network configuration for details.*

See also "Grounding Equipment" on page 42 for the localized version of the above warning.

**Note:** *For an AC BNP, and if power is to be derived from a rack-mounted AC power strip, ensure that the power strip is properly grounded to the rack and UL compliant for 12 AWG.*

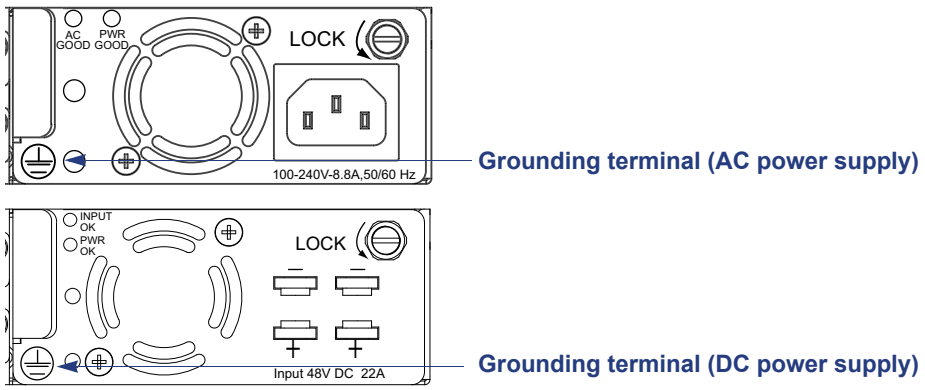
## Connecting the Chassis Ground

1. Using a length of wire, terminate one end with a ring lug.

   For use with a DC power supply, the grounding wire must be a minimum of 12 AWG.
2. Using the provided M4 nut, install the ring lug on the grounding terminal.

   The grounding terminal is at the rear of the BNP 2xr chassis, located at the lower left of the power supply, just beneath the power supply handle (Figure 7).

Figure 7. Grounding Terminals




3. Using wire strippers, strip off 3/8 inch of insulation from the other end of the wire.
4. Attach the stripped wire into a grounding hole on the equipment rack.

# Installing SFP Modules

For optical output, Small Form Factor 1Gbps (SFP) transceivers comply with the current SFP Multi-Source Agreement (MSA) Specification.

- GigE interfaces that meet 1000 Base SX specifications support 850 nm wavelengths for distances up to 550 meters.
- GigE interfaces that meet 1000 Base LX specifications support 1310 nm and 1550 nm wavelengths for distances up to 70 kilometers.

SFPs approved for use with the BNP 2xr are based on the Multi-Source Agreement (MSA) and listed in Table 4:

Table 4. Supported SFPs

| Manufacturer | Part Number | Description |
|---|---|---|
| Finisar | FTLF1519P1BCL | SFP 1550nm GigE optical module |
| Finisar | FCMJ-8521-3 | 1000BaseT Copper SFP Transceiver |
| Fiberdyne | FGE-SFP-T | 1000BaseT Copper SFP Transceiver |
| Avago | ABCU-5710RZ | SFP 1550nm GigE optical module |

**Note:** *For updates on the latest SFPs and XFPs approved for use with products from Imagine Communications, log in to the Imagine Communications website and search for the following term:*

`SFP`
*-or-*
`XFP`

To install an SFP, follow the manufacturer's instructions. General guidelines to SFP installation include:

1. Consider your network and cabling requirements and verify that the SFP you are installing is an approved model as described in Table 4.
2. Insert the SFP into the port.

   SFPs are keyed so they can only be installed one way.
3. Slide the SFP into the port until it clicks into place and the LED is activated.

# Connecting AC Power to the BNP 2xr

Once installed in a rack, connect power to the chassis.

Once installed in a rack, you can connect power to the chassis, either from a wall source or a rack-mounted AC power strip. However, before you connect power to the chassis, make sure that the circuit, wiring, and connections that you are using to supply the power will not become overloaded by the BNP(s). For power consumption details, see "Specifications" on page 35.

**Caution:** *The BNP does not have an on/off power switch. Connection to the power source powers up the BNP immediately.*

See also "Equipment On and Off" on page 42 for the localized version of the above caution.

Refer also to the System Shutdown section of your BNP Element Manger User Guide to find out how to properly power off and shut down an operational BNP.

**Caution:** *If the BNP is to be connected to a rack-mounted, properly grounded AC power strip, ensure that the strip is compliant with 12AWG UL Certification.*

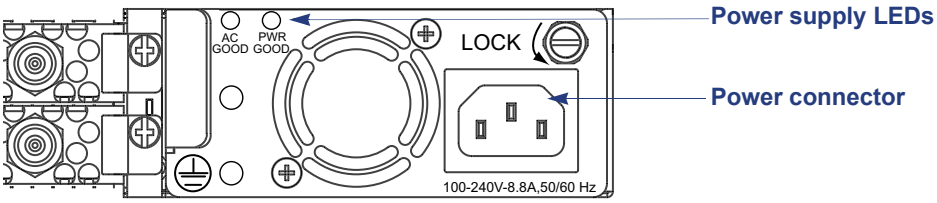
See also "AC Power Strip Compliance Advisory" on page 41 for the localized version of the above caution.

**Note:** *Before you connect power, check to ensure that all applicable ports are cabled, and all installed modules are properly seated in their slots.*

## Connecting AC power to a BNP 2xr

1. Locate the AC power cable included with the BNP 2xr chassis.
2. Plug one end of the power cable into the BNP 2xr power connector. (Figure 8)

Figure 8. AC Power Supply




3. Plug the other end of the power cable into the input power source.

   The BNP should now be powered up. Check the LEDs to verify that power has been applied. The **Cfg/Pwr** LED and the PSU1 and PSU2 LEDs should now be solid green.

   See also"LED Indicators" on page 10.

# Connecting DC Power to the BNP 2xr

This section contains DC power safety advisories and installation procedures in the following topics:

- "Safety," next.
- "Preparation" on page 20.
- "Connecting DC power to a BNP 2xr" on page 20.

## Safety

**Caution:** *Only trained personnel should install or replace this equipment.*

See also "Qualified Personnel" on page 42 for the localized version of the above caution.

- Remove all jewelry, including rings, necklaces, and watches. Metal objects will heat up when connected to power and ground, and can cause serious injury or weld the metal object to the terminals.
- The protective earth connection should be connected before proceeding with the power connection.
- The power cables should be attached to the breaker.
- Confirm that the DC power source is powered off during installation.

- For a centralized DC power connection, the unit must be installed in a restricted access location in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI / NFPA 70.
- Damage may occur if the power is connected improperly.

## Preparation

**Caution:** *Make sure that the safety screw is in the locked position (turned counterclockwise) after the power supply is installed, but before connecting power (Figure 10). Note that the locked position may be different than that of similar units. This ensures that the power supply cannot be accidentally disconnected, causing possible damage.*

See also "Safety Screw Lock Advisory" on page 43 for the localized version of the above caution.

Once installed in a rack, connect power to the chassis. However, before you connect power to the chassis, make sure that the circuit, wiring, and connections that you are using to supply the power will not become overloaded by the BNP 2xr(s). See "Specifications" on page 35 for power consumption details.

**Note:** *The BNP does not have an on/off power switch. Connection to the DC external power source is necessary to power up the system. Please see the System Shutdown section of your BNP Element Manager User Guide to find out how to properly power off and shut down an operational BNP.*

**Caution:** *These are **+48V** DC power supplies, **not** -48V. Please connect accordingly.*

See also "+48V DC Power Supply Advisory" on page 43 for the localized version of the above caution.

The two inputs to the DC power supply are +48V inputs.

- If you need to set up redundant inputs, connect the inputs to the DC power supply from two different 48V sources. When both 48V inputs are sourced, the power supply will load share across the inputs, each of the inputs drawing half the total power. When one 48V input source fails, the other 48V input will draw the full power.
- If you choose not to have redundant inputs, connect only one of the two inputs to the DC power supply and leave the other disconnected.

The DC power supply is configured so that the black (top) cable connects to a -48VDC input and the red (bottom) cable connects to positive ground. Before connecting any cables, measure the output to make sure that you are connecting a -48VDC input to the black cable of the power supply.

**Note:** *Before you connect power, check to ensure that all applicable ports are cabled, and all installed modules are properly seated in their slots.*

## Connecting DC power to a BNP 2xr

1. Cut the provided DC connector cables to the correct length to reach the BNP 2xr from the power source.
2. Attach the connector cables from the power source to the BNP 2xr power connectors (Figure 9 for connector locations, and Figure 10 for connection result).

Figure 9. DC Power Supply

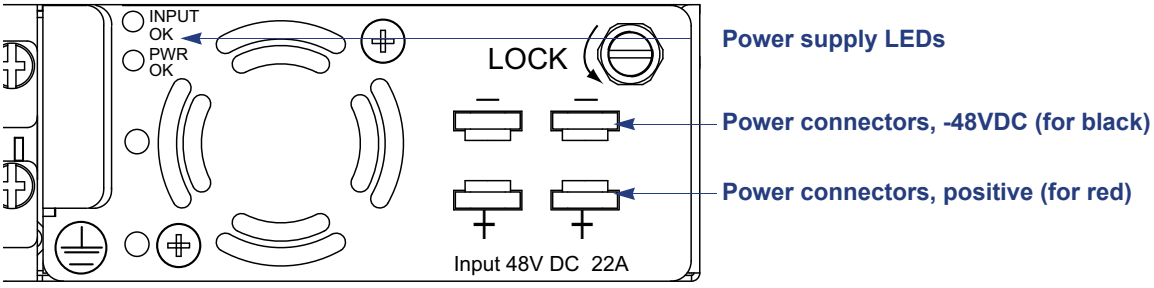
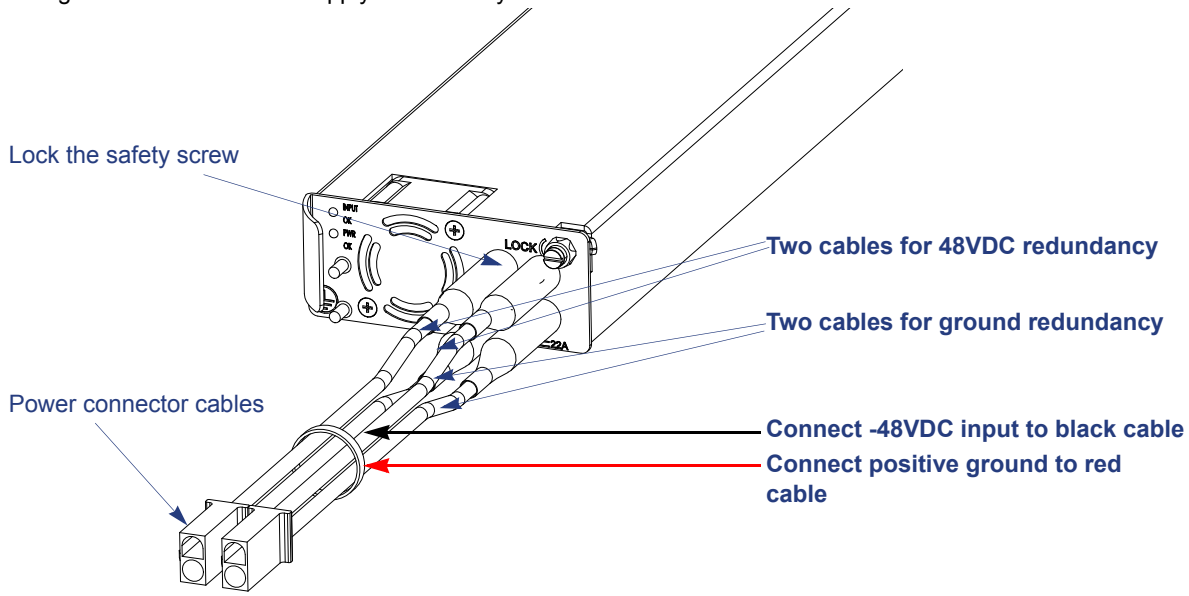
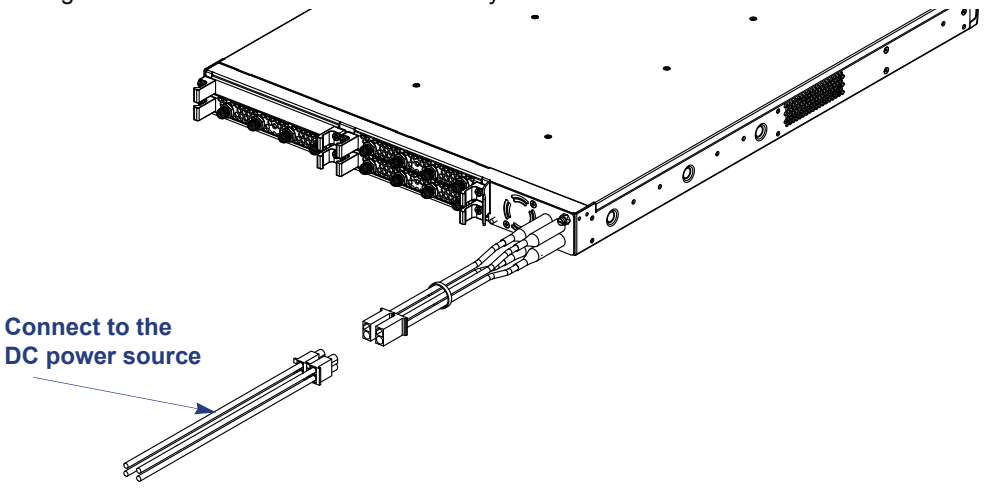



Figure 10. DC Power Supply Connectivity




**3.** Attach the other end of the power connector cables into the input power source (Figure 11). The power cables should be attached to an external UL Listed 20 amp circuit breaker.

Figure 11. DC Power Cable Connectivity




**4.** Apply power to the BNP 2xr.

**Note:** *The BNP does not have an on/off power switch. To apply power for the DC system, toggle the external circuit breaker to the ON position.*

The BNP should now be powered up. Check the LEDs to verify that power has been applied. The **Cfg/Pwr** LED and the PSU1 and PSU2 LEDs should now be solid green. See also"LED Indicators" on page 10.

### Setting the Initial IP Address

By default, the SEP 48 is shipped with a standard IP address. Once power-up is complete, you must change the IP address to the address of the IP network in which the chassis is installed.

To set the IP address:

1. Power on the chassis.
2. Connect a crossover cable from the 10/100BaseT management port on the front of the chassis to the management workstation.

# Connecting External Ports

The BNP 2xr chassis has three discrete types of ports. When connecting ports, be sure to use the correct cabling. This section describes the port types and basic cabling, but the actual cabling requirements will depend on your specific network configuration and needs.

### Fast Ethernet Management Port

The 10/100BaseT Ethernet port is used to communicate with an external console for SNMP configuration control, maintenance diagnostics, status monitoring, fault notification, and redundancy switching. The external console can be a workstation on the IP network.

### GigE Port

The Ethernet port must be fitted with small-form-factor pluggables (SFPs). See Table 4 for a list of tested and approved SFPs that can be used with the BNP 2xr.

### ASI Port

The number of ASI ports in your BNP 2xr chassis depends on the number of ASI cards that are installed. Up to three ASI cards can be installed, each with six ports.

# Installing the Compact Flash Card

The BNP 2xr uses a compact flash card to load software and save configuration information. You cannot use your BNP 2xr without it.

If the compact flash card was not shipped pre-installed with your BNP, you must install it. Remove the flash card from the shipping container and install it into the compact flash slot located on the front of the BNP chassis.

If your compact flash card fails, contact technical support for details about flash repair or replacement. See page 25 for details on contacting technical support.

**Caution:** *Your license is attached to the compact flash (CF); do not discard it. Even if a CF card fails, keep the device and contact Imagine Communications technical support for instructions on repair or obtaining a working replacement.*

See also "Compact Flash Advisory" on page 43 for the localized version of the above caution.

CHAPTER 4

# Troubleshooting

This chapter guides you through basic Selenio™Broadcast Network Processor (BNP) troubleshooting and points to resources you can use for assistance.

## In This Chapter:



## LED Indicators

The LED indicators are described in "LED Indicators" on page 10. These should be your first line of inquiry if any BNP component is not performing correctly.

Figure 12. LED Indicator Locations

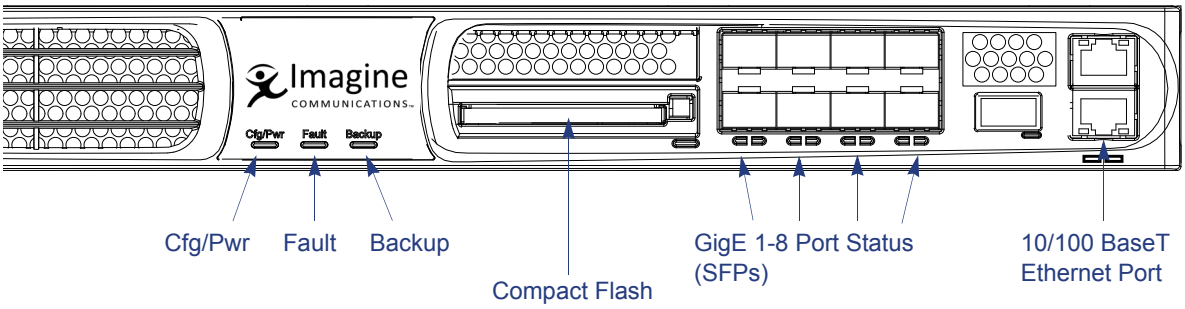



Table 5. LED Indications

| Indication | Possible Solution |
|---|---|
| An LED indicator for one of the GigE ports is off. | Verify that the module is installed correctly and has power. |
| The LED indicator for the 10/100 BaseT port is off. | Verify that the module is installed correctly and the 10/100 BaseT port cable is connected correctly. |
| The system power LED indicator is off. | Verify that the power cord is correctly installed and that the power is turned on. |

Table 5. LED Indications (Continued)

| Indication | Possible Solution |
|---|---|
| The LED indicator for the compact flash is blinking red | Install a compact flash card. |
| The LED indicator for the compact flash is solid red. | A flash error has occurred or the flash module is corrupted and needs to be reformatted or replaced. |

# Event Log Analysis

If asked to do so by technical support, access the event log. You will be instructed on this procedure by the technical support engineer.

# Contacting Customer Support

Imagine Communications Customer Support is available 24x7. If, after reviewing this chapter, you require assistance please contact Imagine Communications Customer Support via any of the following methods:

Table 6. Contacting Imagine Communications Customer Support

| Method | Contact Information |
|---|---|
| Internet | http://app.imaginecommunications.com/customercommunity |
| Inside North America | 1.866.4.Imagine // (1.866.446.2446) |
| Europe and Africa | +1.44.208.339.1900 |
| Middle East | +971.4.433.8260 |
| Asia | +852.2776.0628 |

CHAPTER 5

# Field-replaceable Units

This chapter provides information to assist you with replacement of Field-replaceable Units (FRUs) at the Selenio™Broadcast Network Processor (BNP). The chassis does not need to be removed from the rack to replace a FRU, but the system **must** be powered down before beginning any replacement process.

If replaced items need to be configured, see the *System Configuration* chapter of your *BNP User Guide*.

**Note:** *The BNP must be shut down/powered off prior to removal of the Network Processor Module, ASI Module, or GBP3 Module. See the System Shutdown section of your BNP Element Manager User Guide for more information.*

*It is not necessary to shut down nor power off the system when servicing hot-swappable modules.*

**Warning!** *Never replace any FRU while the chassis is still connected to the power source.*

See also "Power Source Safety Advisory" on page 44 for the localized version of the above warning.

**Warning!** *Do not replace any component (such as fuses) not specifically described here. For replacement beyond the FRU level, contact your technical support representative for instructions on returning the component. (See "Contacting Customer Support" on page 25.)*

See also "FRU Replacement Advisory" on page 44 for the localized version of the above warning.

**Warning!** *Whenever computer components are handled (especially during installation), the equipment can be damaged by the buildup of static electricity. Take precautions before touching any internal components or boards by wearing an ESD wrist strap or working on an antistatic mat. Always hold system modules by the edges and avoid touching any electronic circuitry on the cards.*

**Caution!**

See also "Handling Computer Components" on page 44 and "Electrostatic Advisory" on page 44 for the localized version of the above advisories.

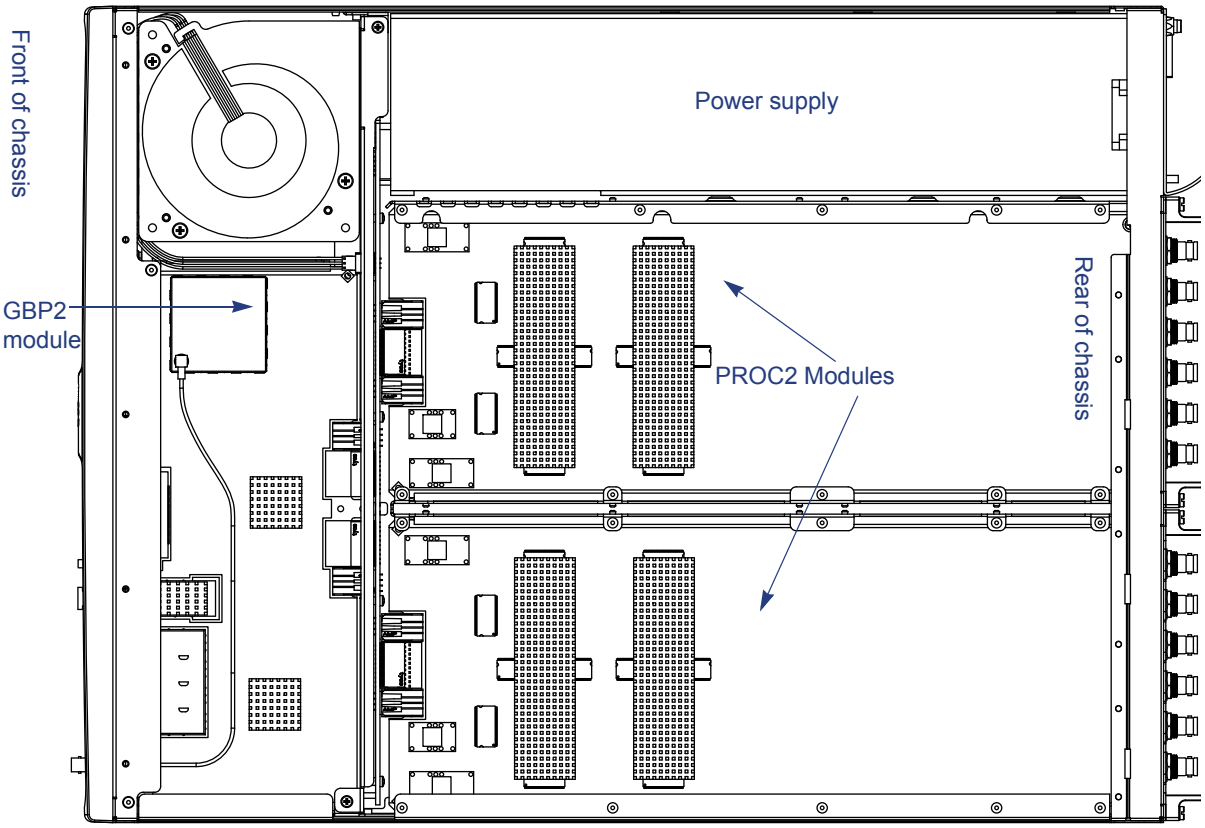
# In This Chapter:



# Overview

The replaceable units on the BNP 2xr are shown in Figure 13. The removal and replacement procedure is provided for each.

Figure 13. Top view of chassis, with FRUs visible




Always wear an ESD wristband or use an electrostatic mat when working with electronic components.

The chassis does not need to be removed from the rack to replace a FRU, but the system **must** be powered down before beginning any replacement process.

**Warning!** *Never replace any FRU while the chassis is still connected to the power source.*

If replaced items need to be configured, see the *System Configuration* chapter in your *BNP User Guide*.

**Warning!** *Do not replace any component (such as fuses) not specifically described here. For replacement beyond the FRU level, contact your technical support representative for instructions on returning the component. (See "Contacting Customer Support" on page 25.)*

# Replacing a Power Supply

The power supply is located on the rear of the BNP chassis. Any time that the chassis is not receiving adequate power, as indicated by the system LEDs and performance, verify that power is reaching the chassis.

If power is reaching the power supply but not getting to the system, you might need to replace the power supply.

## Removing a Power Supply

Use the following basic procedure for removing any BNP power supply.

1. Ensure that you have a replacement power supply ready to reinsert.
2. Ensure that there is no power to the unit:
   - AC power supply units:
     Shut down the unit by removing the power cable from the power supply connector.
   - DC power supply units:
     Toggle the circuit breaker to the OFF position.
     Disconnect the cables from the power connector.
3. Loosen the power supply unit by turning the safety screw *clockwise*.

**Note:** *Turning the screw counterclockwise tightens the screw. Use a slotted screwdriver to tighten or loosen the screw, then use your fingers to further turn the screw, if necessary.*

4. Firmly grasp the power supply by the handle, shown in Figure 14.

Figure 14. Power supply handle (AC power supply)

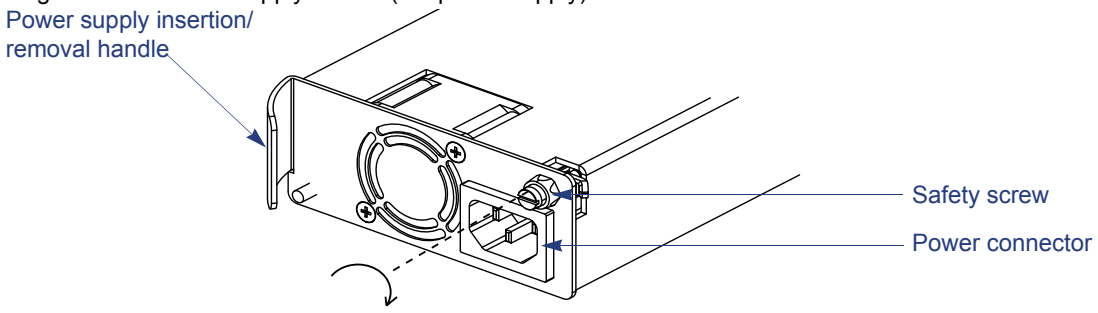
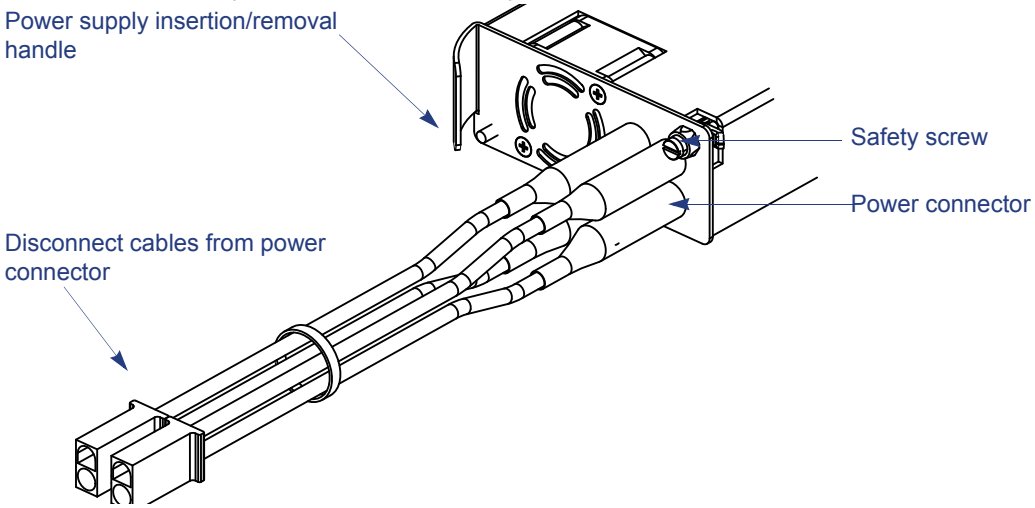
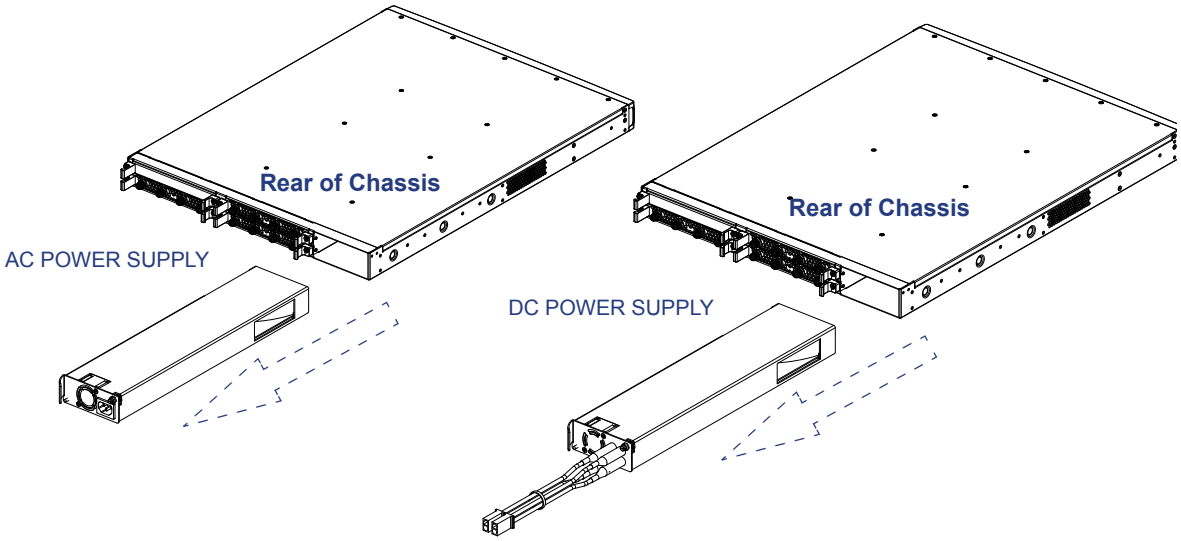


Figure 15. Power supply handle (DC power supply)




5. Pull gently but firmly, sliding the power supply out of the bay as shown in Figure 16.

Figure 16. Power supply removal

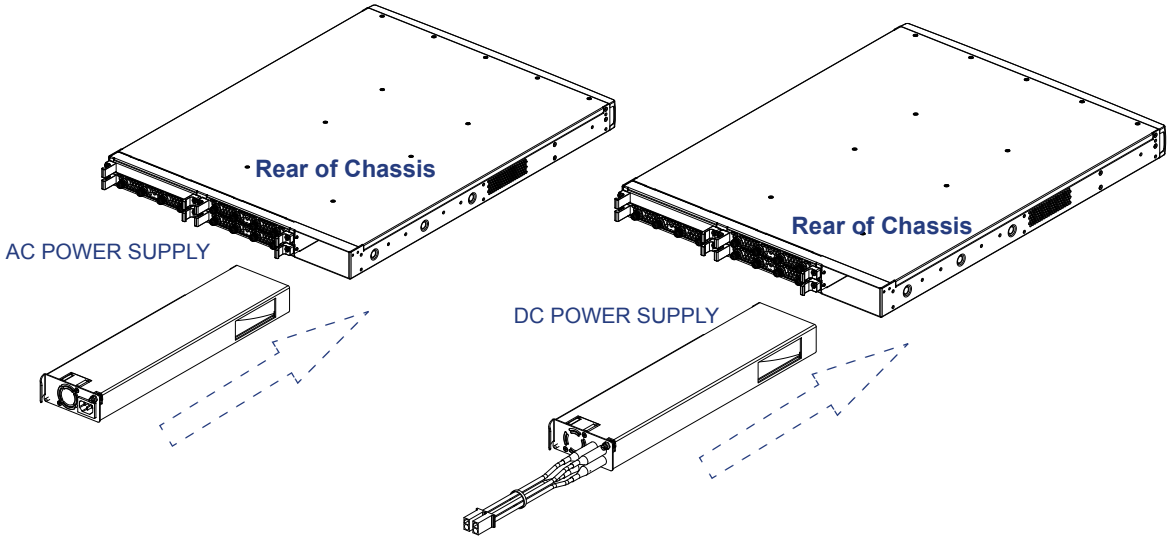



## Inserting a Power Supply

Once you have removed the failed power supply, install a replacement:

1. Remove the replacement power supply from its packing and carefully inspect it for damage. Do not install a visibly damaged power supply.
2. Slide the replacement power supply into the slot.

Figure 17. Power supply insertion




3. Turn the screw counterclockwise to tighten it, securing the power supply to the BNP chassis.
4. Connect power to the power supply:
   - For AC power supplies, refer to "Connecting AC Power to the BNP 2xr" on page 18.
   - For DC power supplies, refer to "Connecting DC Power to the BNP 2xr" on page 19.

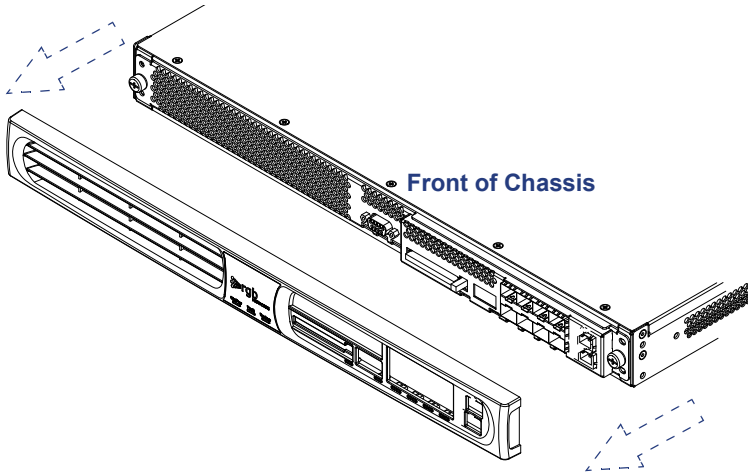
# Replacing a Gigabit Ethernet Processor (GBP2) Module

When you have determined that a GBP2 module must be replaced, follow this procedure to remove and replace the module. You do not need to remove the chassis from its rack mount to replace a module.

## Removing a GBP2 Module

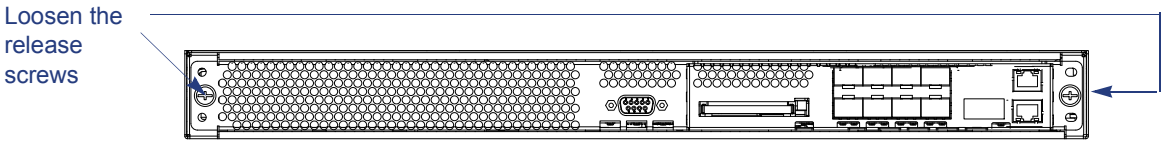
1. Ensure that you have a replacement module available, then shut down the unit by removing the power cable from the power supply connector.
2. Remove all cabling from the module.
3. Grasping it firmly with your fingers, gently remove the bezel on the front of the chassis, as shown in Figure 18.

Figure 18. Front bezel removal



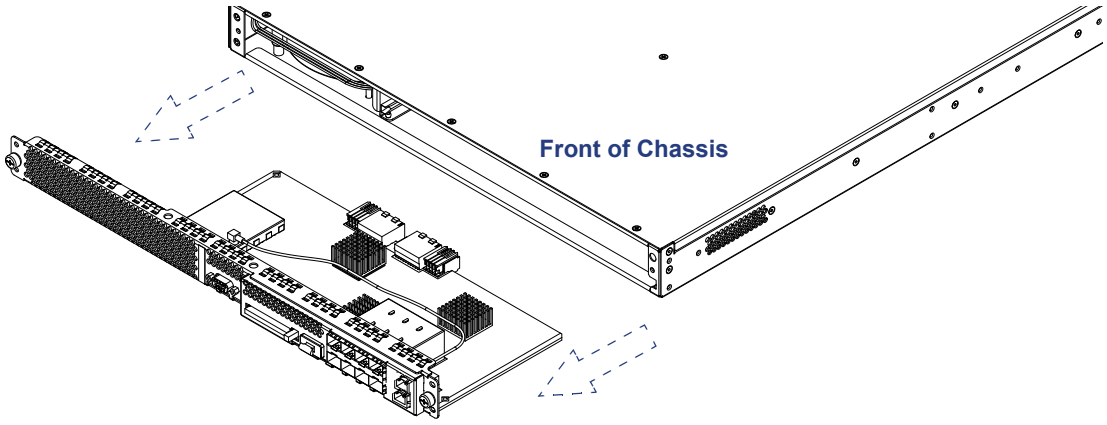

4. Using a Phillips screwdriver, loosen—but do not remove—the screws that secure both sides of the GBP2 module to the chassis. They act as handles to assist with the module's removal.

Figure 19. Loosen the GBP2 module release screws




5. Firmly grasping the screws, slide the GBP2 module out of the bay, as shown in Figure 20.

Figure 20. GBP2 module removal




## Replacing a GBP2 Module

After you have removed the failed GBP2 module, replace it with the new one:

1. Grasp the module firmly by the edges only and slide it into the chassis, using the plastic guide rails to ensure proper seating.
2. Push until the module is firmly seated.
3. Using a Phillips screwdriver, tighten the insertion/removal screws to secure the GBP2 module to the BNP chassis.
4. Replace the front bezel by snapping it in place.
5. Restore any cabling and power up the unit.

# Replacing a Processor Module (PROC2) or an ASI Module

**Note:** *The BNP supports both ASI and ASI2 modules.*

Removing and replacing either a PROC2 module or an ASI module uses the same procedure.

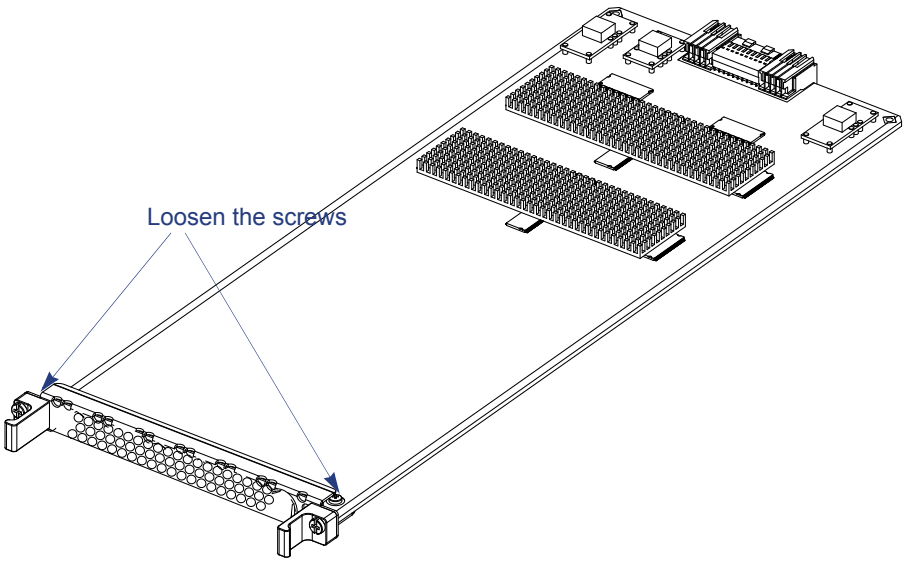
- If you are adding a new PROC2 or ASI module to an existing but underpopulated chassis, insert the card into the next designated slot.
- If you are replacing a failed unit, simply replace that unit regardless of the slot it occupies.

## Removing a PROC2 or ASI Module

1. Use the *Element Manager* to perform the following tasks:
   - Delete all input and output groomings associated with the ASI module to be removed.
   - Delete all output programs and output TSs associated with the ASI module to be removed.
2. Shut down the unit by removing the power cable from the power supply connector.

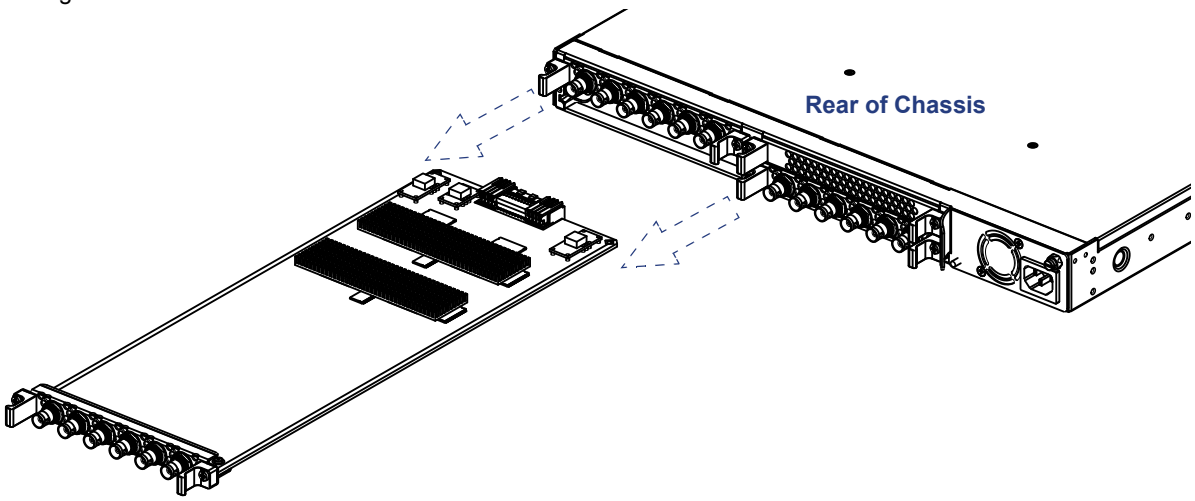
3. Using a Phillips screwdriver, loosen—but do not remove—the insertion/removal screws, shown in Figure 21.

Figure 21. Loosen the insertion/removal screws




4. Using the handles on either side of the module as a grip, gently but firmly slide the module out of the chassis, as shown in Figure 22.

Figure 22. Remove the module



## Replacing a PROC2 or ASI Module

After a PROC2 module has been removed, replace it as soon as possible, or install a blank slot cover to ensure proper air flow.

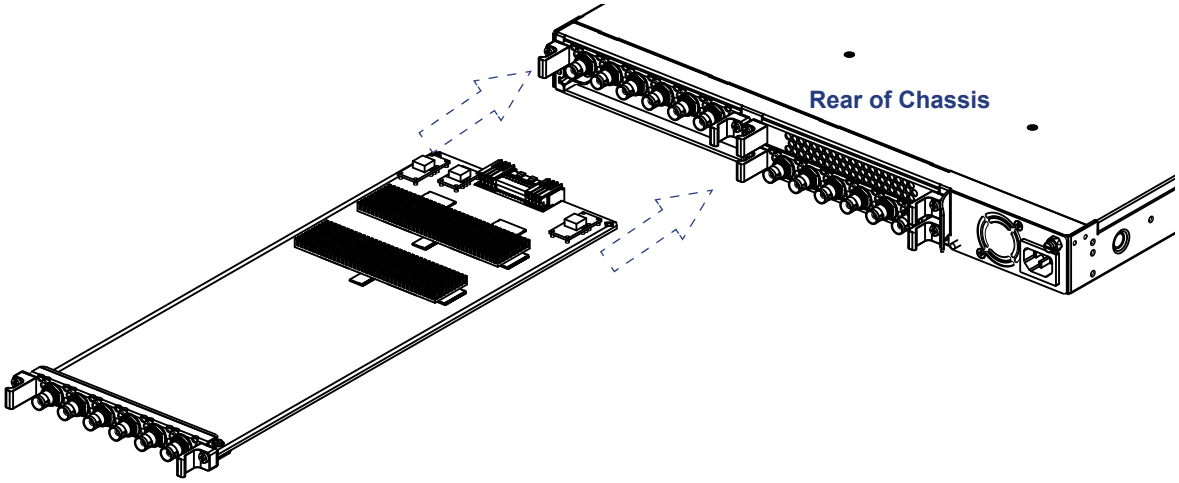
If you are leaving an empty slot, any empty slot should be fitted with a blank cover.

**Caution:** *ASI modules should always be replaced; no filler should be used.*

To install a PROC2 or ASI module:

1. Firmly hold the card by the edges or the handles and slide it into the chassis, using the plastic guide rails to ensure proper seating.
2. Press firmly until the module seats in the chassis.

Figure 23. Install the ASI or PROC2 module (ASI shown)




3. Using a Phillips screwdriver, tighten the insertion/removal screws to attach the card to the chassis.
4. Restore any cabling and power up the unit.
5. Reboot the BNP.

CHAPTER 6

# Specifications

This chapter provides the system specifications for the Selenio™Broadcast Network Processor (BNP).

## In This Chapter:



## Input Interfaces/Output Interfaces

Table 7. Input/Output Interfaces

| Interface | Type |
|---|---|
| Gigabit Ethernet | 8 SFP interfaces (copper or optical) configured |
| Fast Ethernet | 2 10/100BaseT control and management interface |
| ASI | Up to 18 ASI ports per chassis |
| | Up to 3 ASI modules with 6 ASI ports each |
| | Software configurable as input or output |
| | 213 Mbps data rate/port |

# MPEG Processing

Table 8. MPEG Processing

| MPEG | Supported Format |
|---|---|
| Transrating | SD and HD MPEG-2 video streams |
| | VBR and CBR support |
| | QoS - Ability to set priority for the level of transrating desired |
| Multiplexing and Table Processing | MPEG-2 and MPEG-4 H.264/AVC multiplexing and re-multiplexing |
| | MPTS, SPTS, multicast and unicast support |
| | CBR and VBR support |
| | PID filtering and remapping |
| | PCR restamping and de-jitter |
| | Generation and pass-through of PSIP tables |
| | PAT and PMT generation |
| DPI | Seamless SD and HD splicing |
| | SCTE 30 (DVS-380, DVS-638) and SCTE 35 compliant |
| | SCTE 30 to SCTE 35 conversion |
| | Text and graphical crawl messages and graphical logo overlays |
| | SCTE 18 (Emergency Alert Message for cable) |
| | SCTE 21 to SCTE 20 conversion |
| Jitter Tolerance | +/- 100 ms |

# Video Formats

Table 9. Video Formats

| Video | Supported Format |
|---|---|
| MPEG Profile and Level | MPEG-2 MP@ML (SD) and MP@HL (HD)<br>MPEG-4 H.264/AVC (all profiles supported) |
| All SD and HD resolutions | SD – 720 x 576, 720 x 480, 704 x 480, 544 x 480, 528 x 480, 352 x 480<br>HD – 1080i x 1920, 1080i x 1440, 1080i x 1280, 720p x 1280,<br>480p x 720, 480p x 704, 480p x 640 |
| Frame Rates | 24, 25, 29.97, 30, 50, 59.94, 60 |

# Audio Formats

Table 10. Audio Formats

| Audio | Supported Format |
|---|---|
| Audio Format | Dolby AC-3, MPEG-1 Layer 2 (Musicam) and MPEG-2, MPEG-2 AAC, MPEG-4 HE-AAC |

# Elementary Stream Types & Conversions

Table 11. Elementary Stream Types & Conversions

| Output Transport Stream (TS) Type | Video[a] | Audio[b] | Data |
|---|---|---|---|
| MPEG2 | MPEG2 video (0x2)<br>*Converts to 0x2 if input video has type 0x80.*<br>H.264 (0x1B) | MPEG1 audio (0x3)<br>MPEG2 audio (0x4)<br>ATSC AC-audio (0x81)<br>DVB AC-3 audio (0x6)<br>AAC (0x0f)<br>HE-AAC (0x11) | 0x5 ~ 0xff |
| ATSC | MPEG2 video (0x2)<br>SCTE video (0x80)<br>H.264 (0x1B) | MPEG1 audio (0x3)<br>MPEG2 audio (0x4)<br>ATSC AC-audio (0x81)<br>*Converts to 0x81 if input AC-3 audio has type 0x6.*<br>AAC (0x0f)<br>HE-AAC (0x11) | 0x5 ~ 0xff |
| SCTE | SCTE video (0x80)<br>*Converts to 0x80 if input video has type 0x2.*<br>H.264 (0x1B) | MPEG1 audio (0x3)<br>MPEG2 audio (0x4)<br>ATSC AC-audio (0x81)<br>*Converts to 0x81 if input AC-3 audio has type 0x6.*<br>AAC (0x0f)<br>HE-AAC (0x11) | 0x5 ~ 0xff |
| DVB | MPEG2 video (0x2)<br>*Converts to 0x2 if input video has type 0x80.*<br>H.264 (0x1B) | MPEG1 audio (0x3)<br>MPEG2 audio (0x4)<br>DVB AC-3 audio (0x6)<br>*Converts to 0x6 if input AC-3 audio has type 0x81.*<br>AAC (0x0f)<br>HE-AAC (0x11) | 0x5 ~ 0xff |

a. For H.264 video, the stream type will be passed through regardless of input or output TS type.
b. For AAC and HE-AAC audio, the stream type will be passed through regardless of input or output TS type.

# Digital Broadcast

Table 12. Digital Broadcast

| DVB | Supported Format |
|---|---|
| Digital Broadcast | ATSC PSIP, (A/52B, A/53E, A/58, A/65)<br>DVB (DVB-SI, DVB-SUB, DVB-TXT, CSA and Simulcrypt) |

# Regulatory Compliance

Table 13. Regulatory Compliance

| Regulatory Type | Compliance |
|---|---|
| Safety | UL 60950-1:2007; CAN/CSA-C22.2 No. 60950-1-07; TUV/GS, cTUVus: IEC 60950-1:2005, EN 60950-1:2006+ A11 |
| Electromagnetics | FCC - Title 47 CFR Part 15 Subpart B; Canada ICES-003, Issue 2, April 1995 |
| Hazardous Substances | RoHS-compliant (Restricted use of Hazardous Substances) |

# Electrical/Mechanical

Table 14. Electrical and Mechanical

| Specification | Limits |
|---|---|
| Maximum Input Power Limits | AC: 100-240V; 8.8A; 50/60Hz; Class 1<br>DC: 36-72V;15.7A; Class 1 |
| Line Frequency | 50-60 Hz |
| Power consumption | 400 W maximum, fully loaded chassis at 110 V AC |
| Dimensions | 2RU (3.5″ H x 19″ W x 23.25″ L) (88 H x 444 W x 590.4 L mm) |
| Weight | 38.7 lbs. (17.6 kg) |
| Cooling | Front to back; BTU: 2900 BTU/hour maximum |

# Environmental

Table 15. Environmental Ranges

| Condition | Value Range |
|---|---|
| Storage Temperature | -40° C to 70° C |
| Ambient Operating Temperature | 0° C to 40° C |
| Ambient Humidity | 5% to 95% (non-condensing) |
| Noise Emissions (In accordance with ISO 9296) | LWAd (iB=10dB) 7.2 B 6.9 B<br>LpAm (TBD) 58.1 dBA 55.3 dBA |

APPENDIX A

# Localized Cautions and Warnings

The warning and caution statements used in this manual are translated—in this appendix—into equivalent French and German annotations.

### Handling Computer Components

| Statement type | Statement |
|---|---|
| Warning | Whenever computer components are handled (especially during installation), the equipment can be damaged by the buildup of static electricity. Take precautions before touching any internal components or boards by wearing an ESD wrist strap or working on an antistatic mat. Always hold system modules by the edges and avoid touching any electronic circuitry on the cards. |
| Avertissement | Lors de la manipulation de composants électroniques ou informatiques (en particulier pendant l'installation) l'équipement peut être endommagé par l'accumulation d'électricité statique.<br>Prenez des précautions avant de toucher tout circuit ou toute carte interne, soit en portant un bracelet antistatique, soit en travaillant sur un tapis de sol antistatique.<br>Tenez toujours les modules du système par leurs bords et évitez de toucher tout circuit électronique sur les cartes. |
| Warnung | Bei der Handhabung von Computerbauteilen (insbesondere beim Einbau) können diese durch elektrostatische Aufladung beschädigt werden. Treffen Sie Vorsichtsmaßnahmen, indem Sie ein Erdungsarmband anlegen oder auf einer antistatischen Matte arbeiten, bevor Sie Bauteile oder Leiterplatten im Inneren des Geräts berühren. Halten Sie Systemmodule immer an den Kanten, und berühren Sie die elektronischen Bauteile auf den Leiterplatten nicht. |

### Operations Environment

| Statement type | Statement |
|---|---|
| Caution | Install this equipment only in an operations site that is humidity- and temperature-controlled, to ensure compliance with requirements for ambient operational conditions specified in Table 3 and Table 15, "Environmental Ranges," on page 39. |
| Attention | Afin de garantir le respect des conditions environnementales de fonctionnement, ce matériel doit être installé exclusivement dans un lieu où l'humidité et la température sont contrôlées.(voir les spécifications dans le Tableau 3 et le Tableau 92 à la page 266). |
| Vorsicht | Installieren Sie die Geräte nur an einem Betriebsort, der feuchtigkeits- und temperaturgeregelt ist, um die Einhaltung erforderlicher Bedingungen für die Umgebung und den Betrieb zu gewährleisten.(siehe Spezifikationen in Tabelle 3 und Tabelle 92 auf Seite 266). |

### Electrostatic Advisory

| Statement type | Statement |
|---|---|
| Caution |  |
| Attention | EQUIPEMENT SENSIBLE A L'ELECTRICITE STATIQUE<br>PRENEZ DES PRECAUTIONS |
| Vorsicht | Elektrostatisch empfindliches Gerät<br>Vorsichtsmaßnahmen beachten |

### Power Socket Proximity

| Statement type | Statement |
|---|---|
| Caution | Please install the BNP 2xr so as to be easily accessible and as close to a power socket outlet as possible. |
| Attention | Installez le BNP dans un endroit accessible et aussi près que possible d'une prise de courant. |
| Vorsicht | Der BNP muss möglichst leicht zugänglich und in der Nähe einer Netzsteckdose aufgestellt werden. |

### AC Power Strip Compliance Advisory

| Statement type | Statement |
|---|---|
| Caution | If the BNP is to be connected to a rack-mounted, properly grounded AC power strip, ensure that the strip is compliant with 12AWG UL Certification. |
| Attention | Si le système BNP doit être branché sur un bloc d'alimentation secteur avec mise à la terre monté sur rack, s'assurer que le bloc d'alimentation possède la certification 12AWG UL. |
| Vorsicht | Soll der BNP mit einer ordnungsgemäß geerdeten rackmontierten Wechselstrom-Steckdosenleiste verbunden werden, muss sichergestellt werden, dass die Steckdosenleiste den Anforderungen der 12AWG UL-Zertifizierung entspricht. |

### Grounding Equipment

| Statement type | Statement |
|---|---|
| Warning | The BNP 2xr must be properly grounded to ensure safe operation. Before you connect power or turn on the BNP 2xr, ground the chassis. This section provides one method of grounding. There may be others: check your network configuration for details. |
| Avertissement | Le BNP doit être correctement relié à la masse pour assurer un fonctionnement sécurisé.<br>Avant de connecter le courant ou de mettre en marche le BNP, reliez le châssis à la masse.<br>Cette section indique une méthode de mise à la masse. Il peut y en avoir d'autres : vérifiez la configuration de votre réseau pour plus de détails. |
| Warnung | Für einen sicheren Betrieb muss der BNP vorschriftsmäßig geerdet sein. Erden Sie das Chassis des BNP, bevor Sie das Gerät an die Stromversorgung anschließen oder einschalten. Dieser Abschnitt erläutert eine Erdungsmethode. Eventuell gibt es auch andere Möglichkeiten. Prüfen Sie ihre Netzwerkkonfiguration, um diesbezügliche Einzelheiten festzustellen. |

### Qualified Personnel

| Statement type | Statement |
|---|---|
| Caution | Only trained personnel should install or replace this equipment. |
| Attention | Seul un personnel qualifié devrait installer ou remplacer cet équipement. |
| Vorsicht | Dieses Gerät darf nur von qualifiziertem Personal aufgestellt und ausgetauscht werden. |

### Equipment On and Off

| Statement type | Statement |
|---|---|
| Caution | The BNP does not have an of/off power switch. Connection to the power source powers up the BNP immediately. |
| Attention | Le cordon d'alimentation constitue le mécanisme de déconnexion du BNP. Il n'y a pas d'interrupteur : une fois connecté à la prise de courant, le système est immédiatement mis sous tension. |
| Vorsicht | Der BNP wird mit dem Netzkabel ein- und ausgeschaltet. Es gibt keinen Netzschalter. Beim Einstecken des Netzkabels in die Steckdose wird das Gerät unmittelbar eingeschaltet. |

### Safety Screw Lock Advisory

| Statement type | Statement |
|---|---|
| Caution | Make sure that the safety screw is in the locked position (turned counterclockwise) after the power supply is installed, but before connecting power (Figure 10). Note that the locked position may be different than that of similar units. This ensures that the power supply cannot be accidentally disconnected, causing possible damage. |
| Attention | Assurez-vous que la vis de sécurité est en position bloquée (tournée dans le sens contraire des aiguilles d'une montre) après avoir installé l'alimentation, mais avant d'avoir connecté le courant (figure 15).<br>Notez que la position bloquée peut être différente de celle d'unités similaires.<br>Ceci constitue la preuve que l'alimentation ne peut pas être déconnectée par accident, et ainsi causer de possible dommages. |
| Vorsicht | Vergewissern Sie sich, dass sich die Sicherheitsschraube in der verriegelten Position befindet (gegen den Uhrzeigersinn), nachdem das Netzteil eingebaut wurde, aber bevor das Gerät an die Stromversorgung angeschlossen wird (Abbildung 10). Beachten Sie, dass die verriegelte Position anders als bei ähnlichen Einheiten sein kann. So wird sichergestellt, dass das Netzteil nicht versehentlich getrennt wird, was zu Beschädigungen führen kann. |

### +48V DC Power Supply Advisory

| Statement type | Statement |
|---|---|
| Caution | These are +48V DC power supplies, not -48V. Please connect accordingly. |
| Attention | Il s'agit d'une alimentation +48V, et non -48V. Connectez en fonction. |
| Vorsicht | Die Netzteile weisen Anschlusswerte von +48 V DC (Gleichstrom) auf, nicht -48 V. Bitte schließen Sie diese entsprechend an. |

### Compact Flash Advisory

| Statement type | Statement |
|---|---|
| Caution | Your license is attached to the compact flash (CF); do not discard it. Even if a CF card fails, keep the device and contact Imagine Communications technical support for instructions on repair or obtaining a working replacement. |
| Attention | Votre licence se trouve sur la carte mémoire Compact Flash. Ne l'égarez pas.<br>Au cas où la carte mémoire Compact Flash serait déficiente, conservez-la et contactez le support technique Imagine Communications pour obtenir des instructions concernant la réparation ou le remplacement. |
| Vorsicht | Ihre Lizenz ist auf der Compact Flash-Karte enthalten. Entsorgen Sie diese nicht. Selbst wenn eine CF-Karte ausfällt, bewahren Sie diese auf, und wenden Sie sich an den technischen Kundendienst von Imagine Communications, um Anweisungen für die Reparatur oder den Austausch durch eine funktionsfähige Karte zu erhalten. |

### Power Source Safety Advisory

| Statement type | Statement |
|---|---|
| Warning | Never replace any FRU while the chassis is still connected to the power source. |
| Avertissement | Ne remplacez jamais une unité remplaçable sur site si  le châssis est toujours connecté à l'alimentation. |
| Warnung | Tauschen Sie kein vor Ort austauschbares Teil aus, während das Chassis mit der Stromversorgung verbunden ist. |

### FRU Replacement Advisory

| Statement type | Statement |
|---|---|
| Warning | Do not replace any component (such as fuses) not specifically described here. For replacement beyond the FRU level, contact your technical support representative for instructions on returning the component. (See "Contacting Customer Support" on page 25.) |
| Avertissement | Ne remplacez aucun composant (tel que les fusibles) qui ne soit pas spécifiquement décrit ici.<br>Pour des remplacements au-delà des unités remplaçables sur site, contactez le représentant du support technique pour connaître les instructions à suivre si vous souhaitez renvoyer le composant. (Voir "Contacting Customer Support" on page 25). |
| Warnung | Tauschen Sie keine Komponenten (wie Sicherungen) aus, die hier nicht ausdrücklich genannt sind. Beim Austausch von Komponenten, die keine vor Ort austauschbaren Teile sind, wenden Sie sich an den für Sie zuständigen Mitarbeiter des technischen Kundendiensts, um Anweisungen zum Zurücksenden der Komponente zu erhalten. (Siehe "Contacting Customer Support" on page 25.) |

APPENDIX B

# Conformity and Safety

This appendix contains compliance and regulatory information pertinent to the Selenio™Broadcast Network Processor (BNP) *2xr* in the following topics:



- Subpart B of Part 15 of FCC Rules for Class A digital devices
- Industry Canada Interference Causing Equipment Standard ICES-003, "Information Technology Equipment (ITE) – Limits and methods of measurement", Issue 5, dated August 2012 (Class A)
- VCCI Regulations For Voluntary Control Measures of radio interference generated by Information Technology Equipment, dated April 2013 (Class A)
- EN 55022:2010, "Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement" (Class A)
- CISPR 22:2008 "Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement" (Class A)
- AS/NZS CISPR 22:2009: "Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement" (Class A)
- EN 55024:2010 "Information technology equipment – Immunity characteristics, Limits and method of measurement."
- CISPR 24:2010 "Information technology equipment – Immunity characteristics, Limits and method of measurement."
- EN 61000-3-2:2006 +A1:2009 +A2:2009 – AC Current Harmonics
- EN 61000-3-3:2008 – AC Voltage Fluctuations

This product follows the provisions of the EMC Directive 2004 / 108 / EC and carries the CE marking accordingly.

# Declarations of Conformity

Declarations of conformity pertinent to the *BNP 2xr* are provided in the following sections:



## United States

### Declaration of Conformity

Responsible Party Name: Imagine Communications, Inc.
Telephone: (877) 742-6389
Declares that product: *Selenio* ™ Broadcast Network Processor (*BNP)*
Complies with Part 15 of the FCC Rules.

This device complies with Subpart B of Part 15 of FCC Rules for Class A digital devices. Operations are subject to the following two conditions: (1) This device must not be allowed to cause harmful interference; (2) This device must accept any interference received, including interference that may cause undesired operation.

Modifying the equipment without authorization from Imagine Communications may result in the equipment no longer complying with FCC requirements for Subpart B of Part 15 of FCC Rules for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

### For Class A Equipment

**Note:** *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 the user will be required to correct the interference at his own expense.*

## Canada

This Class A digital apparatus complies with Industry Canada Interference Causing Equipment Standard ICES-003, "Information Technology Equipment (ITE)—Limits and methods of measurement", Issue 5, dated August 2012 (Class A).

Avis de conformité à la réglementation d'Industrie Canada.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## Europe

**Warning!** *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.*

### EN 55024

Imagine Communications Inc., declares that the BNP complies with EN 55024:2010 "Information Technology Equipment—Immunity Characteristics, Limits and method of measurements. EN 55024 references various international and European standards and for clarity, the standards utilized are provided in Table 16.

Table 16. EN55024 Referenced Standards

| Referenced Standard | Description | Standard Used |
|---|---|---|
| IEC 60050-161:1990 | International Electrotechnical Vocabulary (IEV)—Chapter 161: Electromagnetic compatibility. | IEC 60050-161:1990 |
| IEC 6100-4-2:2008<br>EN 61000-4-2:2009 | Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques—"Section 2: Electrostatic discharge immunity test". | IEC 6100-4-2:2008<br>EN 6100-4-2:2009 |
| IEC 6100-4-3:2006 +A1:2007 +A2:2010<br>EN 61000-4-3:2006 +A1:2008 +A2:2010 | Section 3: Radiated radio-frequency electromagnetic field immunity test. | IEC 61000-4-2:2006 +A1:2007 +A2:2010<br>EN 61000-4-3:2006 +A1:2008 +A2:2010 |
| IEC 6100-4-4:2004<br>EN 61000-4-4:2004 | Section 4: Electrical fast transient/burst immunity test | IEC 61000-4-4:2012<br>EN 61000-4-4:2012 |
| IEC 61000-4-5:2005<br>EN 61000-4-5:2006 | Section 5: Surge immunity test | IEC 61000-4-5:2005<br>EN 61000-4-5:2006 |
| IEC 61000-4-6: 2008<br>EN 61000-4-6:2009 | Section 6: Immunity to conducted disturbances, induced by radio-frequency fields. | IEC 61000-4-6:2008<br>EN 61000-4-6:2009 |
| IEC 61000-4-8:2009<br>EN 61000-4-8:2010 | Section 8: Power frequency magnetic field immunity text | IEC 61000-4-8:2009<br>EN 61000-4-8:2010 |
| IEC 61000-4-11:2004<br>EN 61000-4-11:2004 | Section 11: Voltage dips, short interruptions and voltage variations immunity tests. | IEC 61000-4-11:2004<br>EN 61000-4011:2004 |

Table 16. EN55024 Referenced Standards

| Referenced Standard | Description | Standard Used |
|---|---|---|
| CISPR 16-1-2:2003<br>+A1:2004<br>+A2:2006<br>EN 55016-1-2:2004<br>+A1:2005<br>+A2:2006 | Specification for radio disturbance and immunity measuring apparatus and methods—Part 1-2 Radio disturbance and immunity measuring apparatus—ancillary equipment - Conducted disturbances. | CISPR 16-1-2:2003<br>+A1:2004<br>+A2:2006<br>EN55016-1-2:2004<br>+A1:2005<br>+A2:2006 |
| CISPR 20:2006<br>EN 55020-2007 | Sound and television broadcast receivers and associated equipment—Immunity characteristics—Limits and methods of measurement | CISPR 20-2006<br>EN 55020:2007 |
| CISPR 22:2008 (mod)<br>EN 55022-2010 | Information technology equipment—Radio disturbance characteristics—Limits and methods of measurement. | CISPR 22-2008 (mod)<br>EN 55022:2010 |

## EN 55022

EN 55022:2010 references various internal and European standards and for clarity, the standards utilized are provided in Table 17.

Table 17. EN550-22 Referenced Standards

| Referenced Standard | Description | Standard Used |
|---|---|---|
| CISPR 16-1-1:2006<br>+A1:2006<br>EN 55016-1-1:2007<br>+A1:2007 | Specification for radio disturbance and immunity measuring apparatus and methods—Part 1-1:Radio disturbance and immunity measuring apparatus-Measuring apparatus | CISPR 16-1 2006<br>+A1:2006<br>+A2:2007 |
| CISPR 16-1-2:2003<br>+A1:2004<br>+A2:2006 | Specification for radio disturbance and immunity measuring apparatus and methods—Part 1-2: Radio disturbance and immunity measuring apparatus- Ancillary equipment - Conducted disturbance | CISPR 16-1:2003<br>+A1:2004<br>+A2:2006 |
| CISPR 16-1-4:2007<br>EN 55016-1-4: 2007 | Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Radiated disturbances | CISPR 16-1-4:2007 |
| CISPR 16-2-3:2003<br>+A1:2005<br>EN 55016-2-3:2004<br>+A1:2005 | Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements | CISPR-2-3:2006 |
| CISPR 16-4-2:2003<br>EN 55016-4-2 2004 | Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling - Uncertainty in EMC measurements | CISPR 16-4-2:2003 |

## Japan

この装置は、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。

VCCI-A

**Warning!** *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 adquate measures.*

VCCI Regulations for Voluntary Control Measures of radio interference generated by Information Technology Equipment, dated April 2013 (Class A).

VCCI regulations reference various national and internal standards and for clarity, the standards utilizaed are provided in Table 18.

Table 18. VCCI Referenced Standards

| Referenced Standard | Description |
|---|---|
| CISPR 22: Ed 6:2008 | Information Technology Equipment – Radio disturbance characteristics - Limits and methods of measurement |
| CISPR 16-1-1 Ed2.1:2006 | Specification for radio disturbance and immunity measuring apparatus and method – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus. |
| CISPR 16-1-2 Ed1.2:2006 | Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Measuring apparatus – Ancillary equipment – Conducted disturbances |
| CISPR 16-1-4 Ed2.0:2007 | Specification for radio disturbance and immunity measuring apparatus and methods –Part 1-4: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Radio disturbances |
| CISPR 16-2-3 Ed2.0:2006 | Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbance and immunity – Radiated disturbance measurements |
| CISPR 16-4-2 Ed1.0:2003 | Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modeling – Uncertainty in EMC measurements |
| ANSI C63.4-2003 and ANSI C63-2009 | American National Standard for Method of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range 9kHz to 40 GHz. |

## Australia/New Zealand

**Warning!** *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 adquate measures.*

AS/NZS CISPR 22:2009: "Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement" (Class A)

# Safety

The *Selenio ™ BNP 2xr* has been certified and is in compliance to the following requirements:

- IEC 60950-1:2005 (2nd Edition); Am 1:2009
- EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011

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